SCHEDULE A

KEY PRINCIPLES OF QUANTITATIVE EVALUATION METHODOLOGY FOR TRANSMISSION AND LARGE-DISTRIBUTION CONNECTED (TLDC) TENDERS

1. ABSTRACT:

The purpose of this document is to describe the financial evaluation methodology that will be used in the CFT to determine the optimum portfolio of up to 800 GWh of annual firm energy (FE), consisting of transmission and large-distribution connected (TLDC) projects (the Optimal TLDC Portfolio), for delivery over a 25 year term, commencing in 2010.

Each project will be evaluated individually to determine its adjusted bid price (ABP), representing the delivered unit cost of FE to the Lower Mainland. Portfolios of TLDC projects will then be assembled, subject to certain portfolio assembly constraints. TLDC projects comprising the portfolio that maximizes value to BC Hydro will be recommended for award of EPA(s).

2. ADJUSTED BID PRICE FOR TLDC TENDERS:

This section describes how the ABP is calculated for TLDC tenders for the purpose of tender evaluation.

- Step 1 – The starting point is the project's Bid Price (BP).
- Step 2 - The next step is to determine the Plant Gate Price, which is the price of electricity before the interconnection/transmission adjustment.
- Step 3 - The final step is applying the interconnection/transmission adjustment to the Plant Gate Price to determine the ABP.

The ABP reflects the $/MWh cost of FE delivered to the Lower Mainland.

If a project is in the Optimum TLDC Portfolio, the bidder of that project will be awarded an EPA (TLDC) containing the BP as tendered. The monthly FE will also be tendered for each project or, if the Hourly Firm Option is elected, the hourly firm-energy delivery rates for heavy load hour (HLH) and light load hour (LLH) periods, by month.

The ABP is used strictly for evaluation purposes only. The BP, after adjustments as specified in the EPA (TLDC), is used to determine the payments made under the EPA (TLDC).

The determination of the ABP is as follows:

Step 1: Bid Price

Bid Price – The BP is the price per MWh tendered by a bidder. The BP is tendered in January 2006 dollars (the Base Year), and will be subject to annual escalation as specified in the EPA (TLDC).

Step 2: Plant Gate Price

The following sections describe adjustments to the bid price to calculate the Plant Gate Price.

Hourly Firm Credit – $3.00/MWh will be deducted from the BP (which improves competitiveness) for bidders who have elected in their tenders to take the Hourly Firm Option in the standard form EPA (TLDC). See the EPA (TLDC) term sheet set out in Schedule C for further details on the Hourly Firm Option.

Curtailability Credit – Bidders who elect the Hourly Firm Option and have projects with a contracted annual firm energy amount in excess of 25 MW (equivalent) can also elect to take one of the curtailability options in the EPA (TLDC). For such bidders, a $/MWh curtailability credit will be deducted from the Bid Price. Such bidders will also be required to tender an Energy Charge (EC), in units of $/MWh, which will escalate at 100% of CPI. The curtailability credit will be derived from a pre-determined table (an example of such a table is set out below), and the amount of the credit will depend on the magnitude of the tendered Energy Charge, as well as what resolution of curtailment is being elected (ie. hourly, daily, weekly, or monthly). The curtailability credit will be interpolated or extrapolated as necessary for tendered ECs that do not coincide with the EC values in the table. Bidders electing one of the curtailability options will also be required to tender a minimum generation level (MGL) associated with each tendered monthly FE amount, and the curtailability credit from the table will be reduced by the following factor: 1 – (annual MGL/annual FE). See the EPA (TLDC) term sheet set out in Schedule C for further details on the Curtailability Option.

Sample Curtailment Credit Table:

EC ($/MWh)	Hourly Credit ($/MWh)	Daily Credit ($/MWh)	Weekly Credit ($/MWh)	Monthly Credit ($/MWh)
20	0.2	0.15	0.1	0.05
30	0.8	0.7	0.6	0.5
40	2.2	2.1	2.0	1.8
50	4.6	4.4	4.3	4.2

Green Credit – $2.00/MWh will be deducted from the BP (which improves competitiveness) for bidders who have elected in their tenders to take the Green Option in the EPA (TLDC). See the EPA (TLDC) term sheet set out in Schedule C for further details on the Green Option.

Plant Gate Price – The BP, less the Hourly Firm Credit, less the Curtailability Credit, less the Green Credit.

Step 3: Adjusted Bid Price

The following section describes the interconnection/transmission adjustment to the Plant Gate Price to calculate the ABP.

Interconnection/Transmission Adjustment – A $/MWh adjustment to the Plant Gate Price to reflect (1) project-specific impacts relating to interconnection and transmission impacts up to the bulk transmission system, and (2) transmission impacts on the bulk transmission system. The Interconnection/Transmission Adjustment is comprised of the following:

Interconnection Network Upgrades – A project-specific $/MWh value will be added to the Plant Gate Price to reflect the financial impact to BC Hydro as a result of any network upgrade cost attributable to the project being borne by BC Hydro. The $/MWh value will be calculated by levelizing the network upgrade cost over the EPA term, and then dividing that value by the

project's annual FE. This adjustment excludes network upgrade impacts on the bulk transmission system.

Interconnection Losses – A project-specific $/MWh value will be added to the Plant Gate Price to reflect the financial impact to BC Hydro of increases (+) or decreases (-) in energy losses in the local area where the generation is sited. This adjustment excludes transmission loss impacts on the bulk transmission system.

Bulk Transmission - A $/MWh value will be added to the Plant Gate Price to reflect the system average reinforcement and transmission loss impacts to BC Hydro of delivering FE from the nearest upstream bulk transmission substation to the Lower Mainland. The $/MWh adjustment will be based on regional values provided in a table.

Adjusted Bid Price – The Plant Gate Price plus the Interconnection/Transmission Adjustment.

3. "CLUSTER EFFECTS":

For transmission-connected projects, there is the possibility that BCTC, as part of a post-tender study requested and paid for by BC Hydro, may identify "clusters" of two or more projects where the transmission network upgrade costs and/or the transmission loss impacts being allocated to individual projects are impacted by particular combinations of such projects. This is referred to as a "cluster effect", and may need to be accommodated in the quantitative evaluation methodology to achieve a fair and competitive result.

This section describes cluster effects and their impact on the quantitative evaluation methodology.

An Example of the Cluster Effect

Consider a cluster of three projects (A, B and C), each of which is proposing to interconnect into a transmission-constrained area. BCTC may determine that the network upgrade impact to BC Hydro in this constrained area depends upon which of the three projects proceed to COD.

There are seven possible combinations of these projects: A, B, C, AB, AC, BC, and ABC.

The network upgrades, as well as their allocation to each project, might differ depending on which combination is being considered. Project A could end up having four different Adjusted Bid Prices for the same tendered Bid Price (i.e. A by itself; A with B; A with C; and A with B and C), because the Interconnection Network Upgrades and/or the Interconnection Losses may differ for the four cases. Projects B and C could each also have up to four different Adjusted Bid Prices for the same tendered Bid Price.

Impact of the Cluster Effect on the Quantitative Evaluation Methodology

Of the seven possible combinations in the example described above, the ABP for the four combinations involving two or more projects would be calculated on an annual FE-volume weighted basis. For example, the ABP for portfolio AC would be the volume weighted average of two ABPs: the ABP for project A (taking into account the impact of project C on project A's ABP); and the ABP for project C (taking into account the impact of project A on project C's ABP). The seven possible combinations would be treated as mutually exclusive for purposes of portfolio assembly.

Within a cluster, the network upgrade costs will be allocated pro-rata, based on the maximum power output in MVA. The information on rated power output will be based on the information in the preliminary interconnection study application as completed by the bidder.

BC Hydro reserves the right to establish a mechanism for narrowing down the number of possible combinations in clusters consisting of more than 4 projects, having regard to the range and distribution of ABPs of qualified tenders comprising such clusters.

There is a possibility that some TLDC distribution-connected projects may be grouped with clusters of transmission-connected projects.

4. OPTIMAL TLDC PORTFOLIO:

This section describes how the Optimal TLDC Portfolio, not exceeding 800 GWh in aggregate, is determined.

All qualified TLDC tenders will be assembled into all possible portfolios, subject to these portfolio assembly constraints:

- each tender in the portfolio must conform in all material respects with the CFT requirements (Qualification Constraint),
- the aggregate portfolio FE must not exceed 800 GWh (Upper FE Constraint),
- the aggregate portfolio FE must be comprised of a minimum of 50% "BC Clean Electricity" (Clean Electricity Constraint),
- BC Hydro must confirm that the construction schedule for interconnection and network upgrades on the distribution system, if any, required in respect of each project or cluster of projects is consistent with the COD required under the EPA (I/NU Development Constraint), and
- BC Hydro will establish, after tenders are submitted and with regard to the range and distribution of ABPs of qualified tenders, a maximum ABP (Maximum Price Constraint). The Maximum Price Constraint will be established in BC Hydro's sole and unfettered discretion. This constraint enables BC Hydro to:
    - establish the value of each tender as described below,
    - avoid selection of a tender that otherwise fits within a portfolio satisfying all of the portfolio assembly constraints, but which has an excessive cost, taking the range and distribution of tendered prices as a market indicator (ie. remove the outliers), and
    - reduce the maximum number of possible portfolio combinations to a more manageable level in the event that a large number of tenders are received.

For purposes of portfolio assembly, clustered projects will be treated as separate but mutually exclusive tenders. In the example of three projects in a cluster, there are seven possible cluster combinations: A, B, C, AB, AC, BC, and ABC. These seven combinations will be combined with all of the remaining tenders to create the universe of possible portfolios. The selected portfolio can have at most only one of these seven combinations, because the seven cluster combinations are mutually exclusive.

The value to BC Hydro of each project is measured relative to the Maximum Price Constraint, by taking the difference between the Maximum Price Constraint and the project's ABP, and multiplying that difference by the project's annual FE. Projects with negative values (ie. projects with ABPs above the Maximum Price Constraint) will be rejected. The value to BC Hydro of a particular portfolio of projects is the sum of the values of all individual projects that comprise the portfolio. The TLDC portfolio that has the greatest value to BC Hydro will be the Optimal TLDC Portfolio. Each tender in the Optimal TLDC Portfolio will be recommended for award of an EPA (TLDC).

5. ADDITIONAL TLDC PORTFOLIO:

This section describes how BC Hydro may award additional EPAs in respect of TLDC tenders not included in the Optimal TLDC Portfolio. This will enable BC Hydro, in its discretion, to resolve any aggregate GWh underrun in TLDC tender awards resulting from the highest value portfolio falling below the target of 800 GWh/year due to project sizing – the "lumpiness problem". In resolving the lumpiness problem, BC Hydro is also able to take the benefit of further well-priced tenders, which may not fit within the Optimal TLDC Portfolio, due to the Upper FE Constraint.

BC Hydro will reserve the right to select and award one or more EPAs in respect of additional TLDC tenders (Additional TLDC Portfolio) in addition to the tenders comprised in the Optimal TLDC Portfolio. If BC Hydro exercises this discretion, it will apply the portfolio assembly constraints and selection methodology described above to the remaining pool of TLDC tenders, except that it will first establish a further aggregate FE limit (Additional Upper FE Constraint) to be applied in lieu of the Upper FE Constraint.

Consider the following example of 20 projects tendered into the TLDC call:

Terminology and acronyms:

Bid Price	BP	($/MWh)
Curtailability Credit	CC	($/MWh)
Hourly Firm Credit	HFC	($/MWh)
Green Credit	GC	($/MWh)
Plant Gate Price	PGP	($/MWh)
Interconnection/Transmission Adjustment		
Interconnection NU	INU	($/MWh)
Interconnection Losses	IL	($/MWh)
Bulk Transmission	BT	($/MWh)
Adjusted Bid Price	ABP	($/MWh)
Firm Energy (annual)	FE	(GWh)
Clean Electricity (annual)	Clean	(GWh)

Summary table showing a sample application of adjustments to the twenty tendered Bid Prices, leading to twenty Adjusted Bid Prices in the ABP column.

	BP	CC	HFC	GC	PGP	INU	IL	BT	ABP	FE	Clean
A	60.3	-2.1	0.0	-2.0	56.2	3.0	-1.0	7.2	65.4	200	200
B	64.5	0.0	0.0	0.0	64.5	6.0	1.0	7.2	78.7	150	0
C	54.7	-1.4	-3.0	-2.0	48.3	2.0	0.0	7.2	57.5	100	100
D	54.8	0.0	0.0	0.0	54.8	1.0	-2.0	4.4	58.2	50	0
E	74.6	-3.4	-3.0	-2.0	66.2	0.0	3.0	-0.7	68.5	400	400
F	62.5	0.0	0.0	0.0	62.5	2.0	-0.3	7.2	71.4	300	300
G	67.4	0.0	0.0	-2.0	65.4	3.0	2.2	-0.7	69.9	200	200
H	63.6	-2.6	0.0	0.0	61.0	1.0	0.0	6.0	68.0	400	0
I	55.7	0.0	0.0	0.0	55.7	0.0	4.0	8.2	67.9	50	50
J	72.1	-3.7	-3.0	-2.0	63.4	6.0	-2.0	5.2	72.6	100	100
K	58.1	0.0	0.0	0.0	58.1	5.0	-1.0	7.2	69.3	200	0
L	69.1	-2.3	-3.0	0.0	63.8	0.0	-5.0	0.0	58.8	100	100
M	62.5	-2.6	0.0	0.0	59.9	7.0	3.0	-0.7	69.2	300	300
N	51.0	0.0	0.0	0.0	51.0	3.0	-1.0	7.2	60.2	50	0
O	73.8	0.0	0.0	-2.0	71.8	1.0	2.0	-0.7	74.1	50	50
P	58.3	-2.1	0.0	0.0	56.2	4.0	4.0	6.6	70.8	75	75
Q	66.9	-2.9	-3.0	0.0	61.0	0.0	0.0	8.2	69.2	50	0
R	64.7	0.0	0.0	0.0	64.7	4.0	-1.5	8.2	75.4	100	100
S	68.1	0.0	0.0	-2.0	66.1	6.0	1.5	-0.7	72.9	150	150
T	69.0	-3.3	-3.0	0.0	62.7	2.0	2.7	0.0	67.4	150	0

Assume there is one cluster of three projects (A, B and C). There are 7 possible mutually exclusive portfolios for that cluster: A, B, C, AB, AC, BC, and ABC. The three stand-alone cases have aleady been analysed by BCTC by virtue of the preliminary interconnection study application. Therefore, there are four more combinations for which BCTC needs to review for NU and loss inter-dependencies: AB, AC, BC and ABC. For each of these four combinations, assume that BCTC reassesses and reallocates the impacts of NUs and losses to the three projects. Thus, in addition to the stand-alone case, project A will have three new allocations of NUs and losses (ie. A by itself; A with B, designated as A_B; A with C, designated as A_C; and A with B and C, designated as A_{BC}), project B will have three new allocations of NUs and losses, and project C will have three new allocations. These new allocations will result in 9 new ABPs, as outlined in the following table:

	BP	CC	HFC	GC	PGP	INU	IL	BT	ABP	FE	Clean
A	60.3	-2.1	0.0	-2.0	56.2	3.0	-1.0	7.2	65.4	200	200
B	64.5	0.0	0.0	0.0	64.5	6.0	1.0	7.2	78.7	150	0
C	54.7	-1.4	-3.0	-2.0	48.3	2.0	0.0	7.2	57.5	100	100
A_B	60.3	-2.1	0.0	-2.0	56.2	4.0	0.5	7.2	67.9	200	200
A_C	60.3	-2.1	0.0	-2.0	56.2	2.0	-0.5	7.2	64.9	200	200
A_{BC}	60.3	-2.1	0.0	-2.0	56.2	5.0	1.0	7.2	69.4	200	200
B_A	64.5	0.0	0.0	0.0	64.5	7.0	2.0	7.2	80.7	150	0
B_C	64.5	0.0	0.0	0.0	64.5	5.0	0.5	7.2	77.2	150	0
B_{AC}	64.5	0.0	0.0	0.0	64.5	4.0	1.0	7.2	76.7	150	0
C_A	54.7	-1.4	-3.0	-2.0	48.3	1.0	0.5	7.2	57.0	100	100
C_B	54.7	-1.4	-3.0	-2.0	48.3	4.0	1.0	7.2	60.5	100	100
C_{AB}	54.7	-1.4	-3.0	-2.0	48.3	2.0	-0.3	7.2	57.2	100	100

Note that the new information from BCTC is reflected in the red numbers in the table.

The ABP for each of the four combinations of two or more projects, namely AB, AC, BC and ABC, is now computed. The ABP of a particular combination will be the volume weighted average (ie. based on the tendered annual FE) of the projects comprising that combination, as outlined in the following table:

	ABP	FE	Clean
AB	73.4	350	200
AC	62.3	300	300
BC	70.5	250	100
ABC	69.1	450	300

This table can be combined with the original table of 20 projects to form a set of 24 tenders, 7 of which are mutually exclusive.

As stated above, the Maximum Price Constraint needs to be established in order to determine the value of each tender to BC Hydro, and to remove the ABP outliers. For purposes of this example, assume that BC Hydro has determined the Maximum Price Constraint to be $71.4/MWh. The effect of this Maximum Price Constraint is to remove 6 tenders from further consideration. The remaining 18 tenders (5 of which are mutually exclusive) are now ready for the portfolio assembly process.

	ABP ($/MWh)	FE (GWh)	Clean (GWh)	Value ('000$)
A	65.4	200	200	1200
C	57.5	100	100	1390
D	58.2	50	0	660
E	68.5	400	400	1160
F	71.4	300	300	0
G	69.9	200	200	300
H	68.0	400	0	1360
I	67.9	50	50	175
K	69.3	200	0	420
L	58.8	100	100	1260
M	69.2	300	300	660
N	60.2	50	0	560
P	70.8	75	75	45
Q	69.2	50	0	110
T	67.4	150	0	600
AC	62.3	300	300	2740
BC	70.5	250	100	225
ABC	69.1	450	300	1035

After analysing all of the feasible portfolios (155381 possible combinations, of which 17221 satisfy the constraints), the Optimum TLDC Portfolio is determined to be comprised of the following seven tender combinations (comprising eight projects):

	ABP	FE	Clean	Value
AC	62.3	300	300	2740
D	58.2	50	0	660
I	67.9	50	50	175
L	58.8	100	100	1260
N	60.2	50	0	560
Q	69.2	50	0	110
T	67.4	150	0	600
Total		750	450	6105