



# 2005 Open Call For Power

## Vancouver Technical Session March 30, 2005



# Agenda

Registration and coffee

8:00 - 8:30 am

## **Welcome and Background to the Call**

Pre-Call First Nations & Stakeholder Engagement

Call Process

Evaluation Process - QEM

**Mary Hemmingsen**

Siobhan Jackson

Jim Scouras

Bill Peterson

*Break - - 10:30 - 10:45*

Product & Pricing

Remaining EPA Terms

Steve Eckert

Alison Briggs

*Lunch - - 12:30 - 1:15*

General Questions

Break Out Rooms

*Coffee - - 2:15 - 3:45  
in Rooms*

Hydro, Wind, Thermal, First Nations

Evaluation Forms

4:00

Mary Hemmingsen

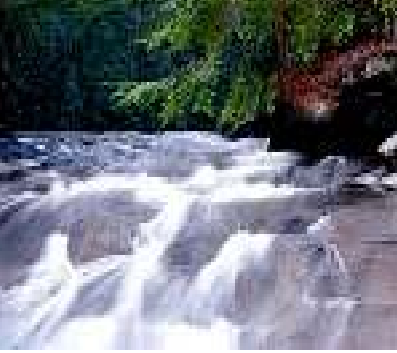
Breakout Room Report Out

4:05

Next Steps and Adjourn

5:00

Mary Hemmingsen



## Workshop Purpose

- Pre-Call dialogue, BC Hydro engages IPPs, First Nations, stakeholders
- BC Hydro presents draft Call elements
- BC Hydro's goal is to shift debate away from Call Issue phase into the pre-Call phase
- Audience is technical, potential bidders
- building to written comments by April 15

[www.bchydro.com/info/ipp/ipp21390.html](http://www.bchydro.com/info/ipp/ipp21390.html)



## Housekeeping Details

- Morning break at 10:00 for 15 min.
- Lunch is at 12:30 for 45 min.
- Afternoon break at 2:15 in break out rooms
- Meeting ends at 5:00
- Washrooms outside and left of this room
- Exits
- Electronics off or in “quiet” mode



## Respectful Meeting Guidelines

- Facilitator / participants share responsibility to meet the agenda
- Questions after each speaker - 15 min.
- General questions after lunch - 1 hour
- Roving microphone for participant questions
- Provide equal opportunity to participate
- Record of meeting rolls into summary of engagement process after April 15



# Welcome

- Introducing the new Manager of Power Acquisitions and Contracting
  - David Kusnierczyk



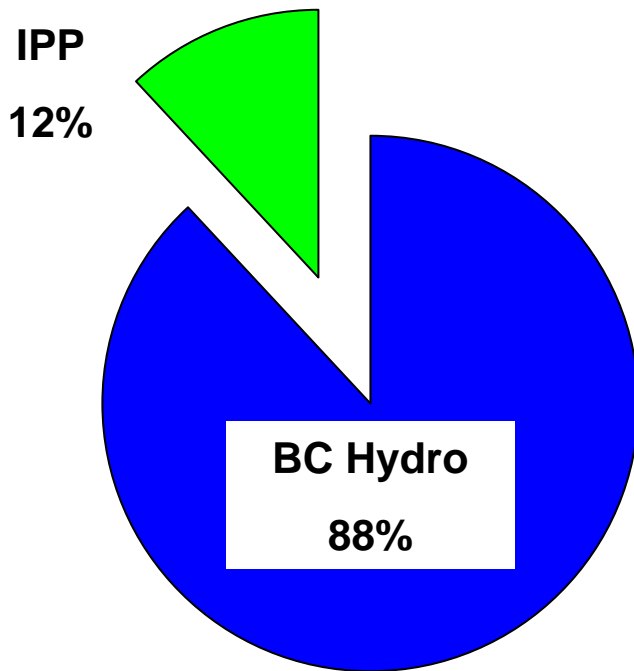
# Policy Framework

- BC Energy Plan
  - BCTC, Regulatory Oversight, Private Sector Development and 50% BC Clean Electricity Voluntary Target
- British Columbia Utilities Commission
  - Integrated Electricity Planning
  - Resource Expenditure and Acquisition Plans
  - Section 71 EPA Approvals
- BC Hydro Long Term Objectives

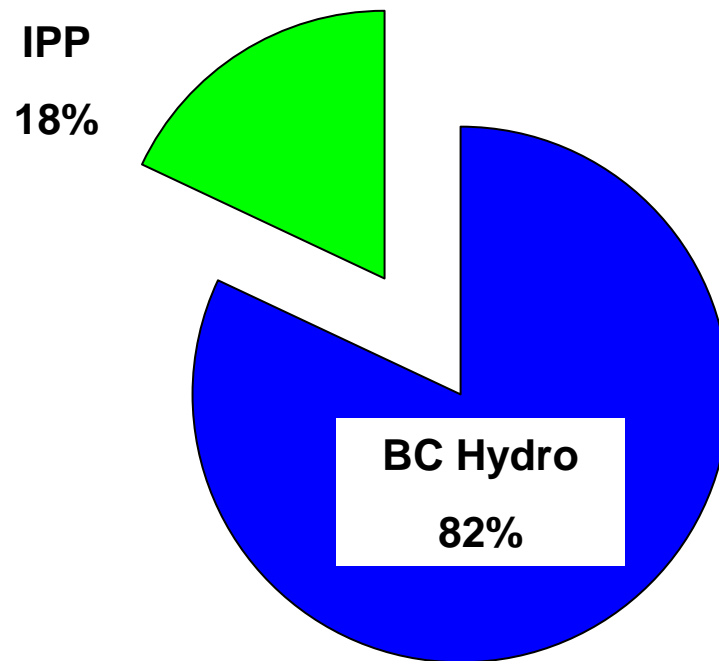


# Our Current Portfolio

Online  
Now

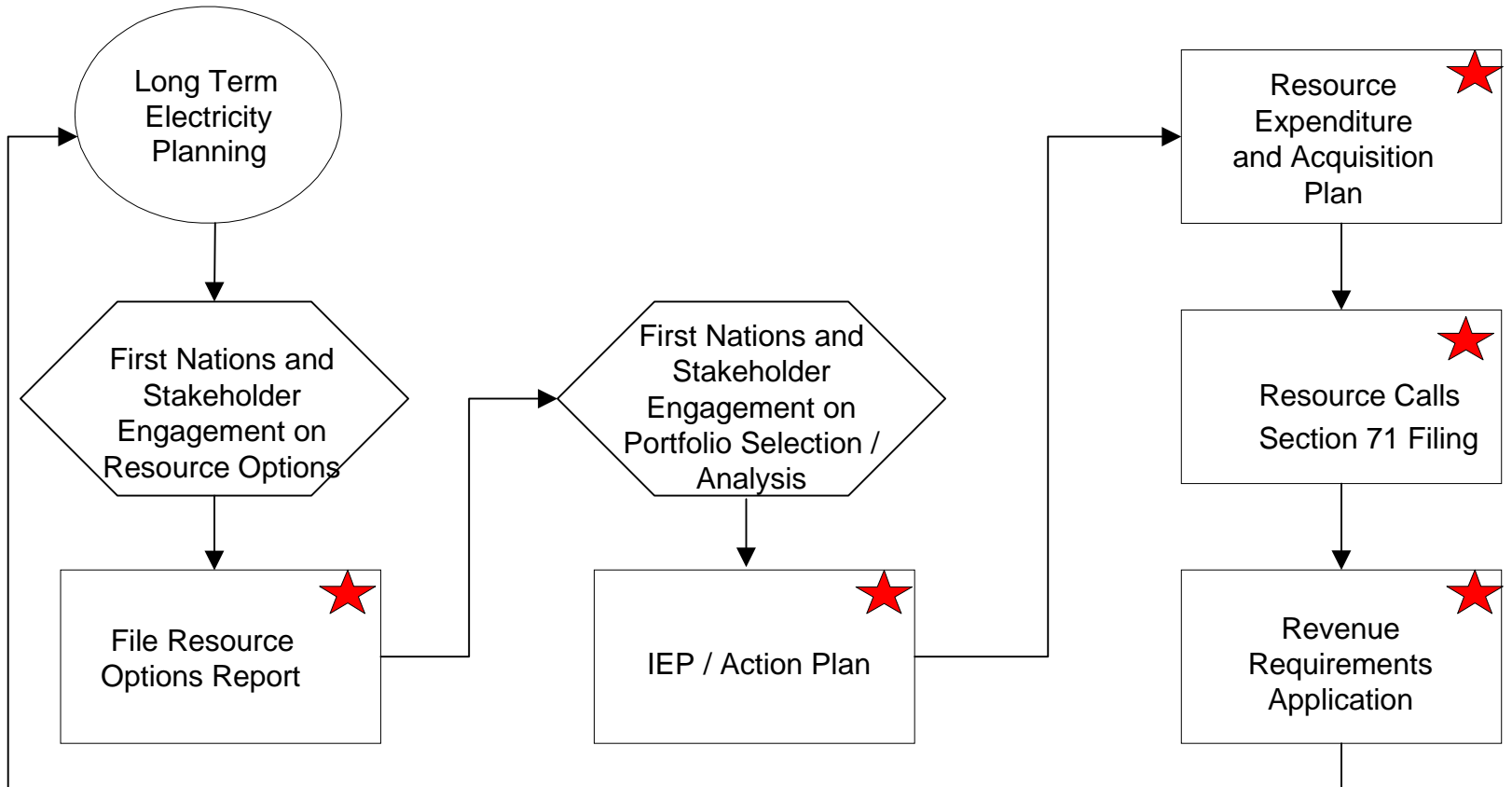


Currently  
Contracted

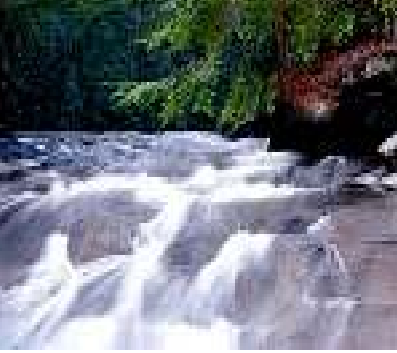




# Regulatory Environment

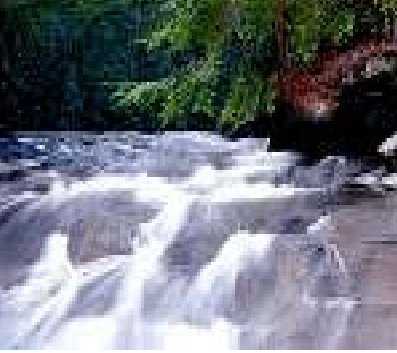


Denote a process that is submitted to the BCUC



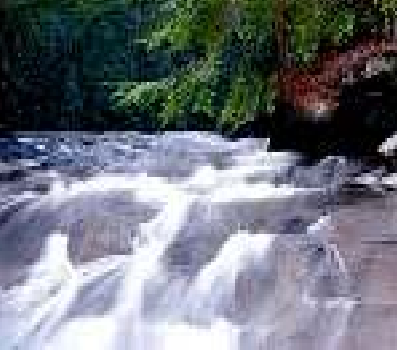
# BC Hydro's Long Term Goals

- BC Hydro Purpose:
  - Reliable Power, at Low Cost, for Generations
- BC Hydro's Long Term Goals
  - 15 objectives that span the breadth of BC Hydro's business over a 20-year horizon
  - 8 objectives under 5 categories relate directly to procurement



## Long Term Goals Related to Procurement

- Supply Reliability
- Environment
- Financial
- Enable Western Market Opportunities
- Social

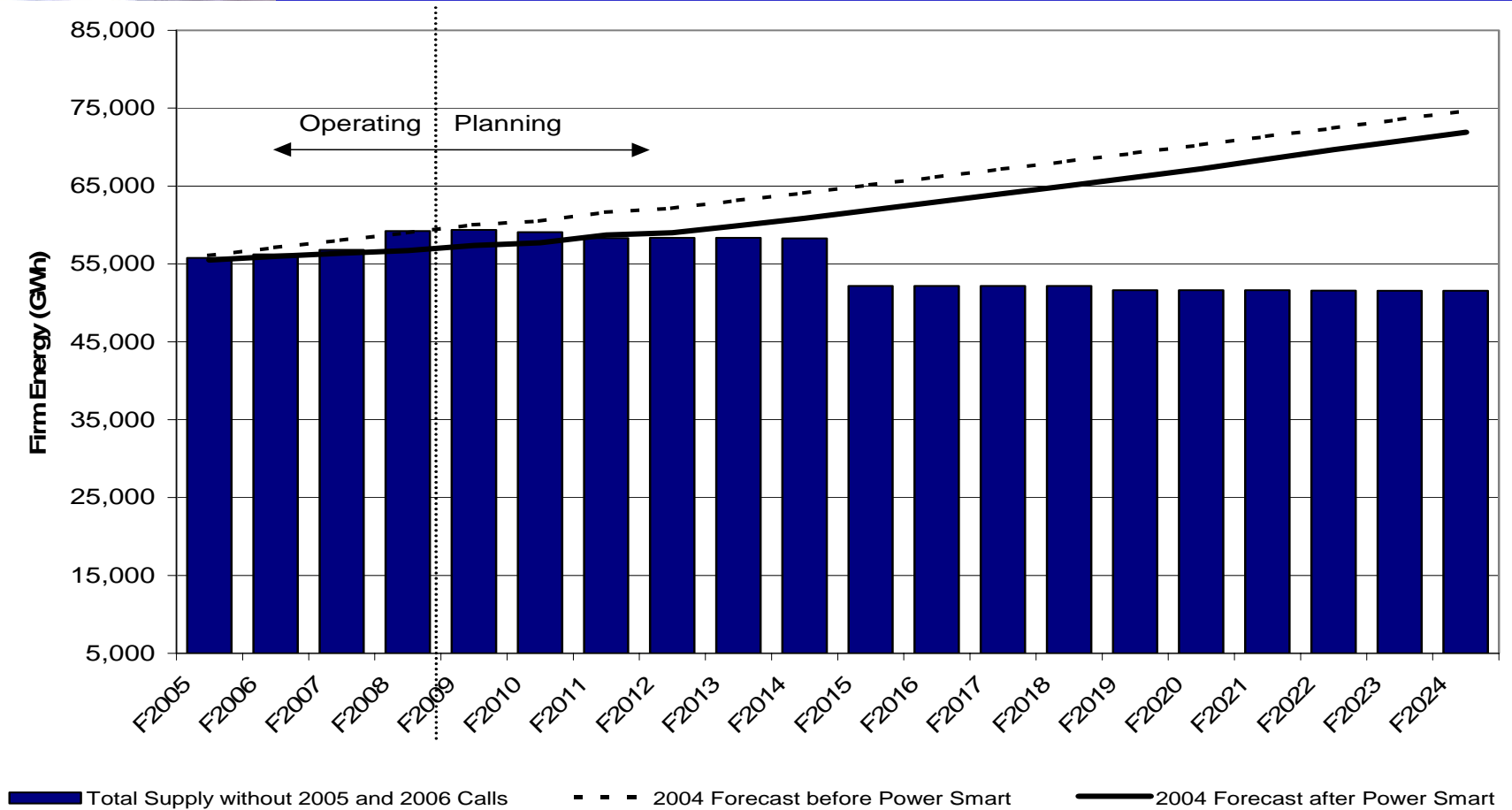


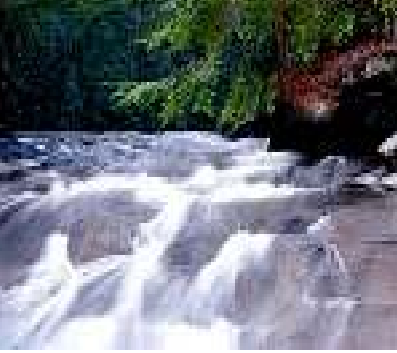
# Call Rationale and Alignment with Policy Directives

- **Reliable Supply**
  - Maintain supply adequacy under higher load/tighter supply conditions
  - Firm energy supply required by F2011; dependable capacity supply required by F2015
- **Environment**
  - 50% Clean award criteria; credit for green
  - Treatment of greenhouse gas emissions
- **Low Cost**
  - Open call with competitive procurement
  - Accommodations for non-firm energy



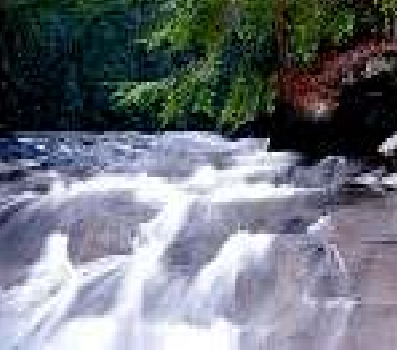
# The Need for the Call Supply/Demand - Energy Outlook





## Ongoing Input into Call Process

- Past Calls
- 2004 IPP workshops in regions
- BCUC process and outcomes
- Ongoing relationship with IPPBC and government agencies
- Multi-party committee
- Government based “one-window” committee



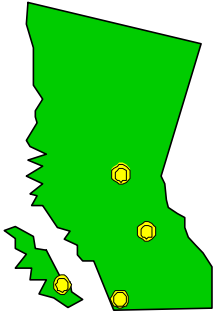
## How Ongoing Input was Used

- Two project streams including two forms of contract and evaluation methodologies
- Single stage tender process
- Contract terms and conditions
- Potential for longer term contracts (25 years + two 5-year BC Hydro renewal options)
- Pre-Call flexible engagement process



**First Nations & Stakeholder Engagement**

**Regional Information Sessions**



**Technical Workshop**



**We are here**

**March 14 - 21**

**March 30**

**April 15**

**Late Spring**

**Summer 2005**

**Fall / Winter 2005**

**REAP PROCESS**

**File Call Information with BCUC**

**BCUC REAP Decision**

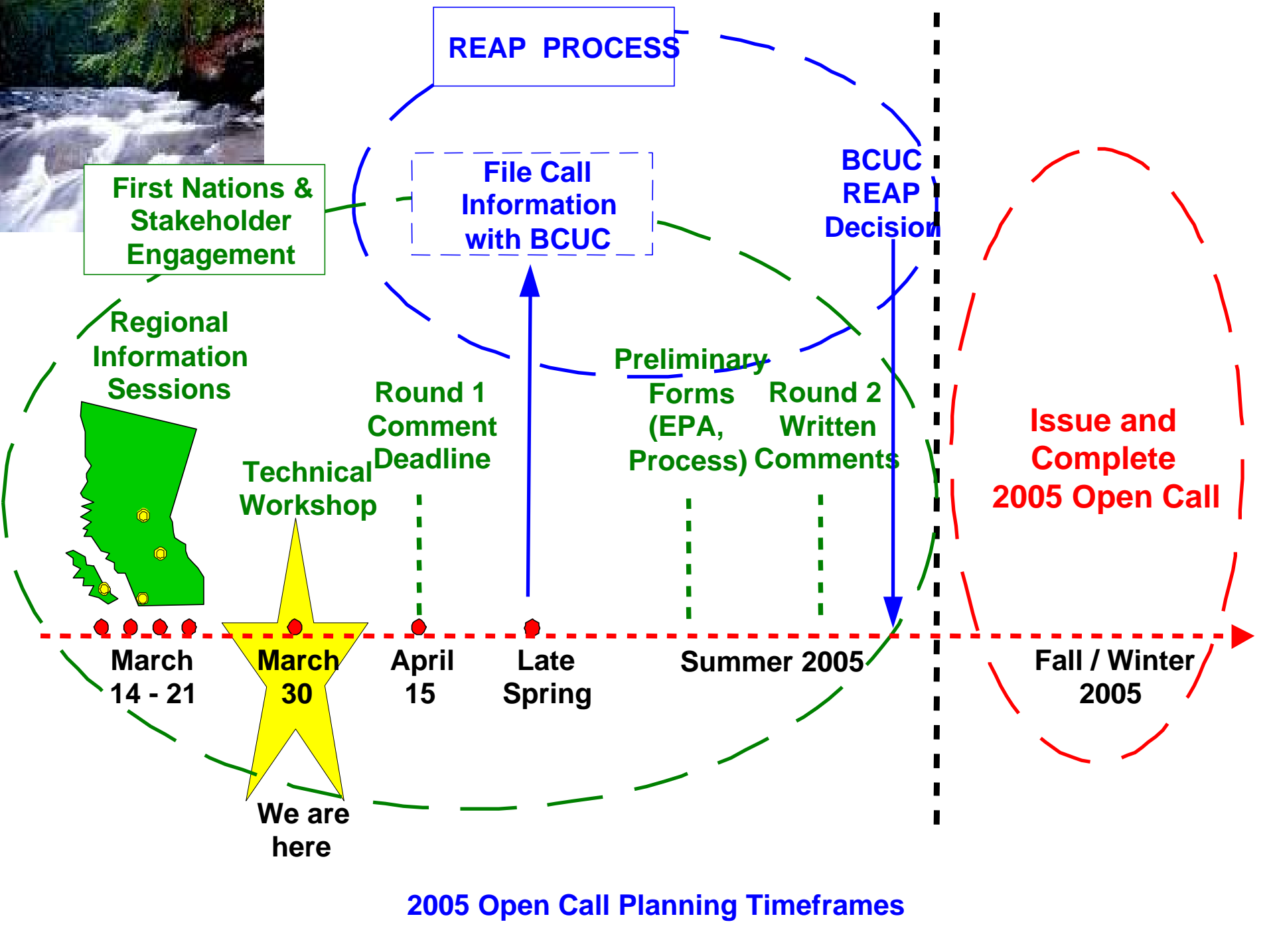
**Preliminary Forms (EPA, Process) Comments**

**Round 2 Written Comments**

**Round 1 Comment Deadline**

**Issue and Complete 2005 Open Call**

**2005 Open Call Planning Timeframes**





## How Your Input Will Be Used

- BC Hydro determines final Call elements using:
  - comments from diverse perspectives, forums
  - policy framework
  - regulatory considerations
- At the end of this engagement process BC Hydro will report on process and input received



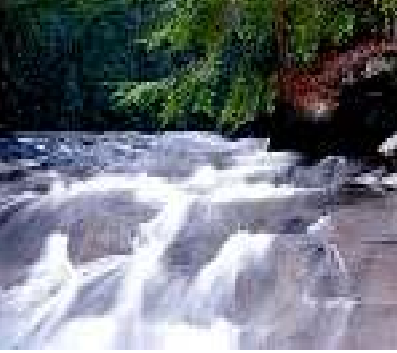
## Building Better Dialogue

- Please complete the Evaluation Form - time is built near the end of the agenda
- Evaluate the workshop
- Evaluate the engagement process
- Help shape the engagement process moving forward
- Help improve future dialogue with our supply partners



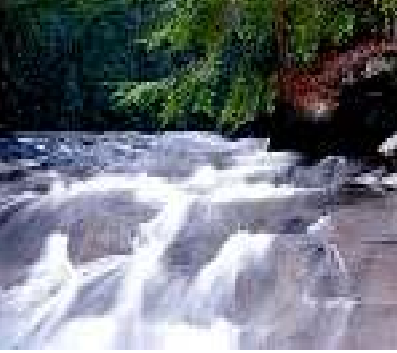
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Welcome and Background to the Call		Mary Hemmingsen
Pre-Call First Nations & Stakeholder Engagement		Siobhan Jackson
<b>Call Process</b>		<b>Jim Scouras</b>
Evaluation Process - QEM		Bill Peterson
	<i>Break - - 10:30 - 10:45</i>	
Product & Pricing		Steve Eckert
Remaining EPA Terms		Alison Briggs
	<i>Lunch - - 12:30 - 1:15</i>	
General Questions		
Break Out Rooms	<i>Coffee - - 2:15 - 3:45 in Rooms</i>	Hydro, Wind, Thermal, First Nations
Evaluation Forms	4:00	Mary Hemmingsen
Breakout Room Report Out	4:05	
Next Steps and Adjourn	5:00	Mary Hemmingsen



# Introduction

- Process Overview
- Key Elements
  - Mandatory Requirements
  - Tender Options
  - Interconnection
  - Evaluation
  - Security
- Regulatory Oversight



## Process Overview

- Up to 800 GWh of firm energy from transmission and large (>10 MVA) distribution connected IPPs (TLDC)
- Up to 200 GWh of energy for small distribution connected projects (SDC)
- Broader First Nations and Stakeholder Engagement on process, elements and terms



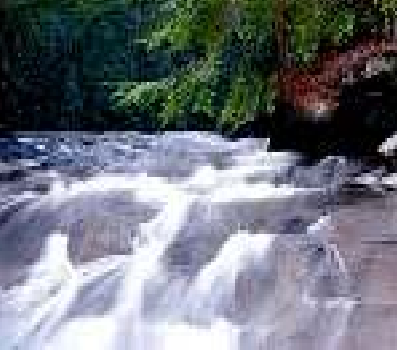
# Overall Procurement Objectives

- **Cost-Effective Supply**
  - secure cost-effective, reliable supply that meets BC Hydro's requirements from financially and technically qualified power producers
- **Competitive Process**
  - competitive and disciplined pricing
- **Streamlined Process**
  - faster, simpler process
  - contracts that reflect the size, complexity and degree of reliance on the project
  - minimize transaction and ongoing administration costs



# Proposed Process

- Call for Tenders (CFT)
  - Single stage
  - Emphasis on bidder self selection
- Key Elements:
  - Level, stable and open competition
  - Legal process with consistent rules
  - All parties are aware of rules
  - Tenders are binding



## Proposed Process (Cont'd)

- Two separate streams (large and small) based on interconnection voltage and size
  - transmission and large ( $\geq 10$  MVA) distribution connected IPPs (TLDC)
  - $< 10$  MVA distribution connected IPPs (SDC)
- Two evaluation processes and two electricity purchase agreements (EPA)



## Proposed Process (Cont'd)

- Transparent Process
  - publicly available website
  - once CFT issued, a Q&A process will be available on the website to registered bidders
  - bidder CFT workshop
- Mandatory Registration to Bid
  - deadline: prior to bidders' workshop
  - registration fee: \$7,500 with discount of \$2,500 for early registration
  - non-refundable



# Mandatory Requirements

- Project Location
  - must be located in BC
- Technology - Type
  - proven generation - commercial use - 3 plants generating for a period greater than 3 years to a standard of good utility practice
- New Generation
  - no load displacement
  - incremental generation separately metered
- Interconnection
  - capable of interconnection to BC Hydro or BCTC



## Mandatory Requirements (Cont'd)

- Project Size
  - not less than 1 MVA
- Exclusivity/No “split bids”
  - all project electrical output sold to BC Hydro
- Interconnection Study
  - must have a completed interconnection study
- No Current Contracts
  - tendered output not under contract to BC Hydro or others



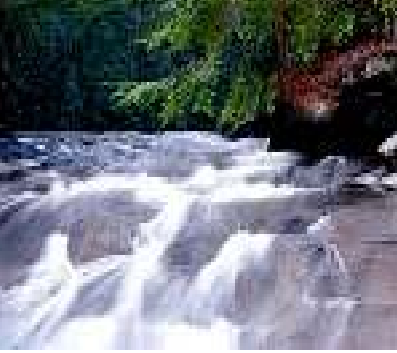
# Highlighted Tender Options - All Tenders

- Multiple Tenders
  - bidders may submit multiple tenders
  - only one tender for each project
  - multiple projects can be included in one tender
- Clean Election
  - “BC Clean” preference in evaluation
  - must tender clean attributes
  - are prohibited from selling attributes
- Green Election
  - EcoLogo certification
  - tender green attributes and receive green credit



## Highlighted Tender Options - All Tenders ( Cont'd)

- Islanding
  - ability to operate and inject power when temporarily isolated from integrated system
  - not currently a tendering option
- BC Hydro is considering including a provision in these EPAs
- Post EPA process
  - requiring bidders prior to final engineering design to undertake an islanding study at our cost
  - if BC Hydro chooses to require the IPP to implement islanding capability, BC Hydro pays incremental capital costs and modest additional to IPP



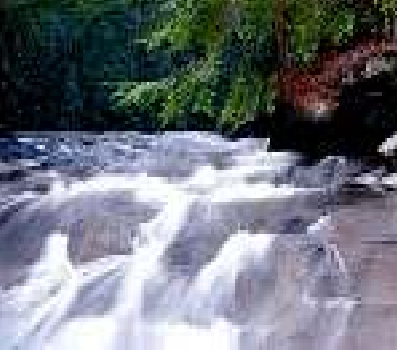
# Highlighted Tender Options - TLDC Stream

- Energy Profile
  - a TLDC bidder will be able to bid a monthly firm energy profile
- Hourly Firm
  - bid in contracted energy amount for heavy load hours and light hours each
- Curtailability
  - bidders with contracted firm energy  $\geq 25$  MW (equivalent), and elected “hourly firm” option may stipulate the project as curtailable



## Generator Interconnection

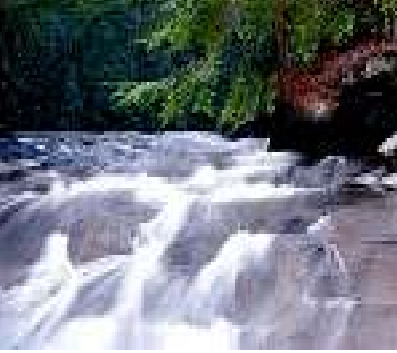
- BCTC Open Access Transmission Tariff (OATT) currently before regulator
- BC Hydro has requested that existing business practices apply to the Call
  - completed preliminary studies available for use in tender evaluation
  - BC Hydro pays for network upgrades
  - interconnection and/or network upgrade costs not borne by bidder, appropriate adjustments will be made in evaluation



# Generator Interconnection

- Distribution connected, 35 kV or less
  - Generator Interconnection
  - (604) 623-3755
  - [gen.connections@bchydro.com](mailto:gen.connections@bchydro.com)
- Transmission connected, 60 kV or higher
  - Market Operations
  - (604) 699-7381
  - [bctc.interconnection@bctc.com](mailto:bctc.interconnection@bctc.com)





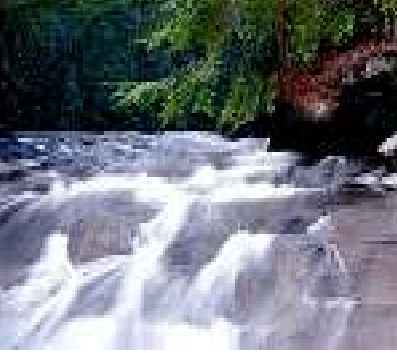
# Tender Evaluation

1. Conformity Review
2. Mandatory Requirements
3. Bidder Capability
4. Quantitative Evaluation Methodology
5. Recommendation of Award



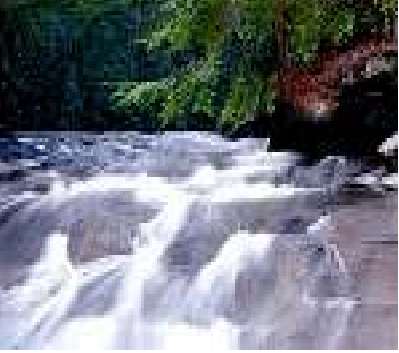
## Tender Security

- Letter of Credit (LOC)
- For TLDC projects, tender security must be equal to \$20,000/MW (based on annual firm tendered energy in MWh divided by 8,760 hours)
- For SDC projects, tender security will be equal to \$10,000/MVA of maximum power output



## Regulatory Issues

- Contracts must be filed with BCUC - section 71 of the BC Utilities Commission Act
- May become subject to a public interest review
- Contract provisions will address regulatory issues



# Process Questions?



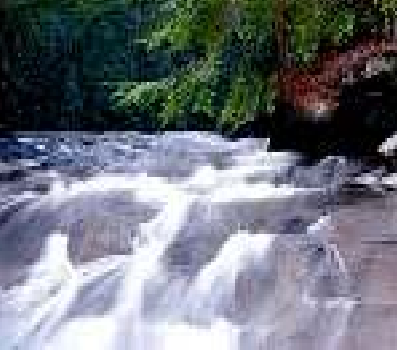
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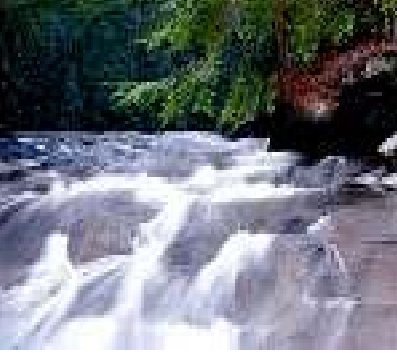
## Introduction

- Purpose is to introduce the evaluation methodology being used to select the winning tenders, and provide an opportunity for clarification
- At a high level
  - All tenders first go through a screening phase
  - Tenders passing the screen then proceed to quantitative evaluation
  - Selected tenders are recommended for award of an EPA(s)



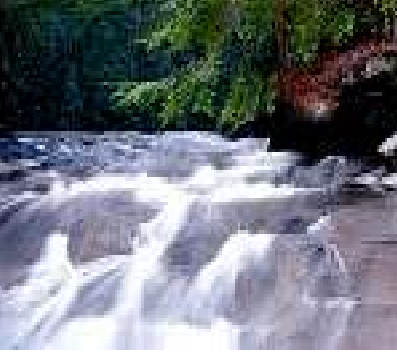
# Screening of Tenders

- Conformity Review
  - reject for material non-conformity
- Mandatory Requirements
  - e.g. project located in BC, proven technology, project size  $\geq 1$  MVA
- Bidder Capability
  - previous development and operation experience, financial strength, reputation



# Quantitative Evaluation Methodology

- Quantitative Evaluation Methodology (QEM)
  - Applied to tenders that pass the screen
  - 100% quantitative
  - Two steps
    - Bid prices adjusted for evaluation purposes to facilitate a fair comparison between tenders
    - The portfolio of tenders is selected that
      - satisfies the specified constraints, and
      - provides greatest economic benefit to BC Hydro



## QEM Approach

- Trade-off between QEM complexity and maximizing benefit to BC Hydro
  - difference in project sizes
  - mutually exclusive tenders resulting from cluster effects
  - minimum 50% clean constraint
- Separate QEM for each stream
- QEM for SDC stream simpler



## Calculation of Adjusted Bid Price

- First part of QEM = calculation of ABP
- There are three steps to get to the ABP
  - Step 1: tendered Bid Price (BP)
  - Step 2: Plant Gate Price (PGP)  
= BP + adjustment(s) for product attributes
  - Step 3: Adjusted Bid Price (ABP)  
= PGP + adjustments for interconnection/transmission

*Adjusted Bid Price used for evaluation purposes only*



# Applicable Evaluation Adjustments

## SDC STREAM

## TLDC STREAM

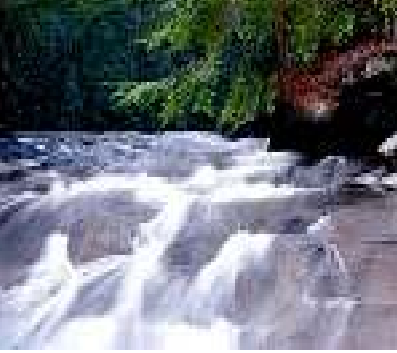
### Monthly Firm Tender

### Hourly Firm Tender

Bid Price	Yes	Yes	Yes
Escalation (50% CPI)	Yes	Yes	Yes
Premium/Discount by Month HLH/LLH	Yes	Yes	Yes
Non-Firm Discounts	No	Yes	Yes

### Evaluation Adjustments

Intercon/Trans Adj	Yes	Yes	Yes
Green Credit	If tendered	If tendered	If tendered
Hourly Firm Credit	No	No	Yes
Curtaibility Credit	No	No	If tendered



## Step 1 - Bid Price

- Bidders must tender an all-in \$/MWh Bid Price based on the following:
  - 25 year term
  - 50% CPI escalator
  - base year of January 2006\$



## Step 2 - Plant Gate Price

- Bidders may elect certain options in their tenders which define the features and hence the value of the product being tendered to BC Hydro
- Product attribute adjustments:
  - For both streams
    - green credit = \$2/MWh
  - For TLDC stream only
    - hourly firm credit = \$3/MWh
    - curtailability credit = \$/MWh value from table



## Step 2 - Plant Gate Price

- Product attribute adjustments (continued):
  - Magnitude of curtailability credit depends on
    - variable/energy cost (EC) of production (higher EC = larger credit)
    - resolution of curtailability offered (hourly larger credit than daily, etc)
    - minimum generation level (lower MGL = larger credit)
      - credit reduced pro-rata
      - MGL can be zero

- Sample Table:

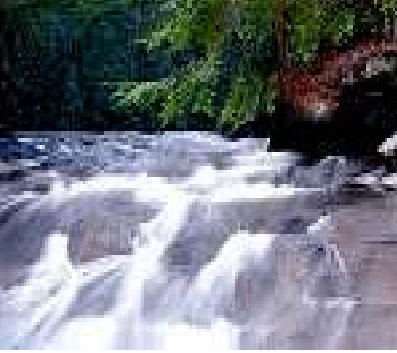
EC (\$/MWh)	Hourly Credit (\$/MWh)	Daily Credit (\$/MWh)	Weekly Credit (\$/MWh)	Monthly Credit (\$/MWh)
<b>20</b>	<b>0.2</b>	<b>0.15</b>	<b>0.1</b>	<b>0.05</b>
<b>30</b>	<b>0.8</b>	<b>0.7</b>	<b>0.6</b>	<b>0.5</b>
<b>40</b>	<b>2.2</b>	<b>2.1</b>	<b>2.0</b>	<b>1.8</b>
<b>50</b>	<b>4.6</b>	<b>4.4</b>	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



## Step 2 - Plant Gate Price

- BP + adjustments for product attributes = PGP
- Example:
  - tendered BP = \$55/MWh
  - TLDC bidder elects green, hourly firm, no curtailment

	\$/MWh
BP	55
Green credit	-2
Hourly firm credit	-3
Curtailment credit	-0
PGP	<u>50</u>



## Step 3 - Adjusted Bid Price

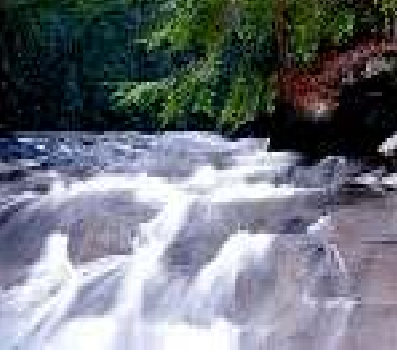
- PGP needs to be adjusted to reflect delivery from plant gate to the lower mainland
- Interconnection/transmission adjustment:
  - Project-specific system impacts from preliminary study
    - interconnection network upgrades up to bulk transmission system
    - interconnection losses (+/-) up to bulk transmission system
    - may be impacted by cluster effects (only for TLDC)
  - Bulk transmission impacts
    - based on regional project location



## Step 3 - Adjusted Bid Price

- $PGP + \text{Intercon/Trans adj} = ABP$
- Lower ABP = better
- Example:
  - PGP = \$50/MWh
  - Intercon/trans adj  
= \$3 (NU) + \$2 (Losses) + \$4 (Bulk)

	\$/MWh
PGP	50
Intercon/trans adj	9
ABP	<u>59</u>



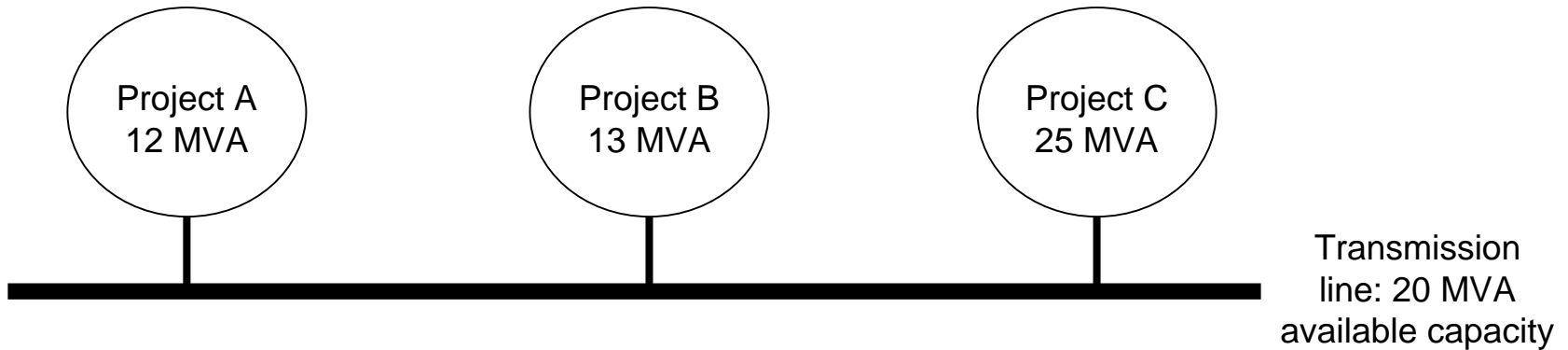
## Clustering Effects (TLDC Only)

- Each project is responsible for paying their direct assignment costs
- Total cost of upgrade to be pro-rated amongst the projects within the cluster based on MVA
- Pro-rated cost used for ABP calculation



# Clustering Effects (TLDC Only): Constrained Area

## Example



### Scenario: Cluster ABC

Project	MVA	Allocation (%)	Upgrade (\$ million)
A	12.0	24.0	4.2
B	13.0	26.0	4.8
C	25.0	50.0	10.0
Total	50.0	100.0	20.0

### Scenario: Cluster AC

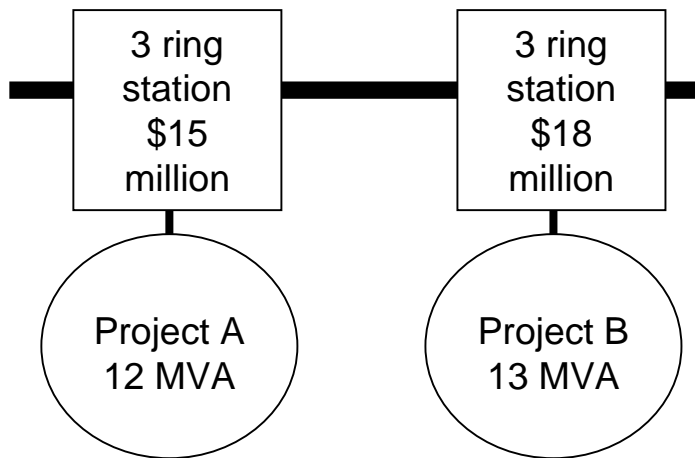
Project	MVA	Allocation (%)	Upgrade (\$ million)
A	12.0	32.4	5.8
B			
C	25.0	67.6	12.2
Total	37.0	100.0	18.0



# Clustering Effect (TLDC Only): Major Gridline

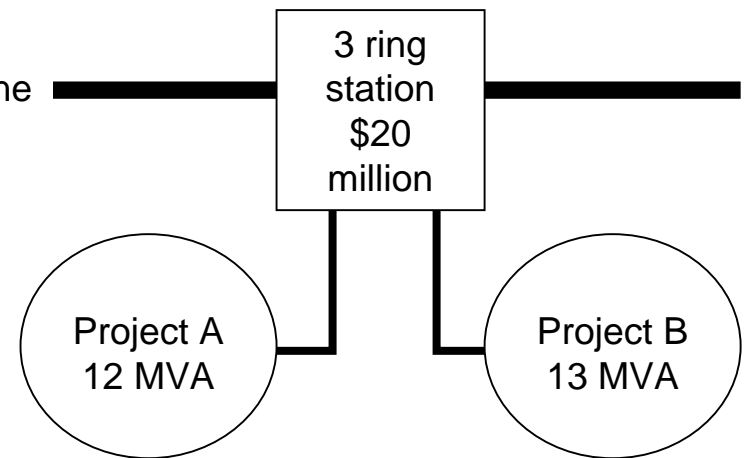
## Example

### Individual Studies

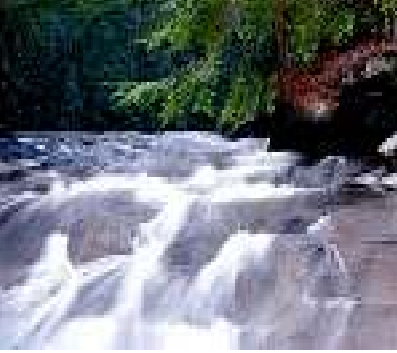


Project	MVA	Allocation (%)	Upgrade (\$ million)
A	12.0		15.0
B	13.0		18.0
Total			

### Clustering



Project	MVA	Allocation (%)	Upgrade (\$ million)
A	12.0	48.0	9.6
B	13.0	52.0	10.4
Total	25.0	100.0	20.0



## Selection of Optimum Portfolio

- Second part of QEM = selection of optimum portfolio
- The technique used to select the optimum SDC portfolio is different from the one used to select the optimum TLDC portfolio
- Accordingly, the technique for portfolio selection is presented separately for each stream



# SDC Optimum Portfolio

- Portfolio Constraints
  - Upper limit for MVA
    - 50 MVA aggregate portfolio
    - project MVA based on project information from preliminary interconnection study and EPA project description BC Clean Electricity
  - At least 50% of MVA in portfolio must be “clean”
  - Interconnection/Network Upgrade development
    - timing of infrastructure must support target COD timing



## SDC Optimum Portfolio

- Optimum SDC portfolio minimizes cost to BC Hydro
- Cost of each tender = ABP
- Optimum Portfolio = ranked tenders with lowest cost and satisfying the constraints
- Technique used:
  - Step 1: Rank ABPs from lowest to highest
  - Step 2: Select lowest cost projects such that cumulative MVA is closest to but does not exceed Upper MVA limit
  - Step 3: Calculate % clean for current portfolio
    - » If  $\% \geq 50\%$  stop (current portfolio = optimum)
    - » If  $\% < 50\%$  then reject non-clean project with highest ABP from current portfolio, and repeat step 2



# TLDC Optimum Portfolio

- Portfolio constraints
  - Upper Limit for Firm Energy
    - 800 GWh/yr
    - based on tendered annual Firm Energy (FE)
  - BC Clean Electricity
    - at least 50% of FE in portfolio must be “clean”
  - Maximum Price
    - to be determined by BC Hydro, based on range of ABPs
    - establishes value of each tender
    - avoids selection of tender with “excessive” price
    - tenders with  $ABP > MP$  are rejected



## TLDC Optimum Portfolio

- Optimum TLDC portfolio = portfolio that maximizes value to BC Hydro
- Value of each tender =  $(MP - ABP) \times$  tendered annual FE
- Optimum Portfolio = combination of tenders with the highest value and satisfying the constraints
- Technique:
  - assemble all possible combinations of tenders
  - filter out portfolios that don't satisfy the constraints
  - keep track of the one with the highest value



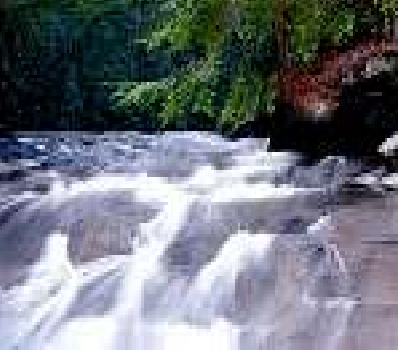
## Additional Portfolios

- In addition to the optimum TLDC and SDC portfolios described above, BC Hydro may decide to purchase additional energy from either stream or both streams at its discretion
- BC Hydro will use the same portfolio selection methodology as before:
  - winning tenders in the original optimum portfolios are removed from the list of available tenders
  - BC Hydro will reset the Upper firm energy limit and/or the Upper MVA limit



## Contract Award

- Projects in optimal portfolios and any additional portfolios will be recommended for award of an EPA



# Evaluation Questions?



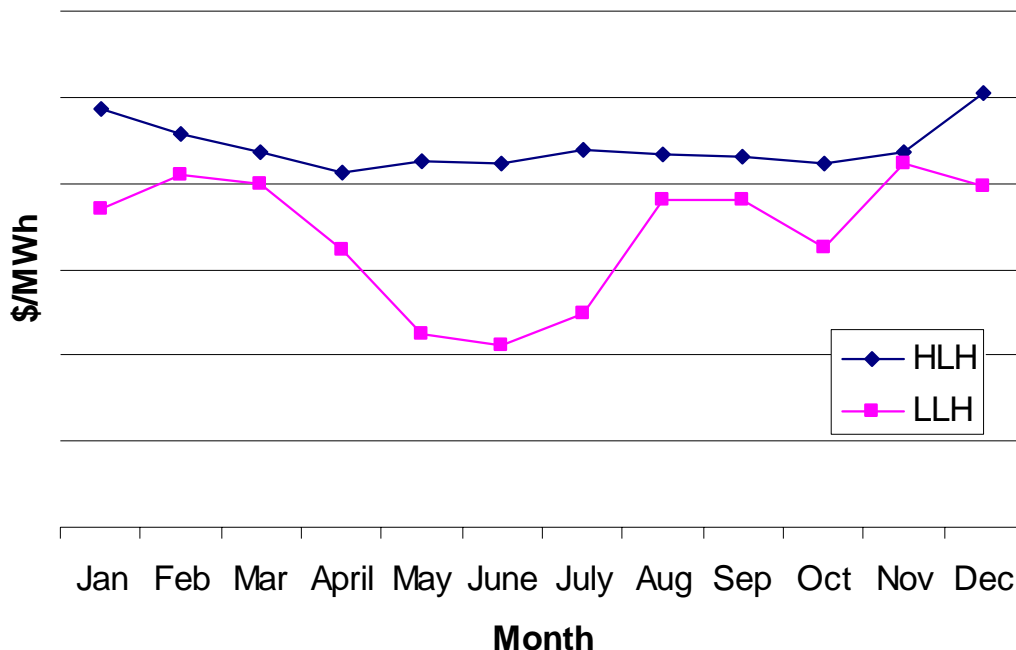
# Agenda

Registration and coffee		8:00 - 8:30 am
Welcome and Background to the Call		Mary Hemmingsen
Pre-Call First Nations & Stakeholder Engagement		Siobhan Jackson
Call Process		Jim Scouras
Evaluation Process - QEM		Bill Peterson
	<i>Break - - 10:30 - 10:45</i>	
<b>Product &amp; Pricing</b>		<b>Steve Eckert</b>
Remaining EPA Terms		Alison Briggs
	<i>Lunch - - 12:30 - 1:15</i>	
General Questions		
Break Out Rooms	<i>Coffee - - 2:15 - 3:45 in Rooms</i>	Hydro, Wind, Thermal, First Nations
Evaluation Forms	4:00	Mary Hemmingsen
Breakout Room Report Out	4:05	
Next Steps and Adjourn	5:00	Mary Hemmingsen



# Pricing Principle 1: Value of energy varies by month and by HLH/LLH period (SDC and TLDC)

Forecast BCB Energy Prices

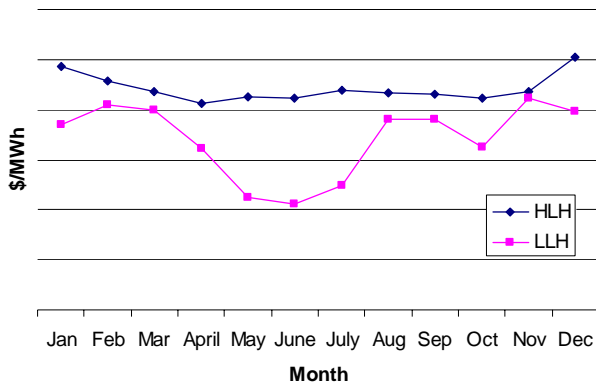


⇒ Bid Price adjusted to reflect value of energy to BC Hydro



# Pricing Principle 1: Value of energy varies by month and by HLH/LLH period (SDC and TLDC)

Forecast BCB Energy Prices

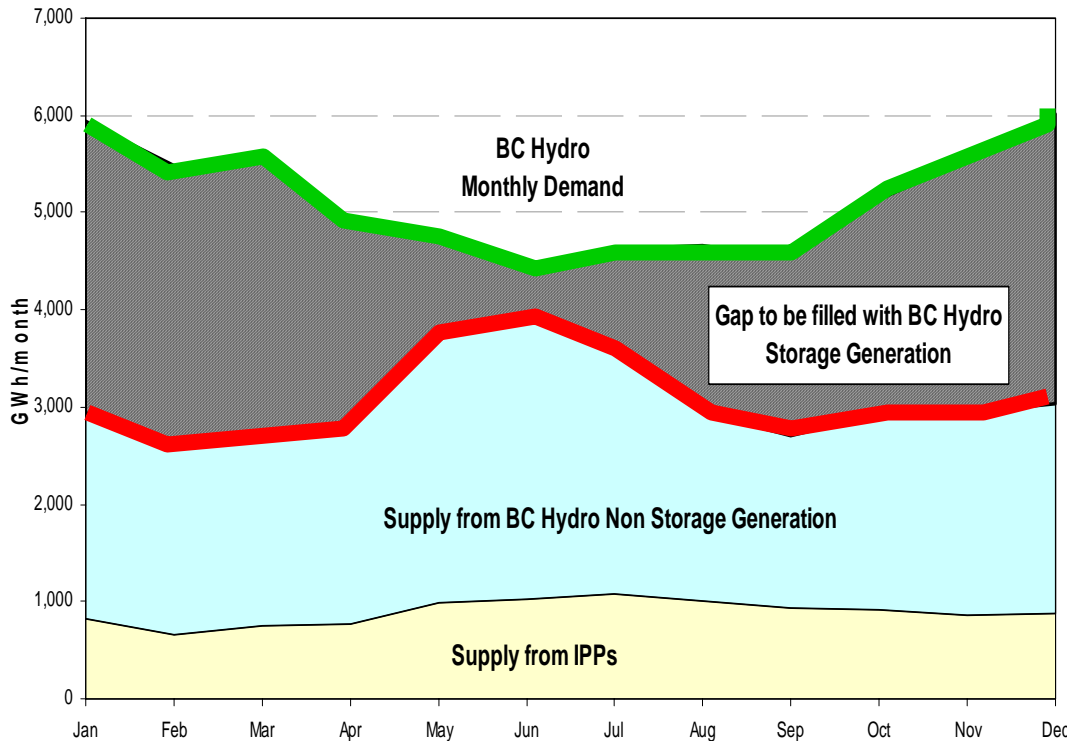


**Sample** Premium/Discount  
Adjustment Table

	HLH	LLH
Jan	113%	97%
Feb	109%	102%
Mar	105%	100%
Apr	103%	88%
May	104%	73%
Jun	104%	71%
Jul	104%	77%
Aug	104%	97%
Sep	105%	98%
Oct	103%	89%
Nov	106%	104%
Dec	117%	101%



# Pricing Principle 2: BC Hydro can accept more energy in certain periods of time better than others



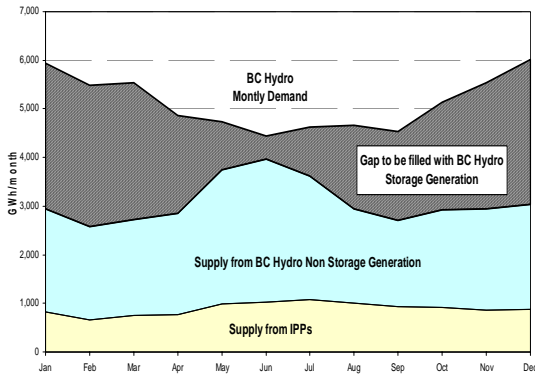
Firm energy tendered during months of April, May, June and July limited to 1/3 of annual firm tendered (TLDC)

Non-firm energy discount factors reflects BC Hydro's current resources and expected load (TLDC)



# Discounts for Non-Firm Energy (TLDC)

## Sample Non-Firm Discount Factors (% of FE price)



	Tier 1 0-25% of FEQ	Tier 2 25-50% of FEQ	Tier 3 50-75% of FEQ	Tier 4 > 75% of FEQ
Jan	90%	80%	70%	60%
Feb	90%	80%	70%	60%
Mar	85%	70%	55%	40%
Apr	80%	60%	40%	20%
May	75%	50%	25%	10%
Jun	75%	50%	25%	10%
Jul	75%	50%	25%	10%
Aug	80%	60%	40%	20%
Sep	80%	60%	40%	20%
Oct	85%	70%	55%	40%
Nov	90%	80%	70%	60%
Dec	90%	80%	70%	60%

*FEQ = Firm Energy Quantity as tendered*

*Annual cap on NFE = 100% of FEQ; Balance accepted but price is zero*



# Energy Characteristics by Stream

## SDC STREAM

- No firm/non-firm differentiation

## TLDC STREAM

- Commitment to deliver a minimum quantity of energy (“firm energy”)
- Firm energy in April, May, June and July limited to 1/3 of annual firm energy tendered
- Additional energy delivered considered “non-firm”
- Annual cap on NFE = 100% of FEQ

### Monthly Firm Tender

- Firm energy tendered for each month (12, GWh)

### Hourly Firm Option

- Firm energy tendered for each month and HLH/LLH period (24, MWh/h)



# Applicable Pricing Terms and Evaluation Adjustments

## SDC STREAM

## TLDC STREAM

Monthly  
Firm Tender

Hourly  
Firm Tender

<b>Bid Price</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Escalation (50% CPI)</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Premium/Discount by Month HLH/LLH</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
<b>Non-Firm Discounts</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>

### Evaluation Adjustments

Intercon/Trans Adj	Yes	Yes	Yes
Green Credit	If tendered	If tendered	If tendered
Hourly Firm Credit	No	No	Yes
Curtaibility Credit?	No	No	If tendered



## Example 1 - SDC Tender

- Assumptions
  - 8 MVA D-connected project (< 10 MVA)
  - Bid Price of \$50/MWh



# Example 1: Application Premiums/Discounts by Month and HLH/LLH

Sample Premium/Discount Table

	HLH	LLH
Jan	113%	97%
Feb	109%	102%
Mar	105%	100%
Apr	103%	88%
May	104%	73%
Jun	104%	71%
Jul	104%	77%
Aug	104%	97%
Sep	105%	98%
Oct	103%	89%
Nov	106%	104%
Dec	117%	101%

Price paid for energy delivered  
(\$50/MWh Bid Price excl. esc.)

	HLH	LLH
Jan	\$ 56.50	\$ 48.50
Feb	\$ 54.50	\$ 51.00
Mar	\$ 52.50	\$ 50.00
Apr	\$ 51.50	\$ 44.00
May	\$ 52.00	\$ 36.50
Jun	\$ 52.00	\$ 35.50
Jul	\$ 52.00	\$ 38.50
Aug	\$ 52.00	\$ 48.50
Sep	\$ 52.50	\$ 49.00
Oct	\$ 51.50	\$ 44.50
Nov	\$ 53.00	\$ 52.00
Dec	\$ 58.50	\$ 50.50



## Example 1: Calculation of Payment

- Assumptions
  - Delivered 4,800 MWh of total energy delivered during HLH; 3,200 MWh delivered during LLH during the month of January
  - Tendered Price, including escalation is \$50.00/MWh
- Payment Calculation for January
$$\begin{array}{r} 4,800 \text{ MWh} \times \$56.50/\text{MWh} = \$271,200 \\ + 3,200 \text{ MWh} \times \$48.50/\text{MWh} = \underline{\$155,200} \\ \hline \mathbf{\$426,400} \end{array}$$



## Example 2: TLDC Monthly Firm Tender

- Assumptions
  - T-connected project
  - Bid Price of \$50/MWh



# Example 2: Application Premiums/Discounts by Month and HLH/LLH

Sample Premium/Discount Table

	HLH	LLH
Jan	113%	97%
Feb	109%	102%
Mar	105%	100%
Apr	103%	88%
May	104%	73%
Jun	104%	
Jul	104%	
Aug		
Sep		98%
Oct		89%
Nov	106%	104%
Dec	117%	101%

Price paid for energy delivered  
(\$50/MWh Bid Price excl. esc.)

	HLH	LLH
Jan	\$ 56.50	\$ 48.50
Feb	\$	\$ 51.00
Mar		\$ 50.00
Apr		\$ 44.00
May	\$ 52.00	\$ 36.50
Jun	\$ 52.00	\$ 35.50
Jul	\$ 52.00	\$ 38.50
Aug	\$ 52.00	\$ 48.50
Sep	\$ 52.50	\$ 49.00
Oct	\$ 51.50	\$ 44.50
Nov	\$ 53.00	\$ 52.00
Dec	\$ 58.50	\$ 50.50

SAME AS EXAMPLE 1



## Example 2: Non-Firm Energy Calculation

**Monthly Firm:** *firm and non-firm energy assumed to be delivered on a proportional basis over the month*

- Assumptions
  - Tendered 20 GWh of energy for January
  - Delivered 50 GWh of energy in January, 2012
  - 60% of total energy delivered during HLH; 40% delivered during LLH
- Firm/Non-Firm Calculation
  - Firm energy delivered = 20 GWh
  - Non-firm energy delivered = 50 GWh - 20 GWh = 30 GWh
  - All energy assumed delivered 60% in HLH and 40 % in LLH



## Example 2: Non-Firm Energy Calculation

	Tendered Firm (GWh)	Delivered (GWh)	Shortfall (GWh)	Non-firm Delivered
Jan	20	50	0	30
Feb	15	40	0	25
Mar	11	35	0	24
Apr	10	20	0	10
May	6	5	1	0
Jun	4	3	1	0
Jul	4	10	0	6
Aug	2	7	0	5
Sep	5	12	0	7
Oct	10	15	0	5
Nov	15	40	0	25
Dec	18	30	0	12



## Example 2: Firm Energy Shortfalls

	Tendered Firm (GWh)	Delivered (GWh)	Shortfall (GWh)	Non-firm Delivered
Jan	20	50	0	30
Feb	15	40	0	25
Mar	11	35	0	24
Apr	10	20	0	10
May	6	5	1	0
Jun	4	3	1	0
Jul	4	10	0	6
Aug	2	7	0	5
Sep	5	12	0	7
Oct	10	15	0	5
Nov	15	40	0	25
Dec	18	30	0	12



## Example 2: Cap on Rolling 12-month NFE

	Tendered Firm (GWh)	Delivered (GWh)	Shortfall (GWh)	Non-firm (GWh)				
				Non-firm Delivered	Previous 11 months	12 month rolling total	Cap exceeded?	Non-firm Purchase
Jan	20	50	0	30	72	102	no	30
Feb	15	40	0	25	92	117	no	25
Mar	11	35	0	24	107	131	yes	13
Apr	10	20	0	10	95	105	no	10
May	6	5	1	0	105	105	no	0
Jun	4	3	1	0	105	105	no	0
Jul	4	10	0	6	99	105	no	6
Aug	2	7	0	5	100	105	no	5
Sep	5	12	0	7	98	105	no	7
Oct	10	15	0	5	100	105	no	5
Nov	15	40	0	25	101	126	yes	19
Dec	18	30	0	12	120	132	yes	0
	120			149				120

*12 month FEQ = 120 GWh*  
*NFE delivered above cap accepted but price is zero*  
*Purchased NFE used to calculate rolling total*



## Example 2: Non-Firm Energy Tiers

January	Energy Delivered (GWh)		
	HLH	LLH	Total
Tendered FE			20
FE and NFE Delivered	30	20	50
% of total	60%	40%	100%
FE	12	8	20
NFE Delivered	18	12	30
NFE Tier 1	3	2	5
NFE Tier 2	3	2	5
NFE Tier 3	3	2	5
NFE Tier 4	9	6	15



## Example 2: Tier Pricing

January	Applicable Non-Firm Discount	Applicable Monthly HLH/LLH Premium/Discount		Effective Price (\$/MWh)	
		HLH	LLH	HLH	LLH
FE	n/a	113%	97%	\$ 56.50	\$ 48.50
NFE Tier 1	90%			\$ 50.85	\$ 43.65
NFE Tier 2	80%			\$ 45.20	\$ 38.80
NFE Tier 3	70%			\$ 39.55	\$ 33.95
NFE Tier 4	60%			\$ 33.90	\$ 29.10



## Example 2: Payment

January	Effective Price (\$/MWh)		Energy Purchased (MWh)			Payment	
	HLH	LLH	Total	HLH (60%)	LLH (40%)		
FE	\$ 56.50	\$ 48.50	20,000	12,000	8,000	\$ 678,000	\$ 388,000
NFE Tier 1	\$ 50.85	\$ 43.65	5,000	3,000	2,000	\$ 152,550	\$ 87,300
NFE Tier 2	\$ 45.20	\$ 38.80	5,000	3,000	2,000	\$ 135,600	\$ 77,600
NFE Tier 3	\$ 39.55	\$ 33.95	5,000	3,000	2,000	\$ 118,650	\$ 67,900
NFE Tier 4	\$ 33.90	\$ 29.10	15,000	9,000	6,000	\$ 305,100	\$ 174,600
						<b>\$2,185,300</b>	



## Example 3 : TLDC Hourly Firm Tender

- Assumptions
  - T-connected project
  - Bid Price of \$50/MWh



# Example 3: Application Premiums/Discounts by Month and HLH/LLH

Sample Premium/Discount Table

	HLH	LLH
Jan	113%	97%
Feb	109%	102%
Mar	105%	100%
Apr	103%	88%
May	104%	73%
Jun	104%	
Jul	104%	
Aug		
Sep		98%
Oct		89%
Nov	106%	104%
Dec	117%	101%

Price paid for energy delivered  
(\$50/MWh Bid Price excl. esc.)

	HLH	LLH
Jan	\$ 56.50	\$ 48.50
Feb	\$	\$ 51.00
Mar		\$ 50.00
Apr		\$ 44.00
May	\$ 52.00	\$ 36.50
Jun	\$ 52.00	\$ 35.50
Jul	\$ 52.00	\$ 38.50
Aug	\$ 52.00	\$ 48.50
Sep	\$ 52.50	\$ 49.00
Oct	\$ 51.50	\$ 44.50
Nov	\$ 53.00	\$ 52.00
Dec	\$ 58.50	\$ 50.50

**SAME AS EXAMPLE 1**



## Example 3: Non-Firm Energy Calculation

**Hourly Firm:** *non-firm energy determined on an hourly basis based on the tendered hourly firm delivery rate for that hour*

- Assumptions
  - Tendered 36 MWh/h HLH and 18 MWh/h LLH for January
  - Delivered 30 MWh of energy in hour starting at 5:00 a.m. and ending at 6:00 a.m. (LLH)
- Firm/Non-Firm Calculation
  - Firm energy delivered = 18 GWh
  - Non-firm energy delivered = 30 GWh - 18 GWh = 12 GWh



## Example 3: Non-Firm Energy Calculation

Hour		MWh			
		Tendered Firm	Delivered	Shortfall	Non-Firm Delivered
1	LLH	18	20	0	2
2	LLH	18	20	0	2
3	LLH	18	20	0	2
4	LLH	18	20	0	2
5	LLH	18	25	0	7
6	LLH	18	30	0	12
7	HLH	36	33	3	0
8	HLH	36	34	2	0
9	HLH	36	38	0	2
10	HLH	36	40	0	4
11	HLH	36	41	0	5
12	HLH	36	42	0	6
13	HLH	36	42	0	6



## Example 3: Firm Energy Shortfalls

Hour		MWh			
		Tendered Firm	Delivered	Shortfall	Non-Firm Delivered
1	LLH	18	20	0	2
2	LLH	18	20	0	2
3	LLH	18	20	0	2
4	LLH	18	20	0	2
5	LLH	18	25	0	7
6	LLH	18	30	0	12
7	HLH	36	33	3	0
8	HLH	36	34	2	0
9	HLH	36	38	0	2
10	HLH	36	40	0	4
11	HLH	36	41	0	5
12	HLH	36	42	0	6
13	HLH	36	42	0	6



# Example 3: Rolling 8760 Cap on NFE

Hour		MWh							
		Tendered Firm	Delivered	Shortfall	Non-Firm				
					Delivered	Previous 8759 Hours	Rolling Total	Cap Exceeded ?	Purchased
1	LLH	18	20	0	2	239,996	239,998	no	2
2	LLH	18	20	0	2	239,996	239,998	no	2
3	LLH	18	20	0	2	239,996	239,998	no	2
4	LLH	18	20	0	2	239,996	239,998	no	2
5	LLH	18	25	0	7	239,996	240,003	yes	4
6	LLH	18	30	0	12	239,998	240,010	yes	2
7	HLH	36	33	3	0	239,996	235,411	no	0
8	HLH	36	34	2	0	239,994	235,411	no	0
9	HLH	36	38	0	2	239,992	239,994	no	2
10	HLH	36	40	0	4	239,994	239,998	no	4
11	HLH	36	41	0	5	239,996	240,001	yes	4
12	HLH	36	42	0	6	239,998	240,004	yes	2
13	HLH	36	42	0	6	239,998	240,004	yes	2

8760 hour FEQ = 240,000 MWh  
 NFE delivered above cap accepted but price is zero  
 Purchased NFE used to calculate rolling total



# Example 3: Non-Firm Energy Tiers

Hour		MWh							
		Tendered Firm	Delivered	Shortfall	Non-Firm Purchased				Total
					Tier 1	Tier 2	Tier 3	Tier 4	
XX	XXX	XX	XX	X	X	X	X	X	X
XX	XXX	XX	XX	X	X	X	X	X	X
XX	XXX	XX	XX	X	X	X	X	X	X
XX	XXX	XX	XX	X	X	X	X	X	X
19	HLH	36	36	0	0	0	0	0	0
20	HLH	36	36	0	0	0	0	0	0
21	HLH	36	30	6	0	0	0	0	0
22	HLH	36	30	6	0	0	0	0	0
23	LLH	18	30	0	4.5	4.5	3	0	12
24	LLH	18	22	0	4	0	0	0	4
XX	XXX	XX	XX	X	X	X	X	X	X
XX	XXX	XX	XX	X	X	X	X	X	X
XX	XXX	XX	XX	X	X	X	X	X	X
XX	XXX	XX	XX	X	X	X	X	X	X



## Example 3: Tier Pricing

January	Applicable Non-Firm Discount	Applicable Monthly HLH/LLH Premium/Discount		Price (\$/MWh)	
		HLH	LLH	HLH	LLH
FE	n/a			\$ 56.50	\$ 48.50
NFE Tier 1	90%	87%		\$ 50.85	\$ 43.65
NFE Tier 2		78%		\$ 45.20	\$ 38.80
NFE Tier 3		79%	68%	\$ 39.55	\$ 33.95
NFE Tier 4	65%	68%	58%	\$ 33.90	\$ 29.10

**SAME AS EXAMPLE 2**



## Example 3: Payment

January	Effective Price (\$/MWh)		Energy Purchased (MWh)			Payment	
	HLH	LLH	Total	HLH (60%)	LLH (40%)		
FE	\$ 56.50	\$ 48.50	20,650	12,390	8,260	\$ 700,035	\$ 400,610
NFE Tier 1	\$ 50.85	\$ 43.65	4,272	2,777	1,495	\$ 141,210	\$ 65,257
NFE Tier 2	\$ 45.20	\$ 38.80	3,027	2,270	757	\$ 102,604	\$ 29,372
NFE Tier 3	\$ 39.55	\$ 33.95	1,027	555	472	\$ 21,950	\$ 16,024
NFE Tier 4	\$ 33.90	\$ 29.10	400	176	224	\$ 5,966	\$ 6,518
						<b>\$1,489,547</b>	

**Similar to Example 2 except:**

***energy for tiers is aggregated based on actual hourly results rather than assumed to occur proportionally over the month.***



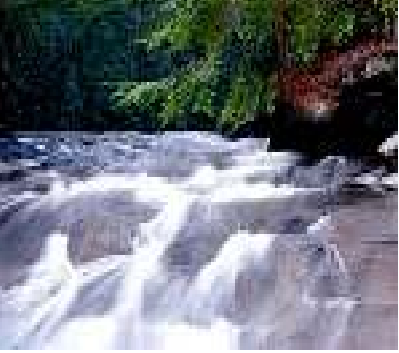
# Curtailability Pricing

- Assumptions
  - Tendered 36 MWh/h HLH and 18 MWh/h LLH for January
  - Bid Price = \$50/MWh
  - Energy Charge = \$30/MWh
- Payment during curtailment for curtailed MWh
  - LLH FE price =  $\$50/\text{MWh} \times 97\% = \$48.50/\text{MWh}$
  - price paid during curtailment  
=  $\$48.50/\text{MWh} - \$30/\text{MWh} = \$18.50/\text{MWh}$



## Other Pricing Terms

- General
  - Fixed escalation (50% CPI)
  - No flow-throughs
- Pre-COD Test Power
  - BC Hydro purchases test power (\$25/MWh)
- Renewal Pricing
  - Two 5-year renewal terms at BC Hydro's option
  - Cost of service based plus 10% of Firm Energy Price escalated at 50% CPI
    - Reasonable operating cost
    - Return on and of sustaining capital

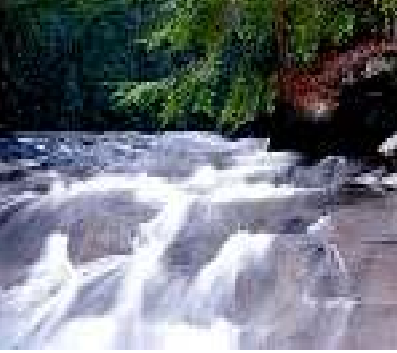


# Product & Pricing Questions?



# Agenda

Registration and coffee		8:00 - 8:30 am
Welcome and Background to the Call		Mary Hemmingsen
Pre-Call First Nations & Stakeholder Engagement		Siobhan Jackson
Call Process		Jim Scouras
Evaluation Process - QEM		Bill Peterson
	<i>Break - - 10:30 - 10:45</i>	
Product & Pricing		Steve Eckert
<b>Remaining EPA Terms</b>		<b>Alison Briggs</b>
	<i>Lunch - - 12:30 - 1:15</i>	
General Questions		
Break Out Rooms	<i>Coffee - - 2:15 - 3:45 in Rooms</i>	Hydro, Wind, Thermal, First Nations
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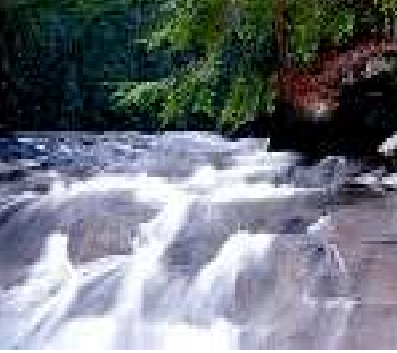
# Introduction

- Purpose:
  - to clearly communicate the key terms and conditions for both the TLDC and SDC term sheets
- Describe our objectives for the contracts
- Outline common terms to both term sheets
- Highlight key differences starting with the TLDC term sheet
- This is a summary only, please carefully review the term sheets



# Objectives

- For the TLDC EPA:
  - firm delivery commitment:
    - minimum monthly delivery obligation
    - liquidated damages (LDs) for non-delivery
  - termination payments in certain circumstances
  - anticipate bidders to be well advanced, therefore:
    - there are no condition subsequent for financing etc.
    - there is a limited termination right regarding permits
  - performance security



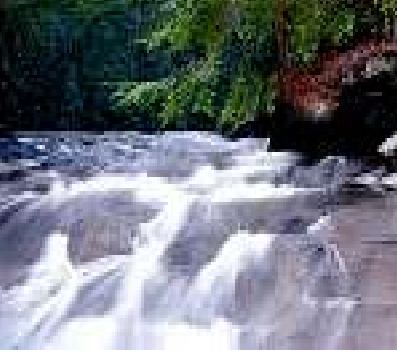
# Objectives

- For the SDC EPA:
  - a less complex document relative to TLDC
  - no minimum delivery commitment
    - 105% delivery limitation
    - no liquidated damages
  - termination payments in certain circumstances
  - performance security - tied to the termination payments



# Common Terms

- Parties
  - BC Hydro as Buyer
  - bidder as Seller
- Term
  - commences on EPA signing
  - extends 25 years from Commercial Operation Date (COD)
- Renewal
  - BC Hydro right to renew for two five-year periods



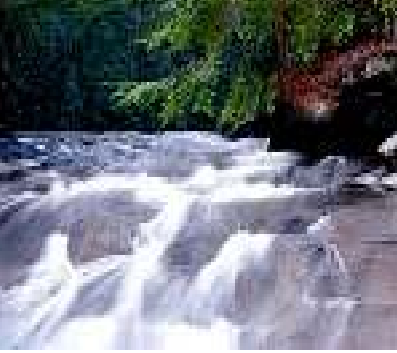
## Common Terms

- Target COD
  - October 1, 2009
- Early COD
  - up to one year earlier - October 1, 2008
- Late COD
  - BC Hydro termination right if COD is 365 days late (October 1, 2010)



# Common Terms

- Green Projects
  - transfer of ownership of Green Rights
  - certification to EcoLogo within one year of COD
  - if EcoLogo certification is lost, price reduced by the amount of the Green Credit as escalated at 100% CPI
- Clean Projects
  - transfer of ownership of Clean Attributes
  - prohibition on sale of Green Rights and Clean Attributes
- This is being re-evaluated in light of the new Federal incentives



## Common Terms

- Greenhouse Gases (GHG)
  - regulatory liability is with bidder
  - may be required to offset some or all of GHG emissions
  - offset definition - BC based offsets



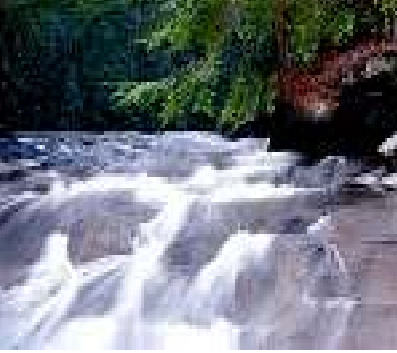
# Common Terms

- GHG
  - two methods of achieving offset requirements proposed
    - Option A: Bidder pays to BC Hydro an amount determined based on the actual tonnes of GHG emissions less offsets purchased for regulatory requirements
    - Option B: Bidder assumes obligation to meet the EPA GHG offset requirements and provides evidence



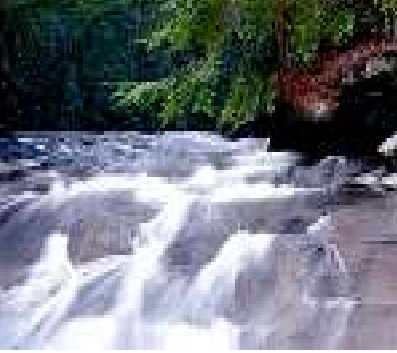
## TLDC Delivery Obligation

- Required to deliver monthly or hourly contracted firm energy amount
- Third party sales allowed pre-target COD
- Can elect 30 days before COD to change firm contracted energy by 10% subject to limitations
- Planned outages allowed April to October
- Some excuses from delivery obligation



## TLDC Purchase Obligation

- BC Hydro will accept energy after October 1, 2008, bidder responsible for any incremental costs of advancing network upgrades
- BC Hydro is required to purchase the bidder's plant output including excess of the contracted monthly firm energy amount subject to non-firm delivery cap
- Some excuses from purchase obligation



## TLDC Consequences for Delivery Shortfalls

- Liquidated Damages
  - the comparison of Adjusted Bid Price to the average of the mid-C index prices for the month with Transmission Adjustments
- Reduction in Firm Energy amount
- BC Hydro termination right if any 24 month period, delivered energy is less than 60% of the original contracted Firm Energy amount for that period



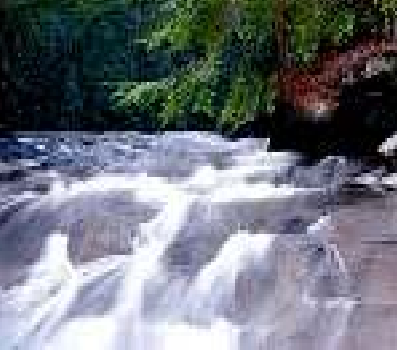
# TLDC Performance Security and Liability Limits

- Performance Security
  - a letter of credit at time of signing of EPA =  $\$40,000/\text{MW}$  based on annual Firm Energy amount bid divided by 8760 +  $\$40,000/\text{MVA}$
  - on first anniversary of COD - performance security reduced to  $\$40,000/\text{MW}$
  - includes the Network Upgrade security
- Liability Limits
  - bidder's annual liability is capped at 200% of the Performance Security
  - number of exceptions



## TLDC Termination

- BC Hydro may terminate for:
  - bidder has not obtained material permits by October 1, 2007
  - COD has not occurred by October 1, 2010
  - BC Hydro termination right if any 24-month period, delivered energy is less than 60% of the original contracted Firm Energy amount for that period
  - other standard termination provisions
- Termination Payment
  - in most cases, the bidder pays a termination payment equal to the Performance Security



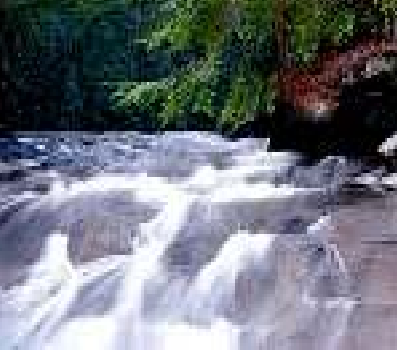
## TLDC Termination

- Bidder may terminate for:
  - after using commercially reasonable efforts, bidder fails to obtain material permits by February 1, 2007
  - other standard termination provisions
- Termination Payment:
  - failure to obtain material permits - bidder pays \$20,000/MW based on annual tendered Firm Energy amount/8760
  - bidder terminates based on BC Hydro default - post COD, BC Hydro pays the amount by which the bidder's losses arising from termination exceed the bidder's gains arising from termination



## TLDC Curtailable Projects

- Available only to T-connected projects with a contracted energy amount  $\geq 25$  MW (equivalent)
- Must elect the Hourly Firm Option
- Four curtailability options - hourly, daily, weekly, monthly
- Required to bid energy charge and minimum generation level
- Under curtailment instruction - cannot deliver in excess of generation level specified



## SDC Delivery Obligation

- Required to maximize generation and deliver all energy output
- Third party sales allowed pre-target COD
- Can elect 30 days before COD to change project size (MVA) by 10%
- Planned outages allowed April to October



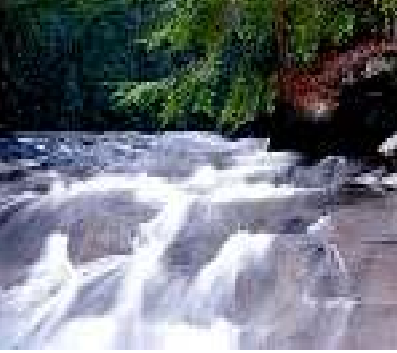
## SDC Purchase Obligation

- BC Hydro will accept energy after October 1, 2008, bidder responsible for any incremental costs of advancing network upgrades
- BC Hydro required to take delivery of entire bidder's plant output up to a maximum of 105% of maximum project capacity
- Some excuses from purchase obligation



## SDC Performance Security Amount

- Letter of credit at time of signing  
= \$60,000/MVA of maximum power output
- Includes Network Upgrade Security
- On first anniversary of COD, performance security reduced to \$20,000/MVA of maximum power output



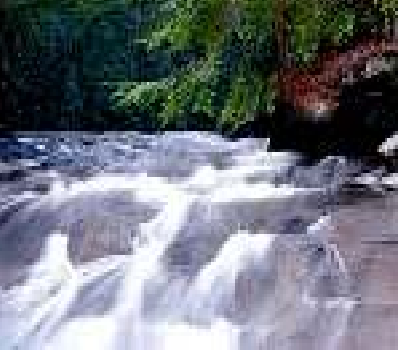
## SDC Termination

- BC Hydro may terminate:
  - if COD has not occurred by October 1, 2010
  - for other standard termination provisions
- Termination Payment
  - bidder pays termination payment equal to the Performance Security

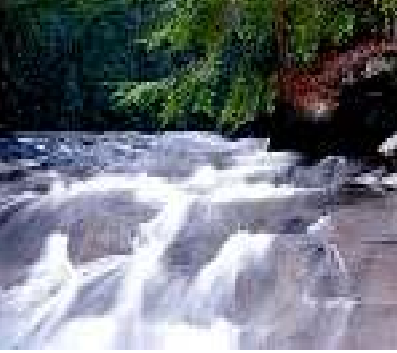


## SDC Termination

- Bidder may terminate:
  - at any time up to the first anniversary of the date of execution of the EPA
  - for other standard termination provisions
- Termination Payment
  - termination before first anniversary of the date of execution of the EPA - bidder pays \$10,000/MVA of maximum power output

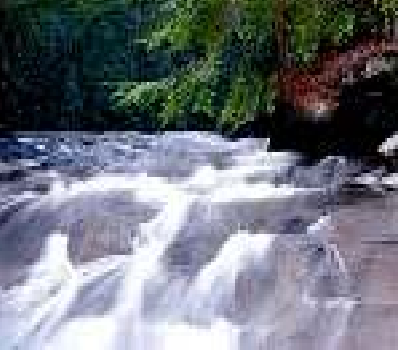


# EPA Questions?



## Lunch 12:30 - 1:15

- General questions after lunch, 1:15 - 2:15
- Option: Submit written questions for question period in the box at registration table outside room



# 1:15 - 2:15

## General Questions



## Break-Out Rooms

- Designed as “your time” for small group dialogue

### Group

### Chair

### Room

First Nations

Darrell Mounsey

Mackenzie

Wind

Ron Percival

Cypress 1 (upstairs)

Thermal

Paul Willis

Seymour

Hydro

Chris Ball / John Johnson  
/ Jim Gemmill

Cypress 2 (upstairs)

- BC Hydro technical resource in each room
- Wrap-up at 3:45, re-convene here at 4:00
- 10 min. each to report key themes to main room



# Agenda

Registration and coffee		8:00 - 8:30 am
Welcome and Background to the Call		Mary Hemmingsen
Pre-Call First Nations & Stakeholder Engagement		Siobhan Jackson
Call Process		Jim Scouras
Evaluation Process - QEM		Bill Peterson
	<i>Break - - 10:30 - 10:45</i>	
Product & Pricing		Steve Eckert
Remaining EPA Terms		Alison Briggs
	<i>Lunch - - 12:30 - 1:15</i>	
General Questions		
Break Out Rooms	<i>Coffee - - 2:15 - 3:45 in Rooms</i>	Hydro, Wind, Thermal, First Nations
<b>Evaluation Forms</b>	<b>4:00</b>	<b>Mary Hemmingsen</b>
<b>Breakout Room Report Out</b>	<b>4:05</b>	
<b>Next Steps and Adjourn</b>	<b>5:00</b>	<b>Mary Hemmingsen</b>