

Capital Portfolio Management Workshop Follow-ups

BPA's Discount Rate Methodology

Official Agency Discount Rates

Power = 12%

Transmission Expansion = 9%

Risk-free = 4.5%

The capital prioritization model uses the risk-free rate adjusted for inflation (3% real discount rate). The risk of an investment is accounted for by using range estimates for all the important cost and benefit uncertainties. Since the risk of the investment is reflected in the cash flows, it is not appropriate to be using discount rates that include a risk premium, which is the case for the Power and Transmission discount rates listed above. Doing so would be double counting for risk.

Federal Hydro used a discount rate of 8% for analyzing their portfolio of investments that are included in their asset strategy.

Transmission used a discount rate of 6.85% for analyzing their portfolio of investments that are included in the sustain asset strategy.

CIR/IPR Capital Level Development

In the 2014 CIR closeout, we committed to revisit the way we view capital affordability with more emphasis on rate impacts. That commitment to long-term competitiveness has underpinned the subsequent Focus 2028 process. We have spent the intervening years in developing the analytical tools and capability to allow us to deliver on that commitment. We have made considerable progress in developing our analytical capability. While our process isn't yet as nimble and efficient as we intend to make it, it does allow us to produce the long-term competitiveness context to support capital decision making.

As we began exploring capital levels in preparation for the 2016 CIR/IPR, we started by analyzing two book-end scenarios with our newly developed capability. One book-end was intended to capture the true system needs and the other was designed to hold capital investment flat and to historical levels. These scenarios are described in more detail as follows:

- The *System Needs* scenario assumes funding constraints are removed. The scenario is intended to capture what the power and transmission systems will need investment-wise, regardless of the rate and financial impacts. However, constraints on our ability to execute -- planned outage time, labor, supply chain, etc., are taken into account. It assumes no change in BPA's willingness to fund transmission expansion investments. This scenario is designed to capture the investment levels needed to:
 - Minimize the risk of meeting reliability, availability, environmental, security and other standards;
 - Satisfy current tariff and policy choices; and
 - Minimize total economic costs for sustain programs (full and timely implementation of asset strategies).

- The *Capital spend held flat and low* scenario assumes sustain capital spending is constrained roughly to historical averages and transmission expand spending does not satisfy current tariff and policy choices. This would not be considered a viable scenario without shifts in risk tolerance to reconsider BPA’s existing transmission tariffs and policies.

After examining the results of the book-end scenarios and realizing that neither would be truly viable, we began an iterative process of running scenarios that fell in between. The intent was to reduce capital spending levels without significantly impacting system performance. We believe the proposed capital levels strike that balance.

As we progressed through the scenarios, we refined our tools and assumptions. We believe the book-end scenarios appropriately frame the boundaries and we’re satisfied that the proposed levels represent a meaningful path forward, given what we know today. We fully intend to continuously improve our process and tools so that future discussions will be even more grounded in solid analytics.

The table below describes some of the key assumption differences between all three scenarios, beyond different sustain capital levels.

	Flat and Low	System Needs	Proposed CIR
Transmission			
I-5	Included \$250m for non-wires alternative and ~\$106m write-off treated as a Regulatory Asset	Included @ \$749m (total direct project cost)	<u>Not included</u> \$749m (total direct project cost) Included SOA alternative @ \$200M
B2H	Not included	Included @ \$300m (total direct costs)	Not Included
Columbia R. Treaty 500Kv line	Not included	Included @ \$874m (total direct costs)	Not Included
Facilities			
Major Ross Building Replacements	Not included, but associated lease expense is embedded	Included capitalized build options @ \$122m	Expense renewal alternatives included for FY20+
Control Center Replacement	Excluded	Excluded	Included. Assume construct in FY27-28 @ \$111M
IT			
BIS	Included @ \$22m	Included @ \$40m	Included @ \$32m
Billing System	Included @ \$8.5m	Included @ \$8.5m	Included @ \$8.5m
Commercial Grid Operations	Not Included	Not Included	Not Included

Reference Case Repayment Assumptions – Additional Information

The repayment assumption in the reference case recognizes the value to Bonneville and its stakeholders of always having access to the short-term liquidity facility with the U.S. Treasury and sets aside \$750 million of its U.S. Treasury borrowing authority (BA) as a constraint for this purpose. Given the limitations on BA and other third party means of accessing capital, additional treasury repayment is modelled to replenish BA as needed to meet that constraint.

For the 15-year financial analysis in the reference case, Bonneville recognizes both the likely levels of future third-party financing based on current programs and current statutory limitations on BA. In order to project a reference case with financial results out 15 years, the \$750 million of BA for the liquidity facility must be maintained for the entire period. If BA were to be depleted within this 15-year period to a level below \$750 million, significant decisions would be made regarding Bonneville’s capital for continuing investments, revenue financing, and additional revenue requirements due to the lack of the liquidity facility for risk mitigation.

Based on the latest CIR figures from 2016, the reference case capital needs resulted in the following schedule of federal bonds issued by business line:

Federal Bonds Issued by Business Line FY16-30		
Business Line	Federal Bond Projections (millions)	Percent of Total
Transmission	\$4,418	44%
Power	\$5,684	56%
Total	\$10,103	

In the previous reference case, this calculation was done using the projected federal bonds through 2044. In an effort to better align this assumption with the rest of the reference case, this calculation is now being done using the projected federal bonds through 2030. Had this calculation been updated to include all projected federal bonds through 2044, the total would be \$22.8 billion and the percentages would have been 43% and 57% for Transmission and Power respectively.

As of the date of the reference case, Bonneville had \$2.5 billion in remaining BA, after reserving the \$750 million liquidity facility (or \$3.3 billion total). Thus, there is a \$7.5 billion shortage of Federal capacity (\$10 billion less \$2.5 billion) by 2030.

The \$7.5 billion shortage in federal capacity is allocated to Power and Transmission by applying the percentage of total federal bonds projected, shown above. This results in Power needing to repay \$4.2 billion in federal bonds and Transmission needing to repay \$3.3 billion, between 2016 and 2030. These amounts are comprised primarily of bonds already scheduled to be repaid as part of the regular repayment process, which takes into account the effects of Regional Cooperation Debt and Lease Purchase, with the remaining amount resulting in additional payments.

The additional payments for the Power and Transmission business lines are \$474 million and \$1,015 million respectively. The early federal repayments in the reference case reduce cumulative interest expense through FY30 for Power by \$53 million and for Transmission by \$177 million.

The specific timing of early federal repayment is determined primarily by evaluating capital-related costs in combination with the exhaustion of BA when no early payments are made with the additional goal of minimizing rate increase volatility. Early repayment of federal debt in the reference case per business line is shown on the next page.

Breakdown of Federal Bond Payments (millions)																
Power	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
New Federal Bonds	332	299	327	343	272	377	377	385	401	409	416	424	432	440	448	5,684
Regularly Scheduled Repayment	11	35	90	285	168	461	471	479	446	159	146	160	152	348	364	3,774
<i>net BA</i>	(321)	(264)	(237)	(59)	(104)	84	94	94	45	(250)	(270)	(264)	(280)	(93)	(85)	(1,911)
Reference Case Repayment	11	35	90	285	168	461	471	479	446	159	186	217	352	440	448	4,247
<i>net BA</i>	(321)	(264)	(237)	(59)	(104)	84	94	94	45	(250)	(230)	(207)	(80)	-	-	(1,437)
Added Payments to Maintain BA	-	-	-	-	-	-	0	0	0	0	40	56	200	93	85	474
Reduced Federal Interest	-	-	-	-	-	-	-	-	-	-	(1)	(4)	(11)	(17)	(21)	(53)
Transmission	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
New Federal Bonds	345	270	240	246	300	306	307	287	291	290	299	299	305	311	323	4,418
Regularly Scheduled Repayment	20	41	5	248	183	193	205	215	204	148	172	172	139	164	178	2,286
<i>net BA</i>	(326)	(229)	(235)	3	(116)	(113)	(102)	(72)	(87)	(142)	(127)	(128)	(166)	(148)	(145)	(2,132)
Reference Case Repayment	20	41	5	248	183	193	206	287	291	290	299	299	305	311	323	3,302
<i>net BA</i>	(326)	(229)	(235)	3	(116)	(113)	(101)	-	-	-	-	-	-	-	-	(1,116)
Added Payments to Maintain BA	-	-	-	-	-	-	1	72	87	142	127	128	166	148	145	1,015
Reduced Federal Interest	-	-	-	-	-	-	()	(1)	(7)	(12)	(18)	(24)	(31)	(38)	(45)	(177)