



Bioenergy Call Phase I

Proponent Information Session

March 26, 2008

Power Acquisitions

Agenda

for generations



1. Welcome and Introduction
2. Changes to RFP and Appendices
3. Electricity Purchase Agreement Terms
4. Evaluation
5. Generator Base Line
6. Lunch
7. Input Forum



Bioenergy Call – Phase I Changes to the RFP and Recently Released Appendices

James Grant
Major Power Calls

RFP - Addenda and Appendices

- Addenda to the RFP
 - Appendix 3 – Proposal Letter
 - Appendix 4 – Project Description
 - Appendix 5 – Fuel Plan Description
- Proposal price and adequate fuel supply, outlined in a detailed fuel plan, will have a large impact on the proposals to short-list for further negotiation

Bioenergy Call Addenda

Addendum 2

- > Use of Auxiliary Fuel in limited capacity
- > Output from the Project must qualify as “clean or renewable energy” in accordance with guidelines published by the British Columbia Ministry of Energy, Mines and Petroleum Resources, except only that portion of the output attributable to the use of Auxiliary Fuel to the extent permitted under “Fuel Type” above and under the EPA
- > Evaluation Criteria - desirability of limiting the use of Auxiliary Fuels

• Addendum 4

- > Energy up to the GBL paid for as Non-firm up to 5% of annual GBL
- > Note: 3 x 12 multiplier table is indicative percentages

Bioenergy Call Addenda

- Addendum 5
 - > Proposals may be accepted without further negotiation.
 - > Confidentiality Agreement
 - Clarifies and confirms the obligations of Proponents and BC Hydro in relation to confidential information disclosed during the RFP process (including during the course of negotiations). Each Proponent will be required to submit a signed copy of the confidentiality agreement with its Proposal (or Proponent may submit earlier, if desired).
 - > Clarified wording on process for 3rd Party Interconnection process

Project Description

- The Proponent
- The Project
 - > Project Details – scope, schedule, progress to date
 - > First Nations consultation to date or required must be identified in your proposal
- Additional Information
 - > Financing, experience

The more information provided on Project Description, the better able we are to assess the Proposal.

Fuel Plan

- Types of fuel
- Availability of fuel
- Impact on current forest-based biomass material supply chain
- Regulatory and operational constraints

Types of Fuel



- Category A
- Category B
- Category C
- Auxiliary

Types of Fuel

Category A Fuel

- Solid mill residues (sawdust, shavings, bark)
- Pulp mill residues (black liquor, HOG)

Category B Fuel

- Road side logging debris piles

Category C Fuel

- Standing biomass timber

Auxiliary Fuels

- Call is for the utilization of biomass only
- Existing producers utilize to various degrees natural gas, oil, coal etc.
- Start-up and some optimizing fossil fuels known to be required
- 1-3% is considered a level of non-biomass that can be used to manage operations
- The fuel plan will take non-biomass fuel into consideration, with a preference for projects where forest-based biomass is more exclusively used

Quantity of Fuel

- Schedule A - Identify by Category using metric tonnes
- Schedule B – Identify by Biomass versus Auxiliary using Giga-Joules
- What is logically available?

Schedule A

“X” for Existing Generators only

Biomass Fuel Volumes

“Y” for Incremental or New Generators

Calendar Year	Category A (Metric Tonnes)		Category B (Metric Tonnes)		Category C (Metric Tonnes)	
	X	Y	X	Y	X	Y
	2005		NA		NA	
2006		NA		NA		NA
2007		NA		NA		NA
2008						
2009						
2010						
2011						
2012						
2013						
2014.....2030						

Schedule B

Fuel Allocation

Calendar Year	Biomass Fuel (GJs)	Auxiliary Fuel (GJs)
2005		
2006		
2007		
2008		
2009		
2010		
2011		
2012		
2013		
2014.....2030		

Incremental Generation

- Requires historical data from existing generators proximal to the proposed generator (i.e. same facility)
- Requires future biomass utilization forecasts up to your GBL if current customer, or to your existing annual generation if not a customer
- Requires future incremental biomass requirements

New and Incremental Generation

New Generation

- Simpler process
- Column Y in Schedule A subdivided by Category
- 5-Year firm plan
- Remaining years - best estimate by Category

Incremental Generation

- Determination of the GBL

Quantity of Accessible Fuel

- Logic Test
 - > Allowable annual cuts (AAC)
 - > Amount of dead pine
 - > Projected changes in AAC
 - > Lumber and chip recovery factors
 - > Existing residual fibre demands and users
- Integrated fibre flow diagram (proof of supply)

Fuel Sourcing Strategies

- Five Year Sources
- Subdivided by
 - > Self-sourced fuels versus third-party sources

Self-sourced Fuels

- List and discuss:
 - > Geographic region
 - > Forest tenure numbers or private purchases
 - > Primary (and secondary) processing facilities
 - > Available volumes by type of residues
 - > Current markets for chips, sawdust, etc
 - > **Estimated fuel cost by Category**

Third-Party Sources

- Include letters of intent, commitments and executed final agreements for the first 5-years
- Estimate delivered fuel cost by Category
- Include discussion on security of supply as per self-sourced fuels

Alternative Fuel Sources

- Identify contingency plans for sawmill curtailments, shut-downs, forest-fire etc.

Fuel Delivery Arrangements

- Arrangements for fuel deliveries
 - > Contractors
- Average haul distances by fuel Category

Impacts on Tenure Holders

- Applicable to Category B or Category C fuel users only
- Discussion on how you will address technical and operational hurdles, e.g.
 - > Road users agreements
 - > Adjacency
 - > Operating areas

Regulatory Compliance

- Applicable to Category B and Category C fuel sourcing
- Demonstrate understanding of regulatory hurdles and how these will be addressed, e.g.,
 - > FSPs, SPs, CHR, VQO, stocking standards, biodiversity etc.



**Bioenergy Call – Phase I
Electricity Purchase
Agreement (EPA)
Term Sheet**

**Judy Baum
Power Acquisitions**

EPA Term Sheet

- ❖ Product (Hourly Firm Energy)
- ❖ Energy Pricing for Firm and Non-Firm Energy Deliveries
- ❖ Commercial Operation Date
- ❖ Performance and Interconnection Security
- ❖ Liquidated Damages
- ❖ Delay in Network Upgrades
- ❖ Use of Mixed Fuel
- ❖ Termination Rights
- ❖ Other EPA Terms

Product

❖ Firm Energy

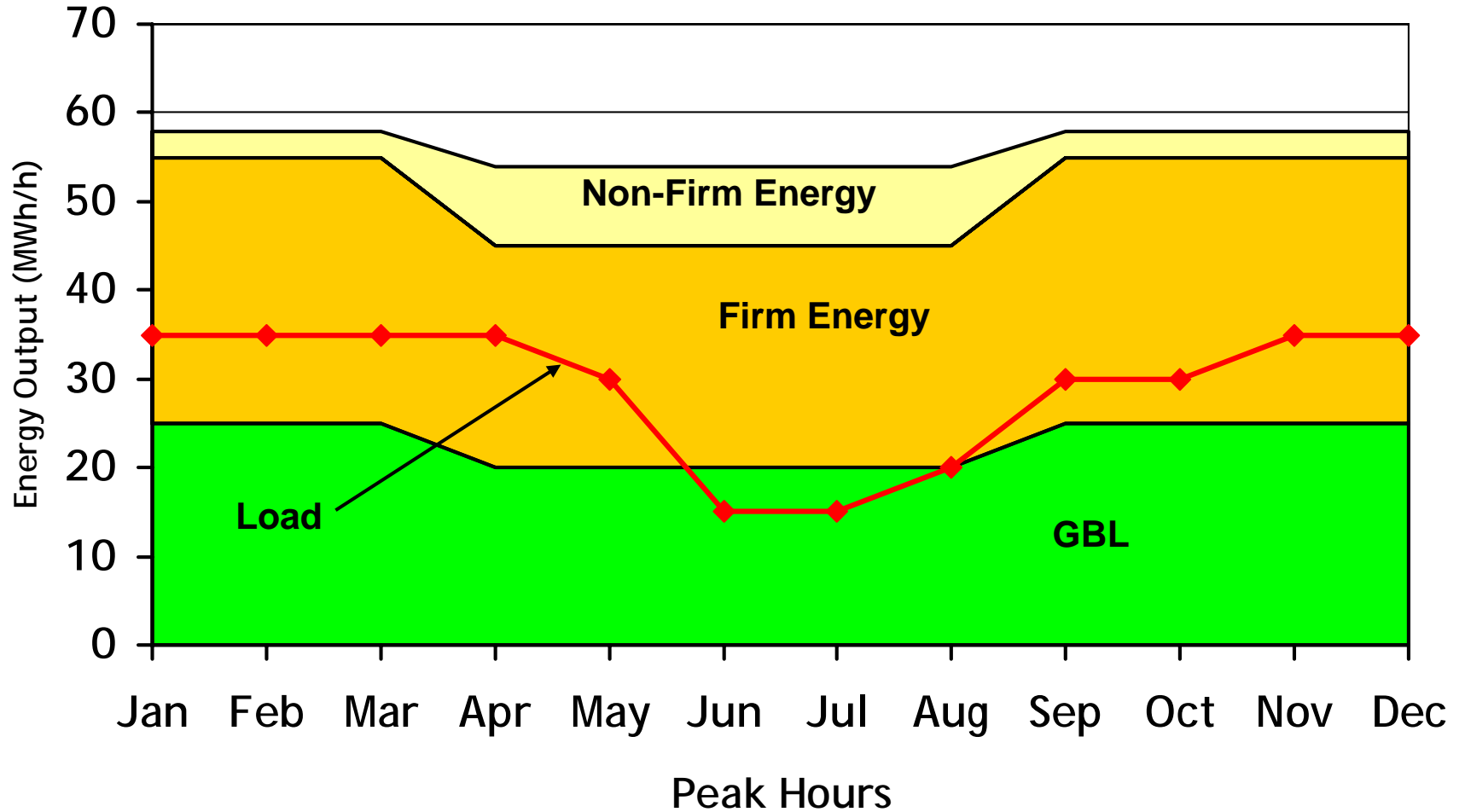
- Seller to deliver hourly firm energy in accordance with the 3 x 12 hourly firm energy delivery profile
- Total firm energy delivered during the freshet period (May 1 to July 31) cannot exceed 25% of the annual firm energy delivery

Product (cont'd)

❖ Non-Firm Energy

- Seller may deliver additional energy as non-firm energy
- BC Hydro is not obliged to take or pay for energy up to the Generation Base Line
- When customer's hourly load is less than the hourly Generation Base Line (GBL), BC Hydro will pay for surplus energy at the non-firm price up to 5% of the annual GBL
- Hourly GBL profile can be changed annually but annual GBL must be fixed for EPA term

Energy Classification

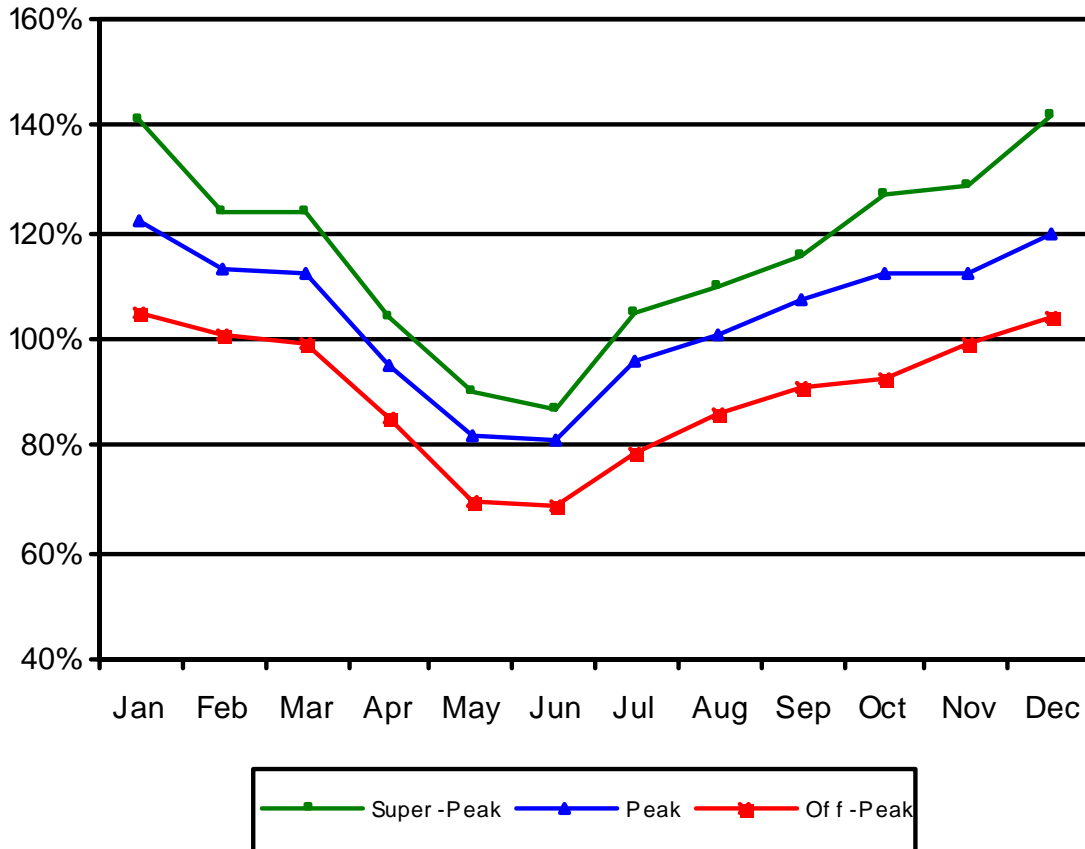


Firm Energy Pricing

- ❖ Seller to submit a price for hourly firm energy (Jan 1, 2008 dollars)
- ❖ Price Escalation
 - Pre-COD: 0% to 300% of firm energy price to be escalated by BC CPI
 - Post-COD: 0% to 50% of firm energy price to be escalated by BC CPI
- ❖ Firm Energy Price = contractual firm energy price, escalated as elected by Seller and adjusted by a delivery time factor

Time of Delivery Factors

Delivery Time Curves



Delivery Time Table

	Super Peak	Peak	Off Peak
Jan	141%	122%	105%
Feb	124%	113%	101%
Mar	124%	112%	99%
Apr	104%	95%	85%
May	90%	82%	70%
Jun	87%	81%	69%
Jul	105%	96%	79%
Aug	110%	101%	86%
Sep	116%	107%	91%
Oct	127%	112%	93%
Nov	129%	112%	99%
Dec	142%	120%	104%

Non-Firm Energy Pricing - Option A

❖ Option A: Fixed Price

- Set of pre-determined annual prices (Jan 1, 2008 dollars)
- Prices escalated at BC CPI commencing Jan 1, 2008
- Escalated price is adjusted by time of delivery factors
- Further adjustment for transmission losses from plant gate to Lower Mainland

Non-Firm Energy Prices - Option A

Option A: Fixed Price Option
January 2008 Dollars

	x									
	0	1	2	3	4	5	6	7	8	9
200x	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	\$50.5	\$50.4
201x	\$44.7	\$41.7	\$44.6	\$47.2	\$50.4	\$50.3	\$47.3	\$49.6	\$51.5	\$55.6
202x	\$61.4	\$61.4	\$61.7	\$62.5	\$62.6	\$64.0	\$65.0	\$66.2	\$67.0	\$68.0
203x	\$69.1	\$70.1	\$71.2	\$71.9	\$72.6	\$73.4	\$74.1	\$74.8	\$75.6	\$76.3

Non-Firm Energy Pricing - Option B

❖ Option B: Floating Price

➤ Lesser of:

- 1) average of the daily Mid-C non-firm prices for the applicable daily delivery period in the month, and
- 2) \$250/MWh, escalated at BC CPI from Jan 1, 2008

➤ Adjustment for transmission losses from plant gate to Lower Mainland

Non-Firm Energy Pricing Selection

- ❖ Seller to elect 0% to 100% (in 10% increments) of non-firm energy to be priced according to Option A
- ❖ Percentage applied to Option B is the difference between 100% and the percentage applied to Option A

Commercial Operation Date

- ❖ Guaranteed COD must be no later than November 1, 2012
- ❖ One-time opportunity to postpone guaranteed COD based on results of the detailed interconnection studies
- ❖ COD delay
 - Penalty after guaranteed COD
 - BCH right of termination one year after guaranteed COD
 - Additional time to achieve COD if construction of generation project is at least 80% complete

COD Requirements

- ❖ All material permits
- ❖ Compliance with all applicable interconnection requirements
- ❖ No material default under EPA
- ❖ 72-hour operating test
 - IPP projects—72 continuous hours at 90% of plant capacity
 - Customer projects—72 continuous hours at the hourly Generation Baseline plus 90% of Seller's highest post-COD hourly firm energy delivery commitment

Performance Security

❖ Performance Security

- Performance Security is calculated by multiplying the performance security amount by the annual firm energy
- Performance security amount is designed to reflect the relative risk at various stages of a project
 - \$2.50/MWh at EPA signing
 - \$8.00/MWh when right to terminate for failure to obtain permits expires
 - \$6.00/MWh after first anniversary of COD
 - Opportunity to reduce performance security amount to \$4.00/MWh at 5-year intervals for demonstrated performance

❖ Interconnection Security

- Interconnection security is based on 150% of the initial interconnection cost estimate

Liquidated Damages

- ❖ Liquidated Damages (LDs) are incurred for delivery shortfall of contractual firm energy
- ❖ No LDs payable for the first year of operation
- ❖ LD amount = LD factor x firm energy delivery shortfall
where the LD factor is the greater of:
 - (1) market price less adjusted firm energy price, and
 - (2) \$5.00/MWh (Jan 1, 2008)
- ❖ Annual LD limit = 2 x performance security amount

Delay in Network Upgrades

- ❖ Distribution-connected Projects
 - BC Hydro will pay for deemed generation if Seller can not achieve COD by guaranteed COD due to a delay in the completion of the interconnection and/or transmission upgrades
- ❖ Transmission-connected Projects
 - BC Hydro will have no liability for delays in the completion of the interconnection upgrade
 - BC Hydro will pay for deemed generation if Seller can not achieve COD by guaranteed COD due to a delay in the completion of the transmission upgrade
- ❖ For both distribution-connected and transmission-connected projects, Seller must satisfy all COD requirements within 30 days after the network upgrades are complete

Use of Mixed Fuel

- ❖ Primary fuel is forest-based biomass
- ❖ Auxiliary fuel (e.g. fossil fuel)
 - No restriction for start ups
 - Normal operation
 - Existing generation: Capped at the auxiliary fuel baseline, i.e. a fixed amount measured in GJs
 - New generation: Limited to 3% of total fuel
- ❖ No payment for energy generated with auxiliary fuel beyond allowable threshold
- ❖ Chronic exceedance of allowable auxiliary fuel consumption may result in contract suspension with eventual termination

Termination Rights

❖ Seller

- Failure to obtain material permits
- Prolonged force majeure
- Bankruptcy, insolvency or material default by the other party

❖ BC Hydro

- Similar to Seller's rights, plus
- COD delay
- Failure to maintain performance and interconnection security
- Failure to meet interconnection requirements

Other EPA Terms

❖ Environmental Attributes

- Mandatory transfer of environmental attributes
- EcoLogo certification is not required

❖ Firm Energy/Plant Capacity Adjustments

- One-time right to adjust plant capacity prior to COD by the greater of 10% and 1 MW
- One-time right to adjust firm energy delivery within one year of COD

❖ Flow Throughs

- No flow through or other charges

❖ Turn-down Right

- BCH has discretionary turn-down right subject to payment of full energy price to Seller less avoidable costs

Other EPA Terms (cont'd)

❖ Planned Outages

- Seller may not take planned outages from Nov 1 to Mar 31 without BCH consent

❖ Reporting Requirements

- Annual fuel consumption by types and volumes
- Replacement Fuel Plan at 5-year intervals

❖ Interconnections

- BCH to bear interconnection costs on the transmission or distribution side of the point of interconnection
- Arrangement for interconnection through an Electrical Host, a private transmission, or third party utility system is the sole responsibility of the Seller



Bioenergy Call – Phase I Quantitative Evaluation

Bill Peterson
Power Acquisitions

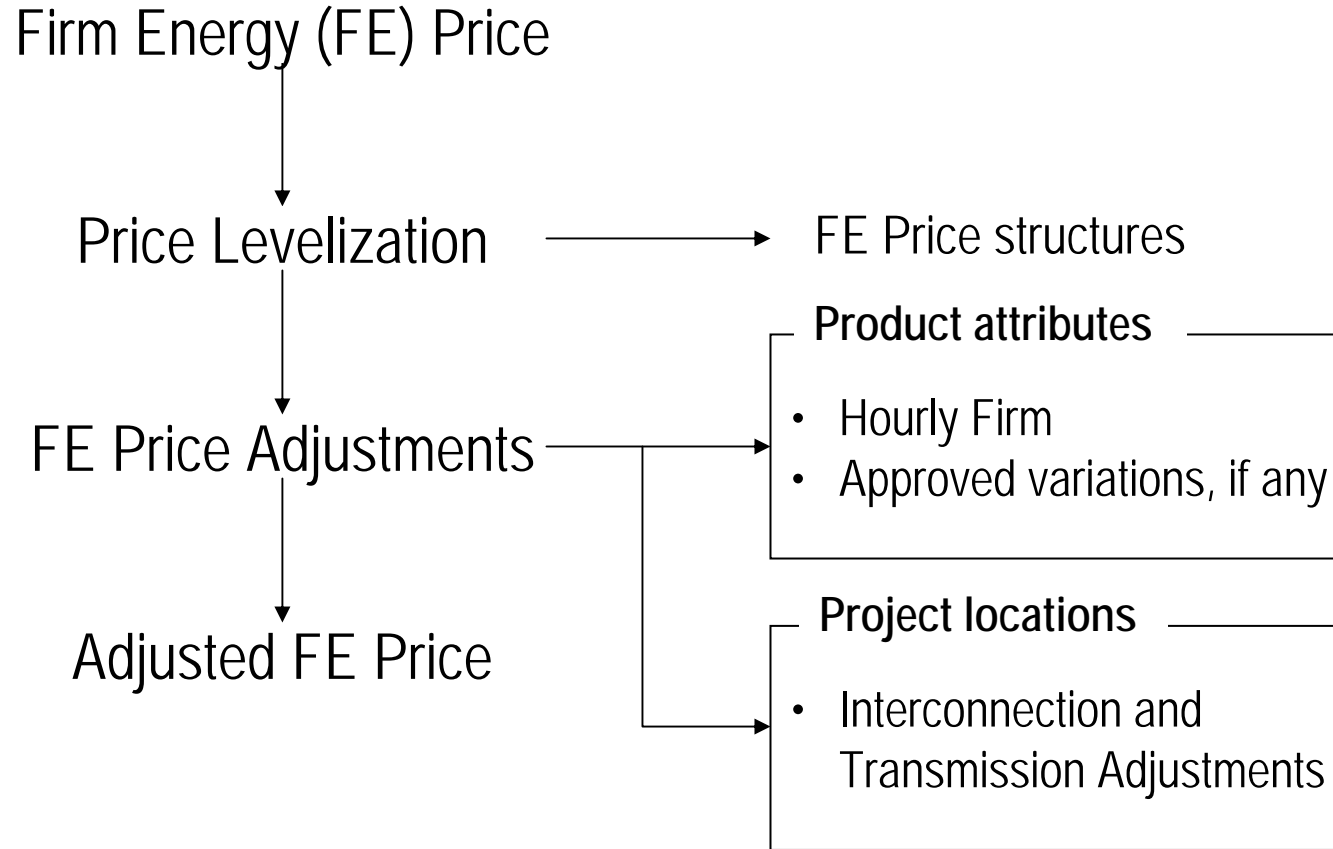
Quantitative Evaluation

- Objective of this part of the presentation is to describe how the Bioenergy Proposals will be evaluated and then selected for contract award
- Two primary steps
 - Firm Energy Prices converted to Adjusted Firm Energy Prices
 - Creation of optimum cost-effective portfolio of Proposals

Quantitative Evaluation

- Possible differences between Proposals
 - Firm Energy Price structures
 - Product attributes
 - Project locations
- These differences define the features and hence the value of the product being offered to BC Hydro
 - Computation of Adjusted Firm Energy Price for each Proposal facilitates a fair comparison of Firm Energy Prices between Proposals
 - Adjusted Firm Energy Prices only used for evaluation purposes
 - Payment for actual energy deliveries will be based on the Firm Energy Price, not the Adjusted Firm Energy Price

Adjusted Firm Energy Price



Price Levelization

- Why do we use levelizing?

Levelizing provides a method for comparing Firm Energy Prices for projects with different start-up dates, different contract durations, and different escalation rates

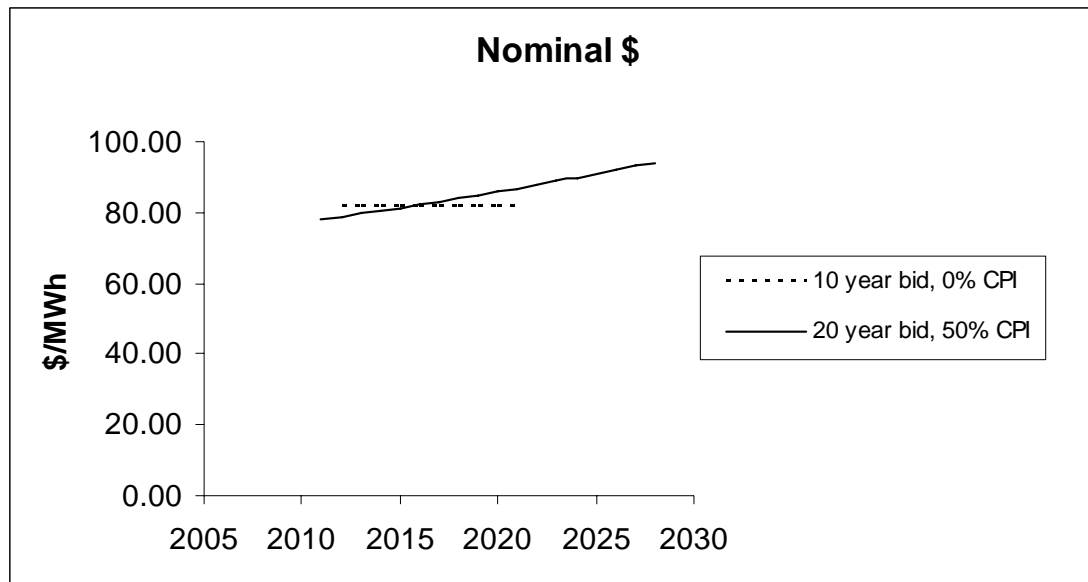
- In the bioenergy call, Proponents choose from the following:
 - COD: < 1 November 2012
 - Term: 5 to 20 years
 - Firm Energy Price escalation:
 - Pre-COD: 0% to 300% of the Firm Energy Price escalates at CPI
 - Post-COD: 0% to 50% of the Firm Energy Price escalates at CPI

Price Levelization

- Definitions of levelizing (all equivalent)
 1. Levelizing = the conversion of a non-uniform stream of cash flows into a net present value (NPV) equivalent uniform stream of cash flows
 - where “non-uniform” means a stream that is not esc at inflation rate
 - “uniform” means a stream that is esc at inflation rate
 2. Levelized unit price = NPV (at the nominal disc rate) of actual Firm Energy Price multiplied by the firm energy, divided by the NPV (at the real disc rate) of the firm energy
 3. The unit price that, when esc at inflation rate and multiplied by the firm energy, has the same NPV (at the nominal disc rate) as the actual Firm Energy Price multiplied by the firm energy
- The “level” in “levelization” means “flat real”, i.e., graphing the levelized price in real \$ would yield a flat line

Price Levelization

- In the graph below, it may not be immediately obvious which pricing structure has the lowest overall unit cost
- It turns out that both pricing structures have the same levelized Firm Energy Price of \$70/MWh (Jan 2008 \$)



FE Price Adjustments - Hourly Firm

- Hourly Firm Energy

- Levelized Firm Energy Price reduced by a \$/MWh amount dependent upon the contracted profile of on-peak hourly firm energy over the year
- Adjustment for a 'flat' profile of on-peak hourly firm energy would be approx \$2.9/MWh, ignoring on-peak losses
- Adjustment higher for a 'shaped' profile of on-peak hourly firm energy
 - more winter / less freshet on-peak hourly firm energy, and/or
 - more on-peak / less off-peak hourly firm energy
 - the following table indicates the relative value that BCH places on hourly firm energy

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
On-peak	25.2%	16.2%	13.9%	2.5%	0.0%	0.0%	0.8%	5.0%	6.2%	6.0%	8.1%	16.1%
Off-peak	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

FE Price Adjustments - Variations

- Approved variations, if any
 - Levelized Firm Energy Price may be adjusted by a \$/MWh amount, assuming any additional value associated with the variation can be quantified
 - For example, project is able to provide dispatchable capacity

FE Price Adjustments - Location

Proposals likely to be located all across the Province

- Levelized Firm Energy Prices will be adjusted to reflect the costs borne by BC Hydro associated with taking delivery of the energy and moving it through the Distribution (if D-connected) and Transmission systems to the Lower Mainland
 - Network Upgrade (NU) costs associated with the interconnection of the Project to the BC Hydro system (INUs)
 - NU costs associated with the transmission of the energy from the Project through the BC Hydro system to the LM (TNU)
 - Energy losses associated with the transmission of the energy from the Project through the BC Hydro system to the LM

FE Price Adjustments - Location

- Project-specific NU costs and energy losses will be converted to a \$/MWh amount, then added to the levelized Firm Energy Price
- Estimates for NUs and losses for each project will come from BCTC (T-system) and BC Hydro (D-system, if applicable)
- Location adjustments initially done on a standalone basis
 - BC Hydro may request BCTC to conduct special studies of two or more Projects, to assess impacts on NUs and/or losses at a portfolio level

Adjusted Firm Energy Price

- End result is a levelized Firm Energy Price for firm energy, adjusted for delivery to the Lower Mainland
- The following example illustrates how Firm Energy Prices are converted into corresponding Adjusted Firm Energy Prices, for three hypothetical proposals

Example Calculation of AFEP

Assumptions:	Proposal A	Proposal B	Proposal C
FE Price (2008\$)	\$80/MWh	\$80/MWh	\$80/MWh
Pre-COD Esc	150%	300%	0%
Post-COD Esc	0%	25%	50%
Term	20 years	10 years	5 years
HLH FE profile	Flat	Flat	Flat
COD	Jan 1, 2011	Jan 1, 2011	Jan 1, 2011
Annual firm	400 GWh	400 GWh	400 GWh
Location	Central Interior	Vancouver Island	Peace River
INU levelized cost	+\$1.2 million/yr	+\$2.4 million/yr	+\$0.2 million/yr
TNU levelized cost	+\$1.1 million/yr	-\$1.8 million/yr	+\$1.4 million/yr
Losses	+10%	+5%	+15%

Example Calculation of AFEP

FEP Adjustments:	Proposal A	Proposal B	Proposal C
Levelized FEP ¹	\$71.2/MWh	\$84.3/MWh	\$74.1/MWh
Hourly firm	-\$2.9	-\$2.9	-\$2.9
INU	+\$3.0	+\$6.0	+\$0.5
TNU	+\$2.8	-\$4.5	+\$3.5
AFEP before losses	\$74.1	\$82.9	\$75.2
Losses	+\$8.2	+\$4.4	+\$13.2
AFEP	\$82.3/MWh	\$87.3/MWh	\$88.4/MWh

1. Assumes nominal discount rate of 8.0%, inflation rate of 2.0%, base year of January 2008.

Portfolio Assembly

- Once all the Adjusted Firm Energy Prices have been calculated, the evaluation moves to the portfolio assembly phase
- Assemble combinations of proposals into portfolios, including clusters of projects that are electrically close
- A blended Adjusted Firm Energy Price is calculated for each portfolio
- BC Hydro may provide a limited number of portfolios to BCTC for further study
 - The blended Adjusted Firm Energy Prices are re-computed for these portfolios, as necessary

Selection of Optimal Portfolio

- Selection of optimal portfolio based on
 - Ranking of the blended Adjusted Firm Energy Prices, and
 - Consideration and potential application of non-price factors, including results from the risk assessment
- Why do we have non-price factors?
 - Provides BC Hydro the discretion to incorporate into the selection process certain factors not captured in the quantitative evaluation
 - Implies that BC Hydro has the discretion to select a portfolio with a higher blended Adjusted Firm Energy Price
 - Application of non-price factors (if any) will be disclosed in the subsequent Section 71 filing

Non-price Factors

- Some examples of non-price factors include:
 - Risk assessment (not a pass/fail)
 - Project development certainty, including FN involvement
 - Energy delivery certainty, including fuel availability
 - Adverse impacts on existing users of biomass, especially type A
 - Approved variations not accounted for in the Firm Energy Price adjustments
 - BC Hydro load resource balance at time of evaluation
 - System impacts at the portfolio level not accounted for in the Firm Energy Price adjustments
 - Generation technology diversity
 - Regional diversity
 - Environmental impacts



Bioenergy Call – Phase I

Hourly Generator Base Line Profile

Lester Dyck

Key Accounts

GBL Determination Process

- GBL discussions and determinations will follow the same process as the initial CBL discussions.
- Individual meetings will be conducted between the customer proponents and a BC Hydro GBL review team in the next few weeks.
- Once GBLs have been agreed to with the review team they will be filed along with the individual customer CBL statements and ultimately filed with the BCUC.
- After GBLs have been determined and expected generation operations are defined (relative to BC Hydro energy sales to customers), both planning for metering configurations and billing system programming can begin.

Hourly GBL Profile

	Peak (MWh/h)	Super-peak (MWh/h)	Off-peak (MWh/h)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			