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May 17, 2018

VIA ELECTRONIC MAIL

British Columbia Utilities Commission
6th Floor, 900 Howe Street
Vancouver, B.C.
V6Z 2N3

Attention: Patrick Wruck, Commission Secretary and Manager, Regulatory Support

Dear Sirs/Mesdames:

**Re: British Columbia Hydro and Power Authority - Waneta 2017 Transaction
Application ~ Project No 1598933**

We are counsel to the Commercial Energy Consumers Association of British Columbia (the "CEC"). Attached please find the CEC's Final Submission with respect to the above-noted matter.

If you have any questions regarding the foregoing, please do not hesitate to contact the undersigned.

Yours truly,

OWEN BIRD LAW CORPORATION



Christopher P. Weafer

CPW/jj
cc: CEC
cc: BC Hydro
cc: Registered Interveners

**COMMERCIAL ENERGY CONSUMERS
ASSOCIATION OF BRITISH COLUMBIA**

FINAL SUBMISSIONS

**British Columbia Hydro and Power Authority Waneta 2017
Transaction Application
Project No. 1598933**

May 17, 2018

**Commercial Energy Consumers Association of British Columbia
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COMMERCIAL ENERGY CONSUMERS ASSOCIATION OF BRITISH COLUMBIA

Final Submissions

British Columbia Hydro and Power Authority Waneta 2017 Transaction Application Project No. 1598933

The Commercial Energy Consumers Association of BC (the “CEC”) represents the interests of those ratepayers consuming energy under Commercial tariffs in applications before the BC Utilities Commission (the “BCUC” or “Commission”).

On October 30, 2017, the British Columbia Hydro and Power Authority (“BC Hydro”) applied to the Commission for approval to acquire an undivided two-thirds interest in the Waneta Dam and associated assets (the “Transaction”) from Teck Metals Ltd (“Teck”). The Transaction has a purchase price of approximately \$1.2 billion.

The CEC has participated in this proceeding and has reviewed the evidence.

The CEC provides the following Final Submissions for the Commission’s review and consideration.

I. INTRODUCTION AND SUMMARY POSITION

1. The CEC is of the view that making a decision on this matter requires significant judgement on the part of the BCUC. Although certain costs and revenues are well established during the lease period contemplated by the Transaction (the “Lease Period”), key issues remain about the value of the asset following the Lease Period and about various valuation approaches that may be considered.
2. The CEC has reviewed the evidence and considers that the Transaction likely will have a positive Net Present Value and will result in beneficial ratepayer impacts.
3. The base evaluation of the lease payments in the 20 years period generate more revenue than the costs attributed to the Transaction leaving low net cost for what BC Hydro receives from the Transaction.
4. The Transaction enables BC Hydro to eventually acquire full control and use of a generating plant currently producing 2670 GWh/year of energy from 490 MW of capacity along with important transmission assets.
5. The revenue from these resources following the 20 years lease period amply cover the costs of the Transaction and give BC Hydro a significant addition to its Heritage Assets for the long term, albeit with significant investments to replace many components in order to extend the life of the Waneta Dam and its usefulness.

A) Base Case

6. BC Hydro has made numerous evaluations under different assumptions across a range which shows net present values for the addition from zero to approximately \$900 million. The CEC estimates \$300 to \$400 million as a reasonable base case evaluation.
7. BC Hydro has made ratepayer impact evaluations for both the lease period and the post lease period showing net revenue requirement reductions across the entire period.

B) Assessing Risks, Uncertainties & Evaluation Approaches

8. If on balance BC Hydro's judgements on the risks and the uncertainties is sustained then the Transaction is a good deal. It is the CEC's view that this application is primarily about assessing these judgements and the unknowns.
9. Given this summary position it remains to outline the key areas of uncertainty and judgement required to assess both those issues which would show even greater value than the range of values BC Hydro has analyzed and those that would show potentially lower values than BC Hydro has analyzed.
10. The CEC summarizes its assessment on both the positive value additions and the negative value detractions which it sees in the evidence before the Commission and the CEC provides its judgements on these issues for the Commissions consideration as it makes its overall judgement about the merits of the Transaction.

C) Positive Values

11. The CEC considers that the evaluation period selected for the acquisition of this asset does not cover the considerable longer-term values acquired as Heritage Assets with an additional 70 years life period following the 40 years evaluation period. The CEC estimates that this value could be placed between present values of between \$.5 billion and \$1.5 billion.¹ The CEC suggests that the tail value of the dam should be a significant weighting in the judgement of risks and benefits. There is a reason that BC Hydro's Heritage Assets have substantial value to ratepayers today and there is a very robust range for that to continue to be the case. BC Hydro has stayed away from making their business case because they have felt that it was too uncertain. The CEC is sure that qualitatively BC Hydro is well aware of the potential for a very substantial tail value to this evaluation and BC Hydro has acknowledged in their final arguments that this is the likely outcome.
12. The CEC notes that the business case also includes many conservative estimates which create the potential for significant upside. In particular, the discount rate of 6% may be unnecessarily conservative. BC Hydro has shown that a .05% change in the discount rate adds to the present value approximately \$100 million to \$200 million depending upon the

¹ The CEC's estimate flows from assumptions of BC Hydro's average domestic revenue at say \$80/MWh escalated at 2%/year, replacement costs of approximately \$1 billion and ongoing operating costs and sustaining capital escalating at 2% per year using discount rates of 6% and 4% to generate present values.

scenario being evaluated. The financing and real costs for ratepayers can better be seen at a discount rate of 3.4% or less giving rise to a present value addition of up to \$400 million to \$700 million over the 40 years evaluation period.

13. The CEC notes that the evaluation takes into account revenue values based on BC Hydro's industrial tariffs and a value for the long run marginal cost of energy but does not show revenues from residential and commercial tariffs, which could be considerably higher providing additional upside if domestic use of the energy is realized. The CEC expects that in this timeframe of 40 years there is a definite probability that this energy will become used and useful for domestic service to BC Hydro's customers. The CEC expects that this issue could add significant real present value to the Transaction case beyond industrial tariffs demonstrating higher potential revenue value. The LRMC cases are higher in value.

D) Negative Values

14. The CEC considers BC Hydro's business case is overly optimistic in that it relies on the 2016 Load Forecast and Mid-Gap Load Resource Balance from the Revenue Requirements Application and a high Long Run Marginal Cost for its evaluation of avoided costs. However, the CEC's view is that BC Hydro has addressed this potential by evaluating a scenario where sales of the energy would be made to the export markets. In addition, BC Hydro has shown the evaluation based on the small gap load forecast, which still shows positive values for the Transaction. The business case remains effectively positive even after accounting for an ongoing surplus and relatively low market prices.
15. On the downside, the CEC notes that the asset is already of considerable age and may require a significant replacement project at the end of the lease period for major components. The CEC submits that costs for such a replacement project could be considerably greater than anticipated. BC Hydro has good knowledge of the Waneta plant and has done considerable due diligence to build an understanding of these potential costs during the 40 years lease period and have considerable understanding of the significant capital investment requirements for replacement. Nevertheless, this issue could erode the tail values. It is the CEC's view that the appropriate judgement is that BC Hydro's long-term interest in adding to its Heritage Assets will prove to be beneficial to its future customers and ratepayers and is a risk worth taking.
16. Another issue is the potential for future supply of energy and capacity costs to drop dramatically from the current levels, potentially obsoleting the investment in the Transaction. The CEC has found that even at low energy and capacity prices for competitive supply the case for the Transaction remains in positive net present value territory. The CEC's view is that while this is a real risk and there is some evidence to support declining costs, making the case for obsolescence has not been realistically possible for the CEC.
17. Finally, the CEC notes that BC Hydro has ongoing construction of the Site C Dam which could result in significant additional investment costs. The CEC believes that it would be

appropriate for the Commission to apply its judgement to the question of how much debt BC Hydro is accumulating and now undertaking another \$1.2 billion in debt at this time.

E) Balance of Judgements

18. On balance, the CEC's judgment of the issues is that the Transaction acquisition will most likely be favourable, and the upside potential is significantly greater than the associated risks and uncertainties.
19. The wide range of positive net present values under different scenarios combined with an assessment of major future uncertainties and conservative evaluation approach issues makes the business case for the BC Hydro ratepayers positive and likely highly positive.

F) Recommendation

20. The CEC recommends that the Commission approve the application as filed by BC Hydro.

G) BC Hydro Requests

21. BC Hydro requests, pursuant to section 44.2(3)(a) of the UCA, \$1.203 billion for the purchase of 2/3rds the Waneta assets, \$20 million for the purchase of the transmission assets (year) and up to \$50 million in transaction costs.²
22. BC Hydro also seeks rate orders from the Commission and an order seeking approval of the Teck Wheeling Agreement.³
23. Additionally, BC Hydro seeks certain accounting orders to make adjustments to the Non-Heritage Deferral Account.⁴
24. The proposed draft orders are included in the BC Hydro Final Argument.
25. The CEC recommends that the Commission approve BC Hydro's requests as outlined in their final submission.

H) Commission Considerations

26. BC Hydro applies for the acquisition under Section 44.2 of the *Utilities Commission Act* ("UCA").
27. In addition to considering the interests of persons who receive or may receive service from the authority, the Commission must consider the BC energy objectives, and an applicable integrated resource plan approved under Section 4 of the *Clean Energy Act* and the extent to which the schedule is consistent with the requirements under section 19

² Transcript Volume 4 page 223 & BC Hydro Final Argument Page 59, Para 145

³ BC Hydro Final Argument, Page 60, Para 148

⁴ BC Hydro Final Argument, Page 61 & 62

of the *Clean Energy Act*.⁵ BC Hydro outlines the considerations in Section 4.9 of the Application.

28. The Commission can issue all, none or some of the requested orders. However, it cannot compel a new transaction between Teck and BC Hydro or between Teck and any other third-party. Subject to the terms of a new transaction the Commission may not have any jurisdiction with regard to it.⁶
29. There are no significant legal ramifications for BC Hydro, Fortis Inc. or Teck if the Waneta Transaction fails to complete.⁷
30. The CEC submits that overall, the proposed acquisition Transaction meets the tests outlined under Section 44.2 of the UCA.

II. BACKGROUND

31. BC Hydro currently owns a one-third interest in the Waneta Dam, which has a history of reliability in the generation of clean and renewable energy.⁸
32. BC Hydro proposes to purchase the remaining two-thirds interest from Teck, at a purchase price of \$1.203 billion.⁹ The Waneta Purchase Agreement is filed as Appendix “E” to the application.
33. The purchase includes a leaseback agreement (to Teck) which includes a default 20-year term with an option for Teck to renew (at its discretion) to extend the leaseback for another 10 years, to a 30-year term in total.
34. BC Hydro is not acquiring Waneta as a load serving facility, until after the lease period.¹⁰
35. Leaseback payments for the first 20 years are at \$74 million per years, escalated at 2%. If the extension option is exercised then the lease payment would increase to \$144 million per year, with a 2% inflation adder.¹¹ The Waneta Lease Agreement is provided in Appendix “F” to the Application.
36. A Co-Possessors and Operating Agreement (“COPOA”) replaces the existing Co-Operators Agreement (“COA”). Under the COPOA Teck will continue as the operator, and BC Hydro will continue to have a ‘seat’ on the operating committee. BC Hydro and Teck will continue to share costs with the facility on a one-third/two thirds basis, reflecting the leaseback to Teck. The COPOA and the COA are attached to the Application as Appendices H and G respectively.

⁵ *Utilities Commission Act* Section 44.2

⁶ Exhibit B-1, CEC 1.1.2

⁷ Exhibit B-9, CEC 1.1.1

⁸ Transcript Volume 4, page 161

⁹ Transcript Volume 4, page 184

¹⁰ Transcript Volume 4, page 162

¹¹ Transcript Volume 4, page 184-185

37. The transaction also includes a transmission agreement. (Exhibit B-12). The Waneta transmission agreement provides for the sale of the transmission assets (Line 71) at a price of \$20 million; this occurs at the expiry or early termination of the lease.¹² Line 71 goes from Waneta to the Border and facilitates import and export.¹³
38. Both the Waneta Dam and Line 71 are unregulated assets.
39. Finally, a wheeling agreement (Exhibit B-12) provides for BC Hydro to provide import wheeling service in a capacity up to 300 MW after the lease period.¹⁴ Teck can use the wheeling agreement only to serve load and not for importing electricity to sell to Alberta.

I) Baseline Business Case Evaluation

40. BC Hydro provides its baseline business case in Appendix “N” of its Application.
41. The Waneta business case hinges primarily on the value of the asset in the post lease period, whether or not the utility is in surplus or deficit at the time, and what the value of energy is to the utility at that point.
42. Additionally, there are risks if BC Hydro does not purchase the Waneta assets but BC Hydro is required to service the smelter load. The CEC notes that Teck is not in BC Hydro’s service territory,¹⁵ and accordingly the risk would seem to be mitigatable but recognizes that this scenario could potentially occur.

(Present value to F2018 in \$ millions)

Valuation Index	LRB Position	Transaction Value Net of ROFO Offer Price	BCH does not purchase, Smelter not served by BCH	BCH does not purchase, Smelter served by BCH
LRMC (Clean)	Deficit	887	0	(879)
LRMC (Clean + Gas)	Deficit	662	0	(682)
Industrial Tariff (RS 1832)	Immaterial	82	n/a	n/a
Market Prices (ABB)	Surplus	114	0	(43)
Market Prices (Extrapolated)	Surplus	(31)	0	95

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43. From a simplistic perspective, the two-thirds asset is to be acquired at a cost of \$1.203 billion. BC Hydro has provided the assessment of the cumulative nominal dollar cost after the 20 years lease period of all of the costs and benefits as \$373 million.¹⁷ In the CECs view this is an exceptionally attractive cost to ratepayers for acquiring the Waneta assets and being able to extend them as Heritage Assets after the lease period.

¹² Transcript Volume 4, page 186-187

¹³ Transcript Volume 4, page 156

¹⁴ Transcript Volume 4, page 187

¹⁵ Exhibit B-8-2, BCUC 1.63.3

¹⁶ Exhibit B-1, Appendix N, page 3 of 90

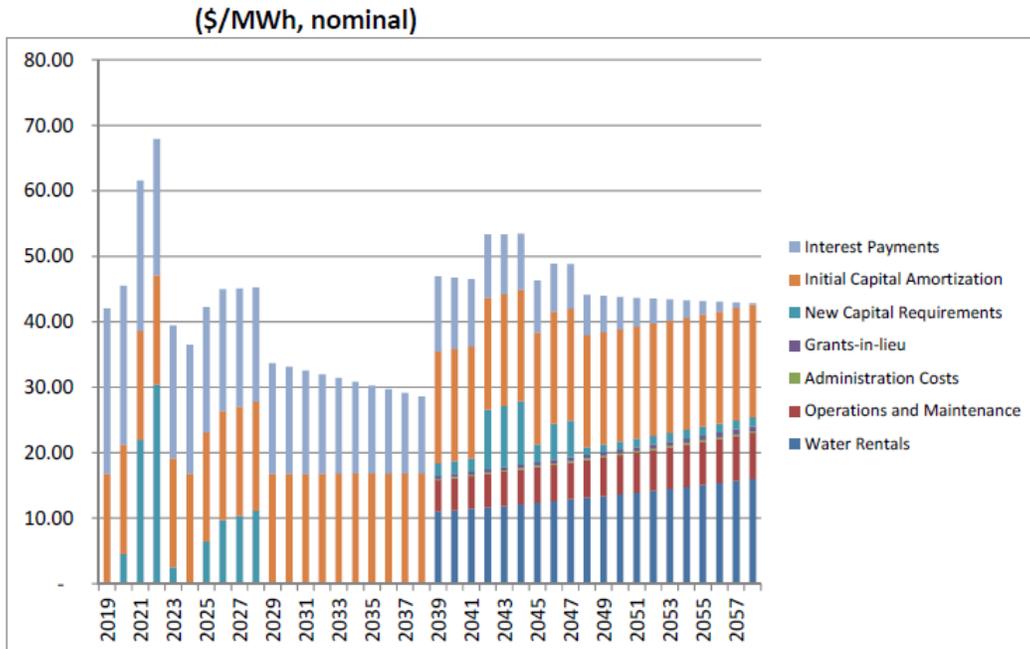
¹⁷ Exhibit B21-1, CEC 2.10.1

44. If this acquisition is amortized over the 40 years evaluation period then facilities not requiring replacement at the end of the 40 years, particularly the dam and other permanent civil infrastructure, would have a substantially longer economic life, certainly up to 70 years longer.
45. In the CEC's view the net cost to ratepayers for the energy and capacity capabilities of the plant will be an exceptional value for ratepayers, subject to one's judgement about the risks and uncertainties.
46. The CEC submits that the initial lease payments can be considered as reasonably secure barring default by Teck.
47. Teck has the option to extend its lease for another 10 years, resulting in 2 potential outcomes – either the asset will be used to serve Teck load for another 10 years, and then be available to BC Hydro at the 30 years mark, or the asset will be available immediately to BC Hydro after 20 years. Since the determination of the lease period extension is at Teck's discretion, the CEC submits that the 10-year lease extension period revenues should be valued at the lower of the value of Teck's lease payments or the value of the asset as an export/use by BC Hydro during this period. Teck might also have the option to acquire supply from FortisBC Inc.¹⁸
48. Following the lease extension period, the asset will be available to BC Hydro either to serve load or sell for export.
49. At the conclusion of the 20 years lease period, BC Hydro will likely be required to conduct some significant rehabilitation work. BC Hydro included the expected rehabilitation costs in its Business Case assuming leading utility practice is followed.¹⁹
50. The following is a detailed annual evaluation of the unit costs incurred by BC Hydro for the Waneta 2017 Transaction. The CEC finds this to be a very helpful way to understand the cost side of the business case.

¹⁸ Exhibit B-9, CEC 1.12.2

¹⁹ Exhibit B-9, CEC 1.26.2 In a good utility practice scenario a portion of the anticipated costs are deferred until following the Lease Period.

WANETA 2017 TRANSACTION UNIT COSTS



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51. BC Hydro provides the following summary Unit Energy Costs for the Transaction. \$48.25/MWh represents the unit cost of energy when the value of the Lease is removed.²¹

Table 4 Unit Energy Costs for Transaction (\$/MWh, 2018 dollars)

Period	20-year Lease
Full term (years 1-40)	41.25
Post-Lease Term (years 21-40)	48.25

(Above numbers rounded to the nearest 0.25)

22

52. For reference, the post-lease UEC of \$48.25 in 2018 dollars is equivalent to \$71.50 in 2038 dollars – the first year of the Post-Lease term.²³
53. The CEC submits that from a high-level perspective a price of \$48.25/MWh may be considered a relatively ‘reasonable’ price to acquire energy versus other options, potentially with the exception of Demand Side Management.

²⁰ Exhibit B-1, Appendix N page 14 of 90

²¹ Exhibit B-1, Appendix N, page 2 of 90

²² Exhibit B-1, Appendix N, page 23 of 90

²³ Exhibit B-1, Appendix N, page 23 of 90

54. The CEC submits that these costs are conservatively presented because they amortize the capital investment over the 40 years evaluation period, which would not recognize properly the substantial portion of the investment properly attributed to the enduring dam facilities and other physical structures that will not require replacement, perhaps at the end of the 40 years period. Of course, there is a risk of the capital investment required over the 40 years being underestimated, which is a judgement to be factored into the evaluation.

55. The CEC provides the following analysis of the components of the business case.

J) Revenues – Lease Payments

56. BC Hydro has negotiated a twenty-year lease term with Teck which provides for revenues to BC Hydro of \$74 million per year for the first 20 years escalating at 2% per year.

57. The payments are outlined in the Application in Appendix “F”.

58. The CEC accepts the revenues as provided by BC Hydro and judges them as reasonably secure subject to the risk of default. In the CEC’s judgement BC Hydro would have significant mitigation opportunities in the event of default.

K) Operating and Capital Costs

59. BC Hydro outlines the types of operating costs and capital costs that will accrue at pages 11 through 15 of 90 in Appendix “N” of the Application.

60. During the 20-year Lease Period, Teck is largely responsible for operating and most capital costs. Incremental capital costs of a nominal \$180 million over 20 years, plus incremental administration costs of \$240,000 per year will accrue to BC Hydro.²⁴ Teck and BC Hydro will share the cost of ‘extraordinary’ sustaining capital projects (>\$5 million).

61. BC Hydro is responsible for the costs of non- sustaining or growth capital projects. BC Hydro may be responsible for the 100% of the costs of any capital projects undertaken to bring the facility to a standard higher than specified under the COA.²⁵

62. As currently contemplated, it is only if BC Hydro directs actions or projects over and above what is required to meet the “Operating Standard” outlined in the COPOA (section 7.1) that BC Hydro will be responsible for all costs.”²⁶

63. BC Hydro has assumed ‘leading utility’ practice forecasts rather than ‘good utility practice’ in its business case.²⁷ BC Hydro’s cost of service is high in the early years due

²⁴ Exhibit B-1, page 4-7 and 4-8

²⁵ Exhibit B-1, Appendix N, page 12 of 90

²⁶ Exhibit B-1, page 2-7 Footnote 53

²⁷ Transcript Volume 4, page 205

to the substantial capital requirements to bring the asset up to Leading Utility practice, and low as Teck pays operating expenses, water rentals, and sustaining capital.²⁸

64. The CEC notes that Teck maintains significant operational control, is the Operator of the facility and that the Waneta Lease Agreement (Appendix “F”) stipulates that the Operator will exercise the degree of care and diligence of an experienced dam operator in accordance with ‘good’ utility practice.²⁹
65. The CEC is confident that the existing working relationships between the parties have been successful and in the CEC’s view the nature of the working relationships ongoing should not be viewed as a major risk.
66. BC Hydro takes on full accountability for capital costs following the Lease Term.
67. Following the Lease Period BC Hydro anticipates capital costs of \$3 million per year plus costs related to grants in lieu of property taxes, operations and maintenance, water rentals and incremental operating costs of the Transmission Asset.³⁰
68. The CEC submits that BC Hydro has substantial experience in evaluating the costs and BC Hydro’s anticipated costs may reasonably be considered as the appropriate operating and capital costs.
69. BC Hydro has considerable operational familiarity. BC Hydro has been part of the operating committee with Teck and has had eight years of insight into both the physical condition and the operational characteristics of the plant.³¹
70. BC Hydro’s response to BCOAPO 2.6.1 provides a comparison of the generation sustaining capital budgets and actuals since the 2010 Transaction.

	CY2010	CY2011	CY2012	CY2013	CY2014	CY2015	CY2016	CY2017
Budget	395,600	1,430,000	1,350,000	0	0	0	0	909,855
Actuals	117,899	1,499,982	346,308	0	0	0	0	45,672

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71. BC Hydro points out that the calendar year 2012 (CY2012) variance is due to a change in scope of planned habitat compensation and the CY2017 variance is due to deferral of work to CY2018.³³
72. The CEC accepts BC Hydro’s explanations with regard to these variances.

²⁸ Exhibit B-1, Appendix N page 14 of 90

²⁹ Exhibit B-1, Appendix G, page 6 of 19

³⁰ Exhibit B-1, page 4-12 to 4-13

³¹ Transcript Volume 4, page 169

³² Exhibit B-20, BCOAPO 2.6.1

³³ Exhibit B-20, BCOAPO 2.6.1

73. Given that BC Hydro has been privy to the operations of the asset since the 2010 Transaction the CEC considers that it is likely that the sustaining capital has been managed appropriately and can be expected to continue.
74. The CEC understands that the NPV and rate impact calculations include Line 71 costs, and post lease revenues from that.³⁴
75. Overall the CEC considers that the operating and sustaining capital costs are likely to be accurately assessed by BC Hydro in its business case.
76. There will of course always be uncertainties and a potential for extraordinary costs related to the facility which could become BC Hydro's responsibility. The CEC views this as a relatively remote possibility because of the ongoing nature of the operation and the considerable time BC Hydro has had to assess the facility.
77. The CEC recommends that the Commission rely on the sustaining capital and operating costs as provided by BC Hydro in its business case.

L) Transmission Assets

78. BC Hydro excluded transmission assets which were included as part of the Fortis Transaction. These consist of Line 71, Lies 14-17, Emerald Switching Station and Waneta Hydro station.
79. BC Hydro will purchase the transmission assets at the end of the Lease period from Teck or upon termination of the Lease³⁵ for \$20 million (dollars of the day).³⁶
80. For the Lease Period, BC Hydro is satisfied with the transmission rights as provided currently under the COA for its one-third interest in Waneta and these rights are included in the Waneta Transmission Agreement.
81. The CEC is satisfied with the exclusion and later purchase of the Excluded Transmission Assets.
82. Estimating any additional costs for transmission above the \$20 million is speculative as it will depend on when any such options are exercised, which options are exercised and other factors. BCUC 1.41.2 provides a range of costs should the Transmission Rights Option be exercised pursuant to the Transmission Facilities Agreement between Teck and FortisBC.³⁷
83. The CEC considers that the cost of \$20 million is relatively minor in this Transaction and submits that the Transmission costs should be considered as relatively fixed.

³⁴ Transcript Volume 4, page 205

³⁵ Exhibit B-9, CEC 1.10.2

³⁶ Exhibit B-9, CEC 1.10.4.1

³⁷ Exhibit B-9-2, BCOAPO 1.8.2

M) Economic Life

84. The economic life of Waneta is expected to be 40 years from 2018, when the Transaction is expected to close, and is consistent with the asset life used to purchase the initial one third interest in Waneta.³⁸ BC Hydro does not incorporate a terminal value following this life.³⁹
85. BC Hydro will likely be required to undertake a substantial rehabilitation or component replacement project at the end of the Lease period (whether after 20 or 30 years) or the 40 years evaluation period, which will likely extend the life of the Waneta Assets past the assumed 40 years life.⁴⁰
86. The CEC submits that BC Hydro's estimate of the economic life of the Waneta Assets is appropriate in that the dam was constructed in 1954⁴¹ and the 40 years life extension will bring the life to 2058; or about 104 years of life. Additionally, the 40 years term is consistent with the economic life used in the acquisition of the initial one third interest.
87. The CEC submits that there will almost certainly be additional value following the 40 years evaluation period.
88. The CEC submits that the tail value for the Transaction when BC Hydro holds the asset as one of its Heritage Assets should be valued against costs for upgrading with a major component replacement project and the potential revenues and operating costs for the next 70 years. The CEC estimates that these tail values are very substantial being on the same order of benefit as the main business case, in the 100s of millions to billions of 2018 present value dollars. The CEC is of the view that this substantial Heritage Asset tail value cements the business case as very positive and attractive to ratepayer interests.
89. The CEC recommends that the Commission adopt 40 years as the appropriate economic life for the evaluation and consider this economic life to be a very conservative estimate.
90. The CEC recommends that the Commission in weighing the risks and uncertainties related to the Transaction make its own judgement of all of the conservative valuation aspects of the business case as an adequate offset to those risks and uncertainties.

N) Financing Charges

91. BC Hydro used a 3.4% financing charge as the basis of its actual financing for the debt it will be issuing.

³⁸ Exhibit B-1, page 4-4

³⁹ Exhibit B-1, Appendix N page 13 of 90

⁴⁰ Exhibit B-1, page 4-4

⁴¹ Exhibit B-1, page 1-2

92. The 3.4% used for the financing rate is based on forecasted fiscal 2019 interest rates provided by the Ministry of Finance and is the rate at which BC Hydro expects to issue debt at the time of the Waneta purchase.⁴²
93. BC Hydro has hedged \$1.25 billion of future long-term debt at a rate of 3.18%.⁴³
94. BC Hydro points out that it is highly unlikely that the Waneta 2017 Transaction would be financed at higher interest rates given current interest rates and the fact that the Waneta 2017 Transaction would close in less than 4 months.⁴⁴
95. The CEC acknowledges BC Hydro's position that it is not possible to precisely and accurately assess the probability of higher or lower interest rates but agrees with BC Hydro that financing costs are unlikely to be higher than 3.4%.⁴⁵
96. The CEC submits that the financing charges are appropriately costed and that 3.4% may be considered a relatively conservative estimate. Ultimately as far as ratepayer impacts are concerned BC Hydro's cost of capital for this Transaction will be in the 3.1% to 3.4% range.
97. The CEC recommends that the Commission accept 3.4% as the appropriate figure for the determination of financing charges but recognize the conservative nature of the figure.

O) Amortization Period

98. BC Hydro assumes a 40 years amortization period, which it considers to be conservative.⁴⁶ BC Hydro has evaluated investments that could extend the asset life past 40 years and as such would be assessed over an additional 70 years life.⁴⁷ BC Hydro rejected using this in its main business case because of uncertainties about the potential costs.

⁴² Exhibit Page 4-4 of the Application Footnote 113

⁴³ Exhibit B-8, BCUC 1.23.3

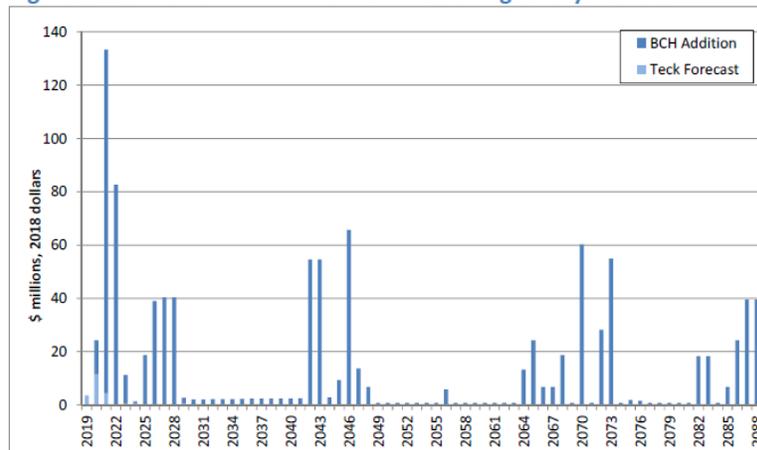
⁴⁴ Exhibit B-18-4, CEABC 2.28.2 (see also BCUC 1.23.3)

⁴⁵ Exhibit B-8, BCUC 1.23.3

⁴⁶ Transcript Volume 4, page 204

⁴⁷ Exhibit B-1, Appendix N, Page 11

Figure 1 – Life Extension Scenario with Leading Utility Practice



- 99. The CEC nevertheless submits that it will be highly likely that BC Hydro will choose to invest in the aging Heritage Asset hydroelectric facilities to extend their lives as it is doing now, including the Waneta facilities.
- 100. The CEC agrees that the amortization cost is conservatively established at 40 years.
- 101. However the CEC submits that the amortization of the dam and physical infrastructure related civil works may appropriately have an added 70 years of economic life.

P) Rehabilitation Costs

- 102. BC Hydro acknowledges that the purchaser will likely have a substantial rehabilitation project following the end of the Lease agreement. The anticipated capital costs are accounted for in the Waneta 2017 Business Case and will likely extend the life of the asset beyond the 40 years assumed life.⁴⁸
- 103. The CEC submits that future rehabilitation costs are extremely difficult to assess.
- 104. The CEC recommends that the Commission consider the potential for a significant increase to occur in the rehabilitation costs when assessing the value of the Transaction.

⁴⁸ Exhibit B-1, page 4-4

Q) Discount Rate

105. BC Hydro uses a discount rate of 6% in its NPV analysis.

106. The discount rate is significant to the analysis as illustrated in the table to the right⁴⁹ showing the consolidated value of the Transaction with changes to the financing costs and the discount rate at several different prices.

Change in financing cost	-0.5%	0%	+0.5%	+1.0%	+2.0%
Discount rate	5.50%	6.00%	6.25%	6.50%	7.00%
LRMC – Clean only	1,163	887	762	645	434
LRMC – Clean + Gas	894	662	558	460	282
BCH Industrial Tariff	263	131	70	13	(90)
Market Prices (ABB)	196	66	7	(49)	(150)
Extrapolated Prices	78	(31)	(80)	(127)	(212)
Industrial Tariff w/ higher load (BCUC IR 2.85.5)	308	170	107	48	(60)
LRMC (Clean) less 15% (BCUC IR 2.85.6.1)	903	679	559	459	278
LRMC (Clean) less 40% (BCUC IR 2.85.6.2)	532	373	282	209	76
LRMC (Clean+Gas) less 40% (BCUC IR 2.81.2)	384	238	172	110	(4)
Panel Mid-C Price Forecast (BCUC IR 2.85.6.3)	107	(8)	(60)	(109)	(199)

107. At 6% the analysis indicates a positive present value assuming BC Hydro is in a deficit position, and also if it is in a surplus position assuming ABB market prices. A negative PV is established under extrapolated prices and the panel mid-C forecast.

108. A change in the discount rate of +1% (ie. 7%) would suggest that the purchase only has a positive NPV when assuming a deficit position and avoided costs for the LRMC Clean and LRMC Clean + Gas scenarios. Under the ‘extrapolated prices the present value is in the order of -\$212 million.

109. Under a slightly lower discount rate of 5.5% the project has a positive present value at all proposed scenarios, including the extrapolated prices and the Panel Mid C price forecast.

110. When calculating the discount rate BC Hydro did not use its actual financing costs (cost of debt) but instead assumed a combination of debt and equity financing at its weighted average cost of capital. BC Hydro states that this approach is more consistent with an assessment of commercial transactions. BC Hydro notes that it will not actually issue any equity to finance the transaction⁵⁰ and that it is a conservative rate developed using conservative figures.

111. BC Hydro developed a weighted average cost of capital (“WACC”) assuming an average future cost of debt of 4.01%, an 8.75% rate of return on equity (“ROE”) and a 60% debt/40% equity ratio. The use of the WACC to determine discount rate used in financial analyses is a methodology that was confirmed in the course of the Commission’s review of the 2008 Long Term Acquisition Plan.⁵¹ WACC is used to determine the appropriate

⁴⁹ Exhibit B-8, BCUC 1.23.6

⁵⁰ Transcript Volume 4 page 214

⁵¹ Exhibit B-20, BCSEA 2.51.5

discount rate to present value a series of cash flows, evaluate business cases, and to support investment decisions at BC Hydro.⁵²

112. The 4.01% (cost of debt) is based on the average future cost of debt and is considered to be conservative.⁵³ The rate of 4.01 per cent used in the cost of debt component in BC Hydro's WACC is based on a five years average of interest rates provided by the Ministry of Finance. A five years average is used as it is evaluating projects that form BC Hydro's entire capital project portfolio on a company wide basis, occurring over a period of time.⁵⁴
113. The CEC agrees that a 5 year average future cost of debt is appropriate in the calculation of the WACC. The CEC submits that it should be considered to be very conservative given BC Hydro's actual cost of debt discussed below.
114. BC Hydro considers 8.75% to be conservative as the rate of return on equity. BC Hydro utilized this figure based on the Return on Equity ROE recently established by the Commission for FortisBC as a benchmark rate. BC Hydro argues that it is confident that if the Commission were to ever examine the appropriate ROE for BC Hydro it would be lower.⁵⁵
115. Previously when BC Hydro invested capital and added to its asset base, a portion of the asset base would be "deemed" to be equity and earn a regulated rate of return⁵⁶ of 11.84%.⁵⁷ Clean Energy Association of BC requested that BC Hydro run a scenario assuming an 11.84% return on equity and 4% cost of debt, which results in a 7% discount rate.
116. BC Hydro points out that there is no basis to establish BC Hydro's WACC using an 11.84% ROE⁵⁸, and the CEC agrees. Under the 10- year Rates Plan, BC Hydro's return on equity is fixed and no additional return is earned upon capital investment. The effect of this change is that the financing of new investments is effectively done at the cost of debt from a ratepayer perspective and does not include a return on equity component."⁵⁹
117. The CEC recommends that the Commission disregard CEABC's scenario of increased ROE or provide it very little weight in the discussion of discount rates.
118. The CEC does not consider a benchmark rate for FortisBC to be an especially appropriate proxy for BC Hydro's cost of capital and agrees that an appropriate ROE for BC Hydro might be lower.
119. The CEC submits however that there is no evidence on the record for a preferable ROE.

⁵² Exhibit B-1, page 4-4 Footnote 113

⁵³ Transcript Volume 4 page 216

⁵⁴ Exhibit B-1, page 4-4 Footnote 113

⁵⁵ Transcript Volume 4, page 217

⁵⁶ Exhibit B-1, page 46-47

⁵⁷ Exhibit B-8, BCC 1.13.2

⁵⁸ Exhibit B-18-4, CEABC 2.28.1

⁵⁹ Exhibit B-1, page 46-47

120. The CEC therefore recommends that the Commission accept the 8.75% ROE as acceptable as a proxy for BC Hydro's ROE.
121. BC Hydro considers the 60%/40% debt/equity ratio to be conservative. It is based on the HC1 directive which limits the amount that can be paid to the government to avoid causing the debt/equity ratio to exceed 60/40. BC Hydro points out that its actual debt/equity ratio is closer to 80/20.⁶⁰
122. The CEC agrees that the 60%/40% debt/equity ratio is the appropriate ratio given HC1 directive but recommends that the Commission recognize that the figure is conservative.
123. Overall the CEC recognizes the value of using a WACC for the discount rate but submits that it should be considered as a very conservative figure given the several conservative inputs.
124. The CEC submits that the actual cost of the financing could also potentially be used in order to reflect the actual costs that would accrue. This would result in a 4.01 discount rate (100% debt) and would place the Consolidated View of the project as being significantly more positive.
125. BC Hydro states that using a different methodology to determine the discount rate (from WACC) brings with it evidentiary and policy issues with far-reaching implications. BC Hydro suggests that an application into a single project, such as the current proceeding is not the appropriate forum for such an enquiry.⁶¹ The CEC agrees that this is not the forum for such a discussion regarding changing the primary project evaluation practices but the CEC does expect that understanding the debt costs to ratepayers is important to assessing ratepayer impact and in assessing the overall risks and uncertainties.
126. The CEC recommends that the Commission heavily weight the conservative nature of the discount rate when conducting its analysis of the Transaction.

R) Lease Period Value of Waneta

127. The initial rent payable by Teck is \$74,180,644 per annum escalated at 2% per annum.⁶²
128. Teck has an option to extend the lease for an additional ten years at a price of \$53/MWh.⁶³ Teck will have the advantage of being able to choose to use market supply or the Lease Renewal option depending on which price is most favourable at the end of the lease period.⁶⁴
129. If the Lease is renewed, the initial rent for the renewal term is \$94,656,990 (\$F2018⁶⁵) excluding rental taxes per annum, also escalated at 2%. The rents and escalation rates⁶⁶

⁶⁰ Transcript Volume 4, page 217

⁶¹ Exhibit B-20, BCSEA 2.51.5

⁶² Exhibit B-1, page 3-7

⁶³ Exhibit B-1, Appendix F, page 24 of 50

⁶⁴ Exhibit B-9, CEC 1.13.2

⁶⁵ Exhibit B-9, CEC 1.12.1. and 1.12.1.1

were determined as part of the competitive sales process leading to the ROFO. While an escalation rate adjusted for market conditions could potentially have some benefit⁶⁷, the CEC recognizes that BC Hydro is unable to alter the terms of the agreement.⁶⁸

130. The Lease Period payments (Un-risked) results in a Value of Assets of \$792 million \$2018⁶⁹ based on the value of the value of the payments included in the transaction agreement.
131. Adjusting the payments for the risk of default revises the value of assets depending on the value of the energy and the scenario considered.
132. BC Hydro provides the following Value of Assets/Lease to BC Hydro under several scenarios in BCUC 2.83.3.

Basis for Post-Lease Value	Value of Assets / Lease to BC Hydro					
	Un-risked Lease Period	Default Risk Adj.	Post-Lease Value	Extension Option	Total Value	Value net of purchase
LRMC (Clean)	792	107	1,482	(291)	2,090	887
LRMC (Clean + Gas)	792	64	1,206	(196)	1,865	662
Industrial Tariff	792	n/a	586	(45)	1,334	131
Market Prices (ABB)	792	1	570	(93)	1,269	66
Extrapolated Prices	792	(54)	440	(6)	1,172	(31)
Industrial Tariff w/ higher load (BCUC IR 2.83.3)	792	n/a	626	(45)	1,373	170
LRMC (Clean) less 15% (BCUC IR 2.83.4.1)	792	84	1,237	(231)	1,882	679
LRMC (Clean) less 40% (BCUC IR 2.83.4.2)	792	33	829	(90)	1,576	373
LRMC (Clean+Gas) less 40% (BCUC IR 2.81.2)	792	19	663	(33)	1,441	238
Panel Mid-C Price Forecast (BCUC IR 2.83.4.3)	792	(17)	477	(56)	1,195	(8)

70

⁶⁶ Exhibit B-9, CEC 1.11.1

⁶⁷ Exhibit B-9, CEC 1.11.3

⁶⁸ Exhibit B-9, CEC 1.12.2

⁶⁹ Exhibit B-18, BCUC 2.83.3

⁷⁰ Exhibit B-18, BCUC 2.83.3

- 133. The CEC notes that utilizing the assumptions of Extrapolated Prices and Panel Mid C price forecasts for the risk adjustment results in a reduction of the value of the asset of up to \$54 million.
- 134. The CEC discusses the risk of default under the Risk section of these submissions.
- 135. Overall, the CEC is satisfied with the BC Hydro calculation of the value of the Un-risked Lease Period as providing a suitable range of evaluations from which to assess the Waneta 2017 Transaction.

S) Extension Option

- 136. BC Hydro provides the following analysis, under various pricing scenarios, for the Teck Extension Option, which is to extend the Lease Period for a further 10 years.
- 137. The CEC notes that these are costs and serve to reduce the value of the Transaction.
- 138. The lease extension is at Teck’s discretion and the CEC considers that it is likely that Teck would exercise its right to a Lease Extension option under a higher market price scenario. BC Hydro has assessed the probability of Teck selecting the extension option at 58% for the higher value scenarios and as low as 11% for the extrapolated prices scenario.⁷¹ In assessing the extension option values the Commission should have regard to probability weighting the impact of this option, lowering the impacts shown. This can be factored into the judgment of risks and uncertainties.

Table 7 Cost of Teck Lease Extension Option (\$ millions)

Basis for Post-Lease Value	Option Cost to BC Hydro
LRMC – Clean only	291
LRMC – Clean + Gas	196
BCH Industrial Tariff	93
Market Prices (ABB)	45
Extrapolated Prices	6

72

- 139. As discussed below, in the Post Lease Value of Waneta Energy, the CEC is of the view that BC Hydro will continue in a surplus position for several years, meaning that BC Hydro would be selling to Teck instead of to the market. To the extent that the lease payments are lower than the market price, BC Hydro will experience a reduction in the Waneta benefits.
- 140. The CEC submits that the Lease Extension cost is not of overwhelming significance but should be included in the Commission’s assessment of the Business Case, as BC Hydro has properly included this evaluation in their evaluation.

⁷¹ Exhibit B-20, CEC 2.66.1

⁷² Exhibit B-1, Appendix N page 28 of 90

T) Post Lease Value of Waneta Energy – Surplus and Deficit Position

141. BC Hydro's Load Resource Balance position following the lease period will have a significant impact on the likely value of Waneta energy during the post lease period. In the post-lease period BC Hydro expects to integrate the two-thirds interest in Waneta into its existing portfolio to optimize the value to ratepayers. This provides the ability to market energy and capacity to external markets at potentially premium prices.⁷³
142. To the extent that BC Hydro requires energy it is likely to be valued differently than if BC Hydro is in surplus and will be selling the energy on the market. The difference arises from the requirement for self-sufficiency. Valuing energy for use within BC Hydro means valuing it at the next highest price for which BC Hydro can acquire the resource within the province and excludes market purchases.
143. The CEC notes that given the high value of the LRMC and LRMC + Gas relative to market prices, a surplus position would diminish the expected value of the acquisition.

III. LOAD RESOURCE BALANCE

144. BC Hydro argued in the Oral Hearing that the Commission should not attempt to figure out exactly where BC Hydro's load forecast is going to be in terms of its resource balance and long-run marginal prices and instead accept the 'logic' of the business case.⁷⁴
145. The CEC agrees that it would be impossible to accurately determine the load and need for energy twenty and forty years hence, particularly as the government and the Commission can influence the load resource balance in the future through its approvals of DSM, policies towards electrification and electric vehicle fueling stations and other determinations.
146. However, the Business Case is not singularly positive or negative under all circumstances and accordingly it is important for the Commission to have a view of the likely range of Load Resource Balance that could be in place following the lease period.
147. The business case NPV ranges from present values of (\$31) to \$887⁷⁵ in 2018 dollars depending on the various scenarios reviewed and the risk adjustments made for Teck default and for the Teck extension uptake.
148. The range of values covered by the BC Hydro scenarios generally covers the low load forecast or small gap case and as such confirms BC Hydro's view that the business case is the best evidence on the record and that treating the Waneta 2017 Transaction and a load resource planning exercise would not be a particularly productive approach.

⁷³ Exhibit B-9, BCSEA 1.15.13

⁷⁴ Transcript Volume 4, page 212

⁷⁵ Exhibit B-18, BCUC 2.83.3

149. The CEC submits that a view as to whether BC Hydro will likely be in surplus or in deficit, at some point, is a good starting point from which the Commission can then assess the likely benefit of the Waneta energy as well as any sensitivities and associated risks with changes to the BC Hydro load resource balance.
150. BC Hydro states that under its expected LRB gap scenario BC Hydro expects to require new energy resources in fiscal 2034⁷⁶ and capacity resources in fiscal 2029. As the expiry of the Lease occurs after those dates BC Hydro expects the energy and capacity from the two-thirds interest in Waneta to replace new resources following the Lease term. (underlining in original).⁷⁷ These assumptions are embedded in BC Hydro's analysis. For years in which BC Hydro is forecast to be in surplus the energy and/or capacity is sold at market prices. For years in which BC Hydro is forecast to be in deficit the energy and/or capacity replaces new resources.⁷⁸
151. The CEC notes that the government and the Commission can have significant influence on whether or not BC Hydro remains in extended surplus positions or whether BC Hydro moves toward requiring additional energy and capacity resources.

⁷⁶ Note: Planning View

⁷⁷ Exhibit B-8, BCUC 1.16.3

⁷⁸ Exhibit B-8, BCUC 1.6.2

**Table 3-9 Peak Capacity Load Resource Balance after Planned Resources
(Table 3-9 from F17-F19 RRA)**

(MWh)	F2017	F2018	F2019	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031	F2032	F2033	F2034	F2035	F2036
Existing and Committed Resource																				
1	Heritage Resources (including Site C) (k)																			
2	Existing and Committed IPP Resources (b)																			
Other Available Resources																				
3	IPP Reserves																			
4	Standing Offer Program																			
5	Renewable S																			
6	Sub-Total (c)																			
7	Total Supply (d) = a + b + c																			
8	14% of Supply Requiring Reserves** (e)																			
9	Effective Load Carrying Capability (f) = d - e																			
Demand - Integrated System Peak																				
10	2015 May Mid Load Forecast Before DSM																			
11	Expected LNG Load																			
12	Sub-Total (m)																			
Existing and Committed Demand Side Management & Other Measures																				
13	DSM Theft Reduction																			
14	Voltage and VAR Optimization																			
15	2015 DSM Plan F15 savings																			
Planned Demand Side Management Measures																				
16	2016 DSM Plan F17 to F19 savings																			
17	2016 DSM Plan F20+ savings																			
18	Sub-Total (n)																			
19	Surplus / (Deficit)** (l) = f - m + n																			
20	Small Gap Surplus / (Deficit)**																			
21	Large Gap Surplus / (Deficit)**																			

* 2015 Integrated System Load Forecast with losses
 ** Planning View is shown in this table. Capacity load resource balances are only shown in Planning View. See section 3.4.2.
 *** This is also referred to as the Planning Reserve - the system generating capacity beyond that required to meet peak demand that is necessary to meet reliability criteria. See section 1.2.2 of the IRP for more details on the criteria.

**Energy Load Resource Balance after Planned Resources
(Table 3-8 from F17-F19 RRA)**

(GWh)	F2017	F2018	F2019	F2020	F2021	F2022	F2023	F2024	F2025	F2026	F2027	F2028	F2029	F2030	F2031	F2032	F2033	F2034	F2035	F2036
Existing and Committed Resource																				
1	Heritage Resources (including Site C) (k)																			
2	Existing and Committed IPP Resources (b)																			
Other Available Resources																				
3	IPP Reserves																			
4	Standing Offer Program																			
5	Renewable S																			
6	Sub-Total (c)																			
7	Total Supply (Operational View)** (d) = a + b + c																			
Demand - Integrated System Total Gross Requirements																				
8	2015 May Mid Load Forecast Before DSM																			
9	Expected LNG Load																			
10	Sub-Total (e)																			
Existing and Committed Demand Side Management & Other Measures																				
11	DSM Theft Reduction																			
12	Voltage and VAR Optimization																			
13	2015 DSM Plan F15 savings																			
Planned Demand Side Management Measures																				
14	2016 DSM Plan F17 to F19 savings																			
15	2016 DSM Plan F20+ savings																			
16	Sub-Total (f)																			
17	Surplus / (Deficit) (Operational View)** (g) = d - e + f																			
18	Surplus / Deficit as % of Net Load (Planning View)**																			
19	Small Gap Surplus / (Deficit) (Operational View)**																			
20	Large Gap Surplus / (Deficit) (Operational View)**																			

* 2015 Integrated System Load Forecast with losses
 ** See section 3.4.2 for description of Operational versus Planning view

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152. BC Hydro plans to continue to include pursuing Demand Side Management savings, the Standing Offer Program and the renewal of IPP electricity purchase agreements consistent with the Recommended Actions the approved 2013 IRP.⁸⁰
153. The CEC submits that BC Hydro could likely cost effectively reduce its need for new energy through the use of increased levels of DSM. The CEC also submits that BC Hydro can make its energy and capacity more affordable by not taking on more

⁷⁹ Exhibit B-1, Appendix N, Appendix A, page 3 of 3

⁸⁰ Exhibit B-1, Appendix N page 16 of 90

expensive sources of energy over \$100/MWh and by signing any renewal of independent power producer power for approximate market prices. These issues are more likely to be addressed in the next IRP process and the next government policy process.

U) Load Forecast

154. The business case is founded on the 2016 Load Forecast⁸¹, which itself is founded on the 2013 Integrated Resource Plan (IRP). BC Hydro's updated Load Resource Balance ("LRB") with future or planned resources indicates the need for future resource acquisitions which could be met by the 2/3 Interest after the end of the Lease. BC Hydro has not made changes that have modified the timing for new energy and capacity resources from F2034 and F2029 respectively.⁸²
155. The CEC recognizes that under the UCA the Commission is required to consider the integrated resource plan approved under Section 4 of the *Clean Energy Act*.⁸³
156. The CEC does not consider that the 2013 IRP and 2016 Load Forecast provide a good basis for the load forecast and Load Resource Balance and while the Commission is bound to consider these sources it does not dictate that the Commission must use these plans.
157. A meaningful new integrated resource plan is not available, nor will likely be for some time.⁸⁴
158. BC Hydro believes its current mid load forecast as provided in its Fiscal 2017 to Fiscal 2019 Revenue Requirements Application and Site C Inquiry submissions represents an appropriate expectation of future load growth recognizing there are a number of uncertainties which could result in future load being higher or lower than the mid-forecast.⁸⁵
159. The CEC notes that BC Hydro's load forecasts have been historically high for several years as was evident in the Site C inquiry.
160. BC Hydro accepts that its load forecasts have more often been over than under but suggests that it still should not prevent the Commission from relying on the load forecast.⁸⁶
161. BC Hydro also points out that its load serving obligations have increased by 1400 GWh since 2010, or an average of approximately 200 GWh per year.⁸⁷

⁸¹ Transcript Volume 4, page 240-241

⁸² Exhibit B-1, Appendix N page 16 of 90

⁸³ *Utilities Commission Act* 44.2 (5.1) (b)

⁸⁴ Exhibit B-9, CEC 1.2.1 and B-20, CEC 2.48.1 and 2.48.2

⁸⁵ Exhibit B-9, BCSEA 1.48.1

⁸⁶ Transcript Volume 4, page 239-240

⁸⁷ Transcript Volume 4, page 240-241 (see BCUC 1.1.1)

162. The CEC notes that when BC Hydro defends its forecasts by selecting the 2010 dip as the starting point it effectively takes the slope of rebound out of the Great Recession as indicative, which is an inherently biased approach.
163. The CEC considers that the Commission should continue to be concerned about BC Hydro's forecasting.
164. The CEC notes that in its review of Site C the Commission found that the BC Hydro mid load forecast was excessively optimistic and considered it more appropriate to use the low load forecast in making its findings. The panel was also of the view that there are risks that could result in demand being less than the low load forecast.⁸⁸
165. The CEC submits that this may again be an appropriate starting point from which the Commission might assess the expected load forecast.
166. The CEC provides the following considerations for the Commission's review in its assessment of the load forecast.

Decline in Pulp and Paper

167. The CEC notes that there has been a material decline in the pulp and paper industry over the last 20 plus years. This industry represents a critical component of the BC forest sector and is facing global challenges. While the industry is enjoying higher prices at the moment there will undoubtedly continue, in the future, to be pressure particularly on lowering paper demand.
168. The CEC believes that the decline in this industry can reasonably be expected to continue and will place downward pressure on the BC Hydro load, until such time as a new market demand appear for the fibre.
169. The CEC recommends that the Commission factor continuing pressure on pulp and paper demand into its assessment of the BC Hydro load forecast for the present, until such time as a structural turnaround appears.

DSM Planning

170. The BC Hydro LRB relies on the DSM plan from the Integrated Resource Plan.
171. BC Hydro points out that Paragraph 44.2(5.1)(d) regarding DSM expenditures is only applicable to expenditure schedules that include expenditures on demand side measures. Since the expenditure schedule in the application does not contain expenditures on demand side measures, this consideration is not applicable.
172. The CEC submits that BC Hydro could cost-effectively do more DSM than is provided for in the Integrated Resource Plan.

⁸⁸ BCUC Site C Inquiry Final Report page 77 of 187

173. The CEC is of the view that the Commission should encourage BC Hydro to increase its DSM expenditures in order to minimize the costs of energy and capacity for ratepayers in the future.
174. The CEC recognizes however that in the current context it may not be appropriate to assume greater DSM expenditures than are already established in the approved IRP.

LNG Electrification

175. The CEC notes that electrification of LNG represents a significant element of the BC Hydro demand forecast but notes that the timeframes for major supply to the world from BC continue to drift into the future.
176. The CEC submits that LNG Electrification cannot necessarily be relied upon as a source of demand.

Natural Gas Electrification

177. The CEC acknowledges that electrification in the natural gas sector has seen active commitments to proceed in that direction, which could well become new increasing demand for BC Hydro. However, the oil and gas sectors may also continue come under competitive pressures and further environmental concern pressures.

Economic Impacts

178. The CEC understands that BC Hydro does not consider the impacts of potential economic downturns.
179. The CEC submits that it is highly likely that a recession, if not more than one, will occur before and or during the post-lease period.
180. The CEC notes that interest rates are expected to increase which will create a dampening effect on the economy. Further, the global debt levels may have severe economic repercussions in a significant economic downturn.
181. The CEC submits that it would be prudent for the Commission to expect that the BC Hydro Load will drop during these periods.

Low Carbon Electrification and Vehicles Electrification

182. The CEC submits that low carbon electrification and vehicle electrification could both have stimulating effects on the BC Hydro load. Low carbon electrification was not assumed in the development of the May 2016 Load Forecast and uncertainty band, however low carbon electrification would increase expected load growth towards the high-load forecast.⁸⁹ Vehicle electrification could be a significant trend but may take several years to develop.

⁸⁹ Exhibit B9, BCSEA 1.48.3

New Digital Economy Loads

183. The CEC expects that low energy cost jurisdictions like BC will have the potential to attract new loads from the expanding digital economy and its need for large computing capabilities and the consequent power demand. This too can provide significant upside potential and should not be overlooked when assessing the potential future requirements that may be served by BC Hydro.

V) Existing Surplus

IPP Purchases and Renewals

184. BC Hydro's LRB shows an energy surplus position of nearly 5,000 GWh in F2018 (operational view) and an ongoing surplus is forecast until 2032 under BC Hydro's expected load.
185. Under the small gap scenario (operational view) the BC Hydro LRB shows a surplus of nearly 7500 GWh in F2018, and a surplus is expected to continue past 2036, at which point the surplus will be over 4,000 GWh.
186. The CEC submits that this is a significant surplus and may take some considerable time to be absorbed by BC Hydro customers.
187. The CEC notes that BC Hydro's load resource balance includes significantly increasing IPP renewals as well as increasing SOP additions. As of F2036 BC Hydro will have IPP renewals of 5,515 GWh and SOP energy of 2,448 GWh.
188. The CEC's view is that IPP and SOP energy can be expensive and the cost can exceed the value of the market into which it will be sold under surplus conditions. The CEC does not believe that BC Hydro should continue to purchase expensive IPP energy or SOP energy at prices above that which it can be sold under surplus conditions, particularly for long periods of time.
189. The CEC submits that the evidence in this proceeding is that Waneta energy is likely to be less expensive than IPP or SOP energy.
190. To the extent that Waneta energy can displace IPP and SOP energy purchases the CEC recommends that this should be part of the future planning discussions, if BC Hydro is going to be focused on providing affordable energy for their customers.

Site C

191. BC Hydro's Load Resource Balance from the RRA includes Existing and Committed Heritage Resources (including Site C). As of F2025, BC Hydro total supply increases from 64,235 GWh to 64,235 GWh.
192. BC Hydro also states that they have not updated the business case to reflect the construction of Site C, and have explicitly avoided doing so, because the business case

“was the decision-making document primarily employed by BC Hydro when they decided to enter into ...the transaction....(A)mended after that fact to reflect changed circumstances, would distort the reality of what the situation was at the time in late July of 2017”.⁹⁰

193. The CEC is not certain as to the adjustments that would have been required to reflect the construction of Site C. Nevertheless, the CEC submits that failing to update the business case for the construction of Site C is not an appropriate approach to decision-making. When determining whether or not to move forward with a \$1.2 billion purchase the best and most current information should be available to the Commission and relied upon. Historical information as to the original known circumstances in a past decision to proceed may be of value in a prudency review, but not in this circumstance.
194. The CEC considers that there is little value to be found in assessing a business case which is based on incorrect information and is concerned that BC Hydro ‘has resisted the idea that it should update the business case’.
195. Additionally, the CEC points out that the construction of Site C was certainly known as a potential outcome in July 2017 and could and should have been included on that basis alone.
196. The CEC is concerned that BC Hydro’s approach to regulation could appear to present outdated information because it was the case at the time of the initial planning. The CEC submits that such an approach is likely to result in compromised decision-making if never properly considered and increased regulatory expense to the extent the information must be elicited during the course of the proceeding through information requests.
197. More importantly the CEC is concerned that BC Hydro does not undertake to assess up to date information for its own purposes in making decisions.
198. The CEC would have appreciated being able to review a completed and updated business case that reflected the reality of the situation going forward.
199. The CEC believes that in this case the range of scenarios in the business case does enable an understanding of what will occur with the inclusion of Site C. Fortunately the Waneta 2017 Transaction appears to be sufficiently robust that its product can be sold profitably into electricity markets.
200. However, the CEC recommends that the Commission direct BC Hydro to reject such an approach in the future and ensure it provides up to date information in all its applications before the BCUC.
201. Overall the CEC submits that there is a probability that BC will continue in an ongoing surplus for several years beyond expectations in evidence.

⁹⁰ Transcript Volume 4, page 193

202. The CEC recommends that the Commission consider the Small Gap scenario as the appropriate LRB for use in the valuation of the Waneta Transaction.

IV. VALUE OF ENERGY – SERVING LOAD IN BC

203. The cost of Waneta energy post lease is estimated to be in the order of \$48.25/MWh, which includes the cost of capacity.⁹¹
204. As noted above, an underlying assumption in BC Hydro’s assessment of the Waneta Transaction is that BC Hydro has a need for energy and that Waneta becomes a load-serving asset at the end of the lease period. Accordingly, the value of Waneta energy in the business case is heavily influenced by the avoided cost of energy that BC Hydro would otherwise be required to purchase.
205. BC Hydro points out that this assumption is consistent with BC Hydro 2013 IRP and its 2016 Load Forecast.⁹² They believe that this is the most robust methodology because it is based on the 2016 forecast which has been employed for a long period.⁹³
206. While the CEC provides a brief discussion on the LRMC Clean and LRMC with Natural Gas scenarios below, the CEC does not expect that BC Hydro will be in a deficit position for some time and that the LRMC may therefore not necessarily represent an appropriate valuation parameter for the post-lease energy for a period of time.
207. As noted above, the CEC considers it likely that BC Hydro will be in a surplus position for many years given the Site C construction, load forecast’s over forecast bias, and the ongoing purchase of IPP and SOP energy.
208. The CEC recommends that the Commission consider an analysis of the avoided cost of energy (i.e the LRMC Clean and LRMC scenarios) primarily as a sensitivity from its main analysis of the value of Waneta energy in the post lease period.

LRMC Clean and LRMC Clean Plus Gas

209. BC Hydro’s LRMC is a proxy for the avoided cost of purchasing new greenfield clean or renewable resources. The determination and usage of BC Hydro’s LRMC is derived from the Fiscal 2017-Fiscal 2019 RRA.⁹⁴
210. The LRMC Clean scenario assumes that load-serving obligations of BC Hydro may only be met by clean resources. This assumption is consistent with current provincial policy and legal framework.⁹⁵

⁹¹ Exhibit B-1, Appendix N, page 2 of 90

⁹² Transcript Volume 4 page 4, page 207

⁹³ Transcript Volume 4 page 4, page 211

⁹⁴ Exhibit B-1, Appendix N page 19 of 90

⁹⁵ Transcript Volume 4 page 207

211. Under the LRMC plus gas scenario BC Hydro assumes that it can serve a portion of its load through natural gas fired generation. (PICA plants). Under this scenario the value of energy would be lower than under the LRMC clean scenario.

Table 3 Marginal New Resources and Related Costs

Marginal Resources	Period of Applicability	LRMC (2018 real dollars)	
		Clean + Gas	Clean Only
Energy: Greenfield IPPs	F2034 and beyond	\$106/MWh	\$106/MWh
Capacity Resources	F2029 and beyond	\$88/kW-yr (SCGT)	\$221/kW-yr (pumped storage)
Combined Cost of Energy & Capacity	Effective for F2034 and beyond	\$122/MWh	\$145/MWh

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212. BC Hydro's LRMC for a combined block of new energy and capacity resources equivalent to Waneta is \$145/MWh (\$2018)⁹⁷ BC Hydro notes that the 20 years blended levelized LRMC from F2038-F2057 is approximately \$122/MWh (\$2018) for a Clean and Gas portfolio. This number is only applicable for the output of the 2/3 interest that is not used to serve Teck smelter load in years in which BC Hydro is forecast to be in deficit.⁹⁸
213. BC Hydro provides the following LRMC Clean and Clean + Gas sensitivities in its Business Case at page 31 of 90.⁹⁹

**Table 11 Sensitivity to LRMC (Clean and Clean + Gas scenarios)
(Present value net of purchase price)**

LRMC Scenario	Energy + Capacity LRMC (\$/MWh, \$2018)	Net Value of Transaction (\$ millions)
LRMC – Clean +15% premium	167	1,155
LRMC – Clean	145	887
LRMC – Clean + Gas	122	662
LRMC – Clean + Gas -15% decrease	104	442

As shown, increases in LRMC increase the value of the Transaction while decreases in LRMC decrease the value of the Transaction.

214. BC Hydro includes wind costs of \$100/MWh in \$F2015 based on forward looking technology and reflects specific development challenges in BC.¹⁰⁰ Wind energy in Alberta has an average weighted bid price of \$37/MWh. BC Hydro considers that its initial projection of \$85/MWh¹⁰¹ for BC wind energy is appropriate due to a variety of

⁹⁶ Exhibit B-1, Appendix N page 19 of 90

⁹⁷ Exhibit B-1, page 4-7

⁹⁸ Exhibit B-1, Appendix N page 19 of 90

⁹⁹ Exhibit B-1, Appendix N page 31 of 90

¹⁰⁰ Exhibit B-8, BCUC 1.10.1

¹⁰¹ F2018 at the point of interconnection. Adjusted for delivery to the lower mainland is \$106/MWh

factors in BCUC 2.80.1 but acknowledges that there is significant downward pressure on wind prices from various market factors.¹⁰²

215. BC Hydro responded to multiple information requests regarding the appropriate calculation of the LPMC. In BCUC 1.12.1 BC Hydro provides the following LPMCs using revised wind cost estimates and revised capacity (using industrial curtailment).

Revised Table 1 Marginal New Resources and Related Costs

Marginal Resources	Period of Applicability	LPMC (2018 real dollars)			
		Clean + Gas (Requested)	Clean + Gas (Business Case)	Clean Only (Requested)	Clean Only (Business Case)
Energy: Greenfield IPPs	F2034 and beyond	\$88/MWh	\$106/MWh	\$88/MWh	\$106/MWh
Capacity Resources	F2029	\$75/kW-year (Industrial Load Curtailment)	\$88/kW-year (SCGT)	\$75/kW-year (Industrial Load Curtailment)	\$221/kW-year (pumped storage)
Capacity Resources	F2030 and beyond	\$88/kW-year (SCGT)	\$88/kW-year (SCGT)	\$221/kW-year (pumped storage)	\$221/kW-year (pumped storage)
Combined Cost of Energy & Capacity	Effective for F2034 and beyond	\$104/MWh	\$122/MWh	\$127/MWh	\$145/MWh

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216. The range of LPMCs provided in the above response are within the LPMC range of \$104/MWh to \$167/MWh utilized in the Waneta business case.¹⁰⁴
217. Clean Energy Association of BC requested a scenario in which the LPMC was established at \$45/MWh.

¹⁰² Exhibit B-18, BCUC 2.80.1

¹⁰³ Exhibit B-8, BCUC 1.12.1

¹⁰⁴ Exhibit B-8, BCUC 1.12.1.1.

**Revised Table 8: Consolidated Value of Transaction Using \$45/MWh Energy LRM C
(Risky present value to 2018, \$ millions, 6% discount rate)**

Basis for Post-Lease Value	Value of Assets / Lease to BC Hydro					
	Un-risked Lease Period	Default Risk Adj.	Post-Lease Value	Extension Option	Total Value	Value net of purchase
LRMC (Clean)	792	52	807	(62)	1,587	384
LRMC (Clean + Gas)	792	9	530	10	1,341	138
Industrial Tariff	792	(17)	584	(45)	1,313	110
Market Prices (ABB)	792	1	570	(93)	1,269	66
Panel Mid-C Price	792	(17)	477	(56)	1,195	(8)
Extrapolated Prices	792	(54)	440	(6)	1,172	(31)

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218. BC Hydro points out that an energy LRM C of \$45/MWh (in \$F2018 adjusted to the lower mainland) corresponds to a Unit Energy Cost (UEC) at point of interconnection of \$32/MWh. BC Hydro does not consider this to be a reasonable assumption for the price of wind for the reasons set out in CEABC 2.28.3
219. The CEC agrees with BC Hydro that it is unlikely that the price of wind would reach \$45/MWh as a delivered LRM C price. The CEC also notes that to deliver wind energy requires capacity values to be added to the energy values.
220. BC Hydro also provides a sensitivity analysis of \$60/MWh in BCUC 2.83.3 (LRMC Clean Less 40%¹⁰⁶).

Basis for Post-Lease Value	Value of Assets / Lease to BC Hydro					
	Un-risked Lease Period	Default Risk Adj.	Post-Lease Value	Extension Option	Total Value	Value net of purchase
LRMC (Clean) less 40% (BCUC IR 2.83.4.2)	792	33	829	(90)	1,576	373

221. The CEC submits that the cost of wind could potentially decline below BC Hydro's \$85/MWh but does not believe it would decline to \$45/MWh.
222. The CEC submits that a \$60/MWh could be an appropriate point for the Commission to consider the likely cost of wind energy in BC in the future for the evaluation period being considered here.

¹⁰⁵ Exhibit B-18-4, CEABC 2.28.3

¹⁰⁶ Exhibit B-18, BCUC 2.80.1

223. The CEC submits that to the extent that the Commission wishes to rely on the BC Hydro LRMC as an avoided cost of energy, there is a probability that BC Hydro may not be permitted to include natural gas in the future.
224. The CEC submits it would be preferable to rely on the cost of the LRMC clean, using a cost of wind at \$60/MWh and recommends that the Commission weight this evidence significantly.
225. The CEC also submits that even if one were to use the CEABC \$45/MWh the net present values resulting do not favour wind energy over the Waneta 2017 Transaction values, particularly when judging all the related risks and uncertainties. The Waneta Heritage Asset would provide BC Hydro considerably more benefit for its ratepayers.
226. The CEC supports wind energy at this time as the next resource in the future to be scheduled when BC Hydro moves from surplus to deficit.

BC Hydro Industrial Tariff

227. Under this scenario BC Hydro assumes that Waneta energy is required to meet load, but it does not displace other resources. BC Hydro effectively sells the output at its industrial tariff rates.¹⁰⁷
228. The CEC considers this scenario to represent a load serving need for energy that would give the most conservative values for tariff energy sales, with residential and commercial loads garnering higher prices and delivering higher value.
229. The CEC recommends that the Commission weight this scenario highly along with the export value scenarios to find a reasonable positive net present value base before the Commission weighs the risks and uncertainties to make its final judgement.

Panel Portfolio from Site C Inquiry

230. CEABC requested that BC Hydro run a scenario based on the Panel's Alternative Portfolio from the Site C inquiry. BC Hydro declined to do so for several reasons outlined in CEABC 2.25.1, including the fact that it largely deals with resource selection over the next 15 years.
231. The CEC agrees that the Panel Alternative Portfolio does not represent an appropriate option for consideration in this instance.

W) Value of Energy – Market Sales

232. BC Hydro also provides scenarios in which the need for BC Hydro to 'serve load' after the lease period is removed from the analysis. These scenarios respond to the question of whether or not the transaction 'makes sense' if BC Hydro is not in need of any

¹⁰⁷ Transcript Volume 4 page 208

generation resources. BC Hydro considers these scenarios to be a way of ‘testing the transaction’, not as an assumption that the scenario is going to occur in the future.¹⁰⁸

- 233. Under these scenarios, Waneta energy is valued as an export. Recognizing that BC Hydro cannot meaningfully attribute surplus to a given resource¹⁰⁹ the Waneta energy can be valued as contributing to the surplus and Powerex would optimize the surplus capability of the system.¹¹⁰
- 234. The business case assumes that any incremental trade revenues BC Hydro earns goes to the benefit of ratepayers.¹¹¹ Powerex’s net income is entirely to the credit of BC Hydro ratepayers.¹¹²
- 235. The CEC submits that the two market price scenarios can be considered as a means to test the Transaction but should also be considered as possible scenarios and weighted significantly by the Commission in their review of the business case along with the Industrial Tariff scenario.

ABB Market Price Scenario

- 236. The ABB market price scenario is based on a methodology developed by a third-party consultant (ABB). It examines all the generation resources into western interconnection and all those that are planned, as well as retirements, and market nodes. BC Hydro states it is a robust methodology employed by BC Hydro and numerous other utilities.¹¹³
- 237. BC Hydro’s ABB market price scenario for the Post-Lease period results in a Value Net of Purchase of \$66 million.

Basis for Post-Lease Value	Value of Assets / Lease to BC Hydro					
	Un-risked Lease Period	Default Risk Adj.	Post-Lease Value	Extension Option	Total Value	Value net of purchase
Market Prices (ABB)	792	1	570	(93)	1,269	66

- 238. The CEC considers that the ABB market price may be somewhat high and could reasonably be considered as the upper bound.

Market Price Extrapolated Scenario

- 239. The Market Price Extrapolated scenario uses Powerex confidential price curves and extrapolates them to the end of the 40 years period to value the energy available for

¹⁰⁸ Transcript Volume 4 page 212

¹⁰⁹ Exhibit B-18, BCUC 2.66.1

¹¹⁰ Exhibit B-18, BCUC 2.66.2

¹¹¹ Transcript Volume 4, page 209

¹¹² Exhibit B-18, BCUC 2.66.2.1 and Transcript Volume 4 pages 210 and 211

¹¹³ Transcript Volume 4, page 209

export.¹¹⁴ The figures used for the Extrapolated Market price is redacted from the public record, but on a levelized basis is lower than the Panel Mid C energy price forecast for the period fiscal 2039 to 2058.

- 240. The Extrapolated Market price results in a negative NPV of \$-31 million.
- 241. The CEC considers that this may represent an appropriate lower bound for market prices.
- 242. The CEC submits that the Commission can roughly consider this to be effectively zero given the size of the Transaction.

Panel Mid C Price Forecast

- 243. The Commission Panel Mid C market price was established during the Site C inquiry.
- 244. On a levelized basis the Commission Panel Mid C energy price forecast is higher than the redacted Extrapolated Forecast curve for the period fiscal 2039 to fiscal 2058 but lower than the ABB market price.
- 245. The CEC submits that the Panel Mid C market price has been thoroughly considered by the Commission and represents a reasonable starting point for valuing energy during the post-lease period.

X) Summary of the Valuation of Post Lease Energy

- 246. The CEC submits that the Commission should undertake to value the Waneta post-lease energy based primarily on a market prices.
- 247. The CEC does not accept the BC Hydro Load Resource Balance load as providing an accurate picture as to the likely surplus/deficit position.
- 248. The CEC submits that it is likely that BC Hydro will remain in surplus during the post-lease period.
- 249. The CEC considers that the Panel Mid C market price represents a reasonable middle ground for market prices.

V. TRANSACTION VALUE SENSITIVITIES

- 250. BC Hydro ran approximately 450 sensitivity analyses.
- 251. In its application BC Hydro provides an analysis in which current low market prices never rise on a real dollar basis and also where the energy price declines to the level of extrapolated market prices but with an increase in the value of capacity (30%). This

¹¹⁴ Transcript Volume 4, page 209

represents a scenario in which the build-out of intermittent renewable puts a premium on capacity resources.

Table 12 Value of Transaction – Lower Market Prices

Basis for Post 20-yr Lease Value	Average market price 2039 – 2058 Energy + Capacity (\$/MWh, 2018)	Net Value of Transaction (\$ millions)
Market Prices (ABB)	\$64.75	114
Extrapolated Market Prices	█	(31)
Flat/Real Market Prices	\$28.00	(328)
Extrapolated Market Prices with 30% capacity premium	█	0

(Above energy pricing rounded to the nearest \$0.25/MWh)

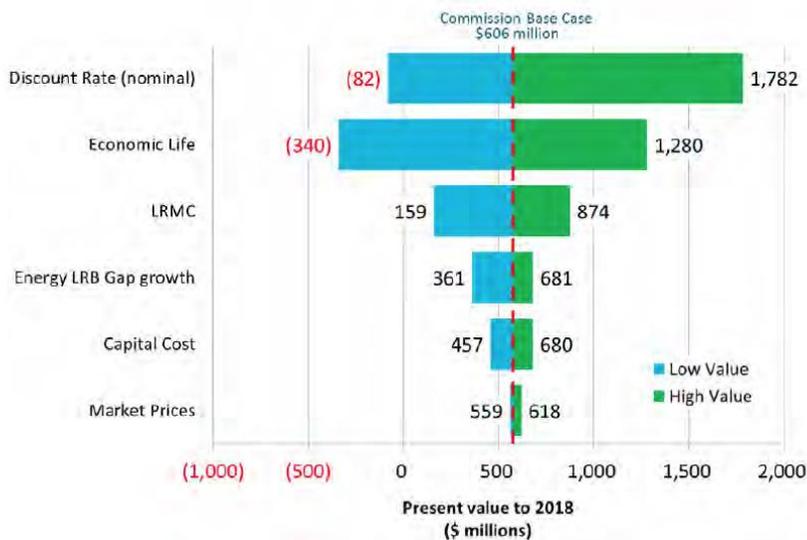
252. The CEC notes that flat real market prices result in a negative NPV of \$328 million, however the capacity premium results in a net wash. The CEC submits that it is reasonable to assume that a market of flat real energy prices would arise from a buildout of renewables and would place a premium on capacity resources.
253. For BC Hydro the value of capacity is increasing significantly because BC Hydro's Revelstoke 6 project would be the last of the inexpensive capacity resources available as a consequence of advance planning for capacity in early generation resource construction.
254. BCUC 1.24.1 and 2.86.2.1 provide a low and high sensitivity range altering one input variable at a time, from a base using a 6% discount rate, the mid Gap LRB, a 15% decrease in LRMC, Panel Mid C market price, Leading Utility Practice, 40 years economic life. BCUC 2.86.2.1 varies the analysis for IPP financing of 6.4% real instead of 7%. The CEC accepts the 6.4% as representing a reasonable cost of financing for IPPs.
255. The base case value is \$606 in BCUC 1.24.1 and \$592 million in BCUC 2.86.2.1
256. The CEC submits that the Commission sensitivity scenarios included in the table below generally represent reasonable book-end ranges for the Transaction, and that the panel Mid C market price represents a reasonable mid-point for the base case.

BCUC 1.24.1

Table 1 Value of Transaction: Commission Sensitivities
(Present value to 2018, \$ millions)

Input Variable	Low Value [A]	[A] less Base Case value	High Value [B]	[B] less Base Case value	Low Value	Base Case	High Value
Discount Rate (nominal)	(82)	(688)	1,782	1,176	8%	6%	4%
Energy LRB Gap growth	361	(245)	681	75	Small Gap Line 19 Table 3-8 RRA	Base RRA Line 18 Table 3-8 RRA	Large Gap Line 20 Table 3-8 RRA
LRMC	159	(447)	874	268	40% decrease in LRMC (Clean)	15% decrease in LRMC (Clean)	LRMC (Clean)
Market Prices	559	(47)	618	12	Flat/Real	"Panel Mid-C" in Site C Report	ABB Market price
Capital Cost	457	(149)	680	74	Leading Utility Practice + 100% (AAACE Class 5 estimate high point)	Leading Utility Practice	Leading Utility Practice – 50% (AAACE Class 5 estimate low point)
Economic Life	(340)	(946)	1,280	674	20 years	40 years	70 years

Figure 1 Value of Waneta 2017 Transaction: Commission Sensitivities relative to Commission Base Case (Present value to 2018, \$ millions)



**Revised Table 1a Value of Transaction: Commission Sensitivities
(Present value to 2018, \$ millions)**

Base Case Present Value Net of Purchase Price: 592 2018 \$ millions

Input Variable	Low Value [A]	[A] less Base Case value	High Value [B]	[B] less Base Case value	Low Value	Base Case	High Value
Discount Rate (nominal)	(52)	(644)	1,687	1,095	8%	6%	4%
Energy LRB Gap growth	386	(206)	657	65	Small Gap Line 19 Table 3-8 RRA	Base RRA Line 18 Table 3-8 RRA	Large Gap Line 20 Table 3-8 RRA
LRMC	308	(284)	763	171	40% decrease in LRMC (Clean)	15% decrease in LRMC (Clean)	LRMC (Clean)
Market Prices	545	(47)	604	12	Flat/Real	“Panel Mid-C“ in Site C Report	ABB Market price
Capital Cost	443	(149)	666	74	Leading Utility Practice + 100% (AACE Class 5 estimate high point)	Leading Utility Practice	Leading Utility Practice – 50% (AACE Class 5 estimate low point)
Economic Life	(349)	(941)	1,207	615	20 years	40 years	70 years

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257. Under the IPP financing cost of 6.4% scenario (BCUC 2.86.1) the CEC notes that the Transaction is negative only under the scenarios in which the discount rate is increased to 8%, and the economic life is reduced to 20 years. The CEC submits that neither of these sensitivities should be provided with significant weight.
258. The CEC submits that the discount rate is appropriately established at 6% and should not be increased to 8% as a result of this sensitivity analysis. The CEC considers that 4% would not necessarily be inappropriate and notes the significant increase of \$1,095 million that could be added to the NPV under this view. The CEC recommends that the Commission weigh this potential upside significantly in its analysis of the transaction as it represents the real expected ratepayer impact.

¹¹⁵ Exhibit B-18, BCUC 2.86.2.1

259. The CEC considers that the Small Gap scenario is the appropriate starting point for the LRB in the Commission's assessment of the value. This assumption results in a reduction of \$206 million from the base case of \$592 million.
260. The CEC considers that the 15% decrease for the LRMC clean is a reasonable assumption for the base case, if the mid Gap or large gap scenario is utilized.
261. The CEC accepts the Panel Mid C price as appropriate for use in the base case. BC Hydro points out that market prices have a minor influence.¹¹⁶ The CEC notes that if Flat/Real prices are utilized, the base case value is reduced by \$47 million. The CEC submits this may be considered as an appropriate conservative bookend.
262. The CEC submits that Leading Utility Practice is appropriate for the base case capital cost estimate and notes that a +100% increase reduces the base case by \$149 million. The CEC submits that future capital costs are very difficult to predict and the significant reduction should be considered as an important sensitivity.
263. The CEC considers 40 years to be the appropriate economic life for the base case. A reduction in the economic life to 20 years would result in a significant decrease to the base case of \$941 million; resulting in a negative NPV of -\$349 million. The 20-year economic life does not include a terminal value, which the CEC would suggest should completely invalidate such a case as a realistic scenario.
264. The CEC submits that it is very unlikely that the economic life would be limited to 20 years and it is more likely that BC Hydro will be able to extend the life of the dam to 70 years. Such an extension would increase the value of the business case by \$615 million, however BC Hydro has not assumed the requisite sustaining capital expenditures.¹¹⁷
265. BC Hydro considers that neither the 20 years economic life nor the 70 years economic life scenarios are supportable. The use of a 70 years life is not supportable without increasing the capital investment in the asset.¹¹⁸
266. The CEC submits that it would be appropriate for the Commission to weigh the upside of a longer life more heavily than the risk of a shortened economic life. Even at capital investment of \$500 million the extension would have a benefit of \$115 million.
267. Based on the above, the CEC considers that a NPV of \$386 million (Base case with small gap scenario) could be the appropriate starting point for the Commission's assessment from which it might evaluate the sensitivities related to risks, uncertainties and evaluation approaches.
268. The CEC considers that a reasonable upper bound could be \$1.596 billion which includes changes from base case as follows: 4% discount rate, small gap scenario, 70 years economic life with an additional capital investment of \$500 million.

¹¹⁶ Exhibit B-18, BCUC 2.86.2.1

¹¹⁷ Exhibit B-8, 1.24.1

¹¹⁸ Exhibit B-8, BCUC 1.24.1

269. The CEC considers that a reasonable lower bound could be \$190 million which included changes from base case: small gap scenario, flat real prices and 100% increase in capital.
270. The CEC notes that even assuming a low value for LRMC -40% (\$284 million) and an increase in capital costs (\$149 million) the NPV remains positive.
271. The CEC submits that given the above it is very likely that the NPV of the transaction is significantly positive, before a risk evaluation.

Y) Risk Assessment

272. BC Hydro notes its operational familiarity with the facility and considers itself to be in a good position to assess risk.¹¹⁹ Given the operational experience and the due diligence conducted in 2010 the risk assessment should not be informed simply by the activities performed in the last year.¹²⁰
273. The CEC agrees with BC Hydro that its risk assessment is likely to be reasonably well informed.
274. BC Hydro considers the risks during the lease period to be very small.

Z) Default Risk

275. The risk of Teck default is discussed in section 4.2.2 of the Business Case (Appendix “N”).
276. Teck default within the 20 years term would result in the elimination of the lease payments and the operating and capital costs being borne by BC Hydro.¹²¹
277. Default risk adjustments would add to the consolidated value of the transaction assuming that BC Hydro is under higher market price scenarios and detract from the value under lower priced scenarios such as the Panel Mid C forecast and the Extrapolated price forecast.¹²²
278. BC Hydro points out that the risk is mitigated through corporate guarantees provided by Teck’s parent through the different transaction documents.¹²³
279. The CEC submits that in the event of a Teck default BC Hydro would likely have significant mitigations for the impact of any such default making the impact on ratepayers considerably more muted.
280. The CEC submits that the possibility of Teck failure is a relevant consideration particularly under a circumstance of higher interest rates, an economic downturn or soft

¹¹⁹ Transcript Volume 4, page 169

¹²⁰ Transcript Volume 4, page 177

¹²¹ Exhibit B-1, Appendix N page 4 of 90

¹²² Exhibit B-18, BCUC 2.83.3

¹²³ Transcript Volume 4, page 205

commodity prices. In a recession it is likely that BC Hydro's demand will diminish and contribute to a greater surplus and market prices could be lower.

281. The CEC does not believe that the risk of Teck failure is sufficient to make a significant adjustment to the business case.
282. The CEC recommends that the Commission consider the risk of Teck failure as being a very modest risk.

AA) Asset Condition

283. BC Hydro states that all the assets to be acquired are in good condition and are comparable to BC Hydro assets of a similar vintage. BC Hydro does not believe that the condition of any of the assets could be an impediment to the Waneta 2017 Transaction.¹²⁴
284. The CEC notes that BC Hydro cited the challenges faced by BC Hydro as a result of aging infrastructure built in the 60s and 70s as a reason for the construction of Site C.¹²⁵ Similarly, BC Hydro makes reference to the investments needed for its 'aging assets' on its website and in its Fact Sheets.¹²⁶
285. The CEC is concerned with the age of the Waneta infrastructure but acknowledges that the BC Hydro plans for investment are likely well founded and any variance from those plans should not be catastrophic to the business case values.

BB) Ownership/Safety Risk

286. The Waneta Dam currently has a High Consequence classification under the BC Dam regulations with regard to dam safety. It is unclear whether the total cost to replace all structures in the inundation zone, and the potential economic loss of the train bridge used by Teck for delivery of concentrate to their smelter, could result in the dam becoming classified as a Very High Consequence dam in future dam safety reviews.¹²⁷ If the consequence category is raised to Very High, overtopping of the concrete dam could be an acceptable option.¹²⁸

CC) Rehabilitation Costs Deferred to Post Lease Period

287. The assumptions in the Business Case are for a scenario assuming leading utility practice, and the rehabilitation is performed within the Lease period. Under a 'good' utility practice scenario a portion of the anticipated rehabilitation is deferred until after the Lease period. This would result in a portion of the major capital spending forecast in the Lease Period occurring during the Post-Lease period instead.

¹²⁴ Exhibit B-1, page

¹²⁵ Exhibit B-9, CEC 1.7.1 Attachment 1 page 1 of 2

¹²⁶ Exhibit B-9, CEC 1.7.3

¹²⁷ Exhibit B-9, BCSEA 1.46.3

¹²⁸ Exhibit B-9, BCSEA 1.46.4.1

288. The scope of the rehabilitation work is somewhat uncertain and will depend on the condition of the assets and BC Hydro's asset standards and capital allocation framework at the time. BC Hydro currently expects the rehabilitation project to involve anchoring the spillway pier and dam, as well as enhancements of the spillway gates and chutes.¹²⁹

DD) Value Enhancement Opportunities

289. On page 49 of the Business Case BC Hydro identifies certain opportunities to enhance the value of the asset including the following:

Investment in the asset sufficient to extend economic life

290. BC Hydro notes that additional investment in the asset has the potential to add ~\$280 million to the present value under the ABB market price scenario and more value under LRMC scenarios. The CEC notes that under the extrapolated and Commission panel price scenario this investment would not likely add value.¹³⁰

291. The CEC notes that the investment decision would be made at a later date and more information would be available at that time.

292. The CEC submits that the Commission might reasonably consider this as a small upside potential having a reasonable probability of occurring when it evaluates the risks, uncertainties and the evaluation approaches in its review of the business case.

Extraction of additional value from the transmission lines

293. BC Hydro points out the possibility to market Waneta energy and capacity to external markets at premium prices.¹³¹

EE) Operating Agreement with Teck

294. The Co-Possessors and Operating Agreement is provided in Appendix "H".

295. The CEC notes that under Section 7 Teck is appointed as Operator of the Waneta Assets. The Operator is entitled to appoint a Manager to manage the day to day operations of Waneta. FortisBC is the current manager. BC Hydro expects to become Operator and Manager following the Lease but will determine whether to retain FortisBC as manager at that time.¹³²

296. The CEC is satisfied with this arrangement both BC Hydro and FortisBC are competent managers of electric utility assets of this nature.

¹²⁹ Exhibit B-9, CEC 1.26.1

¹³⁰ Exhibit B-8, BCUC 1.56.8

¹³¹ Exhibit B-1, Appendix N, page 49 of 90

¹³² Exhibit B-9, CEC 1.18.3 and Exhibit B-8, BCUC 1.52.1.2

297. The main impact of the Lease structure on post-lease risk is the potential for Teck to seek to underinvest in the assets near the end of the Lease as they receive limited benefit from the investment.
298. Within the COPOA there are several provisions to ensure that Waneta will have sufficient levels of sustaining capital investment and maintenance during the Lease as outlined in CEC 1.19.2
299. The CEC is satisfied with these arrangements and notes that BC Hydro will be aware of, and able to comment on the investments made and maintenance performed and may be able to bring issues forward to a referee.¹³³
300. Appendix “G” provides a comparison of the 2010 and 2017 Agreements.
301. The Operating Committee voting continues to be one third BC Hydro and two-thirds Teck except for certain enumerated items where unanimous approval is required.
302. The CEC submits that it would have been preferable if BC Hydro had acquired a higher voting status given its full ownership of the asset. However, the CEC recognizes that this term cannot be altered and does not consider it to be a significant issue upon which to deny the Transaction.

FF) Wheeling Agreement

303. BC Hydro and Teck entered into a Wheeling Agreement which will establish BC Hydro’s obligations to deliver electricity purchased by Teck in the US from the BC US border to Teck’s industrial load in Trail consistent with Teck’s Line 71 import scheduling rights and becomes effective at the expiry or termination of the Lease.¹³⁴ The intention is to maintain Teck’s long-standing right to import electricity to serve its Trail smelter load when economic to do so.¹³⁵
304. There is no contractual arrangement for BC Hydro to swap Teck imports for BC Hydro exports. However, if such an agreement were made in the future the benefits would be dependent on the commercial terms and driven by the difference between Teck’s import price and BC Hydro’s export price. The levelized gap is approximately \$16/MWh.¹³⁶
305. The CEC submits that the Wheeling Agreement is acceptable.

VI. PUBLIC INTEREST AND OTHER CONSIDERATIONS

306. The CEC notes that there are several public interest considerations that are also reasonable for the Commission to consider in its deliberations which the CEC addresses

¹³³ Exhibit B-9, CEC 1.19.2

¹³⁴ Exhibit B-1, page 3-21 and 3-22

¹³⁵ Exhibit B-1, page 3-21 and 3-22

¹³⁶ Exhibit B-9, page 1.23.5

below. Additionally, in preparation for the Oral Hearing the Commission posed several questions to interveners. The CEC provides the following responses to those questions not directly or indirectly responded to in the above submissions.

GG) Intergenerational Inequity

307. The intergenerational issue with regard to the Waneta 2017 Transaction relates to the revenue that BC Hydro will be required to recognize (pursuant to accounting rules) in respect of the capital expenditures incurred by Teck and the timing of the recognition of the revenues relative to the amortization of the capital additions. BC Hydro's approach may result in a shorter recovery period for revenues than BC Hydro will be required to recognize related to capital expenditures incurred by Teck.¹³⁷ The issue is described in CEC 2.51.1 BC Hydro proposes to defer this revenue to the NHDA which would partially mitigate this intergenerational concern.
308. Overall BC Hydro expects the annual incremental revenue and offsetting amortization will be relatively modest amounts – not more than a few million dollars in a given year compared to a revenue requirement in excess of \$4 billion.¹³⁸
309. BC Hydro notes that the Waneta Transaction is expected to provide ratepayer benefits both during and after the lease period.¹³⁹
310. Overall the CEC is satisfied that the issue of intergenerational inequity is not sufficiently significant to recommend modifications.

HH) Integration of Line 71 into OATT Framework

311. BC Hydro provides the following comments in response to BCUC 1.63.5:

Under the Waneta 2017 Transaction BC Hydro's access to U.S. wholesale power markets will be unchanged relative to the status quo until the end of the Lease Period. After the Lease Period Line 71 will be completely integrated into BC Hydro's system and will be subject to its OATT in all respects but one, namely the Teck Wheeling Agreement, and the rights under the Teck Wheeling Agreement will be available to Teck solely to import electricity to serve its smelter load. In contrast, Teck currently has an unfettered right to use Line 71 for any purpose, including the provision of unregulated transmission services to third parties, including BC Hydro. In this sense, the Waneta 2017 Transaction will not maintain the status quo regarding the use of Line 71 generally, but rather regularize it within the larger OATT framework and BC Hydro's transmission service obligations after the Lease Period.

312. The CEC submits that this may be considered a non-quantified benefit of the transaction.

¹³⁷ Exhibit B-9 CEC 1.6.3

¹³⁸ Exhibit B-20, CEC 2.51.1

¹³⁹ Exhibit B-20, CEC 2.51.2

II) Provincial Debt Load

313. The acquisition of the Waneta assets for \$1.2 billion will be undertaken 100% by the issuance of debt.
314. The CEC notes that this debt will be in addition to the significant debt currently being undertaken to construct Site C, and which may exceed \$10 billion.
315. The CEC submits that this is primarily an issue for BC Hydro to resolve with the provincial government and is only a regulatory issue for the BCUC to the extent that there is evidence on the record of a potential pending downgrade of the Province's AAA rating.
316. The CEC has seen no evidence of a pending problem and in fact has seen recent confirmation of the security of the financial standing of the province and the relationship with BC Hydro in regard to debt issues.

JJ) Major River Basin Ownership

317. The CEC considers that Crown Corporation ownership of the major River Basin (Peace and Columbia) Heritage Assets is a public interest issue in BC. This is particularly the case because of the involvement of the province in the Down Stream Benefits from the Columbia River Treaty.
318. Generally, a failure of the Waneta Transaction to complete would free Teck to enter into another transaction of the sale of Waneta with other third parties, including FortisBC.¹⁴⁰ Fortis Inc. is an unregulated entity with no public utility obligations, and no obligations to FortisBC or its ratepayers in regard to Waneta.¹⁴¹
319. BC Hydro considers that if a third party purchases Waneta the Commission should assume it's not going to be a public utility service available for load serving purposes; rather it will likely be a market asset possibly available to BC Hydro and Fortis at market prices.¹⁴² If Fortis Inc. were to complete a similar transaction within 12 months of the termination of the Waneta 2017 Transaction then Fortis Inc.'s share of available Waneta energy and/or capacity would not be available for domestic purposes except insofar as Fortis Inc. was inclined to make it so.¹⁴³
320. The CEC agrees with BC Hydro in this view. There is no reason to expect that Fortis Inc. would have viewed the transaction as anything other than a commercial perspective.¹⁴⁴

¹⁴⁰ Exhibit B-9, CEC 1.1.1

¹⁴¹ Exhibit B-9, CEC 1.4.5

¹⁴² Transcript Volume 4 page 254

¹⁴³ Exhibit B-9, CEC 1.4.6

¹⁴⁴ Transcript Volume 4, page 180

321. The CEC notes that BC Hydro could potentially regain its ROFO after a 12-month period, however the rights would be the same as those BC Hydro exercised in response to the Fortis Transaction.
322. The CEC considers that there is therefore little value in denying the application with the hopes of generating a better agreement after a delay.

KK) Availability to Non-BC Markets

323. The CEC considers that if BC Hydro does not complete the purchase it is likely that Waneta energy will be available to non-BC Markets and potentially, to BC Hydro and FortisBC for the same reasons as noted above.

LL) Availability to Teck

324. The CEC notes that Teck is not in the BC Hydro service territory and there is no other statute or Commission order that directly includes Teck in BC Hydro’s service territory. BC Hydro is unaware as to whether or not FortisBC’s corporate antecedent service territories, which would include Teck, are still applicable.¹⁴⁵
325. The CEC notes that a No-go scenario in which the smelter is served by BC Hydro results in value to BC Hydro only under the Market Prices Extrapolated scenario. Significant costs would accrue if BC Hydro were required to purchase new, clean energy to serve the smelter.

(Present value to F2018 in \$ millions)

Valuation Index	LRB Position	Transaction Value Net of ROFO Offer Price	BCH does not purchase, Smelter not served by BCH	BCH does not purchase, Smelter served by BCH
LRMC (Clean)	Deficit	887	0	(879)
LRMC (Clean + Gas)	Deficit	662	0	(682)
Industrial Tariff (RS 1832)	Immaterial	82	n/a	n/a
Market Prices (ABB)	Surplus	114	0	(43)
Market Prices (Extrapolated)	Surplus	(31)	0	95

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326. Given that Teck is not in BC Hydro’s service territory the CEC does not consider this to be a significant risk, provided other reasonable options were available. The CEC expects that when jobs and communities are facing serious economic consequences the provincial government may look to BC Hydro for solutions.

¹⁴⁵ Exhibit B-8-2, BCUC 1.63.3

¹⁴⁶ Exhibit B-1, Appendix N, page 3 of 90

Revised Table 20: Ratepayer Benefit (3.4% Financing)

(Present value to 2018, \$ millions)

Valuation Index	LRB Position	Value to ratepayers net of purchase price	No-Go, Smelter not served by BC Hydro	No-Go, Smelter served by BC Hydro
LRMC (Clean)	Deficit	1,502	0	(901)
LRMC (Clean + Gas)	Deficit	1,224	0	(703)
Industrial Tariff (RS 1832)	Immaterial	589	n/a	n/a
Market Prices (ABB)	Surplus	570	0	(44)
Market Prices (Extrapolated)	Surplus	436	0	99

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327. The CEC expects that in the absence of the BC Hydro transaction Teck will negotiate a sale agreement which meets its needs.

MM) FortisBC concerns

328. The CEC understands that FortisBC’s concerns about its ability to serve customers and meet its public utility obligations have been largely resolved by agreements between FortisBC and BC Hydro and FortisBC and Teck.¹⁴⁸

329. Further, the CEC understands that the Waneta 2017 Transaction will benefit FortisBC Inc. customers as well, which the CEC sees as a public interest benefit.

VII. REPORTING

330. In paragraph 5 of the order approving the 2010 transaction, the Commission established extensive reporting requirements for BC Hydro including regular reporting through to 2036.¹⁴⁹

NN) Accounting

331. BC Hydro seeks two sets of accounting orders.

332. The first set of accounting orders provides for lease revenue to be accounted for in a future period and is netted against BC Hydro’s revenue requirement. The order is intended to ensure that if the transaction proceeds and lease payments are made from

¹⁴⁷ Exhibit B-20, BCSEA 2.52.2.1

¹⁴⁸ Transcript Volume 4, page 160

¹⁴⁹ Transcript Volume 4, page 178-179

Teck to BC Hydro this year, that BC Hydro ratepayers will receive the benefit of the lease payment, which would otherwise accrue to the Province.¹⁵⁰

333. The CEC submits that if the Commission approves the purchase of the 2/3rds interest in Waneta, then it is appropriate to approve BC Hydro’s proposed accounting order to ensure the benefits of the lease payments accrue to ratepayers.

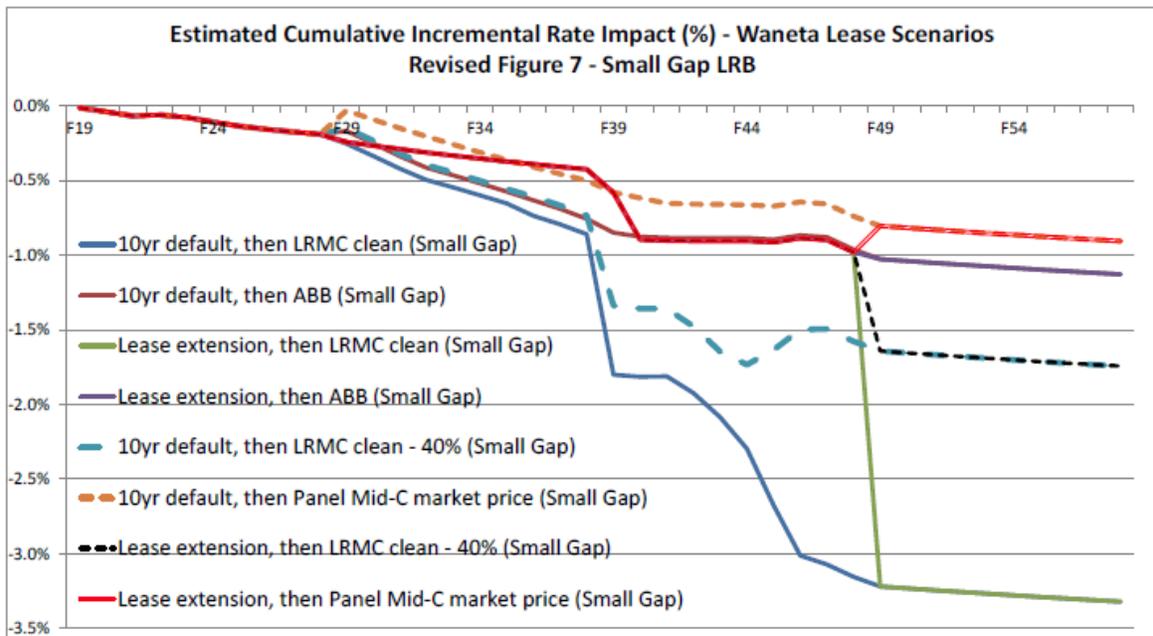
334. The second set of accounting orders relates to the 2/3rds of the operating and maintenance costs that BC Hydro will receive from Teck.¹⁵¹

OO) Rate Impact Analysis

335. For the purposes of estimating ratepayer impact BC Hydro made assumptions regarding the mix of short and long-term debt, interest rates and term in its rate impact model. Details are provided in Attachment 2 filed confidentially in Exhibit A-3.¹⁵²

336. BC Hydro’s Revised Figure 7 provides the incremental rate impacts using a Small Gap Load Resource Balance and a variety of scenarios.

Revised Figure 7: Small Gap LRB



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¹⁵⁰ Transcript Volume 4 page 224

¹⁵¹ Transcript Volume 4, page 225

¹⁵² Exhibit B-9, CEC 1.10.5

¹⁵³ Exhibit B-18, BCUC 2.91.6

337. The CEC notes that, under all scenarios illustrated in the figure above, the incremental rate impact results in reductions.
338. The CEC submits that a 10 years default combined with the Panel Mid C price under a small gap could be considered a very low probability scenario. As noted above, the CEC is of the view that a ‘small gap LRB’ is a reasonable starting point for the Commission. To the extent that Teck fails or defaults under a low market price situation and BC Hydro remains in surplus for an extended period of time, ratepayers still retain a 0.5% to 1.% saving.
339. The CEC sees the ratepayer impacts as one of the most important pieces of evidence before the Commission and the CEC sees the evidence as very positive for ratepayers.
340. The CEC recommends that the Commission weight this evidence heavily in its considerations.

PP) Due Diligence

341. BC Hydro conducted extensive due diligence in regard to its purchase of the one-third interest in Waneta in 2010. Since its investment in Waneta, BC Hydro has been on the Operating Committee and has been privy to information regarding the technical, environmental, legal and commercial aspects of Waneta.
342. BC Hydro initiated further due diligence upon receipt of the sale notice from Teck, which was facilitated through a Teck data room.
343. No new material environmental risks were identified, although it was recognized that BC Hydro's 100% ownership of Waneta and the evolving focus of environmental regulators could result in increased environmental-regulatory risks over time, consistent with risks of the same nature BC Hydro has with its current facilities. Similarly, no new material financial or legal risks were identified, other than those (in the case of financial risks) expressly set out in the Waneta 2017 Business Case or addressed through the accounting orders BC Hydro has requested from the Commission.
344. The CEC submits that the time period for review is relatively short, and as such, limits the level of due diligence available to be undertaken.
345. However, given that BC Hydro is familiar with Waneta operations, the CEC submits that the due diligence conducted by BC Hydro is satisfactory.

VIII. CONCLUSIONS

346. The CEC submits that the Waneta 2017 Transaction is a very unusual early staged acquisition of a significant resource and normally the CEC would prefer to see resource acquisition matching immediate future needs.

347. However, the CEC submits that this Transaction flows from a long-term effort by BC Hydro to capture value for its ratepayers and the CEC submits that this is what BC Hydro has done with this Transaction.
348. The CEC submits that the BC Hydro ratepayer and those who may become future ratepayer of BC Hydro on balance will benefit significantly from this Transaction.
349. The CEC submits that this Transaction will make energy marginally more affordable in BC for BC Hydro's customers.
350. The CEC submits that the Waneta 2017 Transaction is demonstrably in the public interest.
351. The CEC submits that rational judgment about the many risks, uncertainties and different evaluation methodology approaches when combined with a relatively strong base case on balance provides additional positive value to be weighted into the decision.
352. The CEC recommends that the Commission approve the Transaction as filed and requested by BC Hydro.

ALL OF WHICH IS RESPECTFULLY SUBMITTED

David Craig

David Craig, Consultant for the Commercial Energy
Consumers Association of British Columbia



Christopher P. Weafer, Counsel for the Commercial
Energy Consumers Association of British Columbia