

# Integrated Program Review and Capital Investment Review

June 2016

## Capital Portfolio Management

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June 16, 2016



# Purpose

More in depth discussion of the following topics:

- Long-term capital portfolio
  - How levels were established
  - The numbers in more detail
- Capital prioritization
  - Overview
  - How it is changing and expanding
- Asset Management: Key Strategic Initiative
  - Why we need an Asset Management KSI
  - Theme is review and renew
  - Key areas of focus

## How were CIR Capital Levels Established?

- Each asset category developed an asset strategy and plans based on total economic costs that addresses needed refurbishment, replacement and expansion to manage life cycle costs, safety and environmental risks.
- Highest priority is to sustain the assets at greatest risk to preserve and enhance the value they create for the region.
- Several capital related scenarios were analyzed through the long-term rates analysis to understand how various levels of capital spend and associated impacts on expense and revenue drive long-term power and transmission rates.
- The results from these scenarios informed initial capital funding levels for the CIR process.

# Capital Spend Summary

## BPA 2016 CIR: Summary of Capital by Asset Category (\$ in Millions)

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total 2017-2030
1 Transmission Direct	372.4	317.0	310.5	455.5	472.9	482.4	440.9	420.9	416.6	431.9	429.5	437.7	447.3	468.6	<b>5,904.3</b>
2 Federal Hydro	235.6	258.0	281.1	306.2	331.1	337.7	344.4	351.2	358.2	365.3	372.6	380.0	387.6	395.3	<b>4,704.3</b>
3 Facilities	21.9	17.9	35.0	25.0	25.0	25.0	25.0	26.3	26.9	27.4	27.9	28.5	29.0	29.5	<b>370.3</b>
4 Security	8.0	6.0	8.0	7.0	7.0	7.0	7.0	5.4	5.5	5.6	5.7	5.9	6.0	6.1	<b>90.2</b>
5 Fleet	6.2	6.7	7.2	7.5	8.0	8.2	8.5	9.2	9.5	9.5	9.8	9.8	10.0	10.0	<b>120.1</b>
6 IT	25.0	25.0	25.0	2.5	12.0	4.7	6.5	14.8	15.1	15.4	15.6	16.0	16.3	16.6	<b>210.4</b>
7 Fish & Wildlife	44.6	50.5	44.0	38.0	33.6	29.0	29.3	36.0	36.7	37.5	38.2	38.9	39.7	40.4	<b>536.5</b>
8 Environment	5.5	5.5	5.6	5.6	5.7	5.8	5.8	5.6	5.6	5.6	5.6	5.6	5.6	5.6	<b>78.8</b>
9 Total Direct	<b>719.2</b>	<b>686.7</b>	<b>716.5</b>	<b>847.4</b>	<b>895.3</b>	<b>899.8</b>	<b>867.4</b>	<b>869.5</b>	<b>874.1</b>	<b>898.2</b>	<b>905.0</b>	<b>922.4</b>	<b>941.4</b>	<b>972.1</b>	<b>12,014.9</b>
10 PFIA	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	<b>210.0</b>
11 Transmission Indirects	48.7	42.7	41.9	40.3	31.1	31.4	31.8	32.5	33.1	33.8	34.4	35.1	35.8	36.4	<b>509.2</b>
12 Corporate Overheads	48.7	42.7	41.9	40.3	31.1	31.4	31.8	32.5	33.1	33.8	34.4	35.1	35.8	36.4	<b>509.2</b>
13 AFUDC	49.5	31.6	30.2	30.4	31.3	31.4	30.4	30.0	30.2	30.3	30.4	30.4	30.4	30.3	<b>446.8</b>
14 Total Capital CIR-2016 Going-In	<b>881.1</b>	<b>818.7</b>	<b>845.5</b>	<b>973.5</b>	<b>1,003.9</b>	<b>1,009.1</b>	<b>976.5</b>	<b>979.4</b>	<b>985.6</b>	<b>1,011.0</b>	<b>1,019.2</b>	<b>1,038.0</b>	<b>1,058.3</b>	<b>1,090.2</b>	<b>13,690.2</b>

Table above is in nominal dollars

### Exclusions:

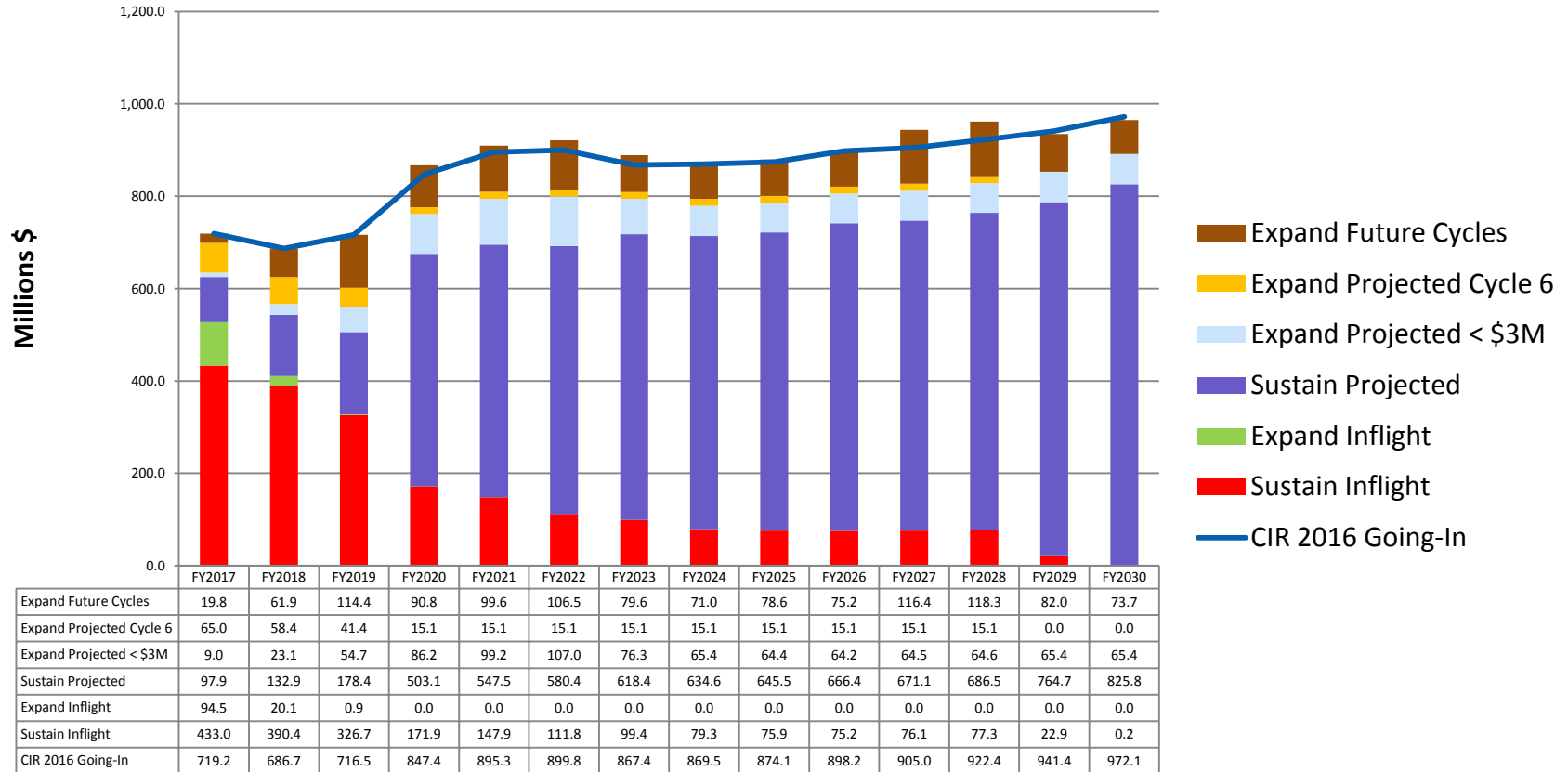
- Columbia Generating Station
- Columbia River Fish Mitigation Program
- South of Allston transmission reinforcement build option
- Boardman to Hemingway transmission build option

# Capital Spend by Business Unit

Summary of Proposed Capital Investment Review (CIR) Program Spending Levels FY 17 Through FY 2030														
(\$ Millions)														
Proposed CIR														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Transmission Business Unit</b>														
1	MAIN GRID	44	3	39	92	100	123	65	42	42	42	42	42	42
2	AREA & CUSTOMER SERVICE	102	76	46	42	58	48	49	48	48	48	48	48	48
3	SYSTEM REPLACEMENTS	348	313	338	412	385	383	404	407	407	425	424	434	446
4	UPGRADES & ADDITIONS	52	68	45	52	53	52	47	49	48	47	48	48	48
5	ENVIRONMENT CAPITAL	7	7	7	7	6	6	7	6	6	6	6	6	6
6	PFIA	15	15	15	15	15	15	15	15	15	15	15	15	15
7	<b>TOTAL Transmission Business Unit</b>	<b>567</b>	<b>481</b>	<b>491</b>	<b>619</b>	<b>617</b>	<b>627</b>	<b>586</b>	<b>567</b>	<b>565</b>	<b>583</b>	<b>583</b>	<b>593</b>	<b>605</b>
<b>Power Business Unit</b>														
8	BUREAU OF RECLAMATION	70	96	139	184	159	165	161	142	140	130	119	92	71
9	CORPS OF ENGINEERS	176	169	149	130	180	181	191	217	225	242	260	295	323
10	POWER INFORMATION TECHNOLOGY	5	5	5	-	-	-	-	-	-	-	-	-	-
11	FISH & WILDLIFE	45	51	44	38	34	29	29	36	37	37	38	39	40
12	<b>TOTAL Power Business Unit</b>	<b>296</b>	<b>320</b>	<b>337</b>	<b>351</b>	<b>372</b>	<b>375</b>	<b>382</b>	<b>395</b>	<b>402</b>	<b>410</b>	<b>418</b>	<b>426</b>	<b>441</b>
<b>Corporate Business Unit</b>														
13	CORPORATE BUSINESS UNIT	18	17	18	3	14	7	9	18	18	19	19	19	20
14	<b>TOTAL Corporate Business Unit</b>	<b>18</b>	<b>17</b>	<b>18</b>	<b>3</b>	<b>14</b>	<b>7</b>	<b>9</b>	<b>18</b>	<b>18</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>20</b>
15	<b>TOTAL BPA Capital Expenditures</b>	<b>881</b>	<b>819</b>	<b>846</b>	<b>973</b>	<b>1,004</b>	<b>1,009</b>	<b>977</b>	<b>979</b>	<b>986</b>	<b>1,011</b>	<b>1,019</b>	<b>1,038</b>	<b>1,058</b>

Table above is in nominal dollars, includes indirects, corporate overheads and AFUDC.

# Direct Capital Spend - Expand & Sustain



**Notes:**

- 1/ Includes Transmission direct, Federal Hydro, Facilities, IT, Fleet, Security & Environment capital forecasts
- 2/ Excludes Transmission Indirects, Corporate Overheads and AFUDC
- 3/ Excludes CGS and Columbia River Fish Mitigation Program capital

# Overview of Capital Prioritization Process

- All capital investments are prioritized and require a business case
  - Sustain, through asset strategies
  - Expansion, capital investment prioritization process
- BPA multi-year capital portfolio is reviewed every 6 months and re-balanced.
- Capital budget by asset category is managed within the levels set through BP-18 and trade-offs are made between investments to stay within those levels.
- Expansion investment costs and benefits are assessed and evaluated based on net economic benefit ratio.
- Costs and benefits are assessed using ranges to capture the uncertainty and risk of the investment and inform decision-making.
- Refer to appendix for more detail on the methodology.

## Why is the Prioritization Process Changing?

In the 2014 CIR, we introduced the concept of a capital “affordability cap”:

- The capital spending cap was set at \$940 million per year over a 10-year period.
- That cap considered rate impacts, but it was primarily concerned with access-to-capital factors.

Over the last two years, our concept of “affordability” has evolved:

- Affordability is now focused on long-term rates and future competitiveness.
- Instead of a single affordability cap, we have proposed spending levels that we believe produce reasonable rate outcomes.

These changes require adjustments to our prioritization process



## Why is the Prioritization Process Changing?

We are moving from a single capital cap to managing within agreed Transmission and Power spending levels:

- The prioritization process will be split to produce a separate prioritization for Transmission and another for Power.
- Rather than a prioritization across the agency, we will focus on selecting the highest value investments within the capital levels available to each of the two rate categories.
- Sustain investments will continue to be prioritized through the asset strategies and the associated value-based modeling tools.
- However, we will now use those tools to establish the value of the sustain program that is on the margin. This will allow us to compare the value of an expansion investment with the value of the sustain investments it might displace.

## Why is the Prioritization Process Changing?

Expansion investments will continue to be prioritized as described in the 2014 CIR materials (repeated in the appendix).

- However, expansion investments will now compete directly with the sustain program that is on the margin.

Capital costs for Facilities and Information Technology will initially be held to the identified capital levels:

- Within those levels, expansion investments will be nominated, assessed and prioritized.
- If investments are nominated above those levels, they will be entered into the prioritization process for Transmission or Power as appropriate, putting them in competition with other proposed investments in those categories.

# Green-Lit Expand Investments

Investment	Asset Category	Classification	Cycle VI Status	Start Year	Total Project Cost \$'MM	NEBR	Comments
Ross HMEM Garage Replacement	Facilities	Discretionary	Green-lit	FY16	\$ 29.487	0.3	Green-lit primarily due to safety concerns
McNary Project Storage Building	Fed Hydro	Discretionary	Green-lit	FY14	\$ 3.906	1.6	
Grand Coulee Units 19-21 Uprate	Fed Hydro	Discretionary	Green-lit	FY15	\$ 146.847	3.1	
Grand Coulee Penstock Stoplogs	Fed Hydro	Discretionary	Green-lit	FY17	\$ 9.000	4.0	Green-lit in Cycle VI
Information Governance and eDiscovery	IT	Compliance	Green-lit	FY14	\$ 10.015	NA	
Pisces Web Project	IT	Compliance	Green-lit	FY14	\$ 3.039	NA	
Vegetation Management System (VMS)	IT	Discretionary	Green-lit	FY14	\$ 2.046	8.6	
Control Center CIPv5 Compliance	Transmission	Compliance	Green-lit	FY15	\$ 3.491	NA	
PGE's Blue Lake - Troutdale # 2 Line - L0365	Transmission	Compliance	Green-lit	FY15	\$ 3.968	NA	
Phasor Measurement Units (PMU) FY15-17	Transmission	Compliance	Green-lit	FY15	\$ 6.684	NA	
Spare Transformers for Wind Sites- Central Ferry	Transmission	Discretionary	Green-lit	FY15	\$ 6.138	15.1	
Spare Transformers for Wind Sites - John Day	Transmission	Discretionary	Green-lit	FY15	\$ 6.752	13.6	
Spare Transformers for Wind Sites - Rock Creek	Transmission	Discretionary	Green-lit	FY15	\$ 6.752	14.7	
Spare Transformers for Wind Sites - Slatt	Transmission	Discretionary	Green-lit	FY15	\$ 6.138	15.5	
Fault Duty Replacement Program	Transmission	Compliance	Green-lit	FY16	\$ 16.183	NA	
Invenergy's Willow Creek Phase 1 Fiber Installation - G0255	Transmission	Compliance	Green-lit	FY16	\$ 3.819	NA	
Lower Valley Upgrade	Transmission	Compliance	Green-lit	FY16	\$ 96.052	NA	
Northern Wasco Network Load Expansion 3 - L0380	Transmission	Compliance	Green-lit	FY16	\$ 25.916	NA	
Reactor Program - FY16	Transmission	Compliance	Green-lit	FY16	\$ 19.609	NA	
Midway - Ashe 230kV New Double Circuit Line	Transmission	Discretionary	Green-lit	FY16	\$ 19.840	0.7	Green-lit due to relationship with CGS
Sun Dial Land Acquisition	Transmission	Discretionary	Green-lit	FY16	\$ 8.000	(1.0)	Green-lit in Cycle VI
Walla Walla Reinforcement (Tucannon River-Hatwai 115kV)	Transmission	Discretionary	Green-lit	FY16	\$ 20.141	5.9	
Fossil - DeMoss Shunt Reactor	Transmission	Compliance	Green-lit	FY17	\$ 2.507	NA	
Golden Hills Interconnection - G0099-2	Transmission	Compliance	Green-lit	FY17	\$ 4.836	NA	
Lower Monumental Powerhouse 2nd 500kV Generation Tie Line - L0368	Transmission	Compliance	Green-lit	FY17	\$ 17.236	NA	
Monroe 500kV Line Retermination	Transmission	Compliance	Green-lit	FY17	\$ 8.406	NA	
Kalispell-Hot Springs Fiber Upgrade	Transmission	Discretionary	Green-lit	FY17	\$ 9.920	0.5	Green-lit in Cycle VI

# Deferred Expand Investments

Investment	Asset Category	Classification	Cycle VI Status	Start Year	Total Project Cost \$'MM	NEBR	Comments
Ross Infill Office Building	Facilities	Discretionary	Not Green-lit	FY17	\$ 78.988	1.5	Not Green-lit by FC in Cycle V due to funding constraints
Ross Cold Creek Connection	Facilities	Discretionary	Not Green-lit	FY19	\$ 4.385	4.8	Not Green-lit by FC in Cycle V due to funding constraints
Black Canyon Unit 3	Fed Hydro	Discretionary	Not Green-lit	FY14	\$ 46.250	(0.2)	Bringing forward model data from Cycle IV
IT Services Mgmt - Change Mgmt System (CMS)	IT	Discretionary	Not Green-lit	FY17	\$ 1.804	(1.1)	Not Green-lit by FC in Cycle IV due to changing scope
IT Services Mgmt - Configuration Mgmt Database (CMDB)	IT	Discretionary	Not Green-lit	FY17	\$ 3.626	(1.0)	Not Green-lit by FC in Cycle IV due to changing scope
IT Services Mgmt - Customer Relationship Mgmt (CRM)	IT	Discretionary	Not Green-lit	FY18	\$ 1.644	0.3	Not Green-lit by FC in Cycle IV due to changing scope
Billing Information System Replacement	IT	Discretionary	Not Green-lit	FY18	\$ 9.002	(1.0)	Deferred to Cycle VII
Troy Substation Expansion and Breaker addition	Transmission	Discretionary	Not assessed	FY16			Deferred to Cycle VII
DATS Replacement	Transmission	Discretionary	Not assessed	FY17			Deferred to Cycle VII
System Spare Transformer and Shunt Reactor Program	Transmission	Discretionary	Not assessed	FY17			Deferred to Cycle VII
Lost River O&M Flex	Transmission	Discretionary	Not assessed	FY18			Deferred to Cycle VII
Silver Creek Substation Reinforcement	Transmission	Discretionary	Not assessed	FY18			Deferred to Cycle VII
Toledo O&M Flex	Transmission	Discretionary	Not assessed	FY19			Deferred to Cycle VII
La Pine O&M Flex	Transmission	Discretionary	Not assessed	TBD			Deferred to Cycle VII
RAS Phanse II - Managing Complexity	Transmission	Discretionary	Not assessed	TBD			Deferred to Cycle VII
Shultz to Monroe Fiber Upgrade	Transmission	Discretionary	Not assessed	TBD			Deferred to Cycle VII
Southern Idaho Communications Upgrade	Transmission	Discretionary	Not assessed	TBD			Deferred to Cycle VII
I-5 Corridor Reinforcement Project	Transmission	Policy Commitment	Not Green-lit	FY15	\$ 759.503	(0.1)	Deferred pending non-wires alternative review
Conkelly Substation Retirement	Transmission	Discretionary	Not Green-lit	FY16	\$ 6.534	(0.4)	Deferred to Cycle VII
Hot Springs to Garrison Fiber Optic Cable Upgrade	Transmission	Discretionary	Not Green-lit	FY16	\$ 13.880	0.7	Not Green-lit by FC due to funding constraints
Hungry Horse-Columbia Falls Fiber Upgrade	Transmission	Discretionary	Not Green-lit	FY16	\$ 13.318	(0.6)	Not Green-lit by FC due to funding constraints
Anaconda-Dixon-Silver Bow Transformer Replacement and Area Improvements	Transmission	Discretionary	Not Green-lit	FY17	\$ 6.506	5.4	Not Green-lit by FC due to funding constraints
Carlton O&M Flex	Transmission	Discretionary	Not Green-lit	FY18	\$ 6.077	0.5	Not Green-lit by FC due to funding constraints

# BPA Asset Management Goals

The Asset Management Key Strategic Initiative (KSI) is designed to advanced the maturity of BPA's asset management practices.

BPA's goal is to **maximize the long-term operational and economic value of federal power and transmission system assets for the Northwest**. This will be accomplished by maintaining and investing in the system so that:

- BPA's **strategic direction is successfully delivered**;
- Assets operate efficiently and effectively and provide the capacity and capabilities needed to **meet reliability, availability, environmental, health and safety, security and other standards**;
- **Total economic costs are minimized over the long-term**.

This goal must be accomplished in a manner that is **sustainable from a long-term power and transmission rate, cost structure, and financing perspective**.

**Processes reflect leading practices** and they are **standardized, transparent, and risk-informed** in accordance with BPA's Risk Management Policy. The processes include **internal controls that are robust, balanced, and adhered to**.

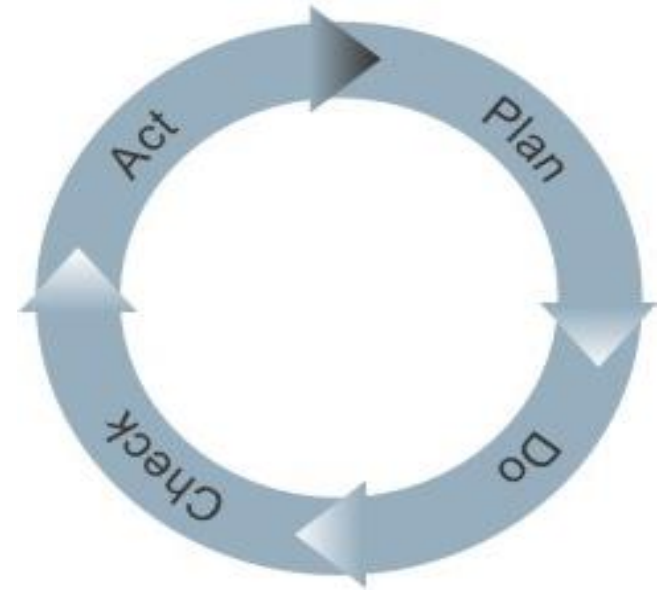
# Asset Management KSI Approach

## Review and Renew

Paradigm shift in 2006: Asset Management Enterprise Process Improvement Project (EPIP) called for and process reforms to achieve a high performing investment and maintenance program.

Many of the EPIP recommendations have been implemented, but the maturity of asset management at the asset category level varies widely, resulting in significant gaps and need for improvements.

The approach of the KSI is to review and renew current practices, as well as the development and implementation of new policies, processes, standards and requirements to ensure a leading practice-based model.



# Leading Practice-Based Model

Execute sustainable and affordable investment strategies where investments are created, selected and executed through a leading practice-based portfolio model and project management practices.

Institute for Asset Management (IAM) integrates Pas 55 and ISO 55000 series

## Group 1 - Strategy & Planning

1. Asset Management Policy
2. Asset Management Strategy & Objectives
3. Demand Analysis
4. Strategic Planning
5. Asset Management Planning

## Group 2 - Asset Management Decision-Making

6. Capital Investment Decision-Making
7. Operations & Maintenance Decision-Making
8. Lifecycle Value Realisation
9. Resourcing Strategy
10. Shutdowns & Outage Strategy

## Group 3 - Life Cycle Delivery

11. Technical Standards & Legislation
12. Asset Creation & Acquisition
13. Systems Engineering
14. Configuration Management
15. Maintenance Delivery
16. Reliability Engineering
17. Asset Operations
18. Resource Management
19. Shutdown & Outage Management
20. Fault & Incident Response
21. Asset Decommissioning & Disposal

## Group 4 - Asset Information

22. Asset Information Strategy
23. Asset Information Standards
24. Asset Information Systems
25. Data & Information Management

## Group 5 - Organisation & People

26. Procurement & Supply Chain Management
27. Asset Management Leadership
28. Organisational Structure
29. Organisational Culture
30. Competence Management

## Group 6 - Risk & Review

31. Risk Assessment & Management
32. Contingency Planning & Resilience Analysis
33. Sustainable Development
34. Management of Change
35. Asset Performance & Health Monitoring
36. Asset Management System Monitoring
37. Management Review, Audit & Assurance
38. Asset Costing & Valuation
39. Stakeholder Engagement

# Proposed Framework

Investments are created, selected, and executed through the Institute of Asset Management's (IAM's) conceptual model comprised of a suite of six subject groups and aligns with the ISO 55000 Series and PAS 55 standards.

- **Strategy and Planning** will align BPA's strategic direction with asset management activities, outputs from its assets.
- BPA's policy(ies) and processes will safeguard **Risk Management** and establish **Effective Feedback and Review** mechanisms to assure that objectives are being met and support continual improvement of asset management activities.
- BPA's practice **Organizational Culture** will promote a whole life asset management approach to deliver the organizational asset management objective.
- BPA's **Asset Information** will be standardized, structured and systemized to ensure activities focus on areas that will provide the most benefit.
- BPA's asset management plan(s) will ensure good control of the **Life Cycle Delivery** activities and risks to create/acquire, operate, maintain and dispose of assets.
- Effective **Decision Making** for the four stages of an asset's life.



# Focus Area – Asset Information

- Data will be standardized, structured and systemized to ensure focus areas that will provide the most benefit.
- Continuous improvement of asset information will refine asset replacement decisions to:
  - Reduce unexpected failures
  - Avoid unnecessary premature replacement
  - Diminish risks
  - Improve reliability and cost savings

## Key components

- Transmission – Asset Information Program (AIP)
- All Asset Categories – Asset Registers

# Focus Area – Life Cycle Delivery

- Asset plans will be implemented with an emphasis on integrating activities using robust systematic considerations of alternatives.
- Project execution will be delivered with relevant repeatable processes.

## Key components

- Transmission – Asset Management Program Delivery (AMPD)
  - *Managing assets and investments to deliver the right work, at the right time, at the right cost, with certainty*
- Federal Hydro – Asset Investment Excellence Initiative (AIEI)
  - Long-term Program Planning
  - Program Execution
  - Contracting and Procurement
  - Human Capital

# Focus Areas – Risk & Review

- Robust risk and review methods will result in internal controls and audit mechanisms that:
  - Assure objectives are met
  - Support continuous improvement
  - Ensure effective feedback for sustainable asset strategies
  - Higher success rates in delivering identified benefits

# Major Outcomes

- Tight alignment between investment priorities and the agency's strategic direction
- Successful implementation of asset strategies, including process reforms
- Robust, systematic consideration of innovative solutions to meet investment needs
- High success rates in delivering projects on time and on budget
- High success rates in delivering the benefits that were planned when the investments were approved

# Closing Remarks

- BPA is committed to improving asset management, and the Asset Management KSI will drive change to close gaps.
- Cost management initiatives will control costs of completing replacement and maintenance work.
- In workshops scheduled the week of June 20, asset categories will provide key elements of their asset strategies and asset plans, explain how their capital spending levels were developed (BP-18 and long-term) and identify asset management improvement initiatives.
  - Asset Categories: Federal Hydro, Transmission, IT, Facilities and Fish & Wildlife

# Questions



# Appendix

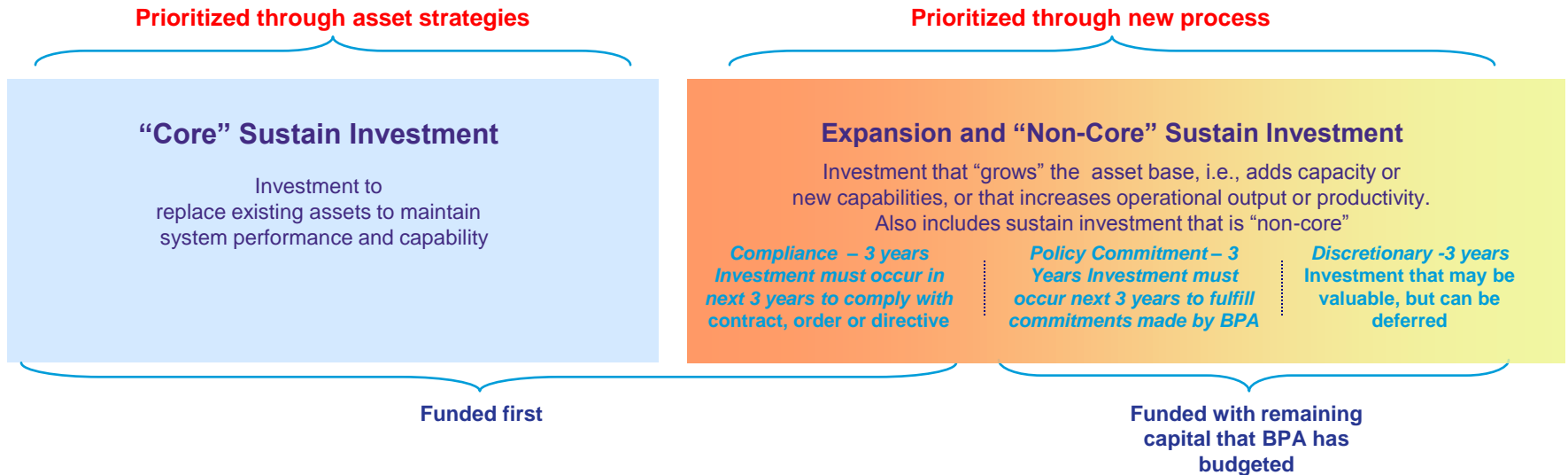
- Capital Prioritization of Sustain and Expansion Investments
- Asset Category Charts – sustain and expand, in-flight and planned

## Key Characteristics of Agency Capital Prioritization

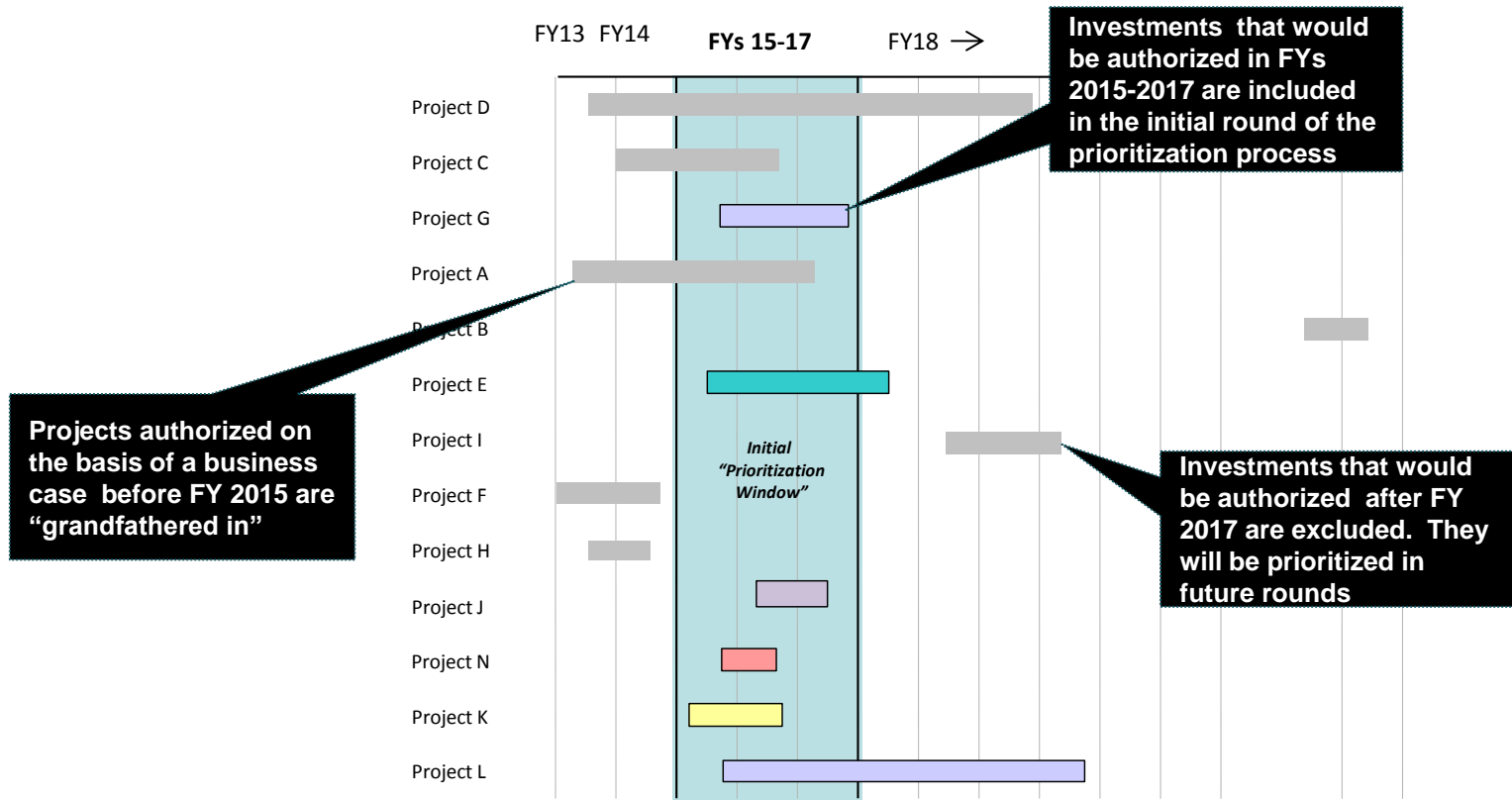
	Characteristics of Prioritization Process
Prioritization of expansion investments	Expansion-type investments are prioritized using a single BPA-wide process. Each asset category nominates, assesses and evaluates its proposed investments using a standardized value-based approach. The results are combined and then prioritized by the Finance Committee to form the BPA investment portfolio
Prioritization criteria for expansion investments	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	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 rebalanced on a 6-month cycle by the Finance Committee, with the results then entered into forecasts. The results of the rebalanced portfolio are shared for public comment through the QBR process
Cap on capital expenditures	Capital expenditure (draft) levels are set by the Finance Committee based on preliminary analysis of long-term rate impacts under a variety of scenarios before the CIR. The established level of capital applies to a planning horizon that extends to 2030. Projected spending levels continue to be established through CIR/IPR process and are finalized after customer comment.
Prioritization of Sustain investments	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 Finance Committee oversees the prioritization process and collectively recommends the BPA portfolio to the Administrator for final decision



## How Investments are Classified for Prioritization Process



**Initially, the new BPA-wide prioritization process covers large expansion investments in transmission , facilities, and IT that would start in FYs 2015-2017**



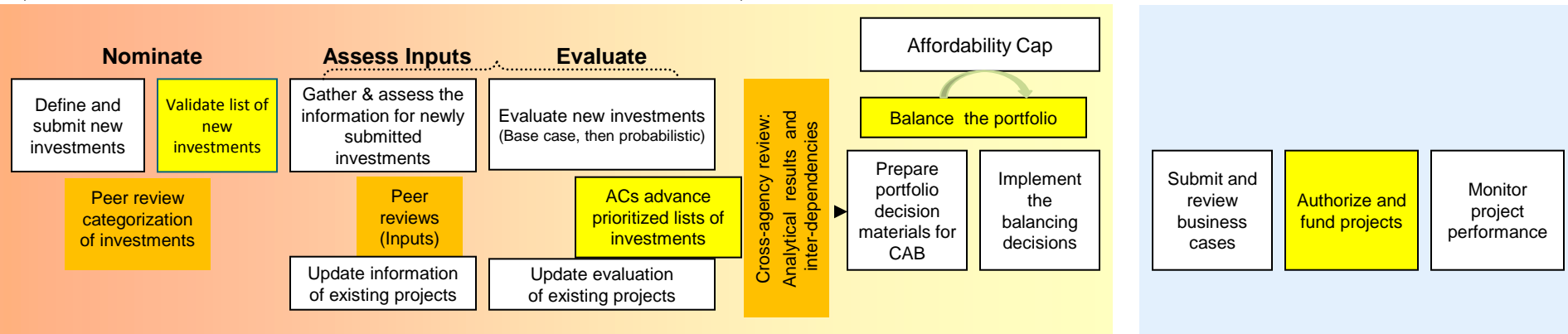
**Note:** The term “investment” includes upfront capital expenditures and upfront expense expenditures to plan, design, and build or acquire equipment, facilities, or software applications

Beginning with new starts in FY 2018, small expansion projects and potentially a portion of sustain investments will be rolled into the new process

# Sequence of steps in the capital investment prioritization process

Asset category-led

Agency-led



Yellow boxes: steps requiring executive action

Orange boxes: steps involving peer reviews

Existing process  
(simplified)

The process is repeated on a 6-month cycle – to consider updates and new investment proposals.

# Key metric: Net Economic Benefit Ratio

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

{PV = Present Value}

“Bang for the buck” ratio

## “PV Economic Benefits” includes the present value of (examples):

- Avoided congestion costs (avoided fuel and other production costs that are enabled by adding capacity on constrained transmission paths)
- Avoided power purchase costs or increased power sales
- Incremental revenue (i.e., revenue beyond that needed to recover project investment and post project costs)
- Labor cost savings through process efficiencies
- Avoided customer value losses from outages
- Avoided CO2 or other environmental costs (monetized)

## “PV Project Investment” includes the present value of:

- Upfront project costs (project planning, environmental review (NEPA), land/land rights acquisition, procurement, construction/installation)

## “PV Post-Project Costs” includes the present value of:

- Maintenance and operations costs that would be incurred to sustain the asset after it is in service, e.g., maintenance, repairs, component replacements, monitoring, licensing (IT), other support

This metric is directed at capturing the net economic costs and benefits of the investment. Net economic benefits are determined without regard to the source of capital that would be used to fund the project and without regard to who might receive the benefits.

## A low / base / high range is assessed by subject matter experts to capture key cost and benefit uncertainties

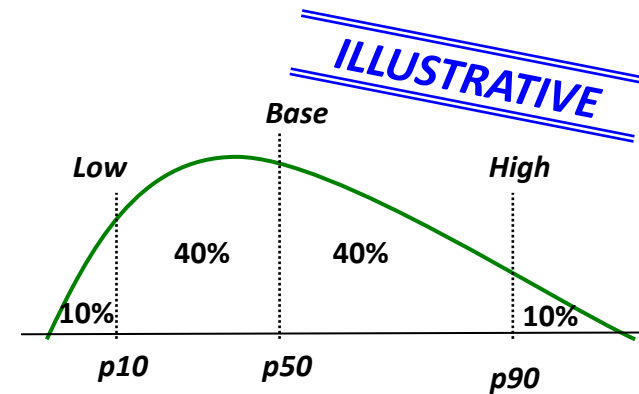
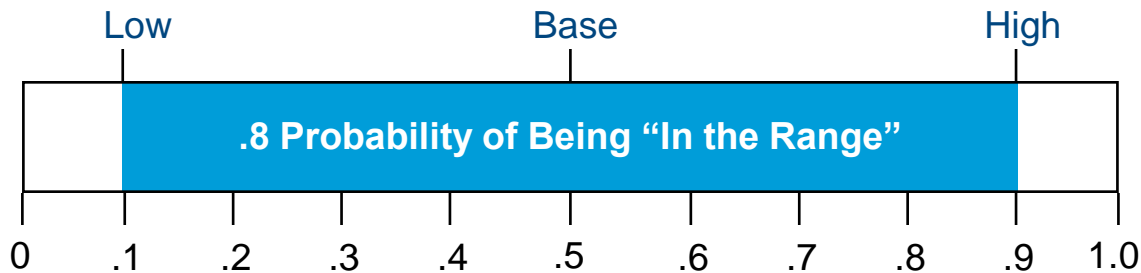
### Definition

**Low** There is only a 10 percent probability that the variable will be *less than or equal to* this value

**High** There is only a 10 percent probability that the variable will be *greater than* this value.

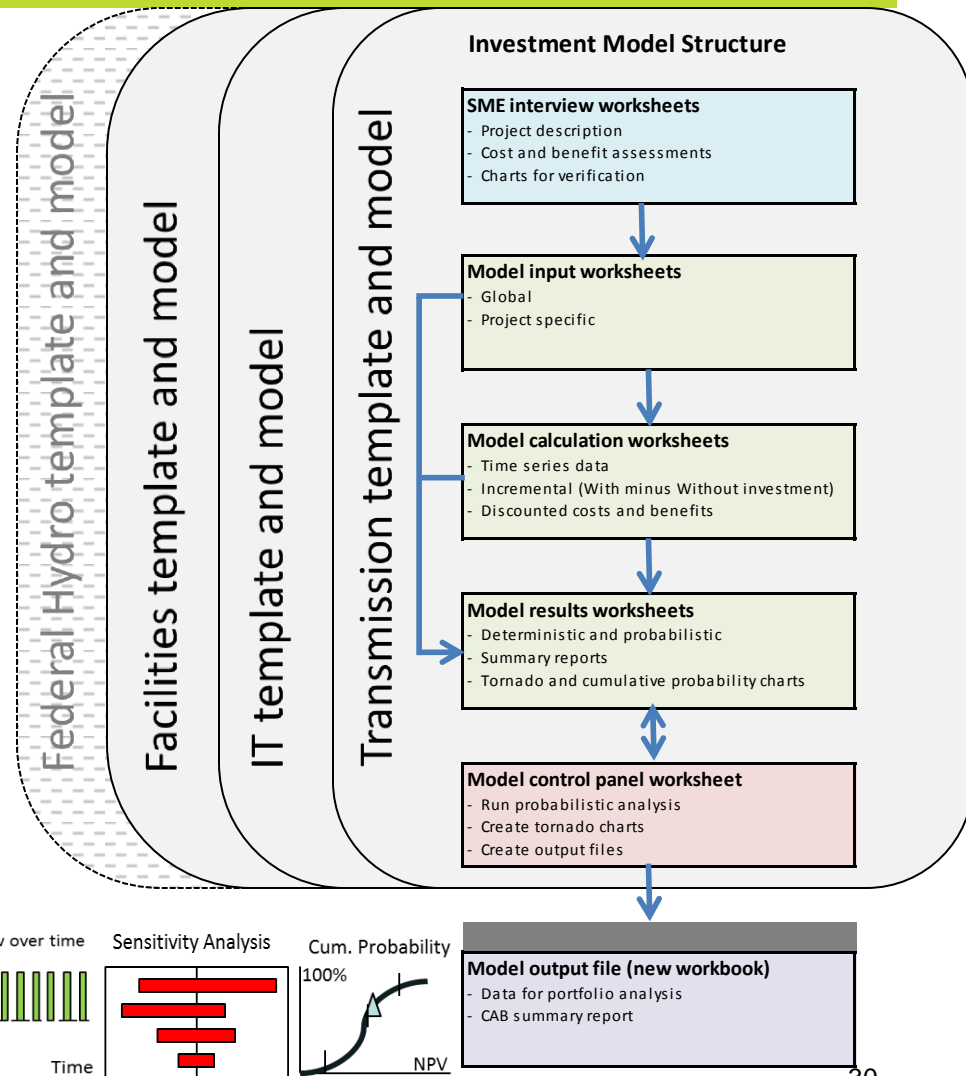
**Base Case** There is a 50 percent probability that the variable will be *less than or equal to* this value.

Project contingencies are not included in upfront cost estimates.



# Investment Model Support Investment Decision-Making

- Capital Prioritization process is supported by a suite of EXCEL based models (customized by Asset Category) including @RISK add-on for probabilistic analyses
- Supports the total economic value approach to valuing investment proposals
- Capable of modeling all sources of economic value and cost, i.e., value to BPA and customers
- Information to evaluate investments is assessed by credible subject matter experts (SMEs)
- Customized templates are used to input basic project descriptive information, key start and end dates, life cycle, upfront costs (capital and expense) and to assess ongoing costs/benefits
- SMEs provide a range for each input rather than single point estimates capturing the uncertainty
- Key metrics include Net Economic Benefit, Investment (Present Value) and Net Economic Benefit Ratio used to rank projects by their economic “bang for the buck”

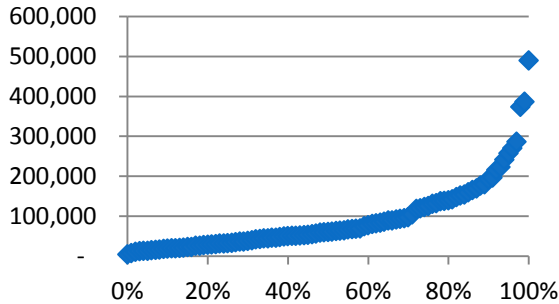


Sample project evaluation results

For investments with assessed costs and benefits these were analyzed through standardized lenses

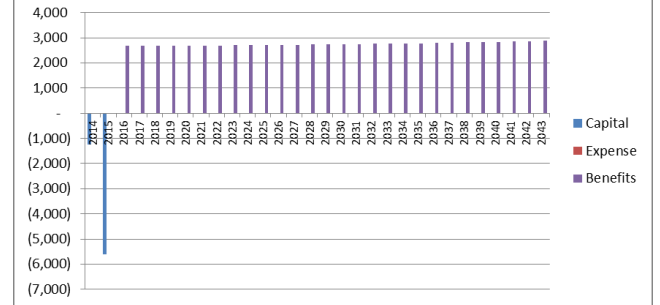
Investment value and key sources of risk (Project Example)

Net Economic Benefits



Uncertainties in project value will be captured probabilistically

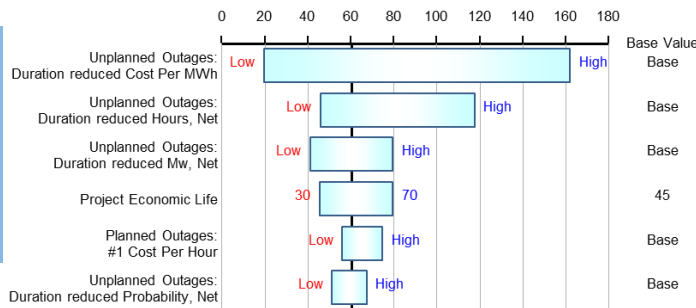
Economic costs and benefits by year (Base values)



- Different values will be quantified
  - Value to BPA
  - Value to region
- Key risk drivers will be quantified consistently to represent the same level of uncertainty (confidence intervals)
- Inputs will be assessed by SMEs and trained portfolio facilitators to eliminate systematic biases

Net Economic Benefit (\$ Millions)

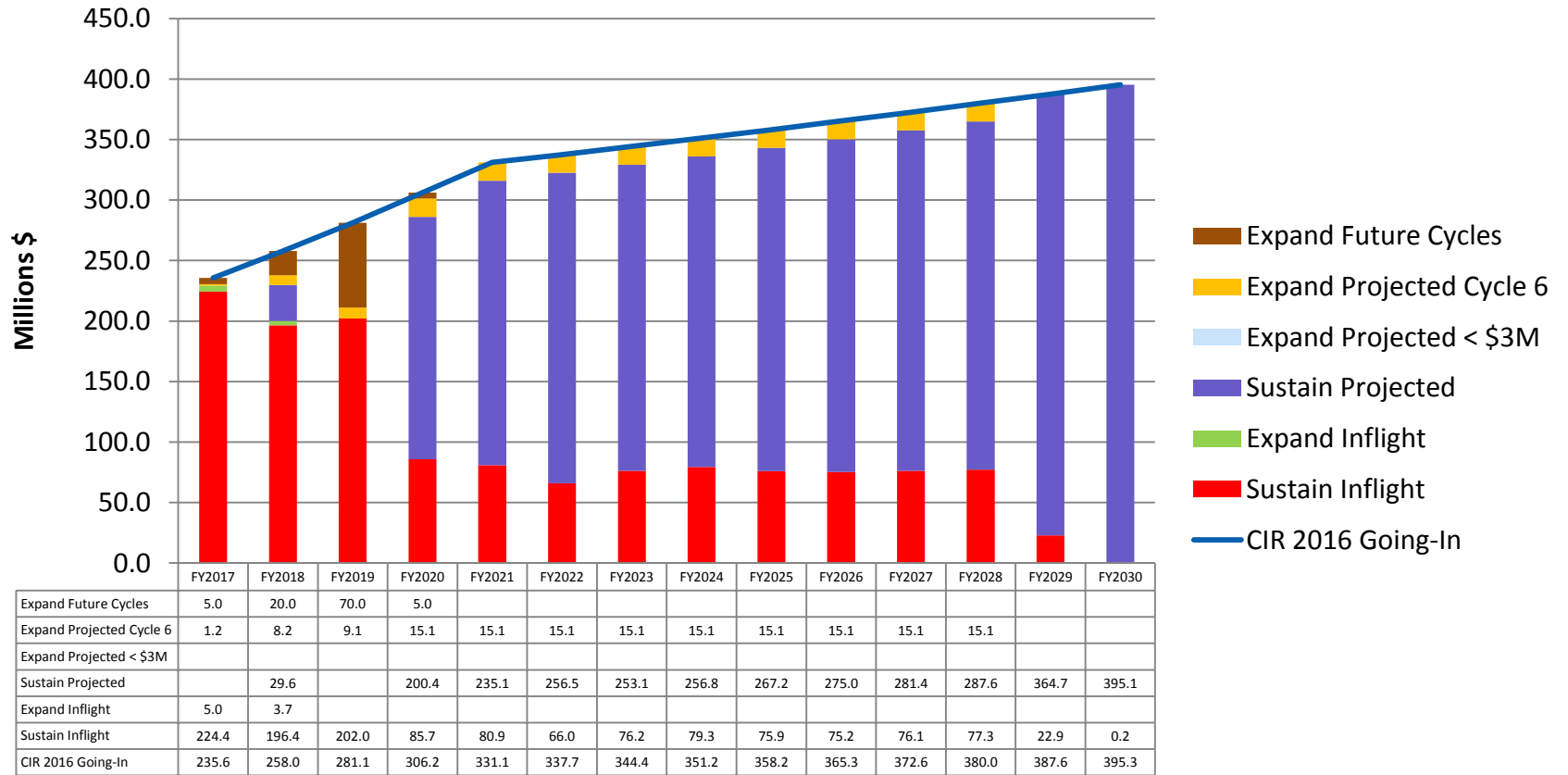
Base value = \$60.4



Sensitivity analysis is conducted to identify key value/risk drivers

# Federal Hydro Capital Spend

## Expand & Sustain

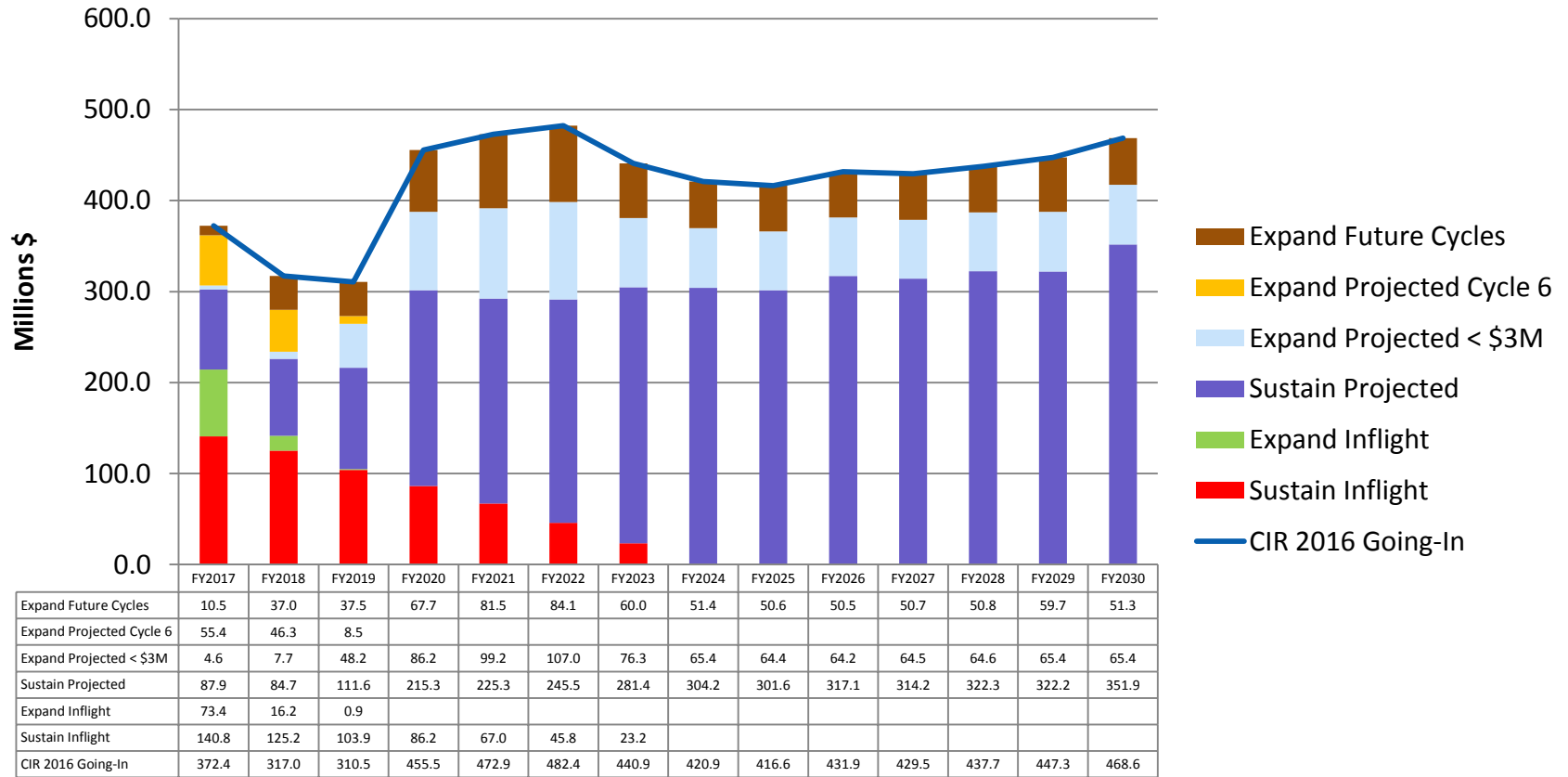


Notes:  
1/Excludes AFUDC



# Transmission Direct Capital Spend

## Expand & Sustain

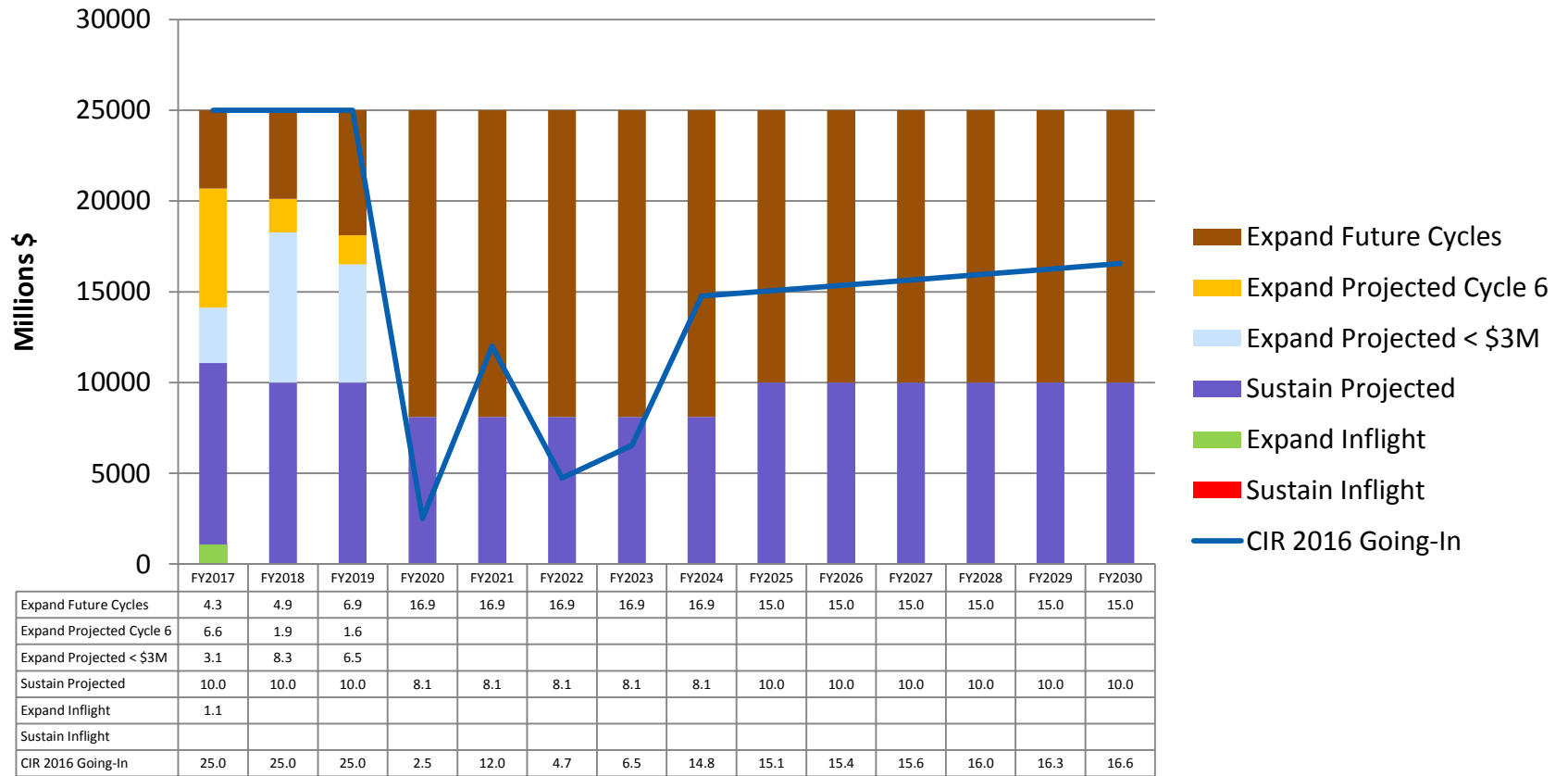


Notes:

1/ Excludes Transmission Indirects, Corporate Overheads and AFUDC

# IT Capital Spend

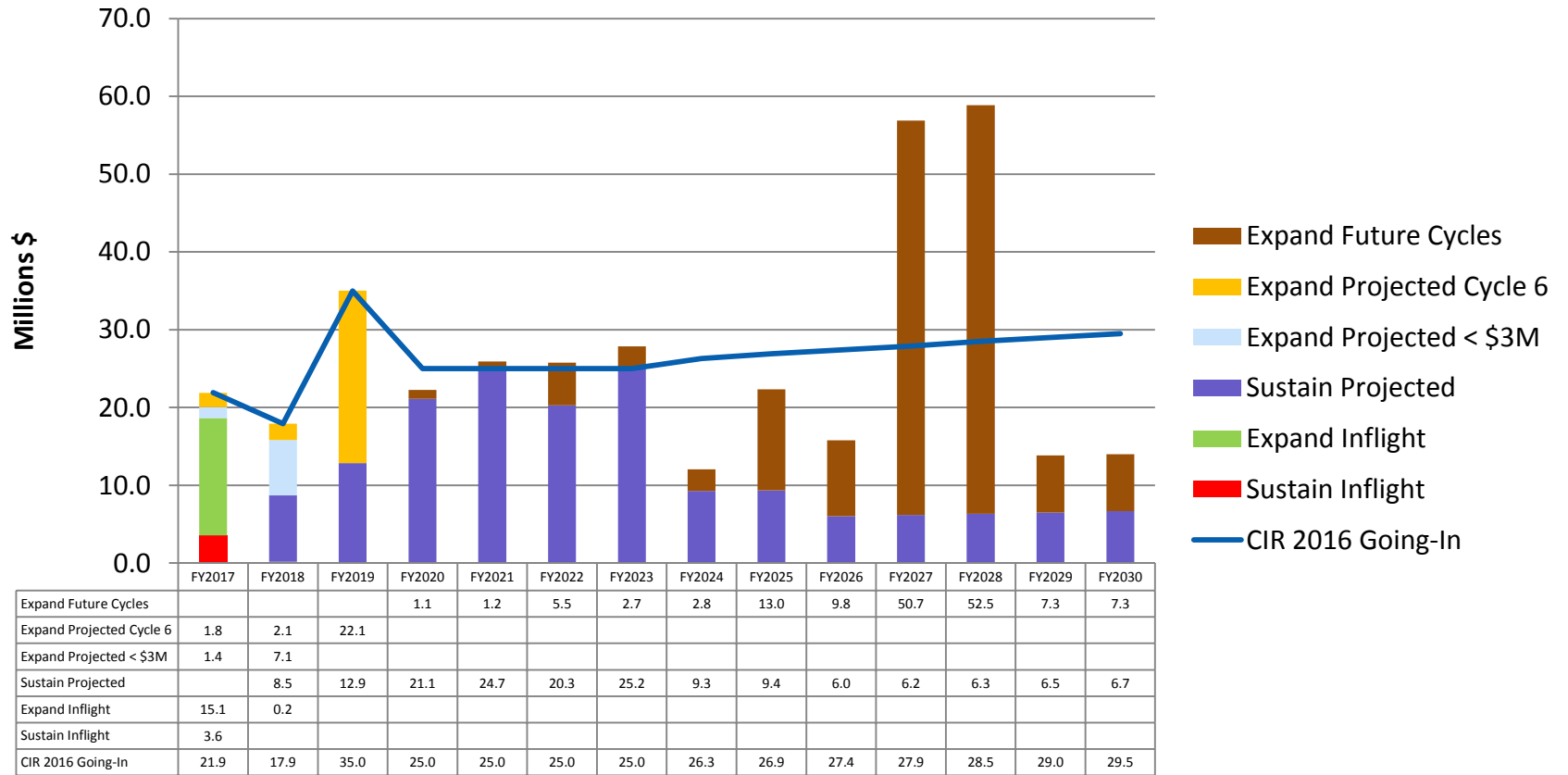
## Expand & Sustain



Notes:  
1/Excludes AFUDC

# Facilities Capital Spend

## Expand & Sustain



Notes:

1/ Excludes AFUDC

# Fish & Wildlife Capital Spend

## Expand & Sustain

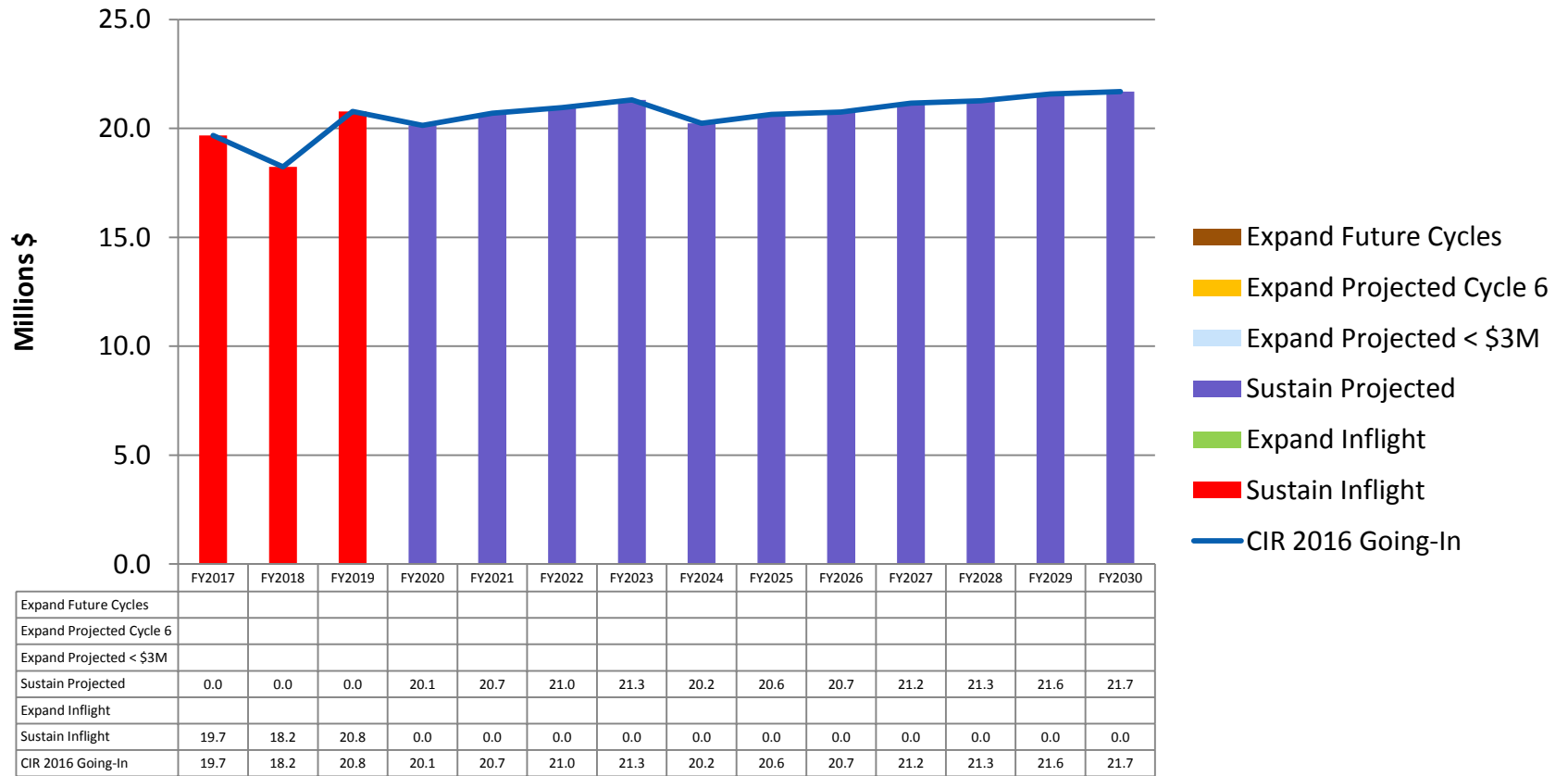


Notes:

1/ Excludes AFUDC

# Environment, Fleet & Security Capital Spend

## Expand & Sustain



Notes:

1/ Excludes AFUDC

# Financial Disclosure

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This information was made publicly available by BPA on June 10, 2016 and contains information not sourced directly from BPA financial statements.