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This document includes BCTC's methodology for prioritizing capital projects. This version of the methodology dates back several years, but it remains the most recent version that is publicly available. BC Hydro (which now includes BCTC) continues to make refinements to prioritization practices, but the basic design and logic remain intact.

F2010 Prioritization Model User Manual

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1.0 INTRODUCTION

A significant development in 2006 was the implementation of a formal prioritization method to evaluate all capital portfolios. Previous capital investment rating systems consisted only of rating investments as "mandatory" or "discretionary", which was inadequate for ranking investments and assembling portfolios. A capital investment ranking system, to better discriminate between capital investments, was needed. BCTC engaged UMS Group Inc. (UMS), a consultant experienced in creating similar ranking systems within other utilities, to assist in the development of a formal prioritization method.

This prioritization method, which was also used in 2007, is used in 2008 to evaluate all capital portfolios as part of the F2010 Capital Planning Process.

The prioritization method is used to assist BCTC's senior management in portfolio planning. All proposed investments are evaluated using this method. The results are reviewed and discussed and become an input into the portfolio decision-making process. The prioritization method does not relieve BCTC of its decision-making responsibility, but it does aid management in identifying the critical and valuable investments that should be undertaken to ensure the success of BCTC, as well as those investments which may be candidates for complete or partial deferral in a resource constrained environment. BCTC's prioritization method has become an integral part of its capital planning process.

This document will help the readers understand what the prioritization method is, and provides guidance for its use. First, an overview of the method is provided in Section 2.0. Section 3.0 provides a description of how the categories and criteria used to score each investment, together with their weightings, are determined. Section 4.0 provides details of the different computations required to calculate the scores for each investment. Finally, the approach to assembling the portfolios using the prioritization scores is described in Section 5.0. The Appendices to this document provide reference information. Appendices A to D provide the figures, data and look-up tables relevant to the prioritization of the F2010 Capital Plan, while Appendices E to G provide three examples of score computations.

2.0 OVERVIEW OF THE METHOD

2.1 Assessment Approach

BCTC uses the prioritization method to evaluate proposed investments in each of its three capital portfolios:

i. Sustaining;
ii. Growth; and
iii. BCTC Assets.

The prioritization method considers two attributes of each investment:

a. Value: the value achieved by implementing the investment; and

b. Deferral Impact: the impact associated with deferring the investment for one capital planning cycle

For each attribute, a score is calculated by assessing each investment against fourteen criteria in five categories. The five categories are:

(a) Financial

(b) Reliability

(c) Market Efficiency

(d) Relationships

(e) Environment and Safety

Once value and deferral impact scores are calculated for all proposed investments, a review is undertaken to ensure scoring is consistent within each portfolio. The scores are then used to rank the investments within each portfolio and identify lower deferral impact and lower value investments, which become candidates for deferral if required by resource constraints.

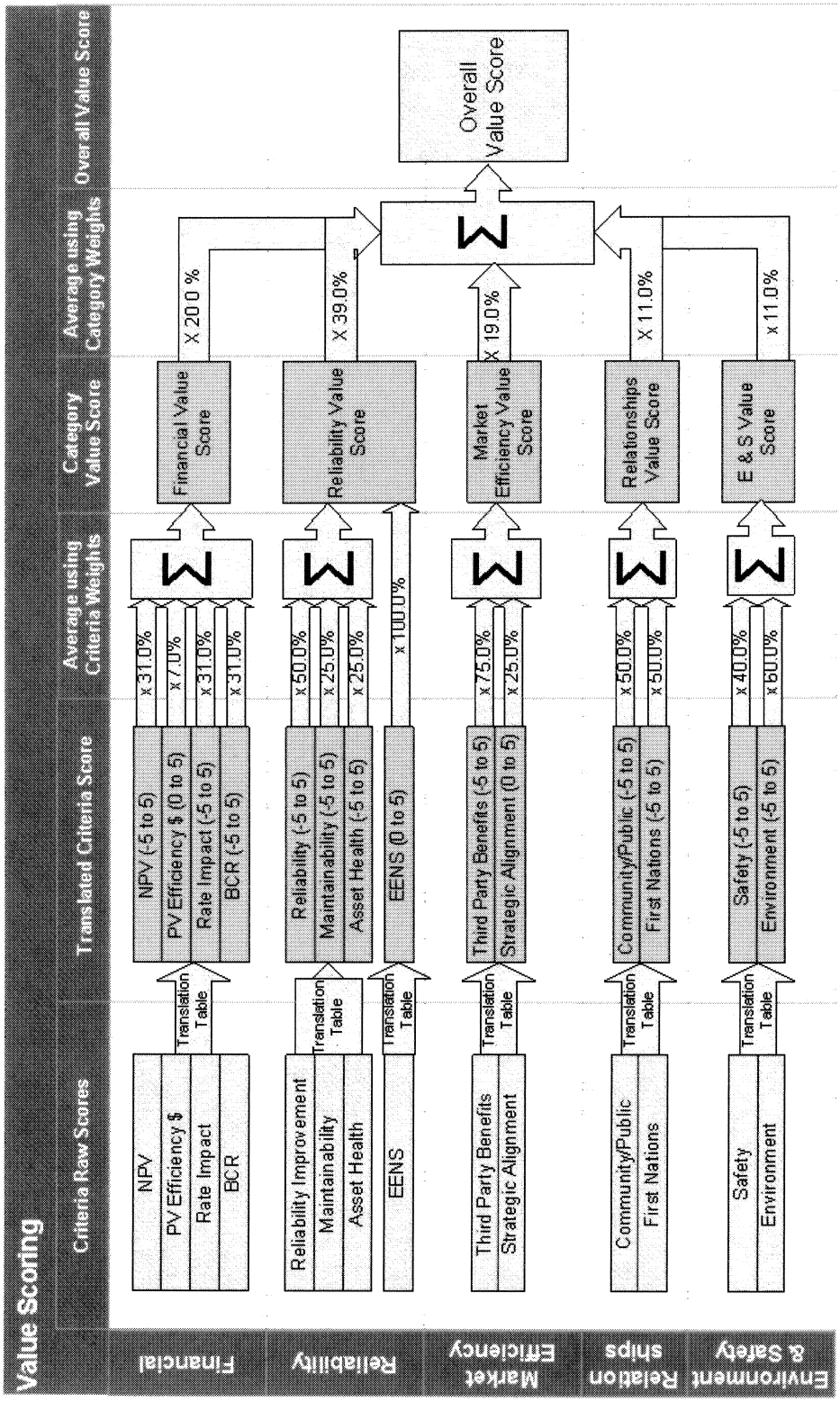
The following sections define the value and deferral impact attributes, as well as the fourteen criteria.

2.2 Value Attribute

The value of an investment is measured by evaluating the costs and benefits associated with the investment for each of the fourteen criteria. A score is determined between -5 and 5 using the value matrix in Appendix B. Then, within each of the five categories, the individual criteria scores are weighted to arrive at a score for that category. The overall value score is then computed as a weighted average of the category scores. The determination of the weights is done using a methodology called Analytical Hierarchy Process (AHP). AHP uses a series of pair wise comparisons to develop group consensus on relative weighting across various elements. Using this process, managers and subject matter experts establish the criteria weights and senior managers establish the category weights. The AHP methodology is further discussed in Section 3 – Determination of Categories and Weightings. The weightings are provided in Appendix A.

Figure 2.1 illustrates how the Value Score is computed.

Figure 2.1. Value Scoring

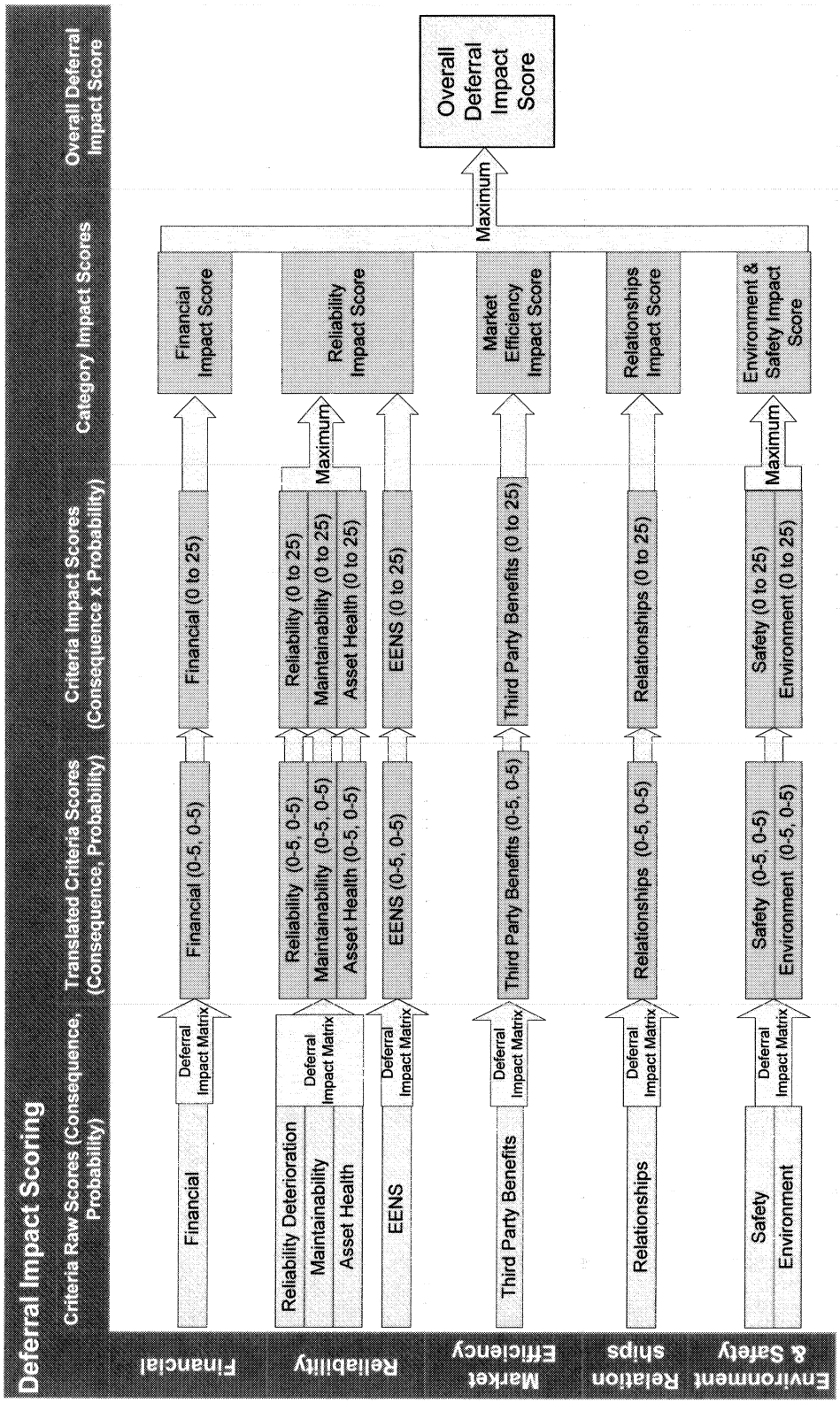


2.3 Deferral Impact Attribute

The deferral impact is the impact (i.e. lost opportunity, expected risk exposure) associated with the investment being deferred for one planning cycle (i.e. two years). The consequence and probability components of the most likely deferral impact scenario (the consequence with the highest probability) are each determined on a scale of 0 to 5 using the Deferral Impact Matrix, shown in Appendix C. In many cases, the deferral impact consequence is derived from the value attribute data. Once the two components have been determined, the deferral impact score for each criterion is calculated by multiplying the consequence and the probability. This results in a deferral impact score between 0 and 25. This deferral impact is calculated for each criterion. The deferral impact of each category is then the highest impact score of the criteria within that category. Similarly, the highest impact score of the five categories becomes the deferral impact of the investment.

Figure 2.2 illustrates how the deferral impact score of an investment is derived.

Figure 2.2. Deferral Impact Scoring



2.4 Category Criteria

2.4.1 Financial Criteria

(a) Net present value: discounted cash flow;

(b) Benefit to cost ratio: net present value of OMA cost savings and revenue compared to net present value of all costs;

(c) Rate impact of each investment; and

(d) Efficiency savings related to time savings, efficiency, or effectiveness that do not impact the bottom line.

2.4.2 Reliability Criteria

(a) Reliability Improvement: based on the pre- and post-investment assessment of the improvement or deterioration of the reliability of an asset or system, and includes attributes such as frequency of failures (# of failures); average duration of failures (in hours); and the criticality of the asset.

(b) Maintainability: based on the pre- and post-investment assessment of the maintainability of the assets and includes attributes such as availability of spares; availability of know-how; level of obsolescence of the asset; and the criticality of the asset.

(c) Asset Health: based on the pre- and post-investment assessment of the assets that will be impacted by the proposed investment. Asset Health includes attributes such as remaining life; asset condition; and criticality of the asset.

(d) EENS (Expected Energy Not Served): the amount of expected energy not served based on the frequency of planned and unplanned outages, the duration of these outages, and the load curtailment. This Reliability measurement does not apply to Sustain investments.

2.4.3 Market Efficiency Criteria

(a) Third Party Benefits: Measures the present value of the benefits accrued to third parties, and includes the following attributes:

- Line Losses Reduction: the estimated reduction in transmission line energy losses due to the investment;
- Congestion Reduction: the estimated reduction in annual congestion due to the investment;

but not ecos of congestion

- Other Trade and Domestic Load Service Benefits: measures other benefits to third parties not included in Line Losses and Congestion Reduction.

(b) Strategic Alignment: Measures the effect of the project on the goal of either one of the two following strategic dimensions:

- Innovation Goal: assesses the introduction of a new proven innovation with a widespread application and demonstrated benefits to customers and/or business operation.
- Rational Build-out of the System Goal: assesses the strategic impact on the long term adequacy of the system.

2.4.4 Relationship Criteria

(a) The Community/Public relations criterion measures the impact of the investment on relationships with the community and the general public, focusing on BCTC's relationships with the following stakeholders: Industrial and Commercial Customers; IPPs and Wholesale Transmission Customers; Municipal and Provincial Governments; and the general public.

The criterion also measures the impact of the investment on the following five Community/Public stakeholder attributes: economic; health & safety; aesthetics; property value; and service quality.

(b) Similar to the Community/Public relations criterion, the First Nations criterion measures the impact of the investment on relationships with First Nations, and the impact on the following five attributes: economic opportunities; land; health & safety; aesthetics; and service quality.

2.4.5 Environment and Safety Criteria

(a) The Environment criterion assesses the operation or maintenance of the asset under the current condition versus a proposed project considering the following environmental attributes of air, waste, land, and water. Investments which are initiated to meet Federal, Provincial, or Municipal environmental requirements are considered to be mandatory, but are still scored.

(b) The Safety criterion assesses the operation or maintenance of the asset under the current condition versus a proposed project considering the following safety attributes employee, workplace and public safety. Investments which are initiated to meet Federal, Provincial, or Municipal safety requirements are considered to be mandatory, but are still scored.

3.0 DETERMINATION OF CATEGORY AND CRITERIA WEIGHTINGS

The categories and criteria BCTC uses in its prioritization method were originally defined in 2006 by reviewing the mission statement, key performance indicators, values, and annual reports to identify the business objectives. These were then discussed with senior decision makers and distilled into six categories and 18 criteria, representing the competing and complementing variables that are required to make sound capital spending decisions at BCTC. In 2007, a criterion for Transmission Expansion Opportunities was added to the Market Efficiency category, increasing the total number of criteria to 19.

In 2008, the six categories and nineteen criteria were reviewed and a number of changes were implemented to ensure consistency with the evolving nature of BCTC's industry. As a result, the Asset Condition category was included under the Reliability category in the F10 Capital Planning Process. The review of all categories and criteria resulted in 5 categories and fourteen criteria.

BCTC has used the Analytical Hierarchy Process (AHP) or "forced pairs methodology" to set the weightings for the categories and criteria used in value scoring. The Analytical Hierarchy Process Model was designed by TL Saaty[1] as a powerful and flexible decision making aid to help set priorities and make the best decision when both qualitative and quantitative aspects of a decision need to be considered. By reducing these complex decisions (such as developing weightings for the categories) to a series of one-on-one comparisons, then synthesizing the results, AHP not only helps decision makers arrive at the best decision, but also provides a clear rationale that it is the best.

Specifically, the process involves building a hierarchy of decision elements and then making comparisons between each possible pair of the elements based on a relative level of importance. This gives a weighting for each element within a cluster (or level of the hierarchy).

[1] T. L. Saaty, The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation, McGraw-Hill, New York, 1980. Dr T.L. Saaty, PhD, Mathematics, Yale University, 1953, developed AHP in the 1970's while he was a professor at the Wharton School of Business of the University of Pennsylvania. He is currently University Professor at the Katz Graduate School of Business of the University of Pittsburgh.

Traditionally, AHP uses a 9-point scale to determine relative importance of the pair wise comparisons (1—equally important, 3—moderately more important, 5—strongly more important, 7—very strongly more important, 9—extremely more important). For simplicity, BCTC used a 4-point scale (1—equally important, 2—slightly more important, 3—more important, 4—much more important) in the pair wise comparison model.

The following steps outline the mathematics behind the Analytical Hierarchy Process used at BCTC:

1. Determine the objectives to be compared. For BCTC, these are Financial; Reliability; Market Efficiency; Relationships; and Environment & Safety.

2. Set up a hierarchy model and determine the relative importance of each pair of objectives using BCTC's 4-point scale. Table 3.1 shows the first step of the AHP using the development of BCTC's category weightings as an example. In Table 3.1, the number in the ith row and jth column gives the relative importance of Category i as compared with Category j. For example, the entry in the Reliability row and Market Efficiency column indicates that Reliability is considered more important than Market Efficiency, scoring a '3'. The inverse, ⅓, is shown in the Market Efficiency row under the Reliability column.

Table 3.1 – Step 1 of the AHP

	Financial	Reliability	Relationships	Environment & Safety	Market Efficiency
Financial	1	1/2	2	2	1
Reliability	2	1	3	3	3
Relationships	1/2	1/3	1	1	1/2
Environment & Safety	1/2	1/3	1	1	1/2
Market Efficiency	1	1/3	2	2	1
Total	5	2 1/2	9	9	6

3. Divide each entry by the sum of the column it appears in, as shown in Table 3.2. For instance the (Reliability, Reliability) entry would be calculated as 1/(1/2+1+1/3+1/3+1/3) = 0.40 . The other entries become:

Table 3.2 – Step 2 of the AHP

	Financial	Reliability	Relationships	Environment & Safety	Market Efficiency
Financial	0.2000	0.2000	0.2222	0.2222	0.1667
Reliability	0.4000	0.4000	0.3333	0.3333	0.5000
Relationships	0.1000	0.1333	0.1111	0.1111	0.0833
Environment & Safety	0.1000	0.1333	0.1111	0.1111	0.0833
Market Efficiency	0.2000	0.1333	0.2222	0.2222	0.1667

4. Next, average the entries in each row to determine the relative weighting of each objective, as shown in Table 3.3.

Table 3.3 – Step 3 of the AHP

	Financial	Reliability	Relationships	Environment & Safety	Market Efficiency	Average
Financial	0.2000	0.2000	0.2222	0.2222	0.1667	20.2%
Reliability	0.4000	0.4000	0.3333	0.3333	0.5000	39.3%
Relationships	0.1000	0.1333	0.1111	0.1111	0.0833	10.8%
Environment & Safety	0.1000	0.1333	0.1111	0.1111	0.0833	10.8%
Market Efficiency	0.2000	0.1333	0.2222	0.2222	0.1667	18.9%

5. The final weightings become: Financial - 20%; Reliability – 39%; Market Efficiency – 19%; Relationships - 11%; and Environment & Safety – 11%. These are the category weightings used for the F2010 Capital Plan.

The same methodology was used to determine criteria weightings within most categories. Criteria weightings can be found in Appendix A.

Changes in BCTC's business environment can impact the criteria and categories that are used to calculate each investment's value score. Consequently, BCTC reviews the category and criteria annually to assess their ongoing relevance to investment evaluation and identifies any new categories or criteria that need to be added. The review also includes an analysis of the category and criteria weightings. It is the responsibility of the Manager, Corporate Capital Planning Process to ensure the categories, criteria and weightings are reviewed annually.

4.0 COMPUTATION OF CRITERIA AND CATEGORY SCORES

The section below describes the computation required to score the investments. The assessment and scoring of each investment is to be done preferably by the planner responsible for the investment, or alternatively, by individuals fully knowledgeable about the investments.

As a general guideline, all new investments coming for approval in the next Capital Plan cycle, together with any approved projects that could be reasonably considered for deferral and future projects that could be reasonably considered for advancement, should be scored.

4.1 Financial

The Financial Category assesses the values and deferral impacts of the financial costs and benefits related to the proposed investment. Financial costs and benefits are calculated using net present value analysis over the period to discount future values back to a comparable present value.

4.1.1 Value Scoring

The Value Score for the Financial Category is calculated by adding the weighted scores of each criterion as follows:

$$\sum \begin{cases} \text{Weighting A1} * \text{NPV} \\ \text{Weighting A2} * \text{Benefit to Cost Ratio} \\ \text{Weighting A3} * \text{Rate Impact} \\ \text{Weighting A4} * \text{PV of Efficiency Dollar Savings} \end{cases}$$

The financial analysis cost, savings, and benefits components used in the Financial category criteria are described in the following section. This is followed by a description of the methodologies for calculation of the four financial criteria value and deferral impact scores. The current weightings are provided in Appendix A.

4.1.1.1 Financial Analysis Cost, Savings, and Benefits Components

Cost Components

i. Direct Capital Investment Costs – any costs incurred to buy or construct an asset. This would include internal labour, contractor labour, materials/equipment, services/other, land purchases, Right of Way (ROW) costs, and contingency costs.

BC Hydro asset categories include Transmission Lines, Switchyard Equipment, Buildings, Computer, Communication, ROW and Land.

BCTC asset categories include Leasehold Improvement, Buildings, Land, Computer Software, Computer Hardware, Furniture and Communication.

ii. Overhead Costs – overhead costs are calculated as a percentage of Direct Capital Investment Costs. For the overhead rates refer to Appendix A for Growth and Sustain Capital Portfolios and Appendix B for BCTC Capital Portfolio.

iii. Contribution in Aid of Construction (CIAC) – CIAC is any contribution received from customers to fund the construction of an asset. These contributions provide an off-set to the finance charges, including Interest during Construction (IDC) for BC Hydro and Allowance for Funds Used During Construction (AFUDC) for BCTC and the depreciation associated with the Direct Capital Investments Costs.

iv. IDC/AFUDC Costs – IDC/AFUDC costs are calculated as a percentage of Direct Capital Investment Cost and Capital Overhead. For capital expenditures in the current year IDC/AFUDC is applied using the half year rule. IDC and AFUDC are compounded annually. For the IDC and AFUDC rates refer to Appendix A for Growth and Sustain Capital Portfolios and Appendix B for BCTC Capital Portfolio.

v. Project OMA Costs – any costs required by the project that do not meet the rules of capitalization. These costs are incurred prior to or during the in-service year and would include items such as data conversion, incremental insurance required during construction, work process development and staff training (not including training materials which can be capitalized). The estimate of project OMA costs should include all internal labour, contractor labour, materials/equipment, services/other expenses.

vi. OMA Ongoing Costs – any on-going operations and maintenance costs (internal labour, contractor labour, materials/equipment, services/other). Generally these costs begin from the in-service year and continue through the life of the asset. These costs would include maintenance, hardware and software costs such as licences and fees, headcount increases.

vii. Carbon Emission Off-sets – It is a provincially mandated initiative that requires all Government agencies and Crown corporations achieve carbon neutrality by the end of the 2010 calendar year. The mandate is expected to impact BCTC in two ways:

(a) BCTC must reduce greenhouse gas emissions where practical; and

(b) BCTC must purchase emission credits to offset those emissions that cannot be reduced.

BCTC anticipates that direct emission reductions will be achieved through the use of alternative asset management techniques, employing advanced technology, or using more energy efficient systems and low emission equipment. Those emissions that cannot be reduced must be offset through the purchase of emission credits through the Pacific Carbon Trust at a currently estimated cost of $25 per tonne of carbon dioxide equivalent (C02e). The purchase of offsets will begin in June 2011, for 2010 calendar year emissions, and continue annually, as mandated under this initiative.

The associated carbon emission in tonne is entered and the model calculates the dollar amount based on the escalating carbon emission unit cost. The General Reporting Protocol (GRP) published by the Climate Registry has details on what Green House Gases (GHG) are subject to carbon emission offset. Also Part III of the same report discusses how to quantify emissions. Follow this link to the report:

http://www.theclimateregistry.org/downloads/GRP.pdf

viii. Dismantling and Removal Costs (Net of Salvage Value) – any remediation, asset dismantling/retirement, or clean-up costs, net of salvage value. These costs are included in the NPV calculation and considered a part of total OMA costs.

ix. Grants and Taxes – These taxes are applied to new transmission lines and existing line extensions (i.e. Growth Investments) but not to Sustaining or BCTC capital investments. Grants and Taxes are calculated based on cost and asset information supplied by the

planners. Grants and taxes calculations begin from the in-service year (applying the half year rule during the in-service year) and span the life of the asset.

i Grants and Taxes for Growth Investments

- Computers and communications assets have no tax impact.
- Switchyard Equipment, Buildings, ROW (land rights) and BC Hydro Owned Land can be combined for calculating Grants and Taxes. Total taxable dollars include capital costs, overhead and IDC, but are not net of CIAC.
- BC Hydro Owned land also incurs an additional General Grant tax refer to Appendix A. However Crown owned land is exempt from tax.
- Lines are taxed based on line or cable length (km) built and the voltage and type of construction (underground, overhead, steel, wood pole, submarine cable). Lines are grouped into tax assessment classes. For Lines with no assessment class, the total project cost (capital expenditures, overhead costs, and IDC) is taxed at a tax allowance rate refer to Appendix A.

ii. Grants and Taxes for BCTC Investments
Grants and taxes pertaining to BCTC investments are not applicable unless the user has a specific capital project whereby land or other taxable assets (such as new building construction or additions) are purchased or constructed.

Savings and Benefit Components

i. OMA Hard Savings – OMA hard savings are those that result in a reduction to OMA. If the OMA reduction cannot be quantified then the savings are considered soft savings, i.e. avoided costs. Example of OMA soft savings include increased herbicide use to reduce future vegetation maintenance, replacement PCB filled equipment to reduce the risk of accidents requiring cleanup (i.e. oil spills) or environmental accidents, site reconstruction reducing the risk of a site fire), productivity improvement, redirected labour and efficiency gains unless the business case specifically identifies the date when the savings occur and OMA is reduced on this date. Hard OMA savings include reductions to maintenance, FTEs, chargeable overtime, contractor costs, maintenance, and software licences.

ii. Incremental Revenue (for Growth Investments only) – to recognize new revenue derived from additional load. The following information is required for this calculation:

i Incremental Load Growth

- Incremental load growth, in MW, each year within the investment's scope area (Starting in the in-service year)
- MW of new capacity that the investment will add
- Load Factor of the expected growth
- $/MWh rate for load growth revenue

ii Probabilistic Revenue

- Additional Firm Point to Point Sales in MW each year
- Long Term Point-to-Point Rate

Efficiency Dollar Savings Components:

These dollars savings are those related to time savings, efficiency, or effectiveness improvements that do not impact the bottom line.

i. Labour Savings (Labour Efficiency Gains, Redirected Labour)

ii. Avoided Costs (Materials/Equipment Costs avoided e.g. OEM Support Costs avoided)

iii. Other Dollar Savings that do not impact the bottom line.

4.1.1.2 Net Present Value

Description

Net Present Value (NPV) measures the discounted cash flow impact of an investment. The calculation of NPV factors in only the hard costs and hard savings (i.e. reductions in OMA, increases in probabilistic revenue and energy loss savings).

Calculation Methodology

The NPV formula is as follows:

$$NPV = \sum_{i=1}^{n} \frac{values_i}{(1 + rate)^i}$$

NPV is the present value of an investment's future net cash flows minus the initial investment. The investment is entered from the construction year up to the in-service year. All investments are discounted back to the current year for evaluation.

The following are considered in the NPV calculation:

- Direct capital including contingency as either inflated or escalated fiscal year dollars
- Other costs and benefits as uninflated fiscal year dollars.

Refer to Appendix A for the uninflated (real) discount rate to be used in the NPV calculation for the Growth, Sustaining and BCTC portfolios.

The calculations for costs and savings should include capital and project OMA values (if applicable), which may span multiple years. Soft savings are not reflected in the NPV analysis.

Efficiency Dollar Components will not be incorporated in the NPV analysis. These are addressed in the PV of Efficiency Dollar Savings in Section 4.1.1.4.

NPV calculated results are translated to a -5 to 5 scale, according to the Value Score Translation Table shown in Appendix D, where a 5 represents a high positive NPV of an investment.

4.1.1.3 Benefit to Cost Ratio

Description

As a measure of relative Benefit to Cost Ratio (BCR) of an investment, it represents a ratio of the net present value of the hard dollar savings and revenue to the present value of all costs.

Calculation Methodology

$$BCR = \frac{\text{PV Hard Savings and Revenue (Benefit components)}}{\text{PV Cost Components}}$$

Where the Present Values are calculated as follows:

$$PV = \sum_{i=1}^{n} \frac{values_i}{(1 + rate)^i}$$

A "break-even" BCR is equal to 1.0. An investment with a BCR greater than 1.0 is profitable and an investment with a BCR less than 1.0 is not profitable.

BCR period represents 20 year span including the in-service year, or the effective life of the asset, which ever is shorter. All investments are discounted back to the current fiscal year for evaluation.

The values will include all non-capital costs and benefits as uninflated, fiscal year dollars. Refer to Appendix A for the uninflated (real) discount rate to be used in the BCR calculation for Growth, Sustain and BCTC Capital Portfolios.

The calculations for costs and savings include capital and project OMA (if applicable), and may span multiple years. Efficiency Saving Components are not reflected in the BCR analysis.

BCR calculated results are translated on a -5 to +5 scale, according to the Value Score Translation Table in Appendix D, where a 5 represents a high positive BCR of an investment.

4.1.1.4 PV of Efficiency Dollar Savings

Description

Measures the present value of the Efficiency Dollar Savings impact to BCTC (not to third parties) of the investment, soft savings are those related to time savings, efficiency, or effectiveness improvements that do not affect the bottom line. Efficiency savings in this parameter consist of items such as soft labour savings (labour efficiency gains, redirected labour), avoided costs, and other soft savings where the savings do not impact the bottom line. Benefits to third parties are included as part of the Third Party Benefits in the Market Efficiency Criteria.

Calculation Methodology

Present value of Efficiency Dollar Savings are calculated as follows:

$$PV = \sum_{i=1}^{n} \frac{values_i}{(1 + rate)^i}$$

The PV of Efficiency Dollar Savings is calculated over a 20 year horizon beginning from the in-service year or the effective life of the asset; whichever is shorter. All investments are discounted back to the current fiscal year for evaluation.

The values will include all soft dollar benefits as uninflated dollars. Refer to Appendix A for the uninflated discount rate to be used in the PV calculation of the soft savings for Growth, Sustain and BCTC Capital Portfolios.

PV of Efficiency Dollar Savings is translated to a 0 to 5 scale, according to the Value Score Translation Table shown in Appendix D, where a 5 represents a high positive savings due to an investment.

4.1.1.5 Rate Impact %

Description

This measure assesses the impact of the investment on BCTC and BC Hydro rates over a 20 year horizon.

Calculation Methodology

Rate Impact =

Transmission Revenue Requirement (TRR) Rate Impact

= PV of TRR Change (i.e. Rev. Req. – Probabilistic Revenue)
Divided by
PV of the TRR over 20 years

BC Hydro Revenue Requirement (BCHRR) Rate Impact

= PV of BCHRR Change (i.e. Rev. Req. – Load Growth Rev. – Energy Loss Savings – Probabilistic Rev)

Divided by

PV the BCHRR over 20 years

Annual Revenue Requirement for the Rate Impact calculation

Change in Revenue Requirement **=**

Annual Equity Cost = Mid Year Asset Base x Equity % x ROE%

Plus

Annual Finance Charges = Mid Year Asset Base x Debt % x Interest %

Plus

Depreciation Expense net of CIAC

Plus

Grants and Taxes

Plus

Incremental OMA (OMA Costs less OMA Savings)*

Plus

Carbon Emission Off-set

Where the Present Values are calculated as follows:

$$PV = \sum_{i=1}^{n} \frac{values_i}{(1 + rate)^i}$$

Non-cash components are treated as follows:

a) Residual Equipment Book Value (Net Book Value of Assets Retired) – Added into Revenue Requirement Annual Amount in the In-service Year.

b) Depreciation Expense for Capital Costs – An accumulated depreciation expense is netted out of the capital costs (excluding BC Hydro owned land) in each year beginning in the in-service year (1/2 depreciation used in T=0) and ending when the asset is fully depreciated. (Capital costs are allocated by a percentage breakdown of asset types included in investment and are depreciated as per the applicable asset type depreciation schedules).

c) Depreciation Expense for CIAC – An accumulated depreciation expense is netted out of the CIAC in each year beginning in the in-service year (1/2 depreciation used in T=0) and ending when the CIAC is fully depreciated. CIAC, like capital costs, is allocated by a percentage breakdown of asset types included in investment and is depreciated as per the applicable asset type depreciation schedules).

The Incremental Revenue Requirement values are calculated as described in Section 4.1.1.1. The BC Hydro Transmission Revenue Requirement values are located in Appendix A.

A negative Rate Impact indicates that the investment will contribute to a reduction in Transmission rates while a positive Rate Impact will result in an increase in Transmission rates.

Rate Impact is translated to a -5 to 5 scale, according to the Value Score Translation Table shown in Appendix D, where a 5 indicates a high percentage rate decrease of an investment and a -5 indicates a high percentage rate increase.

4.1.2 Deferral Impact Scoring

Financial Deferral Impact is evaluated on the consequence and probability of the most likely impact scenario if the investment is deferred by two years. The predicted financial impact of deferring the investment by two years is determined for the following categories:

i. Project Real Cost Increases – Land / ROW, Labour (Internal/Contractor), Materials and Equipment;
ii. Loss of Revenue – Transmission (Current) Revenue; and
iii. Other Cost Implications – Penalties/Fines, Increased Outage Expenses, Increased Ongoing OMA Expenses.

These impacts are summed and translated into a consequence score of 0 to 5. The probability of the most likely scenario is also translated into a probability score of 0 to 5. The translations are based on the Project Deferral Impact Matrix, shown in Appendix C.

The Financial Deferral Impact Score is the product of the consequence score and the probability score, and will have a value between 0 and 25.

4.2 Reliability

The Reliability Category assess the values and deferral impacts related to BCTC's investments that are associated with supply to end user customers (e.g. BC Hydro's residential, commercial, industrial customers).

Reliability measures are typically not associated with congestion impacts on generation, as this is addressed in the Market Efficiency category. For example, for prioritization purposes, generation re-dispatch is considered to be an economics issue rather than a reliability issue up to the point that no generation re-dispatch remains. However, where applicable, generator reliability is considered in the reliability assessment.
Reliability for Growth portfolio investments are assessed differently than Sustain and BCTC portfolios investments.

4.2.1 Value Scoring

The Reliability Value Score is calculated using the following formula for Sustain:

$$\sum \begin{matrix} \text{Weighting B1} * \text{Reliability Improvement} \\ \text{Weighting B2} * \text{Maintainability} \\ \text{Weighting B3} * \text{Asset Health} \end{matrix}$$

Alternatively, Growth investments will calculate the Reliability Value Score using:

Expected Energy Not Served (EENS)

Further detail on each criterion is included in the following sections; the weightings are shown in Appendix A. Sustaining investments will normally be measured against the first three reliability

criteria, while Growth investments will be measured against the EENS criterion. As a result, weightings B1, B2, and B3 sum to 100%. There is no weighting assigned to EENS since this criteria will be measured alone. Investments in the BCTC Portfolio will be measured against the first three criteria or alternatively against the EENS criterion depending on the nature of the investment.

4.2.1.1 Reliability Improvement

Description

The Reliability Improvement criterion assesses the pre- and post-investment improvement on the reliability of an asset or system that has previously failed only. It includes the following attributes:

a. average frequency of failures (# of failures)
b. average failure duration (in hours)
c. the criticality of the asset

Calculation Methodology

Reliability Improvement =

$$\left[\left((\text{Duration} \times \text{Frequency prior to investment}) - (\text{Duration} \times \text{Frequency after investment})\right) \div (\text{Duration} \times \text{Frequency prior to investment})\right]$$

Since the above formula results in a value less than 1, it is then normalized by multiplying the value by 5, to obtain a score with a maximum value of +5.
The Reliability Improvement score is then multiplied by the Asset Criticality score, which is explained below in Section 4.2.1.1.3.

4.2.1.1.1. Frequency of Failures

Frequency Prior to Investment is the average number of failures of the asset over a defined period prior to the investment. This can be obtained from actual failure frequency records at

BCTC. Frequency after investment is the expected average number of failures over a defined period, of the asset class. This can be obtained from actual failure frequency records at BCTC. If this is not available, an industrial standard (such as CEA) may be used.

4.2.1.1.2. Duration of Failures

Duration Prior to Investment is the actual failure duration of the asset over a defined period prior to investment. This can be obtained from actual failure duration records at BCTC. Duration after investment is the expected average failure duration over a defined period, of the asset class. This can be obtained from actual failure duration records at BCTC. If this is not available, an industrial standard (such as CEA) may be used.

4.2.1.1.3. Asset Criticality

The Criticality Score is assessed differently for Stations investments than for Lines and BCTC Owned Assets investments.

The Criticality score for Stations investments is calculated using the Asset Performance Risk Calculator. This Calculator is a methodology developed by BCTC, and it assigns an asset criticality rank between 0 and 100. This asset criticality rank is then normalized to a score of 1, 0.9 or 0.8., as per Table 4.1:

Table 4.1 - Criticality Scoring for Stations

If Asset Criticality Rank (from Calculator) is ...	≥80 to 100	>35 to <80	0 to ≤35
... the Asset Criticality Score is	1.0	0.9	0.8

For example, an asset that has a criticality rank of 90 will have a Criticality Score of 1.0.

For Lines and BCTC Owned Assets, Criticality is assessed using the definitions and scoring shown in Table 4.2:

Table 4.2 – Criticality Definitions and Scoring for Lines and BCTC Owned Assets

Rating	Description	Score
A	High Criticality. High consequence to the system in the	1

	event of a failure. High probability of a prolonged customer or business outage in the event of a failure. High cost of repair or disruption to the business in the event of a failure.	
B	Medium Criticality. Moderate consequence to the system in the event of a failure. Moderate probability of a prolonged customer or business outage in the event of a failure. Moderate cost of repair or disruption to the business in the event of a failure.	0.9
C	Low Criticality. No or Low consequence to the system in the event of a failure. Low probability of a prolonged customer or business outage in the event of a failure. Low cost of repair or disruption to the business in the event of a failure.	0.8

4.2.1.2 Maintainability

Description

The Maintainability criterion is based on a pre- and post-investment assessment of the assets that will be impacted by the proposed investment. Maintainability scoring considers the following areas:

a. Availability of Spares
b. Availability of Know-How
c. Obsolescence
d. Asset Criticality

Calculation Methodology

Maintainability Impact =

Maximum Value Score

$$\begin{cases} f(\text{Availability of Spares Score, prior to investment, after investment}) \times \text{Asset Criticality} \\ f(\text{Availability of Know-How Score, prior to investment, after investment}) \times \text{Asset Criticality} \\ f(\text{Level of Obsolescence Score, prior to investment, after investment}) \times \text{Asset Criticality} \end{cases}$$

Scoring for this measure is calculated as the maximum of the scores of any of the Maintainability attributes that are applicable to the assets being impacted by the investment, multiplied by the Criticality Assessment Score after investment.

4.2.1.2.1 Availability of Spares

Description

The Availability of Spares criterion assesses the availability of spares before and after the proposed investment. This measure is calculated as the change in availability of spares from any source for the impacted investment area as a result of the investment.

Calculation Methodology

Availability of Spares Impact =

$$f(\text{Availability of Spares}) \text{ Before Investment} - f(\text{Availability of Spares}) \text{ After Investment}$$

Where both the 'Before' and 'After' scores are assessed per Table 4.3.

Table 4.3 – Availability of Spares Value Scoring.

	Score
No Availability Today	5
Availability for One Planning Cycle	4
Availability for Five Years	3
Availability for More Than Five Years	0

Subtracting the 'after' investment score from the 'before' investment score results in a value score between 0 and 5.

4.2.1.2.2 Availability of Know-How

Description

The Availability of Know-How criterion assesses the availability of know-how before and after the proposed investment. This measure is calculated as the change in availability of know-how from any source for the impacted investment area as a result of the investment.

Calculation Methodology

Availability of Know-How Impact =

$$f(\text{Availability of Know-How}) \text{ Before Investment}$$
$$- f(\text{Availability of Know-How}) \text{ After Investment}$$

Where both the 'Before' and 'After' scores are assessed per Table 4.4 .

Table 4.4 – Availability of Know-How Value Scoring.

	Score
No Availability Today	5
Availability for One Planning Cycle	4
Availability for Five Years	3
Availability for More Than Five Years	0

Subtracting the 'After' investment score from the 'Before' investment score results in a translated value score between 0 and 5.

4.2.1.2.3 Obsolescence

Description

The Obsolescence criterion assesses the level of loss in the utility of an asset due to the development of improved or superior equipment, but not due to its physical deterioration (the asset may still be in good working condition). Obsolescence frequently happens because a superior replacement has become available, e.g. smaller, faster, lighter or less expensive.

This measure is calculated as the change in obsolescence for the impacted investment area as a result of the investment.

Calculation Methodology

Obsolescence Impact =

$$f(\text{Obsolescence}) \text{ Before Investment} - f(\text{Obsolescence}) \text{ After Investment}$$

Where both the 'Before' and 'After' scores are assessed per Table 4.5 .

Table 4.5 – Obsolescence Value Scoring.

	Score
Asset is Obsolete Today	5
Asset Will Become Obsolete Within One Planning Cycle	4
Asset Will Become Obsolete in Five Years	3
Asset Will Become Obsolete in More Than Five Years	0

Subtracting the 'After' investment score from the 'Before' investment score results in translated value score between 0 and 5.

4.2.1.2.4 Asset Criticality

Asset Criticality is calculated using the same methodology described in section 4.2.1.1.3

4.2.1.3 Asset Health

Description

The Asset Health criterion is based on a pre- and post-investment assessment of the assets that will be impacted by the proposed investment. Asset Health scoring considers the following areas:

a) Remaining Life;
b) Asset Condition; and

c) Asset Criticality.

Scoring for this measure is calculated as the weighted average of the Remaining Life and Asset Condition. The Asset Criticality score will be applied to both measures.
Asset Health impact score is translated to a 0 to 5 scale according to the Value Score Translation Table shown in Appendix D.

Calculation Methodology

Asset Health Impact =

$$\sum \left(\begin{array}{l} \text{Weighting B3.1} * f(\text{Remaining Life Score, prior to investment, after investment}) \times \text{Criticality} \\ \text{Weighting B3.2} * f(\text{Asset Condition Score, prior to investment, after investment}) \times \text{Criticality} \end{array} \right)$$

Each component of the Asset Health impact score is weighted to reflect its relative importance. These weights are shown in Appendix A.
The Remaining Life Score is determined by assessing the remaining life of the impacted assets pre- and post- investment using Table 4.6:

Table 4.6 – Remaining Life Value Scoring

Remaining Life (%) After Investment	Remaining Life (%) Before Investment					
	< 10%	25%	50%	75%	> 90%
< 10%	0				
25%	2	0			
50%	3	1	0		
75%	4	3	1	0	
> 90%	5	4	3	1	0

Within the Asset Health category, Asset Condition is determined by evaluating the impacted assets pre- and post-investment according to the definitions in Table 4.7 and scoring using Table 4.8:

Table 4.7 - Asset Condition Description

A	Means the component is in "as new" condition
B	Means the component has some minor problems or evidence of aging
C	Means the component has many minor problems or a major problem that requires attention
D	Means the component has many problems and the potential for major failure
E	Means the component has completely failed or is degraded beyond repair

Table 4.8 - Asset Condition Scoring Matrix

Asset Condition After Investment	Asset Condition Before Investment					
	A	B	C	D	E
A	0	2	3	4	5
B		0	1	3	4
C			0	1	3
D				0	2
E					0

The Criticality Score for Stations, Lines and BCTC owned assets investments is calculated following the same procedure as described on section 4.2.1.1.3.

4.2.1.4 Expected Energy Not Served (EENS) (Growth Portfolio)

Description

This criterion assesses the reduction in expected energy not served due to the investment. EENS reflects the probabilistic amount of energy not served based on the frequency of planned and unplanned outages, the duration of these outages, and the amount of load curtailment. Scoring for this measure is calculated as the decrease in EENS attributable to the investment.

Calculation Methodology

EENS Reduction = EENS in the year prior to the investment
- EENS after the investment

EENS is measured in MWh/yr. No investment is expected to completely eliminate EENS.

EENS scores are translated to a 0 to 5 scale, according to the Value Score Translation Table shown in Appendix D where a positive score represents a positive impact of an investment.

4.2.2 Deferral Impact Scoring

The Reliability Deferral Impact is assessed across the same sub-criteria as those used in computing the Reliability Value score. The impact is evaluated on the consequence and probability of the most likely deferral impact scenario if the investment is deferred by two years.

For Growth investments, EENS is used to evaluate the Reliability Deferral Impact. The consequence is translated into a consequence score of 0 to 5. The translation is based on the Project Deferral Impact Matrix, shown in Appendix C. The calculation for EENS already accounts for probability, so a probability of 5 (100% certain) is automatically applied to this criterion for calculating its impact score. The EENS impact score is the consequence score times the probability score of 5, and will have a value between 0 and 25. The Deferral Impact Score for Reliability for Growth investments (and the applicable BCTC investments) will be the same as the EENS criterion impact score, as it is the only Reliability criterion for Growth investments.

For BCTC investments, reliability impact will be evaluated where applicable using the Sustaining or the Growth approach described above depending on which best applies to the specific investment.

For Sustaining investments, Reliability Improvement, Maintainability and Asset Health are used and evaluated on the consequence and probability of deferring the investment for two years for the most likely scenario. The consequence is translated into a consequence score of 0 to 5. The probability of the most likely scenario is also translated into a probability score of 0 to 5. A probability of 5 (100% certainty) for Maintainability and Asset Health is automatically applied

since it is certain that at least the current condition of the asset will continue. The translations are based on the Project Deferral Impact Matrix, shown in Appendix C. For each criterion, an impact score is calculated as the product of the consequence score and the probability score, and will have a value between 0 and 25. The Deferral Impact Score for Reliability is then the highest impact score out of the three criteria.

4.2.2.1 Reliability Deterioration

Description

The Reliability Deferral Impact assesses the impact to Reliability Deterioration resulted from deferring the investment for two years. This criterion assesses the reliability of the asset at the end of the planning cycle if no investment is done, and compares it with its current Reliability. This impact is calculated on assets or systems that have previously failed only. It includes the following attributes:

a. average frequency of failures (# of failures per year)
b. average duration of each failure (in hours)
c. the criticality of the asset

Calculation Methodology

Reliability Deterioration =

$$[((\text{Duration} \times \text{Frequency after planning cycle}) - (\text{Duration} \times \text{Frequency today})) \div (\text{Duration} \times \text{Frequency today})]$$

Since the above formula results in a calculated value between 0 and 1 (0% and 100%), it is then normalized to obtain a translated score between 0 and 5, according to table 4.9:

Table 4.9 – Impact of Deferral Translation Table for Reliability Deterioration

Impact of Deferral Calculated Score	Impact of Deferral Translated Score
>= 50%	5
49% to 30%	4

29% to 20%	3
19% to 10%	2
9% to 5%	1
<= 4%	0

The probability of the most likely scenario is also translated into a probability score of 0 to 5. The Reliability Deterioration score is then multiplied by the Asset Criticality score, which is explained in Section 4.2.1.1.3.

4.2.2.1.1. Frequency of Failures

Frequency today is the current average number of failures of the asset over a defined period. This can be obtained from actual failure frequency records at BCTC. Frequency after the planning cycle is the expected average number of failures of the asset class after the planning cycle if the investment is not made. This can be obtained from actual failure frequency records at BCTC. If this is not available, an industrial standard (such as CEA) may be used.

4.2.2.1.2. Duration of Failures

Duration of failures today is the actual failure duration of the asset. This can be obtained from actual failure duration records at BCTC. The Duration of Failures after the planning cycle is the expected average failure duration of the asset class after the planning cycle if the investment is not made. This can be obtained from actual failure duration records at BCTC. If this is not available, an industrial standard (such as CEA) may be used.

4.2.2.1.3. Asset Criticality

Asset Criticality is calculated using the same methodology described in section 4.2.1.1.3

4.2.2.2. Maintainability

Description

Maintainability Deferral Impact is assessed by the same criteria used to determine the Value Score: Availability of Spares; Availability of Know-How; Obsolescence; and Asset Criticality. Each applicable criterion is evaluated on the consequence and probability of the most likely

Deferral Impact scenario resulted from deferring the investment for two years. The actual deferral impact score for Maintainability is then the highest impact score (consequence * probability) out of the three criteria, multiplied by the Asset Criticality.

If these three criteria are not addressed, there is a 100% certainty that at least the current state of Maintainability will continue. Consequently, a probability score of 5, representing this 100% certainty, is automatically assigned to each Maintainability impact criterion.

Calculation Methodology:

Maintainability Consequence Score =

Maximum Consequence Score = Maximum of:

- (Availability of Spares Score, today's state score) x Asset Criticality
- (Availability of Know-How Score, today's state) x Asset Criticality
- (Level of Obsolescence Score, today's state) x Asset Criticality

4.2.2.2.1 Availability of Spares

If the investment is not funded, the expected consequence is equal to the current (pre-investment) level assessment. Table 4.10 shows the scoring matrix used to determine the pre-investment Availability of Spares score:

Table 4.10 – Availability of Spares Impact Consequence Scoring.

	Score
No Availability Today	5
Availability for One Planning Cycle	4
Availability for Five Years	3
Availability for More Than Five Years	0

4.2.2.2.2 Availability of Know-How

If the investment is not funded, the expected consequence is equal to the current (pre-investment) level assessment. Table 4.11 shows the scoring matrix used to determine the pre-investment Availability of Know-How score:

Table 4.11 – Availability of Know-How Impact Consequence Scoring.

	Score
No Availability Today	5
Availability for One Planning Cycle	4
Availability for Five Years	3
Availability for More Than Five Years	0

4.2.2.2.3 Obsolescence

If the investment is not funded, the expected consequence is equal to the current (pre-investment) level assessment. Table 4.12 shows the scoring matrix used to determine the pre-investment Obsolescence score:

Table 4.12 – Obsolescence Impact Consequence Scoring.

	Score
Asset is Obsolete Today	5
Asset Will Become Obsolete Within One Planning Cycle	4
Asset Will Become Obsolete in Five Years	3
Asset Will Become Obsolete in More Than Five Years	0

As explained in Section 4.2.2.2, a probability of 5 (100% certainty) has been assigned to each Maintainability impact criterion.

4.2.2.3. Asset Health

Description

The expected consequence of Asset Health (the impact to Asset Health of not funding the investment) is the pre-investment assessment of Remaining Life and Asset Condition.

Specifically, the consequence score is derived from the weighted average of the Remaining Life and Asset Condition multiplied by the Criticality assessment.
If these two criteria are not addressed, there is a 100% certainty that the current state of Asset Health will continue. Consequently, a probability score of 5, representing this 100% certainty, is automatically assigned to each Asset Health deferral impact criterion.

Calculation Methodology

Asset Health Consequence Score =

$$\sum \begin{pmatrix} \text{Weighting B3.1} * f(\text{Remaining Life Score, today's state score}) \times \text{Asset Criticality} \\ \text{Weighting B3.2} * f(\text{Asset Condition Score, today's state score}) \times \text{Asset Criticality} \end{pmatrix}$$

Each component of the Asset Health Consequence Score is weighted to reflect its relative importance. These weights are shown in Appendix A.

The Remaining Life and Asset Condition Scores are determined by assessing the current state of the assets (i.e. equivalent to the pre-investment state determined in the Asset Health value scoring) using Table 4.13:

Table 4.13 – Remaining Life and Asset Condition Deferral Impact Consequence Scoring

	5	4	3	2	1
Remaining Life	< 10% or 1 planning cycle	25%	50%	75%	> 90%
Asset Condition	E	D	C	B	A

The same asset condition descriptions are used in the deferral impact calculation as in the value scoring. These descriptions are found in Table 4.7 in Section 4.2.1.3.

Additionally, the Criticality scores for Stations, Lines and BCTC assets are calculated using the same method and weightings as described in Section 4.2.1.1.3.

Asset Health Consequence Scores are translated to a +5 to 0 scale, according to the Project Deferral Impact Matrix shown in Appendix C.

4.3 Market Efficiency

The Market Efficiency Category assess the value of the investment related to third party benefits and its alignment to two of BCTC's strategic goals: innovation and rational build-out of the system.

(a) Third Party Benefits: includes those benefits that are associated with third party market participants and excludes any value or deferral impact elements directly related to BCTC. It includes the following attributes:

- Line Losses Reduction: the estimated reduction in transmission line energy losses due to the investment;
- Congestion Reduction: the estimated reduction in annual congestion due to the investment;
- Other Trade and Domestic Load Service Benefits: measures other benefits to third parties not included in Line Losses and Congestion Reduction.

(b) Strategic Alignment: Measures the effect of the project on the goal of either one of the two following strategic dimensions:

- Innovation Goal: assesses the introduction of a new proven innovation with a widespread application and demonstrated benefits to customers and/or business operation.
- Rational Build-out of the System Goal: assesses the strategic impact on the long term adequacy of the system.

4.3.1 Value Scoring

The Market Efficiency Value Score is calculated using:

$$\sum$$

Weighting C1 * Third Party Benefits
Weighting C2 * Strategic Alignment

Further detail on each criterion is included in the following sections; the weightings are shown in Appendix A.

4.3.1.1 Third Party Benefits

Description

Third Party Benefits measures the present value of the benefits accrued to third party market participants (e.g. generation owners, load serving entities), and excludes any value or deferral impact elements directly related to BCTC, such as revenue changes, rate impacts, and avoided costs of other BCTC Capital Plan alternatives to the proposed investment.

Calculation Methodology:

$$\text{Third Party Benefits} = PV = \sum_{i=1}^{n} \frac{values_i}{(1 + rate)^i}$$

The values will include all annual benefits that are accrued to third party market participants, and that are related to:

i. Line Losses Reduction
ii. Congestion Reduction
iii. Other Trade and Domestic Load Service Benefits

Further detail on each criterion is included in the following sections.
Market Efficiency values are assessed over a 20 year horizon beginning from the in-service year or the effective life of the asset; whichever is shorter. The yearly dollar figures are then discounted by a real discount rate, also shown in Appendix A, to the current fiscal year. Results are translated to a scale from 0 to 5, according to the Value Score Translation Table shown in Appendix D, where a 5 represents the greatest positive impact of an investment.

4.3.1.1.1. Line Losses Reduction

Description

Line Losses Reduction is assessed in terms of the estimated reduction in transmission line energy losses in GWhrs due to the investment over a 20 year period.

Calculation Methodology

Line Losses Reduction = (energy losses reduction x value of energy losses)

Estimated reductions in annual line losses are converted to dollars at an energy value applicable for the region that the losses savings will occur. These energy values are shown in Appendix A (Section AA.3.3).

4.3.1.1.2. Congestion Reduction

Description

Investments are assessed in terms of their capacity to reduce congestion over a 20 year period. This criterion provides an estimate of the generation owner benefit due to re-dispatch of existing generation as well as the generation owner benefit of being able to dispatch new generation at a higher output. The value is calculated according to a prescribed formula. If the formula is considered to be not applicable for the congestion reduction due to the project, an alternative estimate would be included in Other Trade and Domestic Load Service Benefits.

Calculation Methodology

Congestion Reduction =

(Generation Re-dispatch Excluding Storage x Rate Excluding Storage)

+ (Generation Re-dispatch Using Storage x Rate Using Storage)

Congestion Reduction is calculated for each year following completion of the project. Generation Re-dispatch is estimated in GWhrs for two categories: reduction in generation that does not use BCH storage; and reduction in generation that uses BCH storage. These GWhrs are then converted to dollar values using their respective re-dispatch rates shown in Appendix A. Congestion Reduction is the sum of these two values.

4.3.1.1.3. Other Trade and Domestic Load Service Benefits

Description

This criterion provides for other market efficiency trade and domestic load service benefits not addressed by Losses Reduction and Congestion Reduction. This criterion may be used as an alternative to consider generation redispatch benefits that are not accurately reflected by the Congestion Reduction methodology. For example, new energy sales made possible by the investment should not be double counted with congestion reduction due to the investment. Avoided costs of other transmission reinforcements are to be excluded. However, avoided distribution costs and other delivery costs that would not be included in the BCTC Capital Plan may be considered.

Calculation Methodology

Other trade and domestic load service benefits are measured in dollars over a 20 year period.

4.3.1.2 Strategic Alignment

Description:

Strategic Alignment measures the effect of the project on the goal of either one of the two following strategic dimensions:

- Innovation Goal: assesses the introduction of a new proven innovation with a widespread application and demonstrated benefits to customers and/or business operation.

- Rational Build-out of the System Goal: assesses the strategic impact of the long term adequacy of the transmission system.

Adequacy is defined as the ability of the transmission system to meet the forecasted needs of its customers. It is important to note that the approach to evaluate the Strategic Alignment impact of the investments is expected to evolve over time, with the BCTC Long Term Transmission Vision.

Calculation Methodology:

Strategic Alignment Impact =

$$\textbf{Maximum Value Score} \left(\begin{array}{l} f(\text{Innovation Goal Score}) \\ f(\text{Rational Build-out of the System Goal}) \end{array} \right)$$

The Strategic Alignment impact score is the maximum of the two strategic goals scores. The scoring for each goal is assessed per Table 4.14:

Table 4.14 – Strategic Alignment Value Scoring

	Score
Significantly Positive Effect	5
Marginally Positive Effect	2
No effect	0

A project with significantly positive effect would be one that others would want to implement. It is expected to become a new "standard". A marginally positive project will be one that introduces new proven innovation but with an impact limited to the project itself or only a few assets.

4.3.2 Deferral Impact Scoring

Market Efficiency Deferral Impact is assessed based on the Third Party attributes: Line Losses Reduction, Congestion Reduction, and Other Trade and Domestic Load Service Benefits. Each of the three attributes is evaluated on the impact of deferring the investment until the next planning cycle, i.e. the impact of deferring the investment for two years. The deferral impact

considers the sum of the benefits of the two year period starting from the in-service year, and discounts it back to the current fiscal year using a real discount rate included in Appendix A.

The consequence level of each of Line Losses Reduction, Congestion Reduction and Other Trade and Domestic Load Service Benefits is the foregone benefit for each of these subcategories. The consequence level is translated to a score according to the Project Deferral Impact Matrix shown in Appendix C.

Market Efficiency Deferral Impact probability scores are assumed to be 5 (100% probability) as the consequence of deferral is already probability adjusted for Congestion Reduction and Other Trade and Domestic Load Service Benefits, or is 100% certain for Line Losses Reduction.

The Market Efficiency Deferral Impact Score is the consequence score times the probability score of 5, and will have a value between 0 and 25.

4.4 Relationships

The Relationships category assesses the value and deferral impact of an investment on Community/Public stakeholders and First Nations attributes, and on BCTC's relationships with Community/Public stakeholders and First Nations.

4.4.1 Value Scoring

The Relationships Value Score is calculated using:

$$\sum \begin{matrix} \text{Weighting D1} * \text{Community/Public} \\ \text{Weighting D2} * \text{First Nations} \end{matrix}$$

Further detail on each criterion is included in the following sections; the weightings are shown in Appendix A.

4.4.1.1 Community/Public

Description

The Community/Public criterion measures the anticipated impact of the investment on stakeholder attributes and relationships. Scoring is calculated as a weighted average of the investment's impact (significantly negative, marginally negative, neutral, marginally positive, or significantly positive) on specific attributes and BCTC's relationships with stakeholders. This combined score is then multiplied by an additional weighting relative to the population density of the investment's scope area.

Calculation Methodology

Community/Public Value Score =

$$\left[\sum \begin{matrix}\text{Weighting D1.1} * \text{Stakeholder Attributes} \\ \text{Weighting D1.2} * \text{Stakeholder Relationships}\end{matrix}\right] \times \text{Weighting D1.3 (Population Density Weighting)}$$

The Stakeholder Attributes, Stakeholder Relationships and Population Density Weightings are shown in Appendix A.

The Stakeholder Attributes are calculated as a weighted average of five attributes. Table 4.15 shows the stakeholder attributes that are assessed together with their weighting reference. Weightings are included in Appendix A.

Table 4.15 – Stakeholder Attributes

Weighting Reference	Attribute
D1.1.1	Economic Impact
D1.1.2	Health & Safety Impact
D1.1.3	Aesthetics Impact
D1.1.4	Property Value Impact
D1.1.5	Service Quality Impact

Similarly, a weighted average is calculated to determine the Stakeholder Relationship score. Table 4.16 shows the stakeholder relationships that are assessed together with their weighting reference. Weightings are included in Appendix A.

Table 4.16 – Stakeholder Relationships

Weighting Reference	Stakeholder
D1.2.1	Industrial Customers
D1.2.2	Commercial Customers
D1.2.3	IPPS & Wholesale Transmission Customers
D1.2.4	Municipal Governments
D1.2.5	Provincial Governments
D1.2.6	General Public

The impact of the investment on each Stakeholder Attribute and Stakeholder Relationship is assessed using the scoring matrix shown in Table 4.17:

Table 4.17 – Scoring for Stakeholder Attributes and Stakeholder Relationships

Significantly Negative Effect	Marginally Negative Effect	No or Neutral Effect	Marginally Positive Effect	Significantly Positive Effect
-5	-2	0	2	5

4.4.1.2 First Nations

Description

The First Nations criterion measures the impact of the investment on attributes and relationships with First Nations. Scoring is calculated as a weighted average of the investment's impact (significantly negative, marginally negative, neutral, marginally positive, or significantly positive) on specific First Nations attributes and on the relationship with First Nations. This combined score is then multiplied by an additional weighting, shown in Appendix A, relative to the number of First Nation communities impacted by the investment

Calculation Methodology

$$\left(\sum \text{Weighting D2.1} * \text{First Nations Attributes} \right) \times \text{Weighting D2.3 (Impacted Communities Weighting)}$$

Weighting D2.2 * First Nations Relationships

The First Nations Attributes, First Nations Relationships and Impacted Communities Weightings are shown in Appendix A.

The score for First Nations Attributes is calculated as the weighted average of five attributes. Table 4.18 shows the First Nations Attributes that are assessed. Weightings are included in Appendix A.

Table 4.18 – First Nations Attributes

Weighting Reference	Description
D2.1.1	Economic Opportunities Impact
D2.1.2	Land Impact
D2.1.3	Health & Safety Impact
D2.1.4	Aesthetics Impact
D2.1.5	Service Quality Impact

The value of the investment on First Nations Attributes is assessed using the scoring matrix shown in Table 4.19:

Table 4.19 – Scoring for First Nations Attributes and First Nations Relationships

Significantly Negative Effect	Marginally Negative Effect	No or Neutral Effect	Marginally Positive Effect	Significantly Positive Effect
-5	-2	0	2	5

The value of the investment on First Nations Relationships is also assessed using Table 4.19.

4.4.2 Deferral Impact Scoring

Relationships Deferral Impact is the impact associated with the investment being deferred for two years. The impact is evaluated on the consequence and probability of the most likely deferral impact scenario. The consequence and probability of the most likely impact scenario for deferring the funding of the investment for two years is evaluated for the Community/Public

and First Nations. The actual deferral impact score for Relationships is the highest impact score (consequence * probability) out of the two criteria.

The Relationships consequence levels (0-5) and probability levels (0-5) for each of the criteria are shown in the Project Deferral Impact Matrix, which is included in Appendix C.

4.5 Environment and Safety

This category assesses the value and deferral impact of an investment associated with environment and safety attributes.

4.5.1 Value Scoring

Description

This category is scored as a function of a current state assessment of the environment according to 4 environmental and 2 safety attributes, and the degree of impact of the investment (significantly negative, marginally negative, neutral, marginally positive, or significantly positive) on each attribute. A weighting, shown in Appendix A, is applied to these calculated scores based on whether the scope of the impacts are dispersed or localized. Localized impact is considered to be within 1 kilometer of the project. Dispersed impact is considered to be beyond 1 kilometer of the project.
Investments which are initiated to meet Federal, Provincial, or Municipal environmental requirements are considered mandatory, but are still scored.

Calculation Methodology

The Environment and Safety Value Score =

$$\left(\sum \begin{matrix} \text{Weighting E1 * Environment Score)} \\ \text{Weighting E2 * Safety Score} \end{matrix} \right)$$

where

Environment Score =

$$\left(\sum \text{Environment Attributes Scores} \right) \times \text{Weighting E1.1 (Scope of Impacted Environment Issues Weighting)}$$

and

Safety Score =

$$\left(\sum \text{Safety Attributes Scores} \right) \times \text{Weighting E1.1 (Scope of Impacted Safety Issues Weighting)}$$

The net value impact on the environment or safety aspects can be positive, neutral or negative. Each of the attributes is scored based on the impact of the investment on the attribute relative to an assessment of the current state of the attribute. The current state assessment and investment impact are evaluated according to Table 4.20. Each of the attribute score will range from -5 to +5. The Environment & Safety score will also range from -5 to +5. If the sum of each attribute score multiplied by the Scope of Impact weight is more than 5, the translated score will be 5. Similarly, if the sum of each attribute score multiplied by the Scope of Impact weight is less than -5, the translated score will be -5.

Table 4.20 – Environment & Safety Value Scoring

	Degree of Impact of Investment on Environment or Safety				
Current State Assessment (Pre-Investment)	Significantly Negative	Marginally Negative	Neutral	Marginally Positive	Significantly Positive
Existing Environmental or Safety Issues/Hazards	-5	-4	-2	4	5
Imminent Threat of Environment or Safety Issue/Hazard	-3	-2	-1	2	3
No Existing Environmental or Safety Issues/Hazards	-2	-1	0	1	2

The environmental attributes are:

a) Air – Potential for adverse impacts to air quality or atmospheric warming: include avoidance, increase or reduce of thermal energy purchases (e.g. green energy), internal BC Hydro emissions (e.g. SF6, vehicle fleet, buildings, diesel generation, own-use electricity, etc.), or external emissions (offsets). CFC emissions that impact the ozone layer, local air quality (mold asbestos, odors), noise or particulate matter.

b) Waste – Potential for adverse impacts from waste handling, storage or toxicity: This includes solid or liquid waste generation through spills, releases, disposal, etc. Examples include introduction or reduction of additional waste products (solid waste, special/hazardous waste, PCBs, oil, fuel, pesticides, etc.) into the environment.

c) Land – Potential for adverse impacts to land resources: This includes all land resources, such as vegetation or animal species, or cultural, community or stakeholder values Examples include contaminated soils remediation, heritage resource disturbance, vegetation removal, landscaping, bird or mammal conflicts, and species at risk etc.

d) Water – Potential for adverse impacts to water resources: This includes water quality, water-dwelling plants or animals or fisheries. The impacts may affect fish bearing water courses, wetlands, stream bank vegetation and stability, habitat, and erosion and sedimentation into water resources.

The safety attributes are:

a) Employee and or Workplace Safety – Includes potential for adverse impacts to employees and others in the workplace due to identified hazards considering the adequacy of existing preventive measures, or the development of new or additional preventive measures to protect workers and others. This includes the potential for: a major structural failure or collapse of a building, bridge, tower, crane, hoist, temporary construction support system or excavation; release of a hazardous substances or exposure to conditions that are likely to cause a chronic health effect; or unguarded energized conditions,

b) Public Safety - This includes involving a member of the public, resulting from interface with BCTC's facilities.

4.5.2 Deferral Impact Scoring

Environment & Safety Deferral Impact is evaluated on the consequence and probability of deferring the investment for one planning cycle for the most likely case scenario. The actual impact score used will be the highest impact score (consequence * probability) out of the two criteria.

The Environment & Safety consequence levels (0-5) and probability levels (0-5) for each of the criteria are listed in the Project Deferral Impact Matrix, which is included in Appendix C.

5.0 DETERMINATION OF PORTFOLIO

It is the responsibility of the Managers involved with each of the three portfolios to determine the prioritized list. The Managers will consider the computed scores in establishing the prioritized list, but the scores are not a substitute for their management decision-making. The final prioritized list may not necessarily follow the computed scores.

The following sections describe the main steps to establishing the prioritized list for each of the three portfolios.

5.1 Step 1

Once the scoring of each investment is complete, a review of the result is required to ensure consistency in the scoring among the investments. Adjustments to the scoring may be required to correct inconsistencies.

5.2 Step 2

The scores are reviewed to identify any investment where the current scoring system may not adequately capture the value or the deferral impact. The final list may need to be adjusted accordingly. Investment deemed mandatory will fall under this category.

Investments deemed mandatory are defined as investments that are required to meet contractual, legislative or regulatory requirements are deemed Mandatory. In addition, investments required to ensure an adequate level of due diligence in the area of safety and environment will be deemed mandatory.

5.3 Step 3

The next step is to establish how the prioritized list is established for each portfolio. The approach varies for each portfolio as outlined below.

5.3.1 Growth

For Growth investments, ranking is based primarily on value, but the deferral impact is also considered. The list is first established by value (and deferral impact) scores. Any adjustments identified in Step 2 are then implemented. Investments deemed mandatory are included in the highest priority group. Remaining investments with similar value are placed in groups and the ranking within the group is determined by deferral impact. Projects are then ranked according to an ordinal ranking with 1 being the highest priority. Investments in the lowest groups, i.e. those projects with the lowest value, are reviewed for possible deferral whether there are resource constraints or not before the list is finalized.

5.3.2 Sustaining

The prioritization of the investments for the Sustaining Portfolio does not result in a prioritized list like the Growth and BCTC Portfolios. The approach is dictated by the fact that Sustaining Capital investments are primarily program expenditures, so that the prioritization is as much about determining the size of programs as the priority of programs. Prioritization of Growth capital investments is about prioritizing specific projects, which may be constructed or not, but cannot be varied in size. The Sustaining approach can be termed 'optimization'.

In order to optimize the Sustaining Portfolio, incremental levels of program activities need to be assessed. This is done by disaggregating programs into component projects and then combining the component projects into groups with similar levels of estimated value and deferral impact. Each group of component projects is scored for value and deferral impact at the group level. Discrete projects are scored individually. Each of the projects is assessed for value and impact of deferral, where both value and impact of deferral are measured relative to cost, providing a cost weighted score. Projects with both high value and high impact of deferral cost-weighted scores, relative to projects that score highly on only one of these attributes, form part of the Sustaining Capital portfolio. Projects that score highly on only one attribute are considered to be marginal projects, which are then reassessed to determine which of them should be undertaken, and which should be candidates for deferral to later periods. Projects deemed mandatory, or whose value or deferral impact is not captured adequately per Step 2 above, are not deferred. Resource constraints are also considered before finalizing the

portfolio. Selected projects are then recombined into programs, resulting in program sizes that optimize value and deferral impact tradeoffs.

5.3.3 BCTC

In the BCTC portfolio, investments deemed mandatory are ranked first. Investments are then ranked according to their deferral impact. Those projects with a similar level of deferral impact are ranked according to their value scores and project costs. Any adjustments identified in Step 2 are implemented. The investments are then given an ordinal ranking from 1st to last. The investments with the lowest value and lowest deferral impact are reviewed for possible deferral whether there are resource constraints or not.

Appendix A - Current Rates and Weightings

AA.1 Strategic Objective & Criteria Weightings for Value Scoring:

A	**Financial**	**20%**
	A1 Net Present Value (NPV)	31.0%
	A2 Benefit Cost Ratio (BCR)	31.0%
	A3 Rate Impact	31.0%
	A4 Present Value of Efficiency Dollar Savings	7.0%
B	**Reliability**	**39%**
	B1 Reliability Improvement, and	50.0%
	B2 Maintainability, and	25.0%
	B3 Asset Health, **or**	25.0%
	B4 Expected Energy Not Served (EENS)	100.0%
C	**Market Efficiency**	**19%**
	C1 Third Party Benefits	75.0%
	C2 Strategic Alignment	25.0%
D	**Relationships**	**11%**
	D1 Community/Public	50.0%
	D2 First Nations	50.0%
E	**Environment & Safety**	**11%**
	E1 Environment	60%
	E2 Safety	40%

In the Reliability category, investment scoring can apply either the first three criteria, for which the criteria weightings sum to 100%, or the fourth criteria, for which the criteria weighting is 100%, but cannot apply the fourth criteria combined with any other Reliability category criteria.

It should be noted that the Deferral Impact assessment does not use these weightings. Therefore, although a low weighting was determined for Relationships and Environment and Safety in the Value Scoring, a significant issue in these categories will be identified in the Deferral Impact Scoring. BCTC's rigorous environmental and safety standards ensure that safety and environmentally driven investments score highly in terms of deferral impact.

AA.2 Sub Criteria Weightings

AA.2.1 Reliability (Section 4.2.1)

Asset Health

Weighting Reference	Factor	Weighting
B3.1	Remaining Life	50%
B3.2	Asset Condition	50%

AA.2.2 Community/Public Relationships (Section 4.4.1.1)

Importance Weights for Community/Public:

Weighting Reference	Description	Weighting
D1.1	Community/Public Stakeholder Attributes Weighting	40%
D1.2	Stakeholder Relationships Weighting	60%

Population Density Weighting:

Area Density	Weighting D1.3
High Density Area (population >50 per square mile)	1.0
Medium Density Area (population >1 and <50 per square mile)	0.9
Low Density Area (population <1 per square mile)	0.8

Stakeholder Attributes Importance Weights:

Weighting Reference	Attribute	Weighting
D1.1.1	Economic Impact	20%
D1.1.2	Health & Safety Impact	20%
D1.1.3	Aesthetics Impact	20%
D1.1.4	Property Value Impact	20%
D1.1.5	Service Quality Impact	20%

Stakeholder Relationships Importance Weights:

Weighting Reference	Stakeholder	Weighting
D1.2.1	Industrial customers	16.67%
D1.2.2	Commercial customers	16.67%
D1.2.3	IPPs & Wholesale Transmission customers	16.67%
D1.2.4	Municipal Governments	16.67%
D1.2.5	Provincial Governments	16.67%
D1.2.6	General Public	16.67%

AA.2.3 First Nations Relationships (Section 4.4.1.2)

Scoring Components Importance Weights for First Nations:

Weighting Reference	Description	Weighting
D2.1	First Nations Attributes Weighting	40%
D2.2	First Nations Relationships Weighting	60%

First Nations Attributes Importance Weights:

Weighting Reference	Attribute	Weighting
D2.1.1	Economic Opportunities Impact Score	20%
D2.1.2	Land Impact Score	20%
D2.1.3	Health & Safety Impact Score	20%
D2.1.4	Aesthetics Impact Score	20%
D2.1.5	Service Quality Impact Score	20%

Impacted Communities Weighting:

Number of First Nation Communities Impacted	Weighting D2.3
Approximately 10 or more bands impacted	1
Approximately 5-9 bands impacted	0.9
Approximately 1-4 bands impacted	0.8

AA2.4 Environment & Safety (Section 4.5.1)

Scope of Impacted Environmental/Safety Issues:

	Weighting E1.1
Dispersed	1.0
Localized	0.8

AA.3 Financial Data

AA.3.1 Financial Category - Transmission Assets (Section 4.1.)

The following tables contain the rates used in the calculations in the Financial Category for Transmission Growth and Sustaining Capital Portfolios :

NPV Financial Assumptions	Fiscal 2009	Fiscal 2010	Fiscal 2011	Fiscal 2012	Fiscal 2013 and onward
Debt Percentage	100%	100%	100%	100%	100%
Deemed Equity	30%	30%	30%	30%	30%
Blended Canadian Long-Term & Short-Term Interest Rate	4.77%	5.30%	5.94%	6.18%	6.18%
Return on Equity (ROE)	11.78%	11.78%	11.78%	11.78%	11.78%
Nominal Discount Rate	8.00%	8.00%	8.00%	8.00%	8.00%
B.C. CPI (Inflation)	2.10%	2.10%	2.10%	2.10%	2.10%
Real Discount Rate	6.00%	6.00%	6.00%	6.00%	6.00%
Overhead Rate	1.95%	2.54%	2.40%	2.69%	2.31%
IDC Rate	6.52%	6.52%	6.52%	6.52%	6.52%
Property Tax Rate	1.42%	1.42%	1.42%	1.42%	1.42%
Property Tax Reduction for Non-Assessable Costs - Substations	30%	30%	30%	30%	30%

NPV Financial Assumptions	Fiscal 2009	Fiscal 2010	Fiscal 2011	Fiscal 2012	Fiscal 2013 and onward
Property Tax Reduction for Non-Assessable Costs - Lines	35%	35%	35%	35%	35%
Land – General Grant Tax	4.0%	4.0%	4.0%	4.0%	4.0%

The following table contains the Property Rates for Transmission Circuit ($ per km) for Transmission Growth and Sustaining Capital Portfolios:

NPV Financial Assumptions	Fiscal 2009	Fiscal 2010	Fiscal 2011	Fiscal 2012	Fiscal 2013 and onwards
69 kV Transmission Line or Underground Cable Circuit	$42,800	$42,800	$42,800	$42,800	$42,800
138 kV Transmission Line or Underground Cable Circuit	$54,400	$54,400	$54,400	$54,400	$54,400
230 kV Heavy Duty Double Circuit *Steel Pole* Transmission Line	$555,000	$555,000	$555,000	$555,000	$555,000
230 kV Double Circuit *Steel Pole* Transmission Line	$422,100	$422,100	$422,100	$422,100	$422,100
230 kV Heavy Duty Double Circuit *Steel Tower* Transmission Line	$535,300	$535,300	$535,300	$535,300	$535,300
230 kV Double Circuit *Steel Tower* Transmission Line	$328,100	$328,100	$328,100	$328,100	$328,100
230 kV Wood or Concrete Pole Transmission Line	$86,100	$86,100	$86,100	$86,100	$86,100
287 kV to 360 kV Single Circuit Wood or Concrete Pole Transmission Line	$95,000	$95,000	$95,000	$95,000	$95,000
230 kV to 360 kV Single Circuit Steel Tower Transmission Line or Underground Cable Circuit	$233,900	$233,900	$233,900	$233,900	$233,900

NPV Financial Assumptions	Fiscal 2009	Fiscal 2010	Fiscal 2011	Fiscal 2012	Fiscal 2013 and onwards
500 kV Steel Tower Transmission Line	$293,800	$293,800	$293,800	$293,800	$293,800
500 kV AC Submarine Cable Circuit	$4,981,900	$4,981,900	$4,981,900	$4,981,900	$4,981,900
230 kV DC Submarine Cable Circuit	$31,100	$31,100	$31,100	$31,100	$31,100
138 kV AC Submarine Cable Circuit	$85,500	$85,500	$85,500	$85,500	$85,500

The following table contains the Depreciation Composite Rates for Transmission Growth and Sustaining Capital Portfolios:

Category	Rate	Asset Life (years)
Transmission Lines / Cables	1.9%	53
Switchyard Equipment	3.3%	30
Buildings / Structures	2.3%	44
Computers	10.7%	9
Communications	5.4%	19
Land / Right-of-Way	0.0%	n/a

The following table contains the Rates for Load Growth Revenue and Losses:

Location	$	Quantity
Average NITS Rate	$0.00732	/ kW.h
Value of Losses - At Plant Gate	$74	/ MW.h
Value of Losses - Delivered to the Lower Mainland	$88	/ MW.h
Rate per MW of Firm ATC	$45,948	/ MW /Year

AA.3.2 Financial Category - BCTC Assets (Section 4.1.)

The following tables contain the rates used in the calculations in the Financial Category for the BCTC Capital Portfolio:

Financial Assumptions	Fiscal 2009	Fiscal 2010	Fiscal 2011	Fiscal 2012	Fiscal 2013 and onwards
Deemed Debt	59.3%	59.3%	59.3%	59.3%	59.3%
Deemed Equity	40.7%	40.7%	40.7%	40.7%	40.7%
Effective Interest Rate	4.91%	4.98%	5.00%	4.99%	4.99%
Return on Equity (ROE)	11.78%	11.78%	11.78%	11.78%	11.78%
Nominal Discount Rate	8.00%	8.00%	8.00%	8.00%	8.00%
B.C. CPI (Inflation)	2.10%	2.10%	2.10%	2.10%	2.10%
Real Discount Rate	6.00%	6.00%	6.00%	6.00%	6.00%
Overhead Rate	3.79%	2.54%	2.40%	2.69%	2.31%
AFUDC Rate	6.46%	6.15%	6.15%	6.15%	6.15%

The following table contains the Depreciation Composite Rates for the BCTC Portfolio:

Category	Rate (%)	Asset Life (years)
Leasehold Improvement	20.0%	5
Building	2.9%	35
Land	0.0%	n/a
Computer Software	15.6%	7
Computer Hardware	20.5%	5

Furniture Equipment	6.7%	15
Communication	8.3%	12

AA.3.3 Market Efficiency Category (Section 4.3)

The following rates are used in the Market Efficiency category:

a. Line Losses Reduction
    i. Value of Energy Losses, delivered to the Lower Mainland = $88/MWhr
    ii. Value of Energy Losses, at Plant Gate = $74/MWhr
    iii. Discount Rate for PV = 6.0%
b. Congestion Reduction
    i. Re-dispatch rate not using storage = $5/MWhr
    ii. Re-dispatch rate using storage = $15/MWhr
c. Trade Benefits
    i. Trade benefits rate = $5/MWhr

Appendix B: Value Matrix

BCTC Project Value Translation Matrix

	Translated Value Score (Note: where calculated score is negative, the translated score is also negative)					
Value Category	**0.00 – 0.95**	**1.00 – 1.95**	**2.00 – 2.95**	**3.00 – 3.95**	**4.00 – 4.95**	**5.00**
Financial	• NPV and PV of Efficiency: $0 to <$50K • Rate Impact: 0% to >-0 01% • Benefit Cost Ratio: 1 to <2.80	• NPV and PV of Efficiency: $50K to <$500K • Rate Impact = -0 01% to >-0 10% • Benefit Cost Ratio: 2.8 to <4.60	• NPV and PV of Efficiency: $500K to <$1M • Rate Impact: -0 10% to >-0 20% • Benefit Cost Ratio: 4.60 to <6.40	• NPV and PV of Efficiency: $1M to <$5M • Rate Impact: 0.20% to >-0 98% • Benefit Cost Ratio: 6 40 to <8 20	• NPV and PV of Efficiency: $5M to <$10M • Rate Impact = 0 98% to > 1 96% • Benefit Cost Ratio: 8.20 to <10	• NPV and PV of Efficiency: >= $10M • Rate Impact:<=-1 96% • Benefit Cost Ratio: >= 10
Reliability	• Reliability Improvement: 0 0% to < 20 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 0 00 to < 1 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 0 00 to < 1.00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 0 to <1	• Reliability Improvement: 20 0% to < 40 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 1 00 to < 2 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 1 00 to < 2 00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 1 to <10	• Reliability Improvement:40 0% to < 60 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 2 00 to < 3 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 2 00 to < 3:00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 10 to <20	• Reliability Improvement: 60 0% to < 80 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 3 00 to < 4.00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 3 00 to < 4.00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 20 to <100	• Reliability Improvement: 80 0% to < 100 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 4 00 to < 5 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 4 00 to < 5 00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 100 to <200	• Reliability Improvement: >= 100 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score >= 5 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score >= 5 00,as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): >= 200
Market Efficiency	• PV of Third Party Benefits: $0 to <$50K • Strategic Alignment score 0 00 to <1 00 as a function of: o Innovation o Rational Build-Out of the System	• PV of Third Party Benefits: $50K to <$500K • Strategic Alignment score 1 00 to <2 00 as a function of: o Innovation o Rational Build-Out of the System	• PV of Third Party Benefits: $500K to <$1M • Strategic Alignment score 2 00 to <3 00 as a function of: o Innovation o Rational Build-Out of the System	• PV of Third Party Benefits: $1M to <$5M • Strategic Alignment score 3 00 to <4 00 as a function of: o Innovation o Rational Build-Out of the System	• PV of Third Party Benefits: $5M to <$10M • Strategic Alignment score 4 00 to <5 00 as a function of: o Innovation o Rational Build-Out of the System	• PV of Third Party Benefits: >= $10M • Strategic Alignment score >=5 00 as a function of: o Innovation o Rational Build-Out of the System
Relationships	• Community/Public score 0 00 to <1 00 as a function of: o Stakeholder Attributes o Stakeholder Relationships o Population Density of Scope Area • First Nations score 0 00 to <1 00 as a function of: o First Nations Attributes o First Nations Relationships o # of Communities Impacted	• Community/Public score 1 00 to <2 00 as a function of: o Stakeholder Attributes o Stakeholder Relationships o Population Density of Scope Area • First Nations score 1 00 to <2 00 as a function of: o First Nations Attributes o First Nations Relationships o # of Communities Impacted	• Community/Public score 2 00 to <3 00 as a function of: o Stakeholder Attributes o Stakeholder Relationships o Population Density of Scope Area • First Nations score 2 00 to <3 00 as a function of: o First Nations Attributes o First Nations Relationships o # of Communities Impacted	• Community/Public score 3 00 to <4 00 as a function of: o Stakeholder Attributes o Stakeholder Relationships o Population Density of Scope Area • First Nations score 3 00 to <4.00 as a function of: o First Nations Attributes o First Nations Relationships o # of Communities Impacted	• Community/Public score 4 00 to <5 00 as a function of: o Stakeholder Attributes o Stakeholder Relationships o Population Density of Scope Area • First Nations score 4 00 to <5.00 as a function of: o First Nations Attributes o First Nations Relationships o # of Communities Impacted	• Community/Public score = 5 00 as a function of: o Stakeholder Attributes o Stakeholder Relationships o Population Density of Scope Area • First Nations score = 5 00 as a function of: o First Nations Attributes o First Nations Relationships o # of Communities Impacted
Environment & Safety	• Environment score 0 00 to <1 00 as a function of: o Air o Waste o Water o Land o Local or Dispersed Scope • Safety score 0.00 to <1 00 as a function of: o Employee / Workforce Safety o Public Safety o Local or Dispersed Scope	• Environment score 1 00 to <2 00 as a function of: o Air o Waste o Water o Land o Local or Dispersed Scope • Safety score 1 00 to <2.00 as a function of: o Employee / Workforce Safety o Public Safety o Local or Dispersed Scope	• Environment score 2 00 to <3 00 as a function of: o Air o Waste o Water o Land o Local or Dispersed Scope • Safety score 2 00 to <3 00 as a function of: o Employee / Workforce Safety o Public Safety o Local or Dispersed Scope	• Environment score 3 00 to <4 00 as a function of: o Air o Waste o Water o Land o Local or Dispersed Scope • Safety score 3 00 to <4 00 as a function of: o Employee / Workforce Safety o Public Safety o Local or Dispersed Scope	• Environment score 4 00 to <5 00 as a function of: o Air o Waste o Water o Land o Local or Dispersed Scope • Safety score 4 00 to <5 00 as a function of: o Employee / Workforce Safety o Public Safety o Local or Dispersed Scope	• Environment score >= 5 00 as a function of: o Air o Waste o Water o Land o Local or Dispersed Scope • Safety score >= 5 00 as a function of: o Employee / Workforce Safety o Public Safety o Local or Dispersed Scope

Appendix C: Deferral Impact Matrix

BCTC Project Deferral Impact Matrix

CATEGORY	0	1	2	3	4	5
	Consequence					
Financial	• Combined financial impact totaling: $0 to <$50K	• Combined financial impact totaling: $50K to <$500K	• Combined financial impact totaling: $500K to <$1M	• Combined financial impact totaling: $1M to <$5M	• Combined financial impact totaling: $5M to <$10M	• Combined financial impact totaling: >=$10M
Reliability	• Reliability Deterioration: <= 4 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 0 00 to < 1 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 0 00 to < 1 00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 0 to <1	• Reliability Improvement: > 4 0% to <= 9 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 1 00 to < 2 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 1.00 to < 2 00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 1 to <10	• Reliability Improvement: > 9 0% to <= 19 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 2 00 to < 3 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 2.00 to < 3 00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 10 to <20	• Reliability Improvement: > 19 0% to <= 29 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 3 00 to < 4 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 3 00 to < 4 00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 20 to <100	• Reliability Improvement: >29 0% to <= 49 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score 4 00 to < 5 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score 4 00 to < 5.00, as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): 100 to <200	• Reliability Improvement: >= 50 0% as a function of : o Frequency of Failures per Year o Duration of Failures (Hrs) o Criticality • Maintainability: score >= 5 00, as a function of : o Availability of Spares o Availability of Know-How o Obsolescence o Criticality • Asset Health: score >= 5 00,,as a function of : o Remaining Life o Asset Condition o Criticality • EENS (MWh): >= 200
Market Efficiency	• PV of Third Party Benefits: o $0 to <$50K	• PV of Third Party Benefits: o $50K to <$500K	• PV of Third Party Benefits: o $500K to <$1M	• PV of Third Party Benefits: o $1M to <$5M	• PV of Third Party Benefits: o $5M to <$10M	• PV of Third Party Benefits: o >= $10M
Relationships	Impact is negligible	Letter(s) to BCTC senior management	Letter(s) to Minister of Energy	Several opinion leaders/customers publicly critical; minimal local media coverage	Provincial profile; most opinion leaders/customers publicly critical Signification local attention and media coverage	National media attention; opinion leaders/customers nearly unanimous in public criticism
Environment & Safety	Environment: • Impact is negligible Safety: • Impact is negligible	Environment: • Non-reportable environmental incident Safety: • First aid injury/illness	Environment: • Non-reportable environmental incident – mitigation required Safety: • Medical aid injury/illness	Environment: • Reportable environmental incident – mitigation not required Safety: • Lost time injury/temporary disability	Environment: • Reportable environmental incident - mitigation required and possible Safety: • Permanent disability	Environment: • Reportable environmental incident - mitigation required but uncertain Safety: • Fatality (ies)
	Probability					
Likelihood of Occurrence	< 0 1 % (<1 in 1000) likelihood that event will occur within next year	0 1% (1 in 1000) likelihood that event will occur within next year	1% (1 in 100) to <10% (1 in 100) likelihood that event will occur within next year	10% (1 in 10) to <50% (1 in 2) likelihood that event will occur within next year	50% (1 in 2) to <90% (9 in 10) likelihood that event will occur within next year	90% (9 in 10) or greater likelihood that event will occur within next year

Appendix D: Value Score Translation Table

VALUE SCORE TRANSLATION TABLE

	Financial				Reliability				Market Efficiency		Relationships		Environment & Safety	
Score	NPV	Rate Impact %	Benefit to Cost Ratio	PV of Efficiency	Reliability Improvement	Maintainability	Asset Health	EENS (MWh)	PV of Third Party Benefits	Strategic Alignment	Community / Public	First Nations	Environment	Safety
5.00	$10,000,000	-1.960%	10.00	$10,000,000	100.0%	5.00	5.00	200.00	$10,000,000	5.00	5.00	5.00	5.00	5.00
4.95	$9,999,999	-1.960%	9.91	$9,999,999	99.0%	4.96	4.95	200.00	$9,999,999		4.95	4.95	4.95	4.95
4.90	$9,736,841	-1.909%	9.82	$9,736,841	98.0%	4.92	4.90	194.74	$9,736,841		4.90	4.90	4.90	4.90
4.85	$9,473,683	-1.857%	9.73	$9,473,683	97.0%	4.88	4.85	189.47	$9,473,683		4.85	4.85	4.85	4.85
4.80	$9,210,525	-1.806%	9.64	$9,210,525	96.0%	4.84	4.80	184.21	$9,210,525		4.80	4.80	4.80	4.80
4.75	$8,947,367	-1.754%	9.55	$8,947,367	95.0%	4.80	4.75	178.95	$8,947,367		4.75	4.75	4.75	4.75
4.70	$8,684,210	-1.702%	9.46	$8,684,210	94.0%	4.76	4.70	173.68	$8,684,210		4.70	4.70	4.70	4.70
4.65	$8,421,052	-1.651%	9.37	$8,421,052	93.0%	4.72	4.65	168.42	$8,421,052		4.65	4.65	4.65	4.65
4.60	$8,157,894	-1.599%	9.28	$8,157,894	92.0%	4.68	4.60	163.16	$8,157,894		4.60	4.60	4.60	4.60
4.55	$7,894,736	-1.548%	9.19	$7,894,736	91.0%	4.63	4.55	157.89	$7,894,736		4.55	4.55	4.55	4.55
4.50	$7,631,578	-1.496%	9.10	$7,631,578	90.0%	4.59	4.50	152.63	$7,631,578		4.50	4.50	4.50	4.50
4.45	$7,368,420	-1.445%	9.01	$7,368,420	89.0%	4.55	4.45	147.37	$7,368,420		4.45	4.45	4.45	4.45
4.40	$7,105,262	-1.393%	8.92	$7,105,262	88.0%	4.51	4.40	142.11	$7,105,262		4.40	4.40	4.40	4.40
4.35	$6,842,104	-1.341%	8.83	$6,842,104	87.0%	4.47	4.35	136.84	$6,842,104		4.35	4.35	4.35	4.35
4.30	$6,578,946	-1.290%	8.74	$6,578,946	86.0%	4.43	4.30	131.58	$6,578,946		4.30	4.30	4.30	4.30
4.25	$6,315,788	-1.238%	8.65	$6,315,788	85.0%	4.39	4.25	126.32	$6,315,788		4.25	4.25	4.25	4.25
4.20	$6,052,631	-1.187%	8.56	$6,052,631	84.0%	4.35	4.20	121.05	$6,052,631		4.20	4.20	4.20	4.20
4.15	$5,789,473	-1.135%	8.47	$5,789,473	83.0%	4.31	4.15	115.79	$5,789,473		4.15	4.15	4.15	4.15
4.10	$5,526,315	-1.083%	8.38	$5,526,315	82.0%	4.27	4.10	110.53	$5,526,315		4.10	4.10	4.10	4.10
4.05	$5,263,157	-1.032%	8.29	$5,263,157	81.0%	4.23	4.05	105.26	$5,263,157		4.05	4.05	4.05	4.05
4.00	$5,000,000	-0.980%	8.20	$5,000,000	80.0%	4.00	4.00	100.00	$5,000,000		4.00	4.00	4.00	4.00
3.95	$4,999,999	-0.980%	8.11	$4,999,999	79.0%	3.96	3.95	100.00	$4,999,999		3.95	3.95	3.95	3.95
3.90	$4,789,473	-0.939%	8.02	$4,789,473	78.0%	3.92	3.90	95.79	$4,789,473		3.90	3.90	3.90	3.90
3.85	$4,578,946	-0.898%	7.93	$4,578,946	77.0%	3.88	3.85	91.58	$4,578,946		3.85	3.85	3.85	3.85
3.80	$4,368,420	-0.856%	7.84	$4,368,420	76.0%	3.84	3.80	87.37	$4,368,420		3.80	3.80	3.80	3.80
3.75	$4,157,894	-0.815%	7.75	$4,157,894	75.0%	3.80	3.75	83.16	$4,157,894		3.75	3.75	3.75	3.75
3.70	$3,947,367	-0.774%	7.66	$3,947,367	74.0%	3.76	3.70	78.95	$3,947,367		3.70	3.70	3.70	3.70
3.65	$3,736,841	-0.733%	7.57	$3,736,841	73.0%	3.72	3.65	74.74	$3,736,841		3.65	3.65	3.65	3.65
3.60	$3,526,315	-0.691%	7.48	$3,526,315	72.0%	3.68	3.60	70.53	$3,526,315		3.60	3.60	3.60	3.60
3.55	$3,315,788	-0.650%	7.39	$3,315,788	71.0%	3.63	3.55	66.32	$3,315,788		3.55	3.55	3.55	3.55
3.50	$3,105,262	-0.609%	7.30	$3,105,262	70.0%	3.59	3.50	62.11	$3,105,262		3.50	3.50	3.50	3.50
3.45	$2,894,736	-0.567%	7.21	$2,894,736	69.0%	3.55	3.45	57.89	$2,894,736		3.45	3.45	3.45	3.45
3.40	$2,684,210	-0.526%	7.12	$2,684,210	68.0%	3.51	3.40	53.68	$2,684,210		3.40	3.40	3.40	3.40
3.35	$2,473,683	-0.485%	7.03	$2,473,683	67.0%	3.47	3.35	49.47	$2,473,683		3.35	3.35	3.35	3.35
3.30	$2,263,157	-0.444%	6.94	$2,263,157	66.0%	3.43	3.30	45.26	$2,263,157		3.30	3.30	3.30	3.30
3.25	$2,052,631	-0.402%	6.85	$2,052,631	65.0%	3.39	3.25	41.05	$2,052,631		3.25	3.25	3.25	3.25
3.20	$1,842,104	-0.361%	6.76	$1,842,104	64.0%	3.35	3.20	36.84	$1,842,104		3.20	3.20	3.20	3.20
3.15	$1,631,578	-0.320%	6.67	$1,631,578	63.0%	3.31	3.15	32.63	$1,631,578		3.15	3.15	3.15	3.15
3.10	$1,421,052	-0.279%	6.58	$1,421,052	62.0%	3.27	3.10	28.42	$1,421,052		3.10	3.10	3.10	3.10
3.05	$1,210,525	-0.237%	6.49	$1,210,525	61.0%	3.23	3.05	24.21	$1,210,525		3.05	3.05	3.05	3.05
3.00	$1,000,000	-0.200%	6.40	$1,000,000	60.0%	3.00	3.00	20.00	$1,000,000		3.00	3.00	3.00	3.00
2.95	$999,999	-0.196%	6.31	$999,999	59.0%	2.96	2.95	20.00	$999,999		2.95	2.95	2.95	2.95
2.90	$973,683	-0.191%	6.22	$973,683	58.0%	2.92	2.90	19.47	$973,683		2.90	2.90	2.90	2.90
2.85	$947,367	-0.186%	6.13	$947,367	57.0%	2.88	2.85	18.95	$947,367		2.85	2.85	2.85	2.85
2.80	$921,052	-0.181%	6.04	$921,052	56.0%	2.84	2.80	18.42	$921,052		2.80	2.80	2.80	2.80
2.75	$894,736	-0.175%	5.95	$894,736	55.0%	2.80	2.75	17.89	$894,736		2.75	2.75	2.75	2.75
2.70	$868,420	-0.170%	5.86	$868,420	54.0%	2.76	2.70	17.37	$868,420		2.70	2.70	2.70	2.70
2.65	$842,104	-0.165%	5.77	$842,104	53.0%	2.72	2.65	16.84	$842,104		2.65	2.65	2.65	2.65
2.60	$815,788	-0.160%	5.68	$815,788	52.0%	2.68	2.60	16.32	$815,788		2.60	2.60	2.60	2.60
2.55	$789,473	-0.155%	5.59	$789,473	51.0%	2.63	2.55	15.79	$789,473		2.55	2.55	2.55	2.55
2.50	$763,157	-0.150%	5.50	$763,157	50.0%	2.59	2.50	15.26	$763,157		2.50	2.50	2.50	2.50
2.45	$736,841	-0.144%	5.41	$736,841	49.0%	2.55	2.45	14.74	$736,841		2.45	2.45	2.45	2.45
2.40	$710,525	-0.139%	5.32	$710,525	48.0%	2.51	2.40	14.21	$710,525		2.40	2.40	2.40	2.40
2.35	$684,210	-0.134%	5.23	$684,210	47.0%	2.47	2.35	13.68	$684,210		2.35	2.35	2.35	2.35
2.30	$657,894	-0.129%	5.14	$657,894	46.0%	2.43	2.30	13.16	$657,894		2.30	2.30	2.30	2.30
2.25	$631,578	-0.124%	5.05	$631,578	45.0%	2.39	2.25	12.63	$631,578		2.25	2.25	2.25	2.25
2.20	$605,262	-0.119%	4.96	$605,262	44.0%	2.35	2.20	12.11	$605,262		2.20	2.20	2.20	2.20
2.15	$578,946	-0.113%	4.87	$578,946	43.0%	2.31	2.15	11.58	$578,946		2.15	2.15	2.15	2.15
2.10	$552,631	-0.108%	4.78	$552,631	42.0%	2.27	2.10	11.05	$552,631		2.10	2.10	2.10	2.10
2.05	$526,315	-0.103%	4.69	$526,315	41.0%	2.23	2.05	10.53	$526,315		2.05	2.05	2.05	2.05
2.00	$500,000	-0.100%	4.60	$500,000	40.0%	2.00	2.00	10.00	$500,000	2.00	2.00	2.00	2.00	2.00
1.95	$499,999	-0.098%	4.51	$499,999	39.0%	1.96	1.95	10.00	$499,999		1.95	1.95	1.95	1.95
1.90	$476,315	-0.093%	4.42	$476,315	38.0%	1.92	1.90	9.53	$476,315		1.90	1.90	1.90	1.90
1.85	$452,631	-0.089%	4.33	$452,631	37.0%	1.88	1.85	9.05	$452,631		1.85	1.85	1.85	1.85
1.80	$428,946	-0.084%	4.24	$428,946	36.0%	1.84	1.80	8.58	$428,946		1.80	1.80	1.80	1.80
1.75	$405,262	-0.079%	4.15	$405,262	35.0%	1.80	1.75	8.11	$405,262		1.75	1.75	1.75	1.75
1.70	$381,578	-0.075%	4.06	$381,578	34.0%	1.76	1.70	7.63	$381,578		1.70	1.70	1.70	1.70
1.65	$357,894	-0.070%	3.97	$357,894	33.0%	1.72	1.65	7.16	$357,894		1.65	1.65	1.65	1.65
1.60	$334,210	-0.066%	3.88	$334,210	32.0%	1.68	1.60	6.68	$334,210		1.60	1.60	1.60	1.60
1.55	$310,525	-0.061%	3.79	$310,525	31.0%	1.63	1.55	6.21	$310,525		1.55	1.55	1.55	1.55
1.50	$286,841	-0.056%	3.70	$286,841	30.0%	1.59	1.50	5.74	$286,841		1.50	1.50	1.50	1.50
1.45	$263,157	-0.052%	3.61	$263,157	29.0%	1.55	1.45	5.26	$263,157		1.45	1.45	1.45	1.45
1.40	$239,473	-0.047%	3.52	$239,473	28.0%	1.51	1.40	4.79	$239,473		1.40	1.40	1.40	1.40
1.35	$215,788	-0.042%	3.43	$215,788	27.0%	1.47	1.35	4.32	$215,788		1.35	1.35	1.35	1.35
1.30	$192,104	-0.038%	3.34	$192,104	26.0%	1.43	1.30	3.84	$192,104		1.30	1.30	1.30	1.30
1.25	$168,420	-0.033%	3.25	$168,420	25.0%	1.39	1.25	3.37	$168,420		1.25	1.25	1.25	1.25
1.20	$144,736	-0.028%	3.16	$144,736	24.0%	1.35	1.20	2.89	$144,736		1.20	1.20	1.20	1.20
1.15	$121,052	-0.024%	3.07	$121,052	23.0%	1.31	1.15	2.42	$121,052		1.15	1.15	1.15	1.15
1.10	$97,367	-0.019%	2.98	$97,367	22.0%	1.27	1.10	1.95	$97,367		1.10	1.10	1.10	1.10
1.05	$73,683	-0.014%	2.89	$73,683	21.0%	1.23	1.05	1.47	$73,683		1.05	1.05	1.05	1.05
1.00	$50,000	-0.010%	2.80	$50,000	20.0%	1.00	1.00	1.00	$50,000		1.00	1.00	1.00	1.00
0.95	$49,999	-0.010%	2.71	$49,999	19.0%	0.95	0.95	1.00	$49,999		0.95	0.95	0.95	0.95
0.90	$47,499	-0.009%	2.62	$47,499	18.0%	0.90	0.90	0.95	$47,499		0.90	0.90	0.90	0.90
0.85	$44,999	-0.009%	2.53	$44,999	17.0%	0.85	0.85	0.90	$44,999		0.85	0.85	0.85	0.85
0.80	$42,499	-0.008%	2.44	$42,499	16.0%	0.80	0.80	0.85	$42,499		0.80	0.80	0.80	0.80
0.75	$39,999	-0.008%	2.35	$39,999	15.0%	0.75	0.75	0.80	$39,999		0.75	0.75	0.75	0.75
0.70	$37,499	-0.007%	2.26	$37,499	14.0%	0.70	0.70	0.75	$37,499		0.70	0.70	0.70	0.70
0.65	$34,999	-0.007%	2.17	$34,999	13.0%	0.65	0.65	0.70	$34,999		0.65	0.65	0.65	0.65
0.60	$32,499	-0.006%	2.08	$32,499	12.0%	0.60	0.60	0.65	$32,499		0.60	0.60	0.60	0.60
0.55	$29,999	-0.006%	1.99	$29,999	11.0%	0.55	0.55	0.60	$29,999		0.55	0.55	0.55	0.55
0.50	$27,499	-0.005%	1.90	$27,499	10.0%	0.50	0.50	0.55	$27,499		0.50	0.50	0.50	0.50
0.45	$24,999	-0.005%	1.81	$24,999	9.0%	0.45	0.45	0.50	$24,999		0.45	0.45	0.45	0.45
0.40	$22,499	-0.004%	1.72	$22,499	8.0%	0.40	0.40	0.45	$22,499		0.40	0.40	0.40	0.40
0.35	$19,999	-0.004%	1.63	$19,999	7.0%	0.35	0.35	0.40	$19,999		0.35	0.35	0.35	0.35
0.30	$17,499	-0.003%	1.54	$17,499	6.0%	0.30	0.30	0.35	$17,499		0.30	0.30	0.30	0.30
0.25	$14,999	-0.003%	1.45	$14,999	5.0%	0.25	0.25	0.30	$14,999		0.25	0.25	0.25	0.25
0.20	$12,499	-0.002%	1.36	$12,499	4.0%	0.20	0.20	0.25	$12,499		0.20	0.20	0.20	0.20
0.15	$9,999	-0.002%	1.27	$9,999	3.0%	0.15	0.15	0.20	$9,999		0.15	0.15	0.15	0.15
0.10	$7,499	-0.001%	1.18	$7,499	2.0%	0.10	0.10	0.15	$7,499		0.10	0.10	0.10	0.10
0.05	$4,999	-0.001%	1.09	$4,999	1.0%	0.05	0.05	0.10	$4,999		0.05	0.05	0.05	0.05
0.00	$0	0.000%	1.00	$0	0.0%	0.00	0.00	0.00	$0	0.00	0.00	0.00	0.00	0.00

BCTC Project Value Translation Matrix

	Translated Value Score (Note: where calculated score is negative, the translated score is also negative)					
Value Category	**0.00 – 0.95**	**1.00 – 1.95**	**2.00 – 2.95**	**3.00 – 3.95**	**4.00 – 4.95**	**5.00**
Financial	• NPV and PV of Efficiency: $0 to <$50K • Rate Impact: 0% to >-0.01% • Benefit Cost Ratio: 1 to <2.80	• NPV and PV of Efficiency: $50K to <$500K • Rate Impact = -0.01% to >-0.10% • Benefit Cost Ratio: 2.8 to <4.60	○ NPV and PV of Efficiency: $500K to <$1M • Rate Impact: -0.10% to >-0.20% • Benefit Cost Ratio: 4.60 to <6.40	• NPV and PV of Efficiency: $1M to <$5M • Rate Impact: -0.20% to >-0.98% • Benefit Cost Ratio: 6.40 to <8.20	• NPV and PV of Efficiency: $5M to <$10M • Rate Impact = -0.98% to >-1.96% • Benefit Cost Ratio: 8.20 to <10	• NPV and PV of Efficiency: >= $10M • Rate Impact:<=-1.96% • Benefit Cost Ratio: >= 10
Reliability	• Reliability Improvement: 0.0% to < 20.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 0.00 to < 1.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 0.00 to < 1.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 0 to <1	• Reliability Improvement: 20.0% to < 40.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 1.00 to < 2.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 1.00 to < 2.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 1 to <10	• Reliability Improvement:40.0% to < 60.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 2.00 to < 3.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 2.00 to < 3.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 10 to <20	• Reliability Improvement: 60.0% to < 80.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 3.00 to < 4.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 3.00 to < 4.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 20 to <100	• Reliability Improvement: 80.0% to < 100.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 4.00 to < 5.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 4.00 to < 5.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 100 to <200	• Reliability Improvement: >= 100.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score >= 5.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score >= 5.00,as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): >= 200
Market Efficiency	• PV of Third Party Benefits: $0 to <$50K • Strategic Alignment score 0.00 to <1.00 as a function of: ○ Innovation ○ Rational Build-Out of the System	• PV of Third Party Benefits: $50K to <$500K • Strategic Alignment score 1.00 to <2.00 as a function of: ○ Innovation ○ Rational Build-Out of the System	• PV of Third Party Benefits: $500K to <$1M • Strategic Alignment score 2.00 to <3.00 as a function of: ○ Innovation ○ Rational Build-Out of the System	• PV of Third Party Benefits: $1M to <$5M • Strategic Alignment score 3.00 to <4.00 as a function of: ○ Innovation ○ Rational Build-Out of the System	• PV of Third Party Benefits: $5M to <$10M • Strategic Alignment score 4.00 to <5.00 as a function of: ○ Innovation ○ Rational Build-Out of the System	• PV of Third Party Benefits: >= $10M • Strategic Alignment score >=5.00 as a function of: ○ Innovation ○ Rational Build-Out of the System
Relationships	• Community/Public score 0.00 to <1.00 as a function of: ○ Stakeholder Attributes ○ Stakeholder Relationships ○ Population Density of Scope Area • First Nations score 0.00 to <1.00 as a function of: ○ First Nations Attributes ○ First Nations Relationships ○ # of Communities Impacted	• Community/Public score 1.00 to <2.00 as a function of: ○ Stakeholder Attributes ○ Stakeholder Relationships ○ Population Density of Scope Area • First Nations score 1.00 to <2.00 as a function of: ○ First Nations Attributes ○ First Nations Relationships ○ # of Communities Impacted	• Community/Public score 2.00 to <3.00 as a function of: ○ Stakeholder Attributes ○ Stakeholder Relationships ○ Population Density of Scope Area • First Nations score 2.00 to <3.00 as a function of: ○ First Nations Attributes ○ First Nations Relationships ○ # of Communities Impacted	• Community/Public score 3.00 to <4.00 as a function of: ○ Stakeholder Attributes ○ Stakeholder Relationships ○ Population Density of Scope Area • First Nations score 3.00 to <4.00 as a function of: ○ First Nations Attributes ○ First Nations Relationships ○ # of Communities Impacted	• Community/Public score 4.00 to <5.00 as a function of: ○ Stakeholder Attributes ○ Stakeholder Relationships ○ Population Density of Scope Area • First Nations score 4.00 to <5.00 as a function of: ○ First Nations Attributes ○ First Nations Relationships ○ # of Communities Impacted	• Community/Public score = 5.00 as a function of: ○ Stakeholder Attributes ○ Stakeholder Relationships ○ Population Density of Scope Area • First Nations score = 5.00 as a function of: ○ First Nations Attributes ○ First Nations Relationships ○ # of Communities Impacted
Environment & Safety	• Environment score 0.00 to <1.00 as a function of: ○ Air ○ Waste ○ Water ○ Land ○ Local or Dispersed Scope • Safety score 0.00 to <1.00 as a function of: ○ Employee / Workforce Safety ○ Public Safety ○ Local or Dispersed Scope	• Environment score 1.00 to <2.00 as a function of: ○ Air ○ Waste ○ Water ○ Land ○ Local or Dispersed Scope • Safety score 1.00 to <2.00 as a function of: ○ Employee / Workforce Safety ○ Public Safety ○ Local or Dispersed Scope	• Environment score 2.00 to <3.00 as a function of: ○ Air ○ Waste ○ Water ○ Land ○ Local or Dispersed Scope • Safety score 2.00 to <3.00 as a function of: ○ Employee / Workforce Safety ○ Public Safety ○ Local or Dispersed Scope	• Environment score 3.00 to <4.00 as a function of: ○ Air ○ Waste ○ Water ○ Land ○ Local or Dispersed Scope • Safety score 3.00 to <4.00 as a function of: ○ Employee / Workforce Safety ○ Public Safety ○ Local or Dispersed Scope	• Environment score 4.00 to <5.00 as a function of: ○ Air ○ Waste ○ Water ○ Land ○ Local or Dispersed Scope • Safety score 4.00 to <5.00 as a function of: ○ Employee / Workforce Safety ○ Public Safety ○ Local or Dispersed Scope	• Environment score >= 5.00 as a function of: ○ Air ○ Waste ○ Water ○ Land ○ Local or Dispersed Scope • Safety score >= 5.00 as a function of: ○ Employee / Workforce Safety ○ Public Safety ○ Local or Dispersed Scope

BCTC Project Deferral Impact Matrix

CATEGORY	0	1	2	3	4	5
	Consequence					
Financial	• Combined financial impact totaling: $0 to <$50K	• Combined financial impact totaling: $50K to <$500K	• Combined financial impact totaling: $500K to <$1M	• Combined financial impact totaling: $1M to <$5M	• Combined financial impact totaling: $5M to <$10M	• Combined financial impact totaling: >=$10M
Reliability	• Reliability Deterioration: <= 4.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 0.00 to < 1.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 0.00 to < 1.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 0 to <1	• Reliability Improvement: > 4.0% to <= 9.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 1.00 to < 2.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 1.00 to < 2.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 1 to <10	• Reliability Improvement: > 9.0% to <= 19.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 2.00 to < 3.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 2.00 to < 3.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 10 to <20	• Reliability Improvement: > 19.0% to <= 29.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 3.00 to < 4.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 3.00 to < 4.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 20 to <100	• Reliability Improvement: >29.0% to <= 49.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score 4.00 to < 5.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score 4.00 to < 5.00, as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): 100 to <200	• Reliability Improvement: >= 50.0% as a function of : ○ Frequency of Failures per Year ○ Duration of Failures (Hrs) ○ Criticality • Maintainability: score >= 5.00, as a function of : ○ Availability of Spares ○ Availability of Know-How ○ Obsolescence ○ Criticality • Asset Health: score >= 5.00,,as a function of : ○ Remaining Life ○ Asset Condition ○ Criticality • EENS (MWh): >= 200
Market Efficiency	• PV of Third Party Benefits: ○ $0 to <$50K	• PV of Third Party Benefits: ○ $50K to <$500K	• PV of Third Party Benefits: ○ $500K to <$1M	• PV of Third Party Benefits: ○ $1M to <$5M	• PV of Third Party Benefits: ○ $5M to <$10M	• PV of Third Party Benefits: ○ >= $10M
Relationships	Impact is negligible	Letter(s) to BCTC senior management	Letter(s) to Minister of Energy	Several opinion leaders/customers publicly critical; minimal local media coverage	Provincial profile; most opinion leaders/customers publicly critical. Signification local attention and media coverage	National media attention; opinion leaders/customers nearly unanimous in public criticism
Environment & Safety	Environment: • Impact is negligible Safety: • Impact is negligible	Environment: • Non-reportable environmental incident Safety: • First aid injury/illness	Environment: • Non-reportable environmental incident – mitigation required Safety: • Medical aid injury/illness	Environment: • Reportable environmental incident – mitigation not required Safety: • Lost time injury/temporary disability	Environment: • Reportable environmental incident – mitigation required and possible Safety: • Permanent disability	Environment: • Reportable environmental incident – mitigation required but uncertain Safety: • Fatality (ies)
	Probability					
Likelihood of Occurrence	< 0.1 % (<1 in 1000) likelihood that event will occur within next year.	0.1% (1 in 1000) likelihood that event will occur within next year.	1% (1 in 100) to <10% (1 in 100) likelihood that event will occur within next year.	10% (1 in 10) to <50% (1 in 2) likelihood that event will occur within next year.	50% (1 in 2) to <90% (9 in 10) likelihood that event will occur within next year.	90% (9 in 10) or greater likelihood that event will occur within next year.