Capital Investment Review

Follow Up Reponses from March 2014 Workshops

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BPA's Discount Rate Methodology

At the Prioritization workshop there was an inquiry about how BPA sets it's discount rate.

BPA's capital investments involve a variety of risks including implementation and construction risks, as well as long term cash flow uncertainties. When discounting cash flows that are risky or uncertain, a risk-adjusted discount rate should be used to capture these uncertainties.

- BPA's discount rate is comprised of two basic components:
  - *Risk Free Discount Rate* - This rate would be appropriate if there were no risk involved in the investment and full cost recovery was certain. It illustrates the time value of money, such that benefits received earlier or cost incurred later are more valuable than benefits received later or costs brought forward.
  - *Risk Premium* – This is the measure of the riskiness of the investment. Common elements of risk specific to BPA would be project construction risk, uncertain water and weather risk, and stranded cost risk. Neglecting to consider project risk could lead BPA to select poor investments and put an undue burden on ratepayers.

BPA's Discount Rate Methodology Continued

- These components are combined to create the *Risk Adjusted Discount Rate*. This is the means by which projects of different riskiness can be compared, since a project that is more certain to attain its expected benefits is more valuable than projects that are less certain to attain the same level of benefits.
- For BPA, measuring the risk premium is always a difficult task. Using discount rates developed by analyzing proxy businesses is an approach that is well accepted in industry and BPA has used this type of benchmarking to measure its own risk. In the past BPA has relied heavily on Ibbotson data to measure comparable industry risk. Since BPA has both Transmission and Generation risk it is appropriate to address these two risks separately. BPA uses the *Electric Services* index (SIC Code 491) to benchmark Transmission industry risk and *Cogeneration Power Producers* index (SIC Code 499) to measure Generation risk.
- Recently, the Ibbotson data was complimented by a more intensive study performed by BPA Finance staff in which public utilities across North America were surveyed about their discount theory and practice. A few of the utilities that participated were Western Area Power Administration (WAPA), BC Hydro, BC Transmission, Tennessee Valley Authority (TVA), New York Power Authority (NYPA), and Sacramento Municipal Utility District (SMUD).
- BPA's current rates of 12% for Hydro capital investments and 9% for non-replacement Transmission capital investments are reasonable in light of the benchmarking study and the benchmarking reinforced BPA's existing practice of using a risk adjusted discount rate. Although there were several different methodologies used to measure and account for risk, it is clear that other public utilities recognize and attempt to account for risk when evaluating capital investments.

Prioritization

Note: Revised 4/8/14

Request: What is the difference in market assumptions on page 39 in the CIR Initial Publication vs. slide 40 in the CIR Workshop slide deck?

Response:

For energy prices, there is no difference. To develop the chart on page 39 of the Initial Publication, Federal Hydro used the same energy market price forecast that was cited on slide 40 of the Investment Portfolio Optimization workshop on March 10. Federal Hydro used the expected case, and inflated the 2043 value to 2062 to extend the energy price forecast to a full 50-yr stream. The levelized value of this 50-yr forecast is $32/MWh (2013$), based on a conservative end-of-year convention for NPV (12% discount rate).

For investment strategy purposes, Federal Hydro added a capacity value to the energy price forecast, based on the fixed costs of an IPP financed LMS100 combustion turbine, consistent with rate case demand charges. The levelized fixed costs of the LMS100 are $24/MWh (2013$). The capacity value compares reasonably well with the cost of capacity products being bought by the trading floor, although not a good one-to-one comparison because purchased capacity products have fewer attributes and less flexibility than the hydro system.

See Slide 6: Market Price Forecast

Market Price Forecast

Prepared for Agency Asset Management
Based on FY 14/FY15 Initial Rate Proposal
Posted January 2013
(Dollars per MWh)

Year	Expected	Low	High
2013	25.23	21.36	28.68
2014	28.43	23.90	32.42
2015	29.33	24.43	33.68
2016	29.57	24.95	33.75
2017	31.33	26.08	35.75
2018	31.20	25.71	35.56
2019	33.02	26.53	37.93
2020	34.07	26.98	39.39
2021	35.47	27.97	41.08
2022	36.80	29.02	42.62
2023	38.18	30.11	44.22
2024	39.62	31.24	45.88
2025	41.12	32.42	47.61
2026	42.68	33.65	49.41
2027	44.30	34.93	51.29
2028	45.99	36.26	53.24
2029	47.75	37.64	55.27
2030	49.58	39.08	57.38
2031	51.48	40.58	59.59
2032	53.47	42.15	61.88
2033	55.53	43.77	64.27
2034	57.69	45.47	66.75
2035	59.93	47.23	69.34
2036	62.26	49.07	72.04
2037	64.70	50.99	74.85
2038	67.23	52.98	77.77
2039	69.87	55.06	80.82
2040	72.62	57.23	84.00
2041	75.49	59.49	87.31
2042	78.47	61.84	90.76
2043	81.59	64.29	94.35

Prioritization

Request: Justification for the proposed IT "expand" projects – it is not clear from the documentation provided what the rationale was for approving these projects.

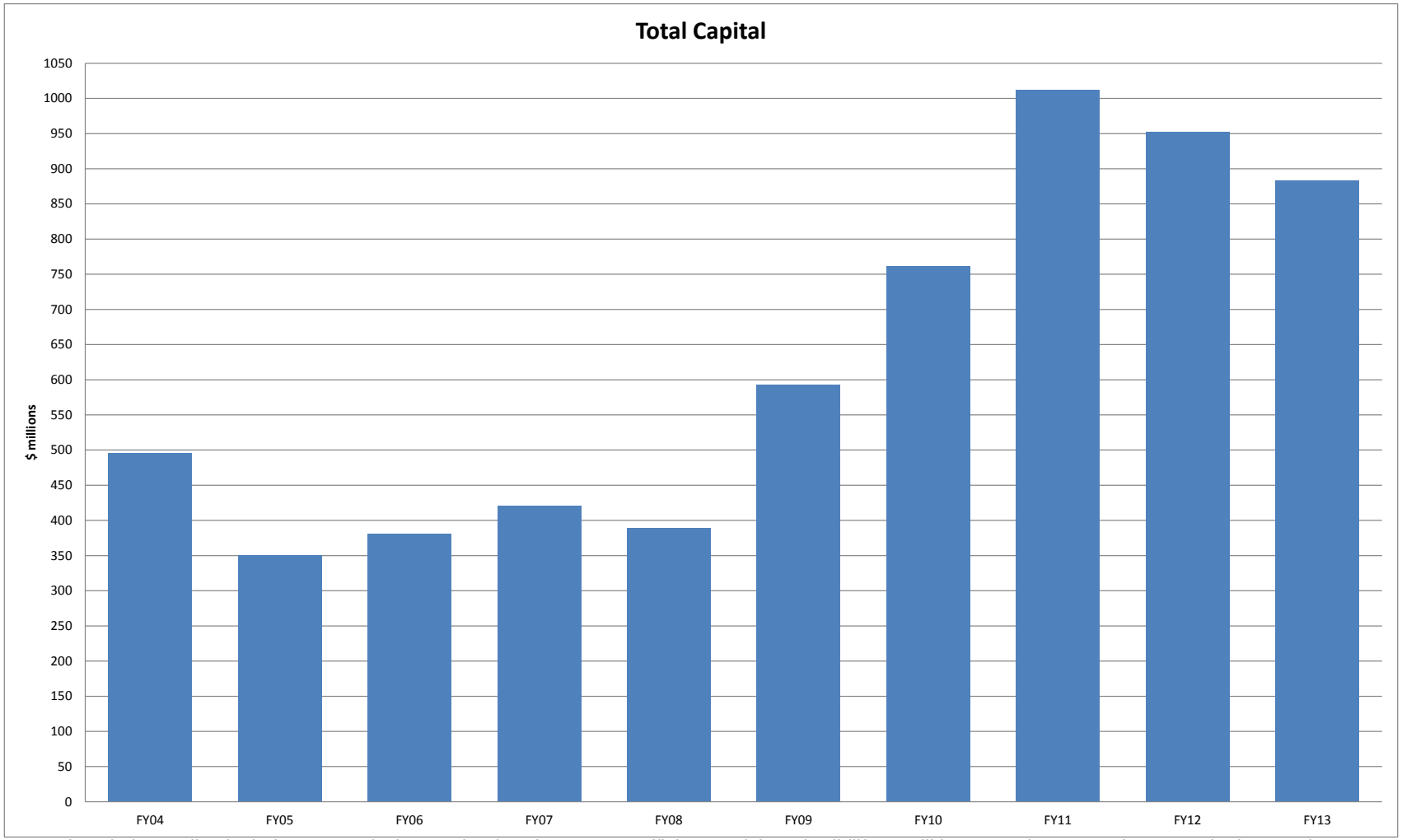
Response:

- BPA is adopting an enterprise approach to reviewing, evaluating, and prioritizing capital projects. IT expand (discretionary) projects above the $3 million threshold are included in this process. As the process matures, all IT capital expand projects will move through this process. This process was covered in the CIR workshop(s).
- The business owners identify IT discretionary projects. In some case IT managers may be the business owner for a discretionary project that delivers new capabilities or improves efficiencies for IT operations or project delivery. For each proposed project, the business owner identifies the benefits the project will deliver. Business owners, working with business analysts, develop estimates of the economic value associated with the tangible business benefits. IT managers develop high level cost estimates for implementing a potential solution. For projects greater than $3 million, a net economic value is calculated based on the economic value associated with the benefits and the estimated cost of the system. These IT projects are then plotted on a curve based on their net economic value, along with other projects from across the agency.
- The IT projects whose net economic value falls above the cutoff line are allowed to continue to enter the IT review and approval process. The IT review and approval process includes presenting a business case to the Agency Prioritization Steering Committee(APSC) which consists of business representatives from across BPA. The APSC provides recommendations to Chief Information Officer on which projects should be approved for capital funding.
- If a discretionary projects has a significant compliance or policy commitment aspect but has an economic value that falls below the cut off value, the Capital Allocation Board may allow the project to proceed to enter the IT project review process.
- The current portfolio of projects consist of projects with a high net economic value with the exception Structured Data Management which has a strong compliance aspect.

Prioritization

Historical Capital Spending

At the Prioritization workshop there was an inquiry regarding BPA's historical capital spending.



*Total capital spending includes Transmission, Federal Hydro, Energy Efficiency, Fish and Wildlife, Facilities, Security, IT, Environmental, Fleet, and projects funded in advance.

Federal Hydro

Request: At the request of BPA power customers, additional analyses were run for the 2016 Hydro Asset Strategy on power price forecasts and discount rates.

Response:

The table in the following slide includes power price sensitivity results for two available funding scenarios:

- 2012 IPR Approved Plan levels as revised June 2013.
- A scenario consistent with 2012 IPR funding levels through 2017, which then increases funding availability by $25 million per year until a $300 million (2013$) threshold is reached, after which funding availability is held constant in real dollars.

Sensitivities were run at both 12% and 8% nominal discount rates.

At all power prices and both discount rates, the risk reduction benefits warrant spending all available funds for the 2012 IPR Approved Plan scenario.

For the $300 million scenario, risk reduction benefits warrant spending all available funds at lower power prices assuming an 8% discount rate, but do not at a 12% discount rate.

The NPV of the $300 million scenario is positive in all cases. The NPV of the $300 million, 12% discount rate sensitivity is slightly lower than the NPV shown in the CIR workshop package on slide 19. This is due to 2012 IPR Approved Plan funding availability streams that were reshaped during the strategy analysis process. The NPV results in this package use the most current funding streams.

Federal Hydro

	Levelized Power Value (2013$/MWh)	PV of Capital Investment (2012 IPR Funding Level)	PV Increase in Capital Investment for $300 Million Scenario	PV Decrease in Risk for $300 Million Scenario	NPV of $300 Million Scenario (PV Decrease in Risk less PV Increase in Cost)
12% Discount Rate	72 *	1,974	609	1,310	701
	50	1,974	558	944	386
	40	1,974	521	786	265
	30	1,973	448	594	146
8% Discount Rate	72 *	2,875	1,133	2,828	1,695
	50	2,875	1,129	2,167	1,038
	40	2,874	1,127	1,907	780
	30	2,874	1,127	1,600	473

All PV and NPV values are in millions (2013$)

* The $72/ MWH case uses BPA Common Agency Assumptions, which include a $16/MWh adder for avoided CO2 emissions. Other price sensitivities include no avoided CO2 value.

Federal Hydro

Request: U.S. Army Corps of Engineers Staffing information

Response:

- The U.S. Army Corps of Engineers conducts a *Long-Term Programmatic and Planning Workforce Analysis* in the first quarter of every fiscal year. The Corps forecasts the size, type and number of upcoming projects and the associated funding levels they anticipate receiving from various sources. The analysis then focuses on shaping the organization to handle the overall expected program, whether that means hiring additional full-time employees (FTE) or shuffling resources across business lines to maximize the efficient use of existing staff.
- Staffing for large capital projects has remained relatively flat recently at 2% growth, based on the assumption that the BPA large capital program will remain level in the near term. Past years have seen wide fluctuations ranging from 10% reductions to 30% increases, as the Corps reacted to changes in the Federal Hydro Projects program budget. Additionally, it takes roughly a year from the decision to hire until an FTE is brought on. Large capital program certainty beyond 2017 will ensure that the Corps is staffed appropriately to address the increasing investment need associated with maintaining the reliability of the FCRPS.

Energy Efficiency

Request: What are the expected yearly energy efficiency nonprogrammic savings achievements for 2010-2019? Please provide any research, data or other information BPA has regarding energy efficiency nonprogrammatic savings calculations for 2010-2019. Please provide all spreadsheets, with formulas intact. If these materials are in draft form, please mark them as such.

Response:

- **2010-2015:**
  - Most of BPA's non-programmatic savings is via NEEA reporting. NEEA reports one savings number per initiative against the 6th Plan baseline; BPA breaks this number out into non-programmatic and net market effects for BPA reporting.
  - The rest of BPA's non-programmatic savings are from research BPA is completing on a few key markets.
    - Completed: BPA recently completed analysis on baseline adjustment savings, which are small. The report is on BPA's website:

      http://www.bpa.gov/energy/n/reports/evaluation/multi_sector/pdf/Baseline_Savings_2010-2012_Report.pdf
    - In progress: BPA is currently researching non-residential lighting and appliance standards. BPA will share those spreadsheets at (http://www.bpa.gov/energy/n/reports/evaluation/multi_sector/) once they have been fully reviewed by Council staff.

Energy Efficiency

- **2010-2015 (continued):**
  - Upcoming:
    - BPA will soon be researching the HVAC, weatherization and agriculture markets.
    - BPA will also be updating our methodology manual (available at: http://www.bpa.gov/energy/n/reports/evaluation/multi_sector/pdf/Market_Induced_Savings_Report.pdf) on tracking non-programmatic savings to reflect greater insight on non-residential lighting and best practices for sales data analysis. BPA is doing this because it is critical that BPA use reliable methods and support those methods with accurate data so that BPA can rely on the non-programmatic resource as well as the programmatic savings BPA achieves.
    - Research conducted by NEEA (RBSA, CBSA) are critical components of tracking future savings, as is robust collection of sales data.
- **2016-2019:**
  - Baselines are critical for BPA to know what non-program savings may exist in the market. Without more detailed insight into those baselines BPA cannot estimate nonprogrammatic savings.
  - If one assumes the 6th Plan baseline, then you would expect non-program savings to be larger as the years pass. BPA has not done detailed analysis on this as BPA is expecting that the region will have a 7th Plan by 2016 to guide BPA's work.

Energy Efficiency

Table 1: Projected Non-Programmatic Savings towards 2010-2015 Target

	One-time adjustment	2010	2011	2012	2013	2014	2015	Total
NEEA, net market effects		12	10	10	*10*	*9*	*8*	58
NEEA, non-programmatic	19	12	13	15	*17*	*22*	*14*	112
Non-programmatic	*7*	*5*	*9*	*12*	*13*	*15*	*15*	77
Total	**26**	**29**	**32**	**37**	**40**	**46**	**37**	**257**

Energy Efficiency

Request: A yearly projection for FY 2013-2017 of the average wholesale power rates (Tier 1) and calculation of the wholesale value of projected, cumulative MWh savings from all BPA energy efficiency programs (capital and expense) over that same time period (FY 2013-17).

Response:

- BPA does not provide a rate forecast for the general public. Additionally, BPA cannot provide cumulative projected yearly programmatic savings for the FY 2015-2017 period without knowing the efficiency target in the Council's 7th power plan.

Energy Efficiency

Request: An analysis of how the net revenues from expected energy efficiency savings resulting from the capital budget for FY2016/2017 will contribute to BPA rates over the following 12-year time frame.

Response:

- The net revenue requirement will be affected by the BP-16/17 costs associated with capital investments which include interest expense and amortization expense. Since BPA borrows from the US Treasury to fund the capital investments, interest expense is incurred until the debt is repaid. EE capital investments are amortized over a 12-year life. It is important to note that the costs can be influenced by the 7th power plan, which could affect the average useful life of EE investments, and by decisions on whether to finance the investments using non-Federal sources. Non-Federal financing of a portion of the EE capital program would likely be at a different interest and would affect the forecast of interest expense.

Energy Efficiency: Additional Questions

BPA is still working on responses to the following questions and will post before April 11th.

A Calculation of the Budget Impact of BPA's Energy Efficiency Investment:

- Yearly totals for FY2005-2013 of MWh saved through the energy efficiency programs (both capital and expense programs).
- Yearly (FY2005-2013) cumulative MWh savings, incorporating savings over the measure lifetime, for BPA energy efficiency savings.
- Yearly (FY2005-2013) average levelized cost per MWh for BPA energy efficiency savings.

A yearly (FY2005--2012) accounting of average wholesale power rates and calculation of the wholesale value of cumulative energy saved based on these wholesale power rates and the yearly MWh savings values. This would be Tier 1 rates going forward, but not historically.

- Note: *BPA will provide the FY2005-2012 average wholesale power rates and the cumulative energy savings per year, but BPA does not calculate" the wholesale value" of those savings using the wholesale power rates.*

Fish & Wildlife

Request: BPA is excluding fish and wildlife programs from prioritization, on the grounds that decisions regarding fish and wildlife are largely being made elsewhere. Does BPA have no flexibility on when to do fish and wildlife capital investments, even if the investments are mandated?

Response:

- BPA has limited flexibility on timing of capital expenditures, such as delaying land acquisitions or passage projects by a few months to manage spending to FY budgets. However, we exercise this flexibility with caution as it may impact landowner willingness to engage, shorten the in-water work window, and/or otherwise negatively impact the feasibility or benefits of the project, including its costs.

Transmission

Request: Can BPA provide more detail on long-term rate forecasts for Point to Point or other segments?

Response:

- This detail is not available at this time.

Financial Disclosure

This information has been made publicly available by BPA on March 28, 2014 and contains information not reported in BPA financial statements.

Note: Revised 4/8/14