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October 20, 2014

Thomas Assimes
CFO, BC Hydro Site C Clean Energy Project
Suite 1100, Four Bentall Centre
1055 Dunsmuir Street, P O Box 49260
Vancouver, BC, Canada V7X 1V5

Dear Mr. Assimes,

Re: Site C Clean Energy Project - Model Review

KPMG LLP ("KPMG"), acting in its role as commercial advisor to BC Hydro, was asked by BC Hydro to review a financial model ("Financial Model") and capital cost estimate prepared by BC Hydro in respect of the Site C Clean Energy Project ("Project"). Specifically, BC Hydro requested KPMG to comment on the logical and arithmetic integrity of the Financial Model, as well as the reasonableness and appropriateness of the approach, methods and processes used in developing the assumptions ("Assumptions") used to develop the project budget transcribed in the Financial Model.

In this context, it is our understanding that the objective of the Financial Model (the "Financial Model Objectives") is to function as a tool to consolidate key input data with respect to capital costs; calculate interest during construction; assess the financial implications of constructing the Project; and calculate the levelled unit energy cost for the Project.

KPMG conducted a similar review of the Financial Model in 2011 and our current review also focused on changes in processes from our 2011 review.

A. Scope of Review

KPMG reviewed the project documentation made available to us by the BC Hydro Integrated Team ("Project Team") and interviewed members of the Project Team, including the Project's cost estimators. Our review focused on the following:

1. the approach, methods and processes followed by the Project Team in developing the assumptions and cost inputs;

2. the incorporation of Assumptions into the Financial Model; and

3. the construction of the Financial Model, insofar as its logical and arithmetic integrity is concerned, as an analytical tool that BC Hydro may use to achieve the Financial Model objectives.

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.

Our work did not include any of the following:

1. assessing or verifying the commercial risks associated with the Project, nor commenting on the possibility of the financial projections contained in the Financial Model of being achieved;

2. reviewing consistency of the Financial Model with externally linked files or verification of the contents and calculations of externally linked files in any way;

3. considering any formula containing implicit assumptions, external references;

4. reviewing the accuracy or appropriateness of visual elements (such as graphs) included within the Financial Model;

5. assessing the completeness of the Assumptions or inputs used in the Financial Model;

6. reviewing or testing of any sensitivity analysis of the Financial Model, including assessing the impact in the Financial Model of differing assumptions; or

7. providing any opinion or assurance regarding the functionality, accuracy or correctness of Microsoft Excel, the software program in which the Model was developed and operates, not the operating system that any users uses to run the Financial Model in Microsoft Excel.

The procedure we used to perform the work set out above will not constitute an audit or review made in accordance with any generally accepted auditing standards, or company law, or assessment of the technical feasibility or technical engineering review, or compliance with application legislation.

B. Methodology

Our work was based on the following methodology:

1. Document Review – a review of project documents made available to us by the Project Team;

2. interviewed Project Team Members - conducted interviews with Project Team Members and other relevant parties associated with the Project. The purpose of the interviews were to develop an understanding of the processes followed in creating the Assumptions contained in the Financial Model;

3. Reviewed the process employed to develop the Financial Model assumptions;

4. Reviewed the transcription of assumptions into the Financial Model – we compared the Assumptions contained in the project documentation that was made available to us to those inputs used in the Financial Model; and

5. Verified logical and arithmetic integrity of the Financial Model – we reviewed the formula contained in the Financial Model for logical and arithmetic integrity.

C. Findings

Our observations regarding each item in the scope of work is addresses as follows:

1. **The approach, methods and processes followed by the Project Team in developing the Assumptions**

   The Financial Model was populated from Assumptions developed by the Project Team for direct construction costs, indirect construction costs, contingencies, loadings including inflation and interest during construction, and benefits including First Nations & Regional Benefits Agreement. The Assumptions are explained further in Appendix 1.

   In respect of this review, our observations are as follows:

   - **Estimating Team**: Various teams were involved in the development of the 2014 estimate. Estimating teams were broken down as per direct cost work packages, indirect cost, contingency and benefits The details of the teams involved in development of the Assumptions are summarized in Tables 1 and 2 in Appendix 1.

   - **BC Hydro Estimating Procedure**: The Assumption development process demonstrates a level of care and diligence consistent with an infrastructure project about to enter the construction phase. The estimating process appears to be in line with BC Hydro Estimating Procedure for Preliminary Design or EAR Estimates as applicable. The Project Team expects the accuracy of the 2014 estimate to range from +15% to -10%, very similar to AACEI Expected Accuracy Range for projects in Class 3 Budget, Authorization, or Control phase.

   - **Direct Construction Cost**: Integrated Engineering Team (IET) worked with the Site C Estimating Team in developing estimates for direct cost work packages - Main Civil Works and Generating Station & Spillways. IET performed the primary estimate and the secondary check estimate was conducted by BC Hydro Site C Estimating Team. The two estimates were reviewed and final numbers were agreed to carry and these were carried in the final primary estimate by IET. For the remaining direct cost work packages, the estimates were prepared by the Site C Team and subsequently reviewed by IET.

   - **Design Change Management**: Additional control measures have been implemented by the Site C Team including design change management process to ensure more visibility and control on design changes. All design changes that affected the cost and schedule were identified, formally recorded and reported, including the estimated impact on the project cost, scope or schedule. The 2010 design and the corresponding estimate was considered the baseline for the purpose of assessing the impact of the design change, and scope creep. The authorization of IET's Management Team was obtained prior to implementation of any proposed design changes, thereby managing scope creep that originated from within the IET or other parts of the Site C Team.

   - **Work Packages**: A major change from the 2010 estimate is in the repackaging of the direct cost elements from 18 major work packages to 14 major work packages to match the procurement model. Repackaging was done based on the Board approved Procurement Strategy. As the project progresses into the construction phase, only minimal changes would be required on the estimate in terms of combining work elements for procurement.

- **Labour rates:** Labour rates were validated against standard industry labour agreements and updated in the 2014 estimate. The BC Hydro Project Team changed the assumptions regarding the labour turnaround schedule in the 2014 estimate. The 2010 estimate was based on the assumption that people will work 5 weeks continuously before taking 1 week break (5:1 schedule). In 2014, the estimate was updated to include a 3:1 shift schedule – people will work 3 weeks continuously and then take 1 week break.

- **Commodity Prices:** BC Hydro has retained the services of MMK Consulting to conduct a study on Construction Cost Trends and Outlook. The report by MMK Consulting shows that prices of most commodities have remained largely flat during the last 4 years. Prices of commodities such as steel, cement, fly ash, diesel etc. have been reviewed and updated to reflect the trend in commodity prices

- **Supplier Costs:** Minimal new supplier costs were obtained because the project is now in active procurement. Relevant previous supplier quotes such as turbine and generators costs were carried from the 2010 estimate with escalation. Equipment rates were validated and updated as per rates published by Equipment Watch.

- **Indirect Construction Cost:** Indirect Costs were estimated by the BC Hydro Generation Estimating Team with assistance from Site C's Finance, Estimating, and Environment Teams as well as BC Hydro Corporate Finance Team. IET was not involved in developing the estimates for indirect cost items.The definition and regulatory cost estimate was based on BC Hydro accounting records for costs already incurred and reforecasting of remaining work. Management and Engineering costs were estimated based on a detailed resource plan of all activities required to execute the project. The 2014 estimate for regulatory mitigation and compensation remains unchanged compared to the 2010 estimate.

- **Insurance:** The Site C Team engaged Marsh Canada as the insurance advisor for the Project. Marsh has developed an insurance program for the Project and confirmed that the current estimate for insurance is sufficient based on current market pricing.

- **Contingency:** Contingency is an allowance to address risks that are reasonably within the control of the Project Team and which can be addressed through timely mitigation measures.

  In 2010, the Site C Integrated Engineering Team performed Monte Carlo analysis, a leading industry practice for quantitative risk analysis, in assessing project risks to calculate the amount of contingency for Site C. The analysis included an assessment of the adequacy of the contingency fund to address the potential of risks occurring as the project progresses to the procurement and construction phase. The Team also reviewed the uncertainty associated with the estimated cost of the direct cost work packages, with respect to scope changes, accuracy of estimate and labour cost fluctuations. The impact of variations in mark-up was also assessed as a total for the overall direct cost package. The contingency analysis was refreshed from the bottom up in the 2014 estimate by the Site Estimating Team.

  Overall, the Site C Team has diligently assessed project risk events and allowed for contingency to address such risks.

- **Project Reserve:** A Project Reserve is an allowance to address macro risks that are outside the control of the team managing the project.

  In 2010, the Site C team conducted a risk analysis to identify these risks and calculate a reserve. The most significant macro risks identified in 2010 included extraordinary delays in regulatory process and approvals, extraordinary incentives to attract labour, harsher than anticipated environment assessment certificate (EAC) requirements, exceptional fluctuations in interest or inflation rates, design errors/omissions, or diversion tunnel construction issues.

  Since 2010, the Project did indeed experience a delay in the regulatory process and extraordinary changes in labour conditions. These changes were largely offset by a positive movement in interest rates. The EAC requirements are in line with the original estimate. The changes have been incorporated in the 2014 Estimate.

  Considering the duration of Site C's construction schedule, KPMG recommends that the Team continue to update the Project Reserve calculation and measure the risk associated with macro events on the Project.

- **Escalation/Inflation**: MMK Consulting recommended allowances for short and long term, for construction costs at BC Hydro, in the range of 2% to 3.5% depending on the mix expenditures on a project. Based on the report by MMK Consulting, and discussions with other Utilities, BC Hydro's Principal Engineer recommended an inflation rate of 2% per annum for the 2014 estimate, at the lower end of the predicted construction inflation would be appropriate for mix of expenditures directly on the Site C Project.

- **Oversight**: For additional oversight, the process followed by the Site C Project Team also included consultation with its Technical Advisory Board and Executive Project Board. Also, a panel of industry experts with 35 to 50 year experience in the construction of heavy civil works were engaged to review the direct cost estimate. The review process was monitored by KPMG. A separate report was delivered to BC Hydro by the panel.

2. The incorporation of Assumptions into the Financial Model

In respect of our review of the financial model, our major observations are as follows:

- We observed a number of labelling inconsistencies that required clarification to confirm whether a number of core capital cost items were input in nominal or real dollars. These were confirmed with BC Hydro and have been updated in the current version of the draft model.

- We observed that Contingency was substantially similar to the prior 2010 estimate and that Contingency had been updated for the 2014 estimate primarily by applying actual BC Consumer Price Index inflation since 2010. To ensure that the Contingency amount remained sufficient, Site C subsequently performed a full Monte Carlo Analysis from the bottom-up.

- We observed several individual cost estimates that had not changed from the 2011 to the 2014 Capital Cost Model (i.e. same dollar value in 2010 and 2014 dollars indicating no inflation was applied since the last estimate) and communicated these items to BC Hydro for clarification. We understand this was intentional as these are sunk costs that are not subject to inflation.

3. **The construction of the Financial Model, insofar as its logical and arithmetic integrity is concerned**

   - We observed that Interest During Construction (IDC) was being calculated using a compounding interest rate and requested clarification if compounding or fractional interest rate methodology should be used to derive IDC. BC Hydro confirmed that the use of a compounding interest rate is intended at the direction of BC Hydro Treasury.

   - We noted discrepancies in how inflation was applied to approximately $430 million of costs as it appeared the assumptions applied to these costs differed from the majority of costs. Upon clarification with BC Hydro it was confirmed that forecasted inflation (i.e. forecasted as of 2010 for the 2011-2014 period), rather than actual inflation was used to update these costs in parallel with BC Hydro's expectation at the time (i.e. in 2010) that these costs would increase at a rate faster than actual inflation. As forecasted inflation was higher than actual inflation, this assumption seems appropriate.

   - We asked for clarification on the timing assumptions used for the calculation of net present value used to estimate the Unitized Energy Cost ("UEC"). We noted any change in assumptions would have an immaterial effect on UEC regardless of the outcome of this observation. BC Hydro confirmed that the timing assumptions used for the calculation of UEC were consistent with the nature of the calculations used in the model.

   - On the core "RAW-DirectCF" tab we noted numerous hardcoded assumptions combined with references to other cells in individual formulas and flagged all instances of these formulas for clarification by BC Hydro. Upon clarification with BC Hydro it was confirmed by BC Hydro that these cells are effectively input cells so no further investigation was required after this confirmation.

   - We noted some instances where inflation assumptions were hard coded into formulas (i.e. Cell X*1.02) but generally observed that the application of inflation was linked to a single input in a logical manner. BC Hydro has corrected all instances of this in the current version of model under review.

   - We noted one core referencing error on "Calc-CASHFLOW" where approximately $54 million in costs were not referenced to the appropriate timing (shaping) sensitivity profile, thus potentially misrepresenting the timing of when those capital costs would be assumed to occur. We noted that in the current draft version of the model under review that the appropriate shaping sensitivity profile has been referenced.

D. Conclusion

We have reviewed the Assumption development process and it shows a level of care and diligence consistent with an infrastructure project about to enter the construction phase. Based on our review, it is our view that the Project Team has followed reasonable and appropriate processes for developing the Assumptions used in the Financial Model.

Overall, BC Hydro Project Team has diligently assessed project risk events and allowed for Project Contingency to address such risks.

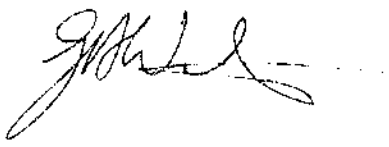
Based on our review, we believe that the Assumptions have been properly transcribed into the Financial Model. The Financial Model also appears to have been constructed appropriately, insofar as its logic and arithmetic integrity is concerned.

E. Restrictions

This report is addressed to BC Hydro. We will not accept responsibility to any other party to whom the report may be shown or who may acquire a copy of the report.

Our review findings, as set out in our report, apply only to the specified version of the Financial Model and that has been made available to us by the Project Team. We will not be under any obligation to perform any work, take account of or comment on any intervening events or model changes after the issue of our report in final form to BC Hydro.

Sincerely,



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Appendix 1: Summary of Processes used to Develop Assumptions

This Appendix summarizes the processes used to develop the Assumptions contained in the capital cost component of the Financial Model.

The Financial Model is based on five categories of Assumptions:

1. Direct construction costs;
2. Indirect construction costs;
3. Contingencies;
4. Loadings including inflation and interest during construction; and
5. Benefits

Different teams were responsible for developing various elements of the Assumptions, as summarized in tables on the following pages. The process by which the Assumptions were derived are summarized thereafter by category.

Table 1: Assumption Categories

Category		Sub-Component		Developed By
1	Direct construction costs	A	Land & rights	Site C Properties Team, Integrated Engineering Team Site C Commercial Team
		B	Worker accommodation	Radloff/SSA
		C	Highway 29 realignment	Site C Highways Team, Tetratech
		D	Clearing	Site C Clearing Team
		E	Early works	Site C Estimating Team, Integrated Engineering Team, and Tetratech
		F	Main civil works	Site C Estimating Team, Integrated Engineering Team
		G	Generating station & spillways	Site C Estimating Team, Integrated Engineering Team
		H	Turbines & Generators	Site C Estimating Team
		I	Transformers	BC Hydro Site C Estimating Team
		J	Substation	Transmission & Distribution Estimating Team, Site C Estimating Team
		K	Peace Canyon 500kv upgrade	Transmission & Distribution Estimating Team, Site C Estimating Team
		L	Transmission line	Transmission & Distribution Estimating Team, Site C Estimating Team
		M	Miscellaneous items	Site C Estimating Team
		N	Construction management	Site C Estimating Team
2	Indirect construction costs	A	Definition & regulatory phase (including sunk costs)	Site C Finance Team
		B	Management and engineering costs	Site C Finance Team, Site C Estimating Team
		C	Construction insurance & bonding	Site C Finance Team, Premium supplied by BC Hydro Corporate Finance and Marsh Canada

Table 1: Assumption Categories				
Category		**Sub-Component**		**Developed By**
		D	Regulatory mitigation & compensation	Site C Environment Team
3	Project Risk Allowance	A	Contingency	Integrated Engineering Team, Site C Estimating Team, BC Hydro Generation Estimating Team, Site C Commercial Team
4	Cost loadings and inflation	A	Inflation	Site C Commercial Team, Rates supplied by BC Hydro's Treasury Group
		B	Interest during construction	Site C Commercial Team, Rates supplied by BC Hydro's Treasury Group
5	Benefits	A	First Nations and Regional Benefits Agreement	Site C First Nations Team, BC Hydro Commercial Team

Table 2: Teams Responsible for Developing Assumptions		
Team	**Team Members**	**Team Leader**
Integrated Engineering Team	Klohn Crippen Berger Ltd.	John Nunn
	SNC-Lavalin Inc.	Alfred Hanna
	BC Hydro Engineers	Andrew Watson
Site C Estimating Team	BC Hydro Cost Estimation Experts	Alan Le Couteur
BC Hydro Generation Estimating Team	BC Hydro Principal Engineer	John Boots/ Jeff Acland
BC Hydro Transmission & Distribution Estimating Team	BC Hydro Transmission & Distribution Experts	Matt Drown
Tetratech	Tetratech Cost Estimating Experts	Alex Izett
Radloff/SSA	Radloff/SSA Cost Estimating Experts	Bob Radloff
Site C Highways Team	Site C Highway Experts	Don Wharf
Site C Clearing Team	Site C Clearing Experts	Paul Veltmeyer
Site C Properties Team	Site C Property Experts	Judith Reynier
Site C Commercial Team	Site C Commercial Experts	Michael Savidant
Site C Finance Team	Site C Finance Experts	Kathy Young
BC Hydro Treasury Group	Site C Treasury Experts	James Le Lievre
Site C Environmental and Regulatory Group	Site C Environment Experts	Danielle Melchior
Site C First Nations Team	Site C First Nations Expert	Trevor Proverbs

A. Process Update

Several processes and changes were made to the BC Hydro estimating process since the 2010 estimate. These are summarized below:

Estimation Process: Site C Team has rearranged the direct cost elements from 18 work packages included in the 2010 estimate to 14 work packages in the 2014 estimate, in accordance with the procurement model. Repackaging was done based on the Board approved Procurement Strategy. BC Hydro has not obtained any formal approval on the work packages yet as some of the items in the scope are still being finalized. At this stage of the project, BC Hydro Project Team expects the accuracy of the 2014 estimate to be in the range of +15% to -10%, very similar to AACEI Expected Accuracy Range for projects in Class 3 Budget, Authorization, or Control phase.

Labour Rates: Site C Team has updated the labour rates in the 2014 estimate by taking into consideration standard industry labour agreement . The Site C Estimating Team Leader worked with labour relation team while updating the labour model. The revised labour model was uploaded to Heavy Bids and the estimate was recalculated accordingly. The Site C Project Team has changed the assumptions regarding labour turnaround schedule in the 2014 estimate. The 2010 estimate was based on the assumption that people will work 5 weeks continuously before taking a break for 1 week (5:1 schedule). In 2014, the estimate was updated to include 3:1 shift schedule – people will work 3 weeks continuously and then take a break for 1 week. Equipment rates have been updated as per Equipment Watch.

Design Change Management: The 2010 design and the corresponding estimate were considered as the baseline for the purpose of assessing the impact of design change. The current design change management process is applicable to any potential changes in design that could make an impact on the project scope, cost and schedule from the 2010 baseline. As per the process, the related Discipline Lead in the Integrated Engineering Team issues a Design Change Notice for a potential change. The Discipline Lead along with the Engineering Manager identifies the potential implications of the change in terms of scope and quantity. The related estimating team calculates the potential cost impact and the Engineering Area Manager and Work Package Manager confirms the changes to the project in terms of cost, schedule and scope. Subsequently, the Engineering Controls Manager issues a change order to formalize the change. The authorization of IET's Management Team was obtained before any proposed design changes were implemented, thereby managing scope creep that originated from within the IET.

B. Direct construction Costs

The processes followed by Site C to estimate major direct cost work packages are illustrated below:

Land and Rights: Site C Properties Team estimated the costs for Land and Rights. Some of the costs are sunk costs as BC Hydro continues to purchase the lands required for the Project. Judith Reynier, Site C Properties Team lead, has a map of all the properties that need to be acquired for the project and all the numbers are based on assessed land value.

Judith has a Diploma in Urban Land Economics, is a Member of the Real Estate Institute of BC, has significant experience in estimating property acquisition costs for major infrastructure projects and has over 35 years of experience in the acquisition and management of properties required for public purposes.

Worker Accommodation: Worker Accommodation costs were estimated by R. Radloff & Associates Inc. and SSA Quantity Surveyors Ltd. The 2014 estimate for Worker Accommodation was based on 30% complete design. In 2010, the estimate was based on vendor quotes. In 2014, R. Radloff & Associates Inc.

and SSA Quantity Surveyors Ltd. team used operational cost database to prepare the estimate and then compared the estimate against industry comparators including the camp costs of Manitoba Hydro and Quebec Hydro. The team focussed on the quality of service including the quality of food while doing the benchmarking and preparing an estimate for the Project. BC Hydro does not carry a separate % on escalation of direct cost items; however, worker accommodation estimate includes an escalation allowance for 1 year, indirectly buried in the cost.

Radloff & Associates Inc. and SSA Quantity Surveyors Ltd. was led by Bob Radloff, a Civil Engineer with over 36 years of progressive experience in the design, construction and operation of municipal infrastructure. He has worked extensively on both small and large systems, in First Nation's communities, as well as municipal, and industrial settings.

Highways: The estimate for Highway 29 realignment was prepared by the Site C Highways Team in collaboration with Tetratech. The 2014 estimate for Highways was based on a 40% complete design. This was done as a bottom-up exercise using TetraTech's road design. The costs were reviewed in August 2013 by the Site C team, including the Integrated Engineering Team.

The Site C Highways Team was led by Don Wharf. Don has been serving as Program Manager, Road Infrastructure for BC Hydro Site C Project since 2010, responsible for the planning, engineering, design and implementation of the Site C Roads Program. Don has over 31 years extensive experience with the Ministry of Transportation & Infrastructure of BC in project and program development and delivery, highway contract administration, and stakeholder relations.

Clearing: The estimate for Clearing was prepared by the Site C Clearing Team based on several seasons of ground truthing and reflecting Environmental Impact Statement (EIS) commitments. The design was 30% complete when the estimate was prepared. The estimate assumed Blue Book rates for equipment (and associated operators) as well as labour rates based on experience. BC Hydro has received initial submissions from several companies and the labour rates are 5 -20% higher than what BC Hydro used in the estimate. The Site C Team is currently in negotiation with those companies to get them to accept Blue Book rates for equipment and ensure that their labour rates are similar to those used for the 2014 estimate.

The Site C Clearing Team was led by Paul Veltmeyer. Paul is a Registered Professional Forester and has a Bachelor of Science degree in Forestry. Paul has over 25 years experience working in different capacities in companies in the Forestry industry. Since 2011, Paul has been serving as Forestry Lead for Site C Clean Energy Project responsible for developing and executing a Clearing and Debris Management Strategy for the Project.

Early Works: Early works were estimated by Tetratech in collaboration with the Site C Estimating Team. The Site C Estimating Team prepared approximately 10% of the package estimate, while Tetratech developed the rest including the estimate for road work. Tetratech did not use a bottom up approach to estimate the Early Works. Tetratech produced the estimate based on unit pricing comparable to what Ministry of Transportation and Infrastructure has experienced in that area. The estimates were subsequently reviewed for by the IET.

Tetratech Team was led by Alex Izett. Alex has a Bachelor of Science degree in Civil Engineering. Alex has over 15 years experience providing engineering and project management services to private sector and private sector clients in the transportation industry.

Main Civil Works: Main Civil works were estimated by the Site C Estimating Team in collaboration with the Integrated Engineering Team, based on 40% complete design. The preparation of the estimate was a 2 stage process - IET did primary estimate and a secondary check estimate was done by BC Hydro Site C Estimating Team. BC Hydro started with the 2010 estimate and refreshed quantities in line with design reports and incorporated costs for resources, equipment, material etc, using Heavy Bids. Michael Pauletto and Wendy Lannin developed the schedule and resourcing plan for Main Civil Works. Michael Pauletto is an external consultant serving the IET through SNC Lavalin and Wendy Lannin is IET Project Controls Manager. The two estimates were reviewed and final numbers agreed to carry and these were carried in the final primary estimate by the IET.

The estimate was also reviewed and validated by BC Hydro's Principal Engineer for Estimating and Scheduling and Site C's Estimating Team. The reasonableness of the final estimate was also validated against costs incurred for previous BC Hydro projects.

The work package was estimated based on the assumption that the work will be executed by a single large general contractor. Profit and overheads for the work package were determined mainly by BC Hydro's Principal Engineer for Estimating and Scheduling and Site C's Estimating Team Lead, based on their extensive experience from similar projects. BC Hydro has not allowed for any Joint Venture costs in its 2014 estimate for Main Civil Works. Contractor's contingency has not been allowed as BC Hydro's standard practice for the estimate. BC Hydro is carrying a significant portion of the risks except for the risks such as productivity, material logistics, and adverse weather conditions.
The credentials of the Integrated Engineering Team and Site C Estimating Team are summarized in Appendix 2.

Generating Station and Spillways: The estimate for Generating Station and Spillways ("GSS") was prepared by the Site C Estimating Team in collaboration with the Integrated Engineering Team, based on 30% complete design. The preparation of the estimate was a 2 stage process - IET did primary estimate and a secondary check estimate was done by the Site C Estimating Team .The two estimates were reviewed and final numbers agreed to carry and these were carried in the final primary estimate by the IET.

The Spillway is one of the largest scope change item when compared to the 2010 estimate. The overall dimensions of the spillway have changed and there was a reduction in parts designed for construction by Roller Compacted Concrete. This change reduced the cost of the Main Civil Works component, but the GSS cost has increased accordingly. The estimate for penstock was updated in the 2014 estimate from the low unit rates allowed in the 2010 estimate.

Turbines and Generators: The estimate for Turbines and Generators was prepared by the Site C Estimating Team. The design was in the feasibility stage at 10% of the overall design when the 2014 estimate was prepared. The 2010 estimate was based on quotes received from vendors. The 2014 estimate is based on the 2010 pricing, adjusted for inflation in the labour rate.

BC Hydro has also validated its assumptions on commodity prices through a study conducted by MMK Consulting. The report by MMK Consulting shows that prices of most commodities have remained largely flat during the last 4 years. Prices of commodities such as steel, cement, fly ash, diesel etc. have been reviewed and updated to reflect the trend in commodity prices. The 2014 estimate does not include any allowance for fluctuations in the currency rate as BC Hydro does not expect too much fluctuation in the currency rate over the duration of the project.

Substation, Transmission & Peace Canyon 500kv Upgrade: The estimate for substation, transmission & Peace Canyon 500kv upgrade was prepared by BC Hydro Transmission and Distribution Estimating

Team. A bottom-up approach was used to develop the estimate based on available designs. BC Hydro expects that some adjustments would be required in the final estimate once the location of the substation is finalized. BC Hydro is holding additional costs in Value Engineering for the new substation location. The estimate was reviewed and validated through the standard channels for such estimates, up to and including BC Hydro's Principal Engineer for Estimating & Scheduling.

BC Hydro Transmission and Distribution Estimating Team was led by Matt Drown. Mark is a Professional Engineer and certified Project Management Professional. Mark is a Transmission Project Management subject matter expert for PPM Committee and has substantial substation and transmission line design knowledge. Mark has worked at BC Hydro in several roles, including Mechanical Engineer- Stations Engineering, Stations Team Lead and Project Manager Transmission Engineering.

C. Indirect Construction Costs

The processes followed by BC Hydro to estimate indirect cost are illustrated below:

Definition and Regulatory Phase (including sunk costs): The Site C Finance Team estimated the definition and regulatory phase cost for the project. Approximately 84% of the costs are already sunk and actual at this stage of the project and BC Hydro Finance Team based its estimate on its accounting records. BC Hydro develops a baseline regulatory schedule at least once a year. The baseline schedule was last prepared in November, 2013 along with a forecast analysis for the rest of the regulatory phase. In addition, each month the Site C Finance Team reviews the Expected Total Cost to the end of the regulatory phase.

The Site C Finance Team was led by Kathy Young. Kathy has over 27 years experience in project cost control, project management, operations management and management accounting. Kathy is the Manager, Planning, Forecasting and Business Services for BC Hydro since 2010.

Management and Engineering: Management and engineering costs associated with the Project were estimated by BC Hydro Site C Estimating Team and based on a detailed resource plan of all activities required to execute the project. The hourly rates for Management and Engineering activities have not changed from the 2010 estimate. BC Hydro has not updated the quantities of Management and Engineering items except for the extra quantities added to account for the additional schedule duration for diversion and other related activities.

Construction Insurance and Bonding: Construction insurance and bonding estimate in the 2014 model remain unchanged from the 2010 estimate. The 2014 estimate was prepared by BC Hydro Site C Finance Team in collaboration with BC Hydro Corporate Finance Team. BC Hydro Site C Finance Team led by Kathy Young reviewed the insurance requirements based on the final scope of work and contract packages and then worked with BC Hydro Corporate Finance Team to estimate the insurance cost for the project. Subsequently, BC Hydro Site C Finance Team has retained Marsh Canada to review costs and develop an insurance program within the allocated budget. Marsh has confirmed the estimate is sufficient based on current market pricing.

Regulatory Mitigation and Compensation: The Site C Environmental and Regulatory Group estimated the allowance for regulatory mitigation and compensation associated with the environmental impacts of constructing a new dam. The Site C Environmental experts consulted with subject matter experts and external consultants while developing the estimate back in 2010 and the estimate for 2014 remains unchanged.

The Site C Environmental and Regulatory Group was led by Danielle Melchior. Danielle Melchior has a Bachelor of Arts and a Masters degree in Economics. Danielle has significant experience in investment analysis and project financing for large infrastructure projects in the oil and gas sector and has worked at BC Hydro in several roles, including Director of Finance Generation/EARG, Project Director Site C and Director of Environmental Assessment & Regulatory.

D. Project Risk Allowances

Allowances that address risks are usually split into two components – Project Contingency and Project Reserves. Project Contingency is to address risks that are reasonably within the control of the Project Team and which can be addressed through timely mitigation measures and Project Reserve is to address macro risks that are outside the control of the Project Team.

Project Contingency: In 2014, the BC Hydro Site C Estimating Team performed Monte Carlo analysis, a leading industry practice for quantitative risk analysis, in assessing project risks. Using Monte Carlo analysis, BC Hydro Site C Estimating Team assessed the adequacy of the contingency fund to address the potential of risks occurring as the project progresses to the procurement and construction phase.The Team reviewed the 14 major work packages with respect to: scope changes, accuracy of estimate and labour cost fluctuations. The analysis considered best and worst case scenarios on each line item in the estimate. The impact of variations in mark up was also assessed as a total for the overall direct cost package. The resulting construction contingency was reviewed by IET on a top-down basis, to ensure that it made sense at the overall project level.

Project Reserves: In 2010, the Site C Team with assistance from Partnership BC conducted a full assessment of the external macro risk events that the Site C Project is exposed to and calculated a Project Reserve to address such risks. A number of positive and negative reserve events have materialized and been absorbed in the 2014 estimate. The reserve events that have been absorbed in the 2014 estimate include: overtime premiums increased from the rates included in the 2010 estimate, extra cost included for flight for turnarounds, quality of the camp improved, a decrease in interest rates, and nearly 2 years of schedule delay in the regulatory process during Stage 3. Considering the long construction schedule of the Project, BC Hydro should continue to update the Project Reserve calculation in the event that additional reserve events occur.

E. Loadings Including Inflation and Interest During Construction

The Site C Commercial Team worked with BC Hydro Treasury Group to determine the inflation rate for the 2014 model. BC Hydro Commercial Team has validated the inflation rate against the rates provided by MMK Consulting in its Construction Cost Trends and Outlook 2014 Edition. MMK Consulting recommended allowances for short and long term, for all construction at BC Hydro, in the range of 2% to 3.5%. Based on the report by MMK Consulting, and discussions with other Utilities, BC Hydro Site C project Team included an inflation rate of 2% per annum for the 2014 estimate, at the lower end of the predicted construction inflation

Interest During Construction ("IDC") is based on long term interest rate and it was provided by BC Hydro Treasury. Long term interest rate was also verified against the rates forecasted by the BC Ministry of Finance. Policies related to how to account for IDC for the various components is being worked on.

The Site C Commercial Team was led by Michael Savidant. Michael is the Commercial Manager in Site C's Commercial Team, and led the team at the time the cost estimate was developed. Michael has a Bachelor of Applied Science degree in Engineering Physics as well as an MBA. Michael has 10 years of experience

in the energy industry and has experience in financial modelling for power projects and economic modelling for resource planning.

F. First Nations and Regional Benefits Agreement

Estimates for First Nations and Regional Benefits are based on the expected outcomes from negotiations with First Nations. The estimates were calculated by the Site C First Nations Team in collaboration with BC Hydro Site C Commercial Team.

The Site C First Nations Team was led by Trevor Proverbs who is responsible for consulting with and negotiating Benefit Agreements with Aboriginal groups in relation to the Site C Clean Energy Project.Trevor has a Bachelor of Arts degree in Sociology and 35 years' experience working in the areas of fisheries and aboriginal relations, serving as Chief Negotiator for British Columbia for 15 years. Trevor has concluded both treaties and reconciliation agreements with the Nisga'a Nation, Lheidli T'enneh First Nation, Sliammon First Nation, In-SHUCK-ch First Nation, K'omoks First Nation and the Haida Nation.

G. Oversight

The development of the Assumptions and the resulting cost estimate has been reviewed internally by various boards. The Technical Advisory Board reviews major decisions on the project, including the general arrangement and the robustness of the design, upon which the cost estimate is based. We understand that the process followed by the Site C Project Team also included consultation with its Technical Advisory Board and Executive Project Board. The boards that have an oversight role with respect to Site C are outlined in Table 4.

Table 4: Role of Oversight Groups with respect to Site C

Board	Chair of Board	Executive Members (non-exhaustive)	Role with respect to Site C
BC Hydro Board	Chair BC Hydro	Stephen Bellringer (Chair); Bill Adsit; W.J. Brad Bennett, O.B.C.; Larry Blain; James M. Brown; James P. Hatton, Q.C.; John Knappett; Tracey L. McVicar; Janine North, ICD.D; John Ritchie; Jack Weisgerber	• Overall approvals on project goals, scope, budget and schedule; • Approval of any significant changes to budget, scope and schedule; • Approval on contract awards over $50 million; and •
Executive Project Board	Chair BC Hydro	Stephen Bellringer (Chair) ; John Ritchie; Brad Bennett; Janine North	• Provide guidance and oversight to project staff and to the CEO on project strategy as well as on regulatory, First Nations, procurement and other issues as required

KPMG

Table 4: Role of Oversight Groups with respect to Site C			
Board	**Chair of Board**	**Executive Members (non-exhaustive)**	**Role with respect to Site C**
Executive Team	President and Chief Executive Officer	President and CEO, BC Hydro; Senior Vice-President & Chief Human Resources Officer; President & Chief Executive Officer, Powerex; Executive Vice-President, Transmission & Distribution; Executive Vice-President, Generation; Executive Vice-President, Site C Clean Energy Project; Executive Vice-President & Chief Financial Officer; Senior Vice-President, Corporate Resources and General Counsel;	• Advise Executive Vice-President, Site C Clean Energy Project regarding the project and integration with other BC Hydro operations and considerations
Technical Advisory Board	Dr Norbert Morgenstern, Geological Engineer	International panel of experts in the development of major hydro-electric projects: • Dr Norbert Morgenstern, Geological Engineer • Kari Rytters, Hydraulics Engineer • Wynfrith Riemer, Geologist • Cassio Viotti, Dam Engineer	• Advise Executive Vice-President, Site C and Executive Project Board regarding the engineering and technical decisions related to project design consistent with best practices and current international guidelines.

Appendix 2: Integrated Engineering Team & BC Hydro Site C Estimating Team

The Site C Integrated Engineering Team comprised engineers and cost estimators from Klohn Crippen Berger, SNC-Lavalin and BC Hydro, and was led by John Nunn, Alfred Hanna and Andrew Watson. Klohn Crippen Berger is an internationally-recognized engineering and environmental services firm. SNC-Lavalin is an internationally-recognized engineering, procurement, construction and related technical services firm. Each of the team leaders (John Nunn, Alfred Hanna and Andrew Watson) is a senior engineer with several decades of relevant professional experience.

John Nunn has a Bachelor of Science degree in Civil Engineering, a Master of Science degree in Soil Mechanics & Foundation Engineering and is a Professional Engineer with 35 years' experience. Previous project roles have included Project Director and Design Manager.

Alfred Hanna has a Master of Engineering degree in Civil Engineering, a Doctorate in Geotechnical Engineering and is a Professional Engineer with 35 years' experience. Previous project roles have included Project Manager and Project Director.

Andrew Watson has a Master of Engineering degree in Geotechnical Engineering and is a Professional Engineer. Andrew is the Engineering Division Manager for BC Hydro and has worked on the Site C project since 2007. Andrew has worked as Lead Project Engineer for a variety of dam safety deficiency investigations, seismic upgrades and remediation projects within the past ten years at BC Hydro. Prior to joining BC Hydro Andrew gained several years' experience in the mining and engineering consulting fields

BC Hydro Site C Estimating Team was led by Alan Le Couteur. Alan is a Certified Management Accountant and has a Bachelor of Science degree in Forestry. Alan has significant experience in financial modelling and analysis, business case development and risk management of projects and has taken up various roles in BC Hydro since 2006.

Jeff Acland is BC Hydro's Estimating Team Lead. Jeff has a Bachelor of Applied Science degree in Engineering and is a Professional Engineer. Jeff has 16 years of construction and engineering experience, including significant experience estimating costs for major projects.

John Boots is BC Hydro's Principal Engineer for Estimating and Scheduling. John has a Bachelor of Applied Science degree in Civil Engineering and is a Professional Engineer. John has 33 years of experience in heavy civil construction and hydroelectric engineering, and is a member of the Association for the Advancement of Cost Engineering, and the BC Labour Market Industry.

Knowles, Jessica D FIN:EX

From: Nikolejsin, Dave MEM:EX
Sent: Tuesday, November 18, 2014 4:39 PM
To: Henderson, Kim N PREM:EX; Dyble, John C PREM:EX; Sweeney, Neil PREM:EX; Doyle, Dan PREM:EX; Cadario, Michele PREM:EX; Milburn, Peter R FIN:EX; Foster, Doug FIN:EX
Subject: SITE C
Attachments: SITE C.docx

Follow Up Flag: Follow up
Flag Status: Flagged

I just put this together. High level, but may be useful for the discussion at 5.

Dave Nikolejsin
Deputy Minister

Ministry of Energy and Mines
Province of British Columbia
250-952-0120
Dave.Nikolejsin@gov.bc.ca

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Option 1: Build Site C now. Start in January 2015.

s12, s13

Option 2: Delay FID by one year. Do a contingent call for Clean Energy alternatives.

s12, s13, s17

Option 3: Delay FID by 3 years. Revisit the project at that time.

s12, 13. s17

s12, s13, s17

FUNDING OFF-RAMPS

Should provincial debt become an issue 1-2 years following an investment decision on Site C, the Province could consider the following options:

s12, s13, s17

s12, s13, s17

Knowles, Jessica D FIN:EX

From: O'Riley, Christopher <Chris.Oriley@bchydro.com>
Sent: Monday, November 24, 2014 2:38 PM
To: Foster, Doug FIN:EX; MacLaren, Les MEM:EX
Subject: Fwd: BC Hydro LF/ IRP Slides
Attachments: Maclaren and Milburn Nov 2014 V4.pdf; ATT00001.htm; Milburn_V3_20141124_final.pdf; ATT00002.htm

Follow Up Flag: Follow up
Flag Status: Completed

Slides for today.

Sent from my iPhone

Begin forwarded message:

> **From:** "Reimann, Randy" <Randy.Reimann@bchydro.com>
> **To:** "O'Riley, Christopher" <Chris.Oriley@bchydro.com>
> **Cc:** "Savidant, Michael" <michael.savidant@bchydro.com>, "Little, Doug" <Doug.Little@bchydro.com>, "Ince, David" <David.Ince@bchydro.com>
> **Subject: BC Hydro LF/ IRP Slides**
>
> Hi,
> Here are both decks in PDF format.
>
> R.

This email and its attachments are intended solely for the personal use of the individual or entity named above. Any use of this communication by an unintended recipient is strictly prohibited. If you have received this email in error, any publication, use, reproduction, disclosure or dissemination of its contents is strictly prohibited. Please immediately delete this message and its attachments from your computer and servers. We would also appreciate if you would contact us by a collect call or return email to notify us of this error. Thank you for your cooperation.

BOILER WORKS FEASIBILITY STUDY

David Ince

November 2014

BOILER BUILDING FOR GENERATIONS

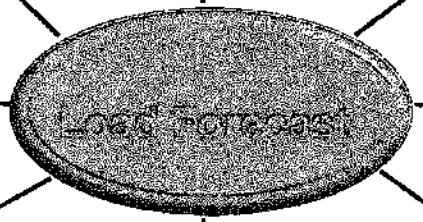
LOAD & MARKET FORECASTING

The Load & Market Forecasting group produces a 30-year load forecast (energy and peak) approximately annually, as well as a 5-year forecast at least annually.

These reports inform decision making with respect to where, when, and how much electricity is expected to be required by our customers.

These forecast reports serve as key inputs to integrated resource planning, energy procurement processes, revenue requirement applications, BC Hydro annual reports, capital plans and project economic justifications.

LOAD FORECAST USERS AND USES



Generation

Real Time Forecast

Generation Dispatch

System Optimization

Rates & Regulatory

Hearings

Rate Design & Structure

Generation Resource Planning

Long-Term Resource and DSM Planning

Power Trading

Resource Availability for Trade

Regulator

Reliability: obligation to Serve

Investment and Operations Prudency

Finance

Income Forecasting

Wires

Transmission and Distribution Planning and Investments

Board and Executive

Approval of expenditures and plans

2 MAIN PRODUCTS:

Annual Peak Forecast (MW)

- Distribution substations
- Transmission substations

&

Annual Energy Forecast (GWh)

Total Sales forecast includes

- Residential
- Commercial
- Industrial

BC HYDRO CUSTOMER BREAKDOWN

Residential (33% of firm sales)

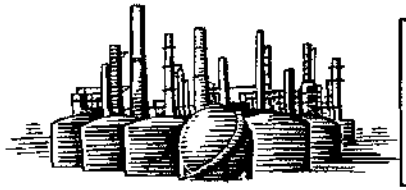
1.6 million customers

The average household in BC Hydro's service

Commercial (29% of firm sales)

200,000 customers

A typical large office building of 20–25 storeys might



Industrial (34% of firm sales)

160 customers

A large industrial customer, such as a pulp mill, might use

Sales to Other Utilities such as Fortis BC (4%)

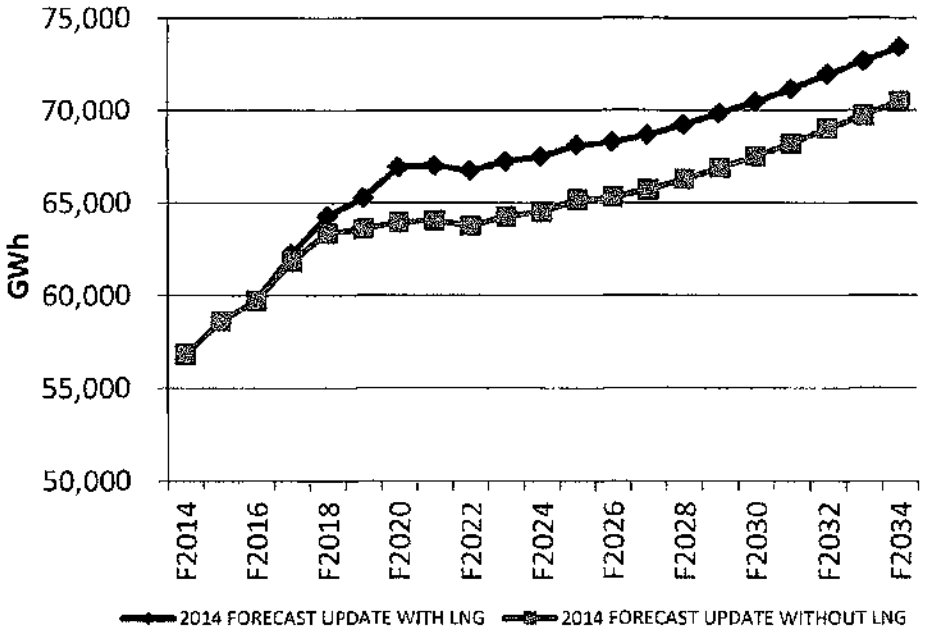
FORECASTING PRINCIPLES

- BC Hydro reference (mid) energy forecast represents the most likely (P50) outcome
- Uncertainty around the forecast is quantified and reported.
- BC Hydro system and asset planners apply reserve margins to forecast to account for contingencies (weather, generation and transmission outages)
- Forecast is constructed using credible, independent third-party inputs
- "Evidence" principle – not speculative:
  - Add and subtract loads to the forecast based on concrete evidence
  - Forecasts are built using multiple credible sources of information
  - Defensible before the regulator

LOAD FORECAST HIGHLIGHTS

- Expected 40% growth over the next 20 years - before DSM and LNG (1.7% growth per annum)
- Expected DSM savings reduce energy growth rate to 23% (1.1% per annum)
- 'Expected' LNG adds 5% to BC Hydro load
- Electricity forecast reflects continued slower general economic growth post-recession. Most North American utilities have revised long-term economic and load growth rates downwards.
- The load forecast anticipates significant industrial (oil and gas, mining, LNG) demand growth within the next 10 years. Any rate impacts of these developments will be small in the near term.
- Key demand uncertainty – industrial load
- Accuracy of load forecasts:
  - Load forecasts have typically been within 2% of actual demands (Revenue Requirements test period)
  - 2008-09 Recession - significant reduction in industrial demand leads to reduction of long-term load projections

NORMAL WEATHER ENERGY REQUIREMENTS WITH RATES WITH DSM (WITH LNG)
2014 FORECAST UPDATE



	2014 Forecast Update With LNG (GWh)	2014 Forecast Without LNG (GWh)	Difference due to LNG (%)
F14	56,817	56,817	0.0%
F15	58,597	58,597	0.0%
F16	59,708	59,708	0.0%
F22	66,710	63,746	4.6%
F28	69,202	66,238	4.5%
F33	72,647	69,683	4.3%

Note: Expected LNG load forecast is approximately 3,000 GWh for F20 and beyond.

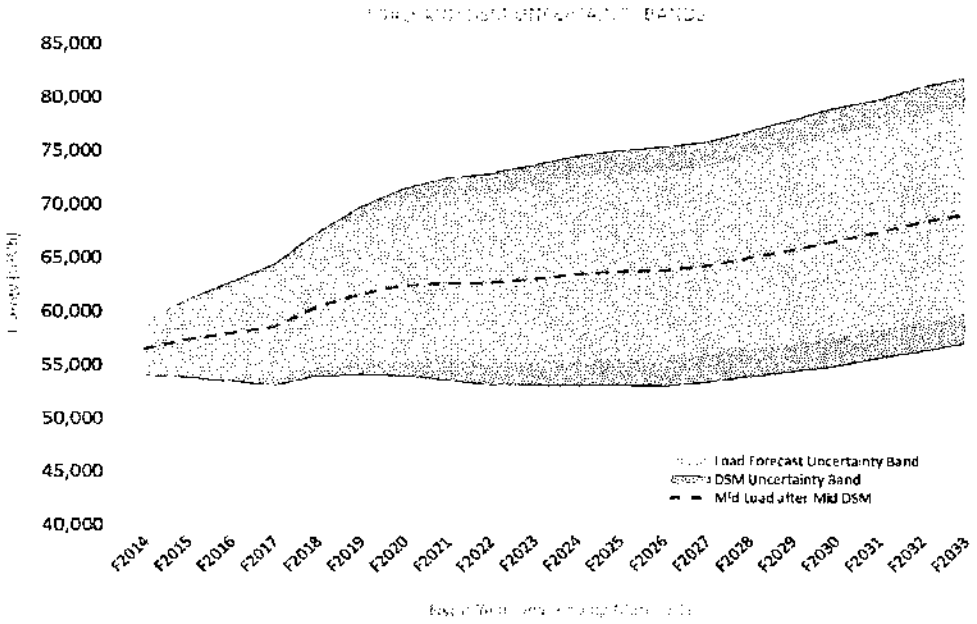
UNCERTAINTIES ASSOCIATED WITH THE LOAD FORECAST

Residential and Commercial Sectors:

- Short-term weather variations
- Housing starts and population trends
- Demographic trends.
  Regional economic drivers such as retail sales, employment and commercial GDP
- Electrical Vehicle market development
- 'Natural' efficiency trends
- Realization of DSM savings

Industrial and Large Transmission Sectors:

- Unexpected large customer closure either permanent or temporary shut downs.
- Forecast drivers and uncertainties: commodity prices for metals and minerals, GDP growth (domestic and Major BC trading partners), and overall demand for BC key exports.
- Fiber supply from Pine Beetle infestation, impacts forestry growth projection.
- Future commitments from large customers in oil and gas sector - including LNG.
- Realization of DSM savings



Quantification of Uncertainty:

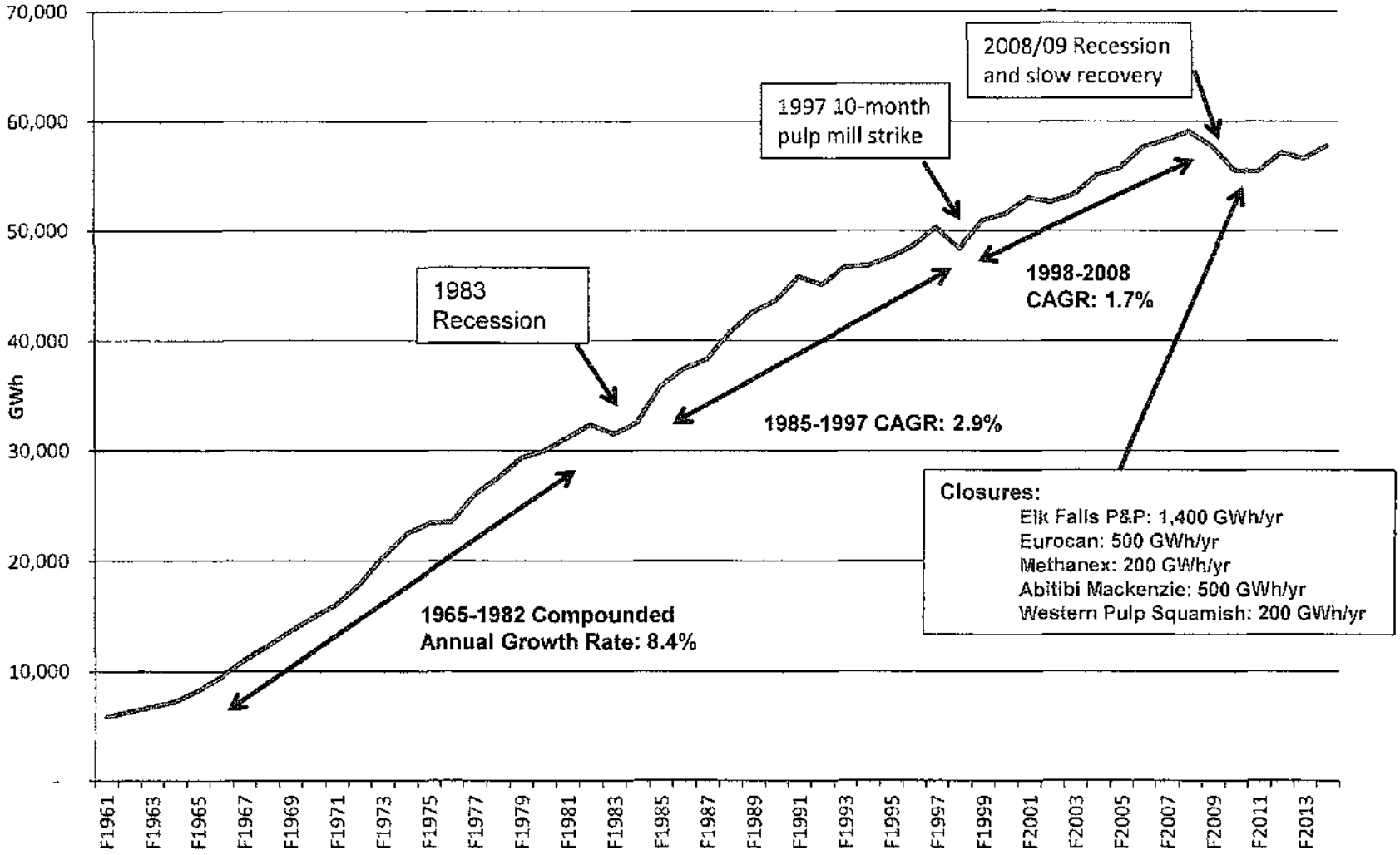
Residential and Commercial Sectors:

- Load probability distribution created with Monte Carlo model
- 50,000 iterations using drivers of demand such as GDP, weather and rates impact

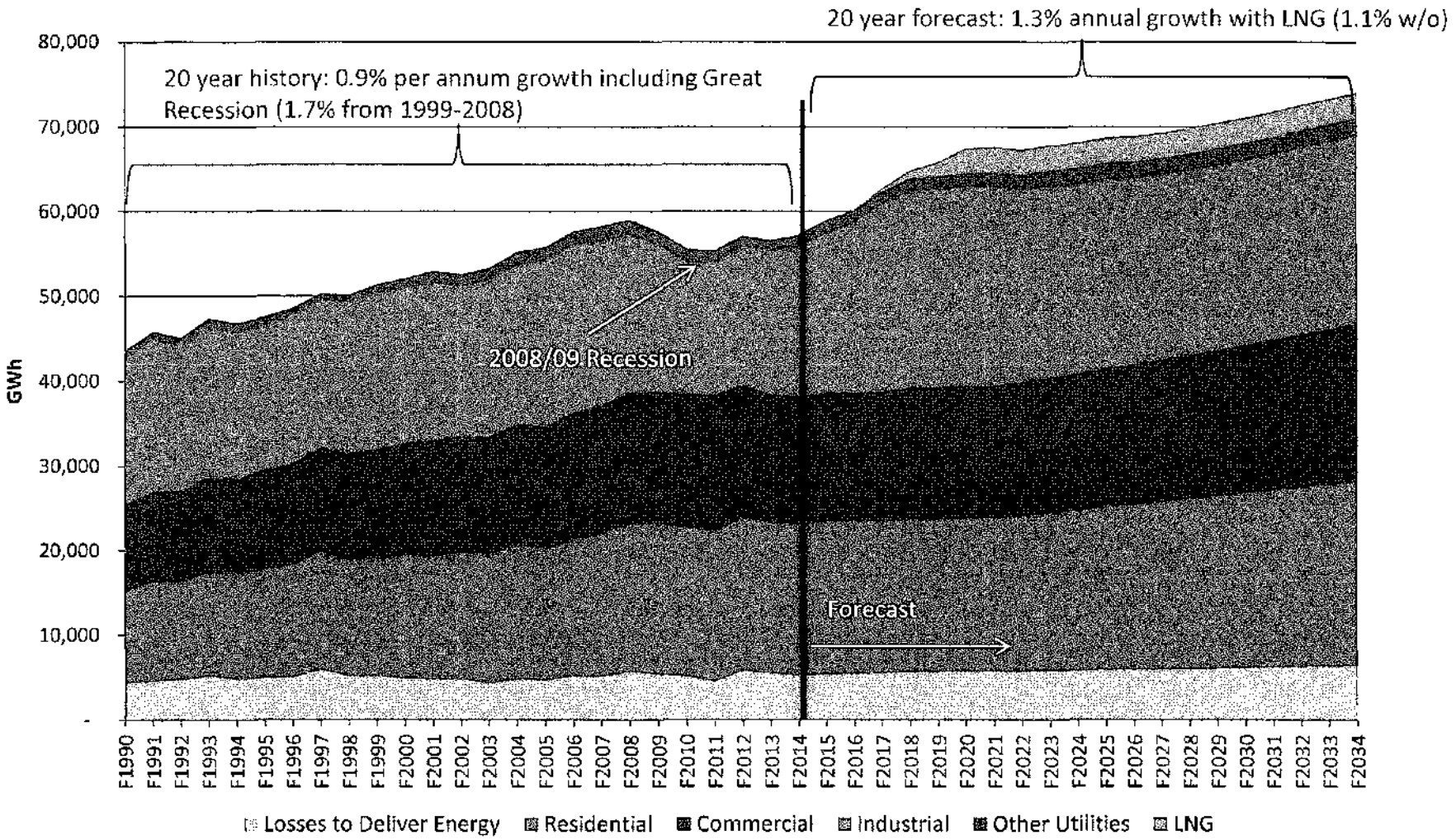
Industrial and Large Transmission Sectors:

- Discrete high and low scenarios created for sector such as mining, oil & gas, pulp & paper
- Positive growth correlations applied between these sectors to create consistency in analysis.

HISTORICAL DEMAND GROWTH

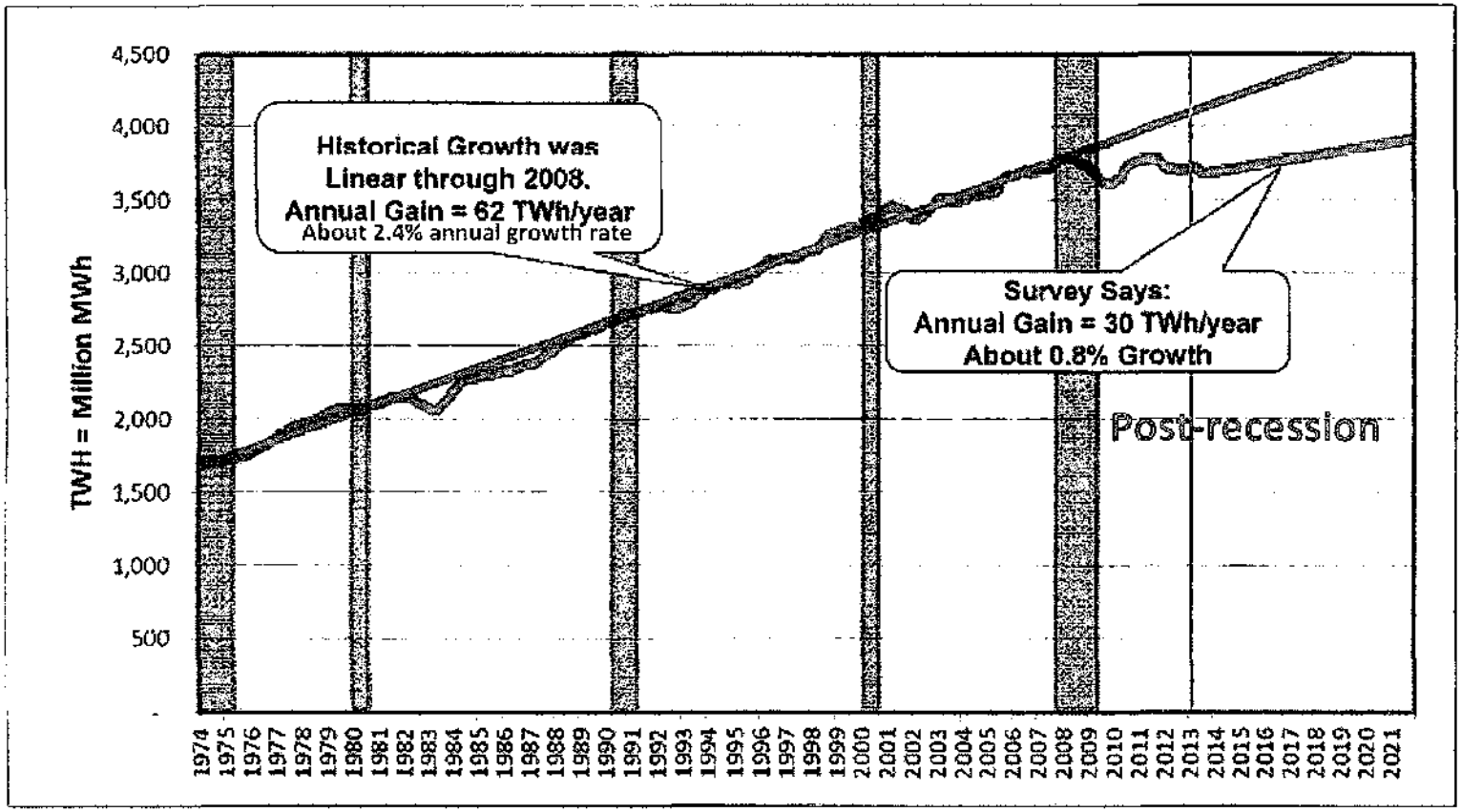


LOAD HISTORY AND FORECAST



Source: Itron Energy Trend Survey (April 2014)

Living in a 1% World



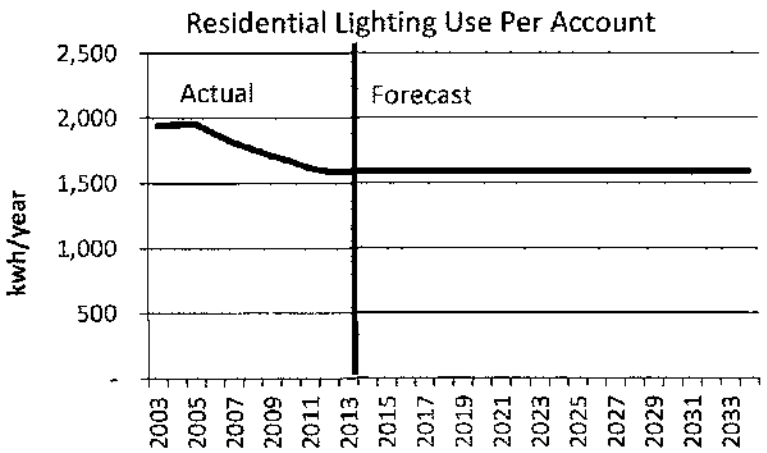
	2014 Forecast Update (GWh)
F14	17,928
F15	18,070
F16	18,057
F22	18,406
F28	20,186
F33	21,555

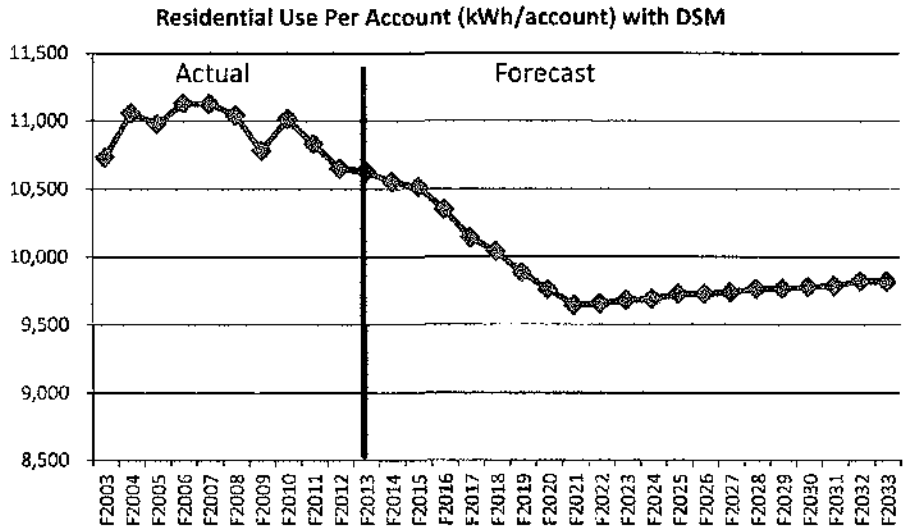
As in the table to the left, residential customer demand is projected to grow in the forecast, due to growth in number of accounts driven by population growth.

Residential use per account has trended down for several reasons including savings from DSM lighting programs and codes and standards.

In the previous Forecasts, BC Hydro adopted an approach of maintaining residential lighting use per account at 2008 levels. Since 2008, there has been significant savings in lighting codes and programs of 400 GWh or 30% of total residential DSM.

An update lighting use profile was included in the 2014 Forecast Update which leads to a lower forecast of use per account.



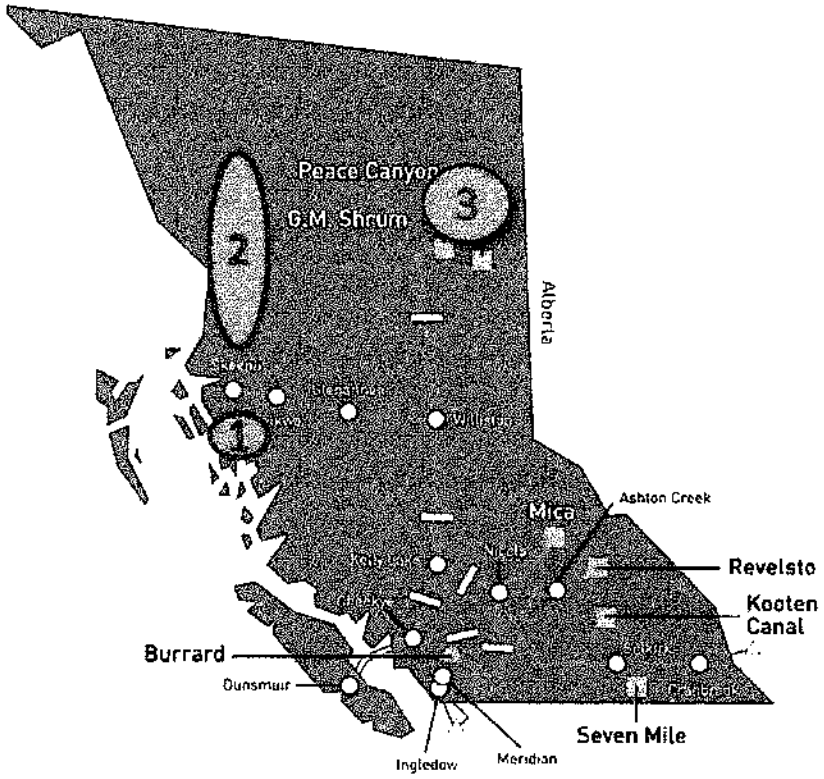


Source: U.S. Energy Information Administration

INDUSTRIAL LOAD

Unprecedented load growth potential in the North

- Driven by LNG, shale gas and mining developments
- Base forecast contains:
  1. LNG – 360 MW / 3,000 GWh/yr by F2022
  2. Mining – 2,000 GWh/yr growth by F2022
  3. Shale Gas – fivefold growth in Montney Basin by F2033.



1. *LNG facilities expected to be located in the Kitimat, Prince Rupert and Lower Mainland*
2. *Mining expected to be interconnected to the Northwest Transmission Line and other potential mines in the North Coast region of B.C.*
3. *Electrification of gas production / processing in Montney Basin*

MAJOR OIL & GAS AND METAL MINING CUSTOMERS IN FORECAST

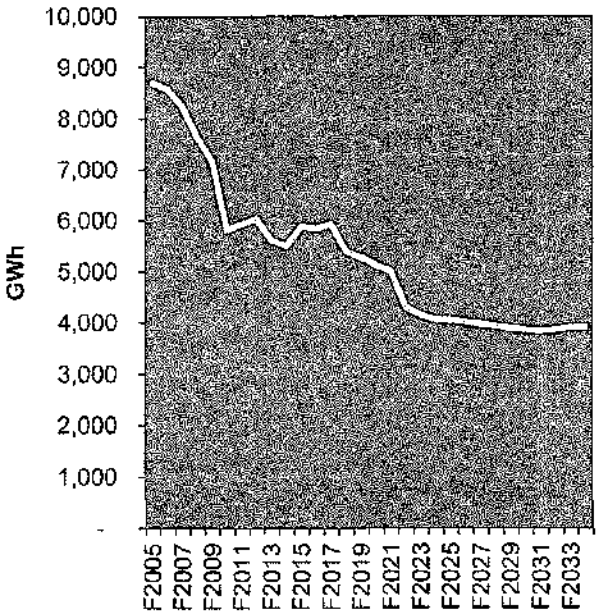
CONFIDENTIAL

s13, s17, s21

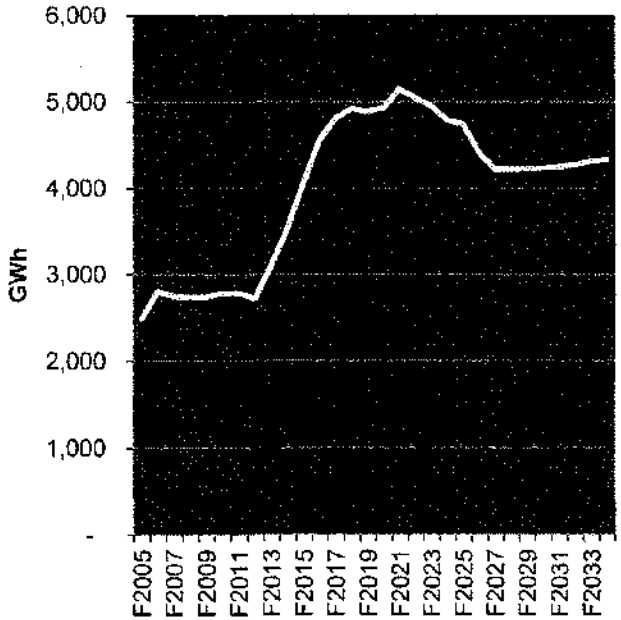
MAJOR INDUSTRIAL SECTORS

10 YEARS HISTORY AND 20 YEAR FORECAST

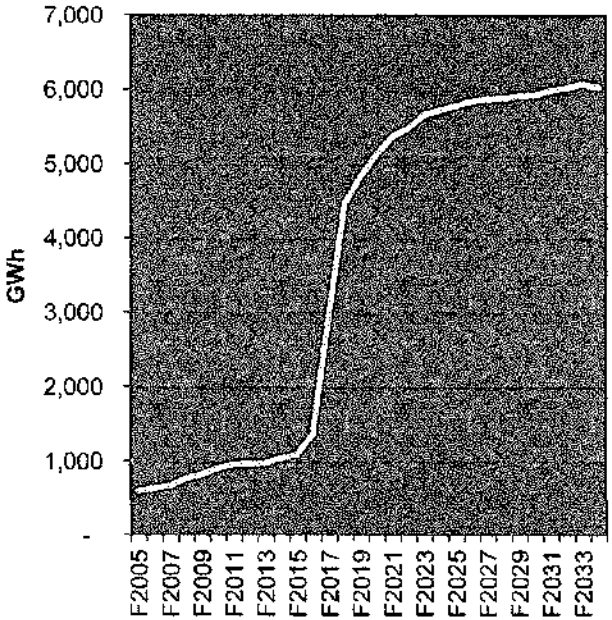
Pulp and Paper



Mining



Oil and Gas



INDUSTRIAL LOAD – SHALE GAS

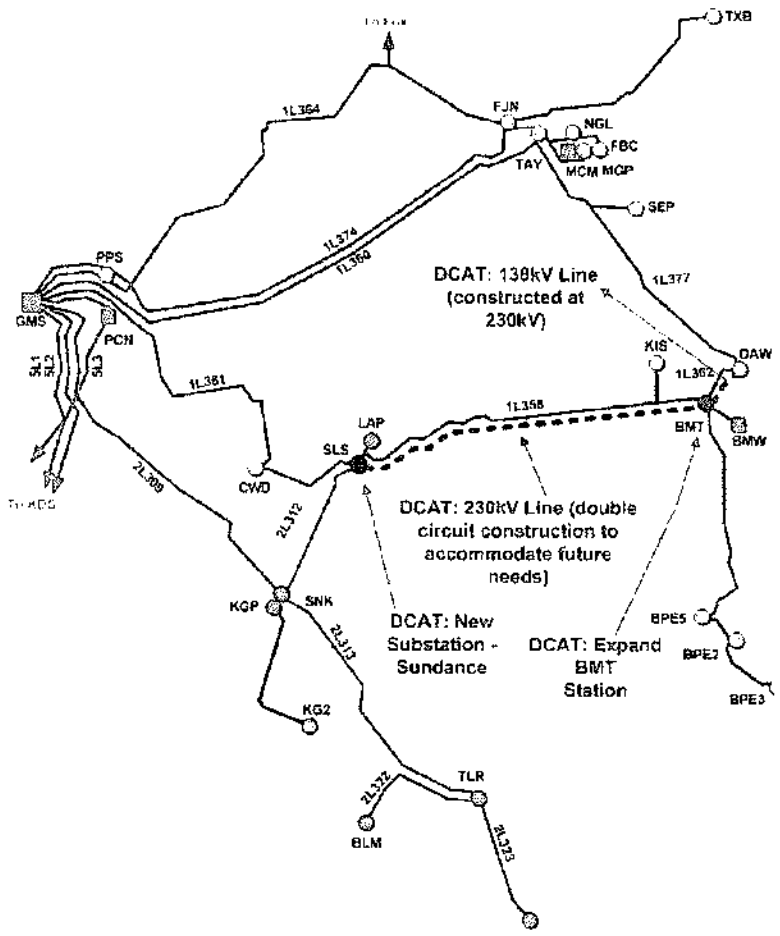
Shale Gas in Montney Basin

- Growth in Montney Basin electricity demand of 500%
- DCAT project expected to be in-service by June 2015 which will increase capacity by 115 MW
- The line is already fully subscribed
- Currently planning a second transmission project (PRES) expected to be in service in 2020 or 2021
- We are predicting significant long term growth particularly in the Dawson & Groundbirch areas, which are liquids rich.
- Some short-term deferrals by customers, but overall the aggregate loads continue to rise, with a 9 fold increase predicted in the next 10 years.

Horn River

- Fort Nelson and vicinity Is not connected to the BC Hydro Integrated system
- Significant but uncertain load potential (over 1,000 MW)
- Continuing to monitor industry developments and maintain electricity supply options

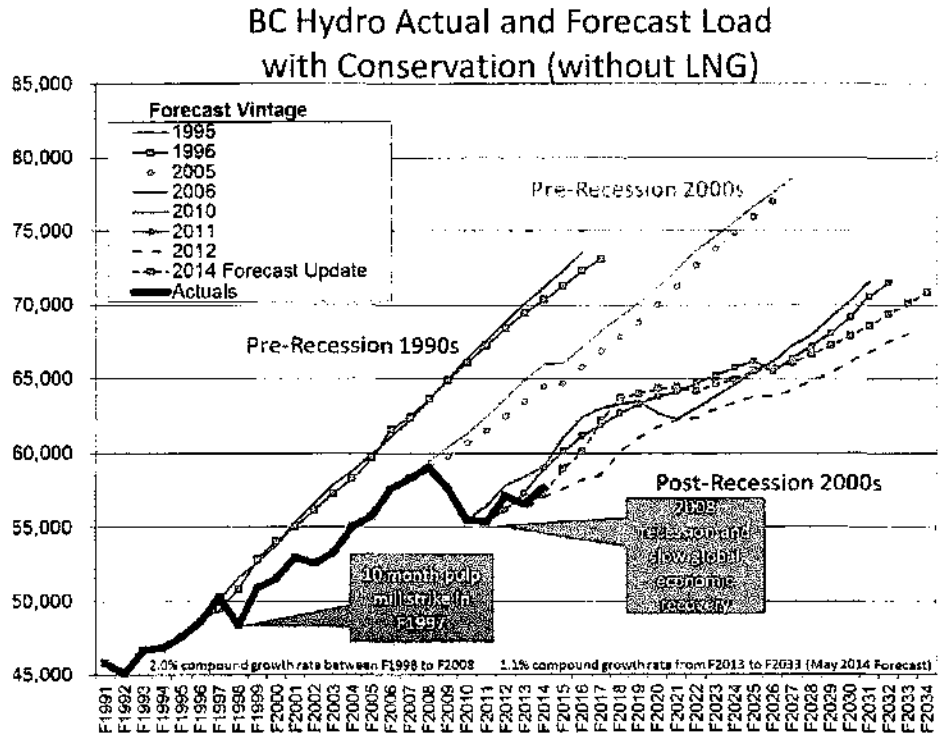
DCAT System Map

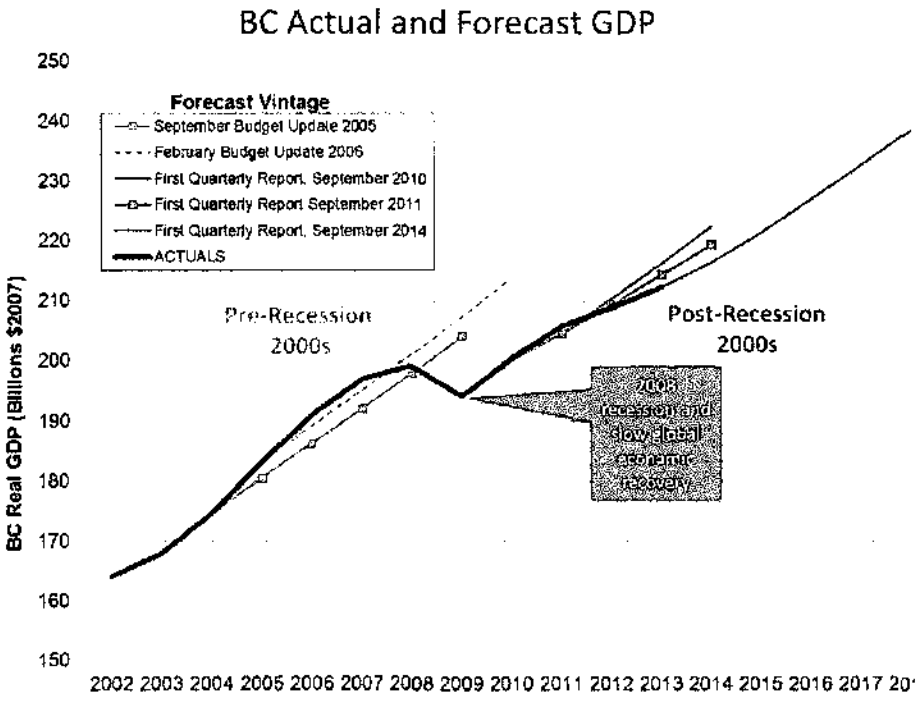


s13 s17 s21

LOAD AND ECONOMIC FORECASTS ARE CONSISTENT

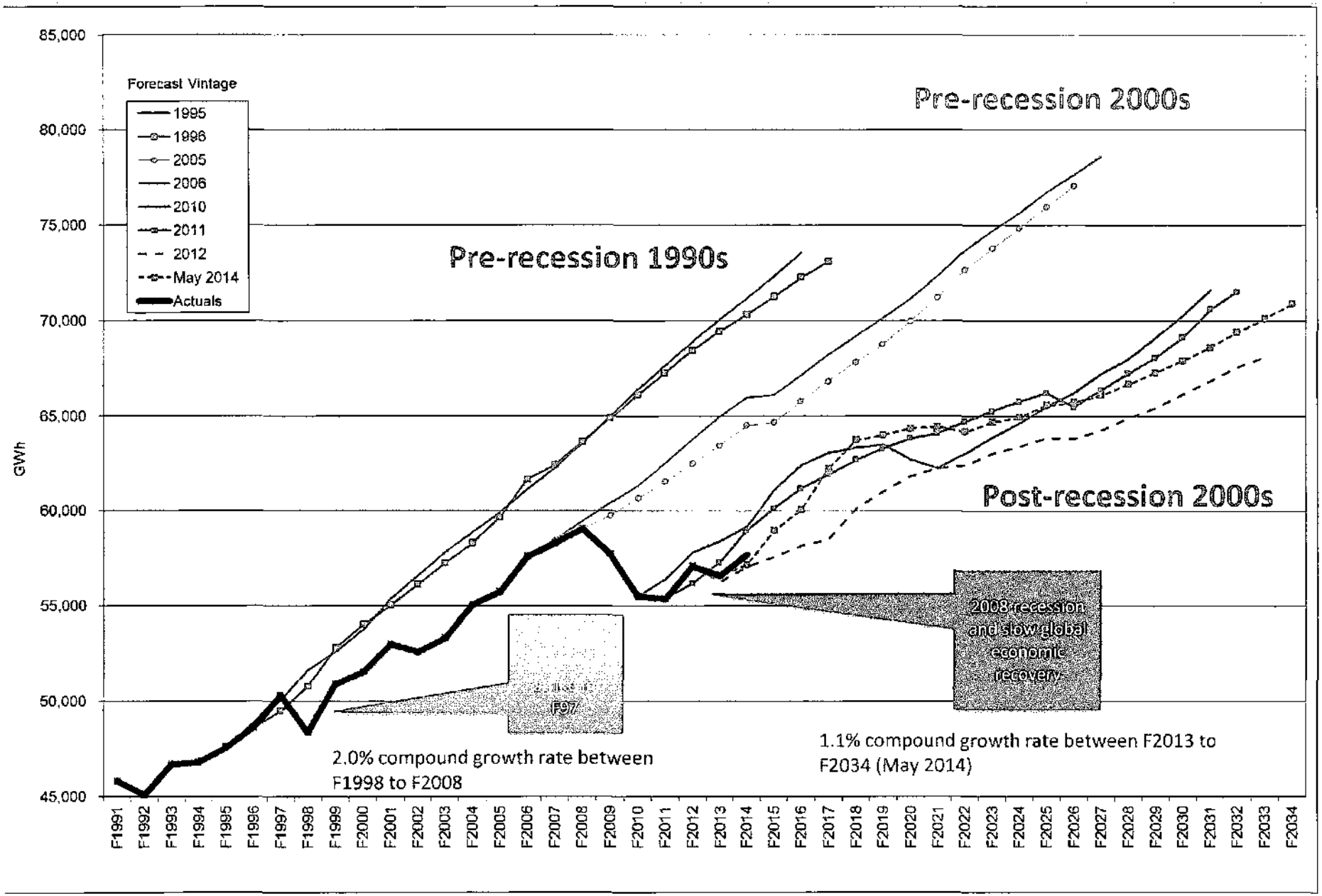
- Neither the BC Hydro forecast nor the BC GDP forecast were able to predict the 2008 recession.
- Growth rates and absolute values for both forecasts have dropped post-recession.

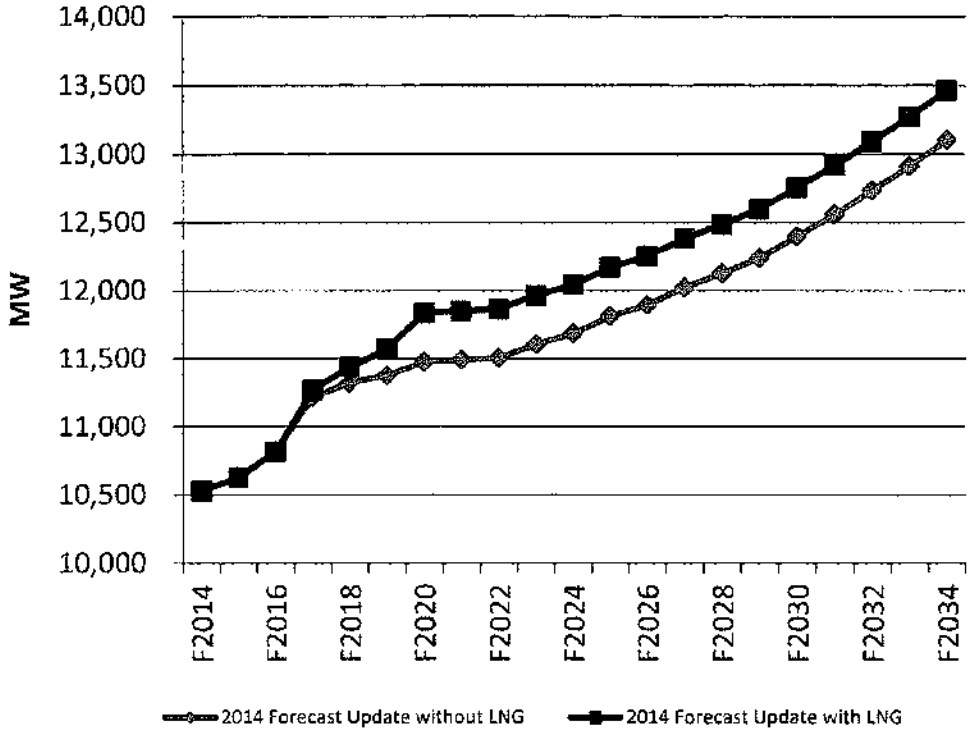




APPENDIX

TOTAL FORECAST ELECTRICITY DEMAND INCLUDING CONSERVATION (WITHOUT LNG)





	2014 Forecast Update With LNG (MW)	2014 Forecast Update Without LNG (MW)	Expected LNG (MW)	Difference due to LNG (%)
F14	10,527	10,527	0	0.0%
F15	10,626	10,626	0	0.0%
F16	10,812	10,812	0	0.0%
F22	11,863	11,503	360	3.1%
F28	12,484	12,124	360	3.0%
F33	13,270	12,910	360	2.8%

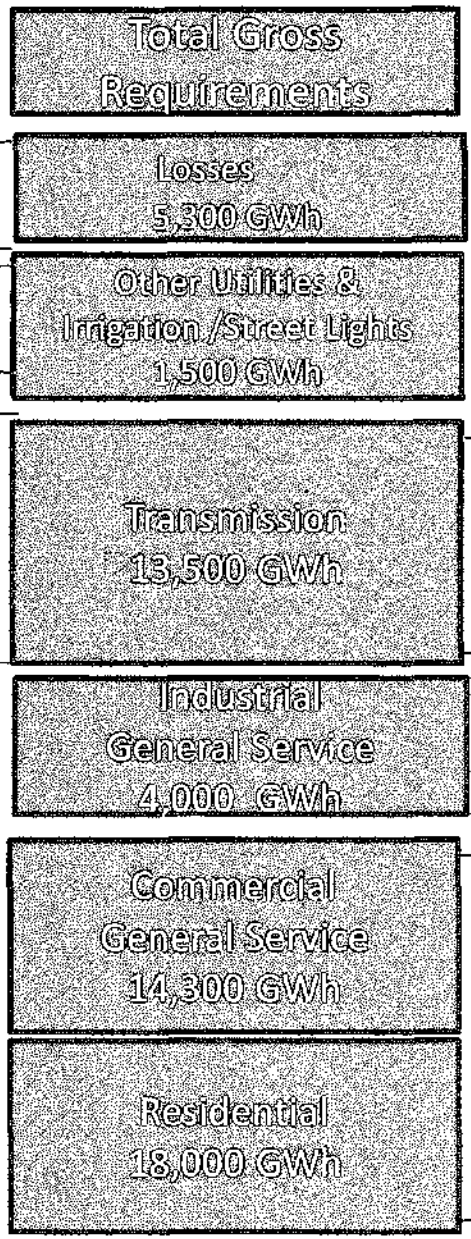
Load Forecast Methodology

- Industry-standard approach and prepared in accordance with BC Utilities Commission Resource Planning Guidelines
- Reflects multiple inputs such as economic drivers (e.g., GDP and population growth) and production forecasts with respect to major industrial customers.
  - Oil & Gas: IHS, Ventyx, PIRA
  - Forestry: Valois Vision Marketing, Temanex Consulting, Russ Taylor
  - Mining: PricewaterhouseCoopers Canada
- Most of the inputs are provided by external expert sources and the Ministry of Finance.
- The demand forecast is subject to regularly scheduled audits, which include a review of forecasting processes, forecasting models and tools, methodologies, the expertise and qualifications of the staff involved, and oversight/controls.
- In 2011, BC Hydro's demand forecasting process and results were reviewed as part of the Government Review of BC Hydro and were noted to be "well planned" and "accurate, reliable forecasts"
- Recent 2014 independent review call forecasting methodology, "state of the art".

LOAD FORECAST COMPONENTS AND METHODOLOGY OVERVIEW

Total Peak
F13: 10,450 MW

Total Energy
F13: 56,600 GWh



Losses range between 6% - 7% of total demand peak (800 MW)

FortisBC ; Seattle City Light & City of New Westminster MW (350 MW)

- Approximately 9-10% of total energy requirements. Losses are based on historical trends.
- FortisBC largest load, sales dependent on market prices relative BC Hydro rates.

Transmission Peak demand forecast developed consistently with energy forecast. (1,400 MW)

- Sales tend to be volatile and dependent upon world commodity price & approvals of projects.
- Forestry, Mining, Oil and Gas (including pipelines), and Other (includ Ports, Universities, Cement Operations).
- Forecast developed for individual accounts (+200) using multiple sources and probability weightings.

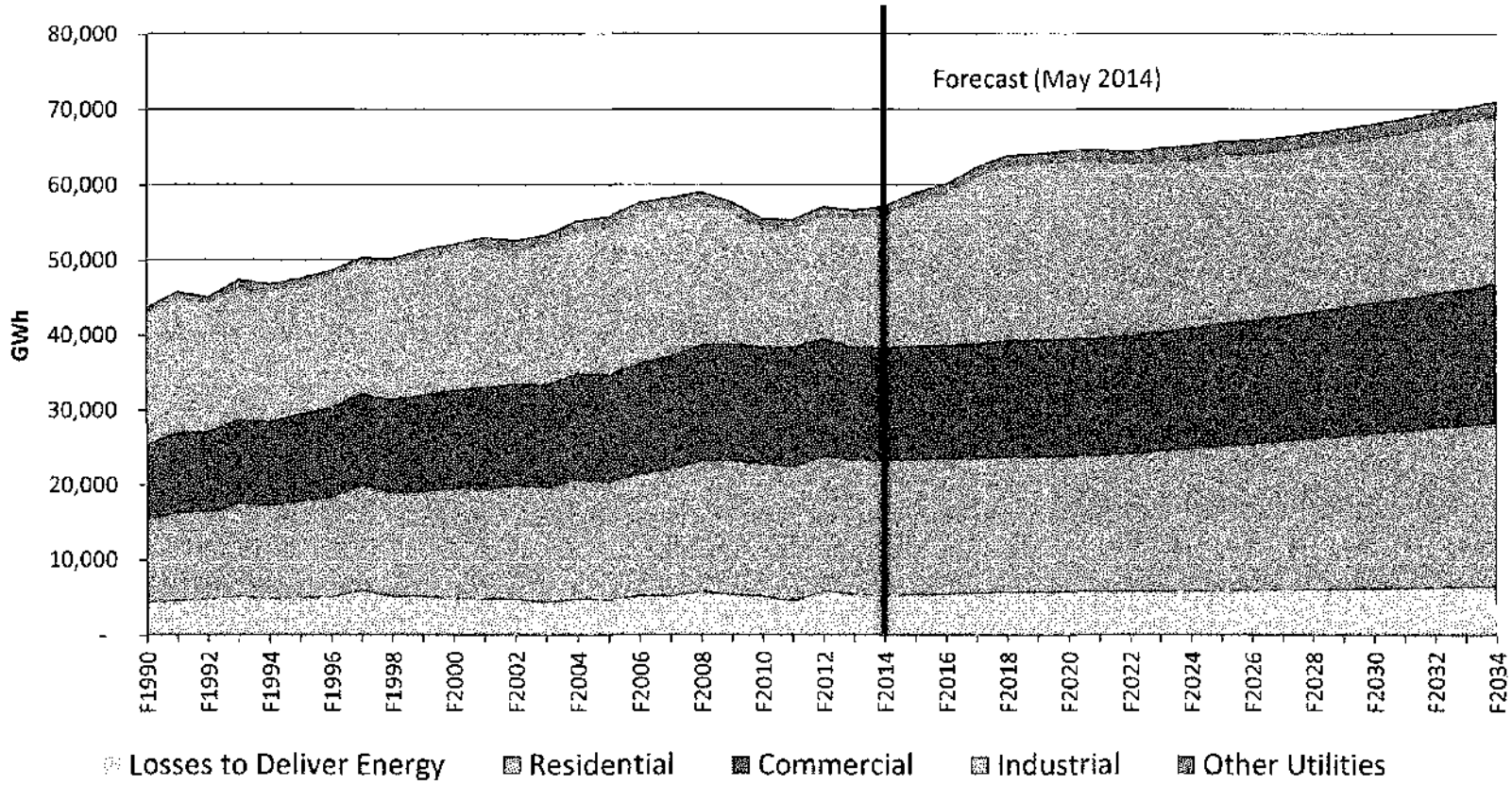
Distribution Peak based on Design Temperature: coldest daily average over rolling 30 years. (7,900 MW)

Driver of the peak are housing starts and commercial and industrial energy.

Coincidence factors and regional growth trends in housing and energy are drivers of growth.

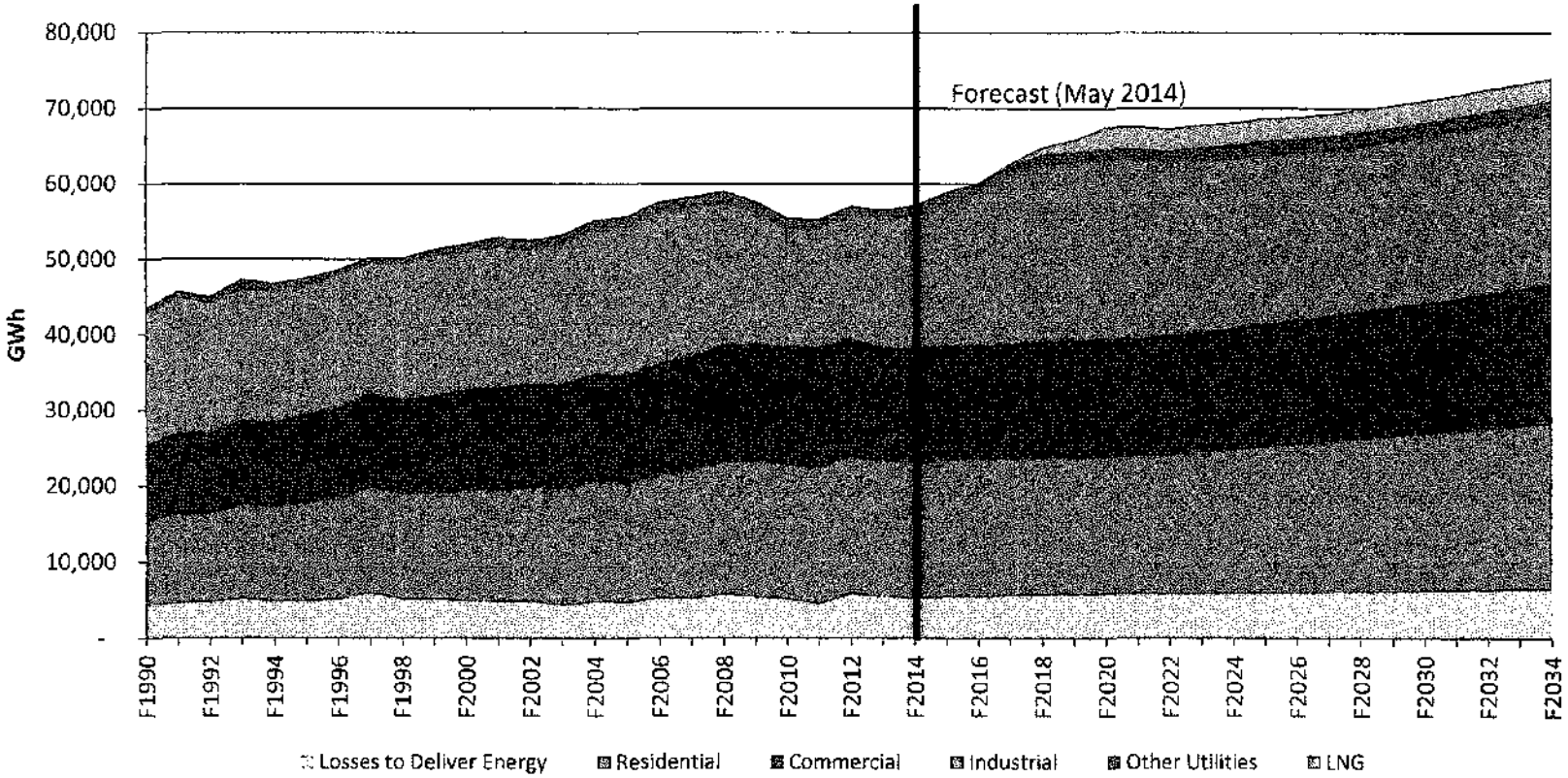
- Consists of wood, oil and gas, coal mining and agriculture and other manufacturing. Production estimates & BC provincial GDP are drivers of growth projection.
- Residential and Commercial developed using Statistically Adjusted End Use (SAE) model; 60 other utilities in N. America use SAE forecasting methods.
- Forecasts are developed with BC provincial and third party drivers for housing starts, employment, retail sales, GDP. Residential sales are correlated to weather & population trends. Commercial varies with economy.
- BCUC has reviewed SAE methodology in numerous proceedings.

LOAD FORECAST COMPARISON TO HISTORICAL TRENDS (FORECAST BEFORE LNG)



Compound Growth Rates with DSM Savings					
		Residential	Commercia	Industrial	Total
					Gross Reqt
History	10 yr	1.6%	0.9%	-0.8%	0.6%
	20 yr	1.9%	1.5%	-0.1%	0.9%
Forecast	10 yr	0.5%	0.6%	2.7%	1.3%
	20 yrs	0.9%	0.9%	1.3%	1.1%

LOAD FORECAST COMPARISON TO HISTORICAL TRENDS (FORECAST WITH LNG)



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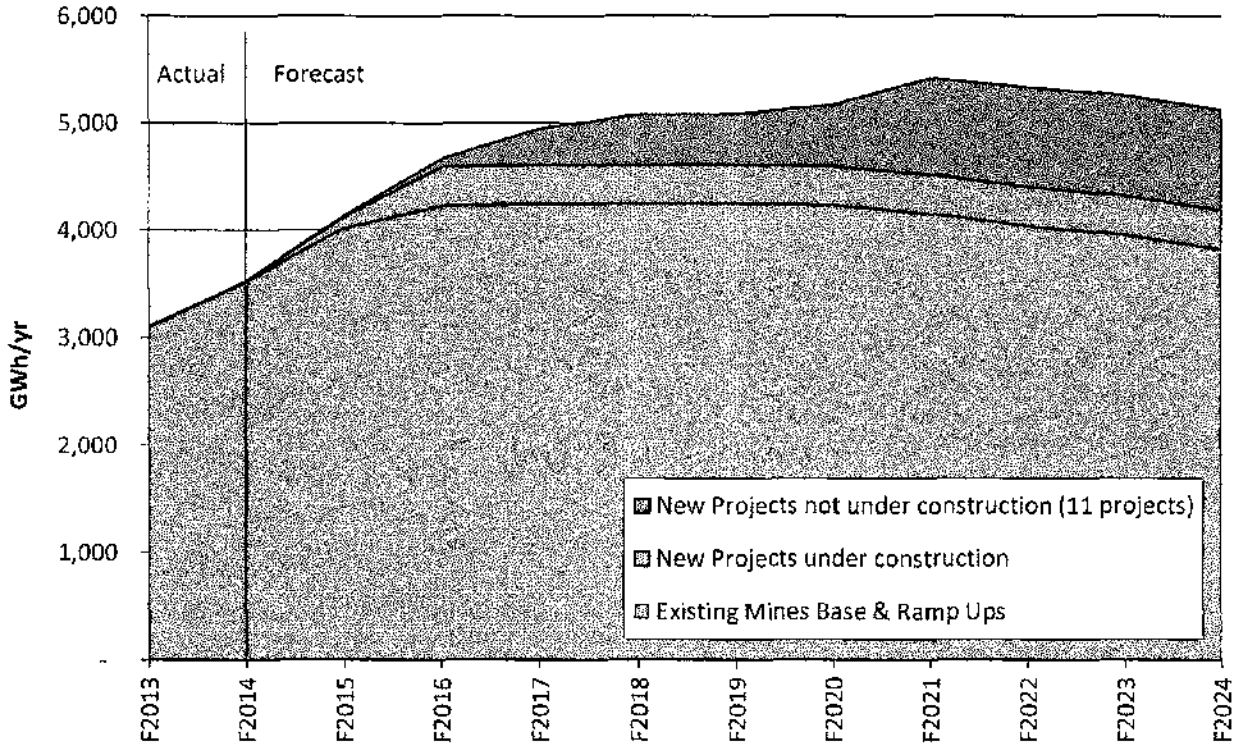
Forecast	10 yr	0.5%	0.6%	2.7%	1.8%
	20 yrs	0.9%	0.9%	1.3%	1.3%

TOTAL MINING FORECAST METAL AND COAL + ENERGY BEFORE DSM AND RATES



Existing mines increase loads between F13 to F16:

Three new large mines have been commissioned over the past 3 years. These mines are expected to increase production and sales between F13 to F16.

Three major expansions to existing operations also contribute to increased sales from F13 to F16.

New projects not under construction:

11 new transmission mining projects in various stages of permitting and development are included in the forecast at project-specific discount factors.

There are an additional 25 mining projects are currently being monitored that are in a very preliminary state, and are weighted with a very low probability.

RESOURCE PLANNING

UNDERSTANDING PORTFOLIO MODELING AND DECISION MAKING IN THE INTEGRATED RESOURCE PLAN

BRIEFING TO AN FOR GENERATIONS

AUGUST, 2014

AGENDA

- BC Hydro's IRP development process
- Ventyx's System Optimizer portfolio modeling tool
- Model description
- Model inputs
- Portfolio results
- Conclusions

PLANNING CRITERIA / CLEAN ENERGY ACT

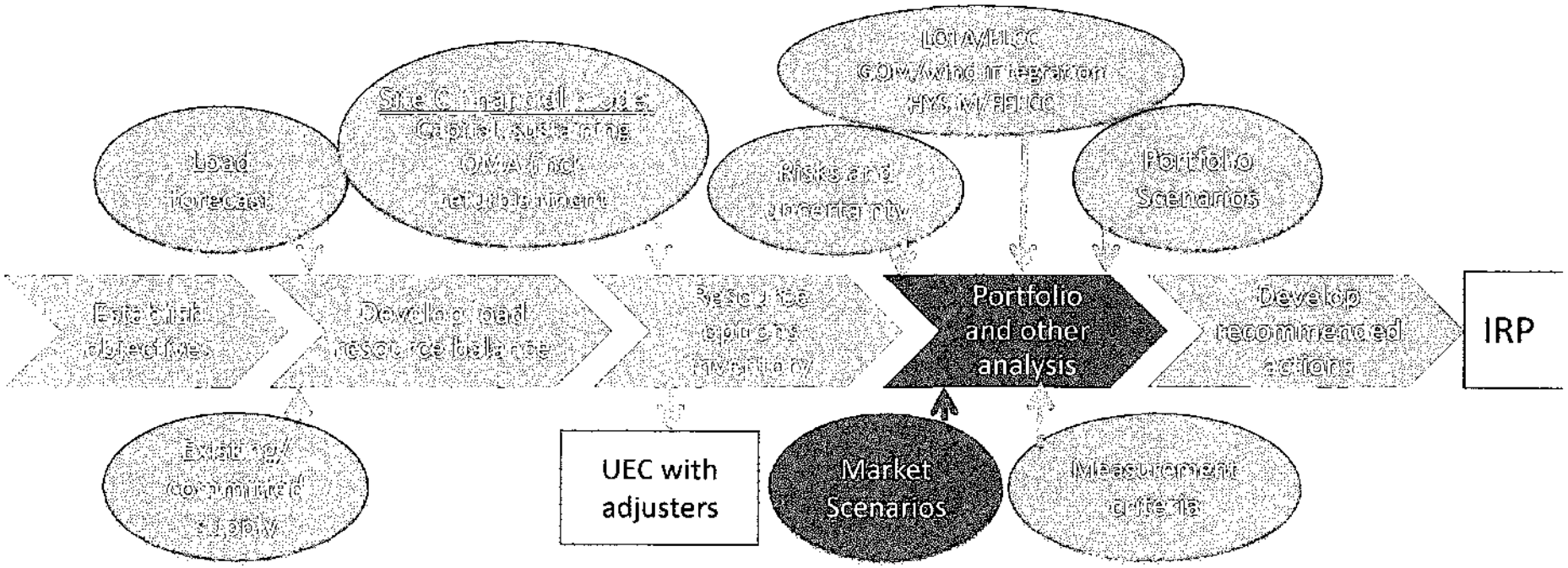
Planning Criteria - consistent with good utility practice:

- Obligation to supply customers' requirements
- Meet reliability criteria
- Minimize ratepayer costs
- Minimize environmental impacts/ footprint

15 Energy Objectives including:

- Self-sufficiency by 2016
  - Mid-load forecast / average water
  - No reliance on Burrard
- 66% DSM by 2020
- Generate 93% from clean or renewable resources
  - Other than supply for LNG exporting facilities
- Ensure utility rates remain competitive with public utilities in NA
- Encourage economic development and job creation / retention

IRP DEVELOPMENT PROCESS



BC HYDRO SYSTEM OVERVIEW

Generation

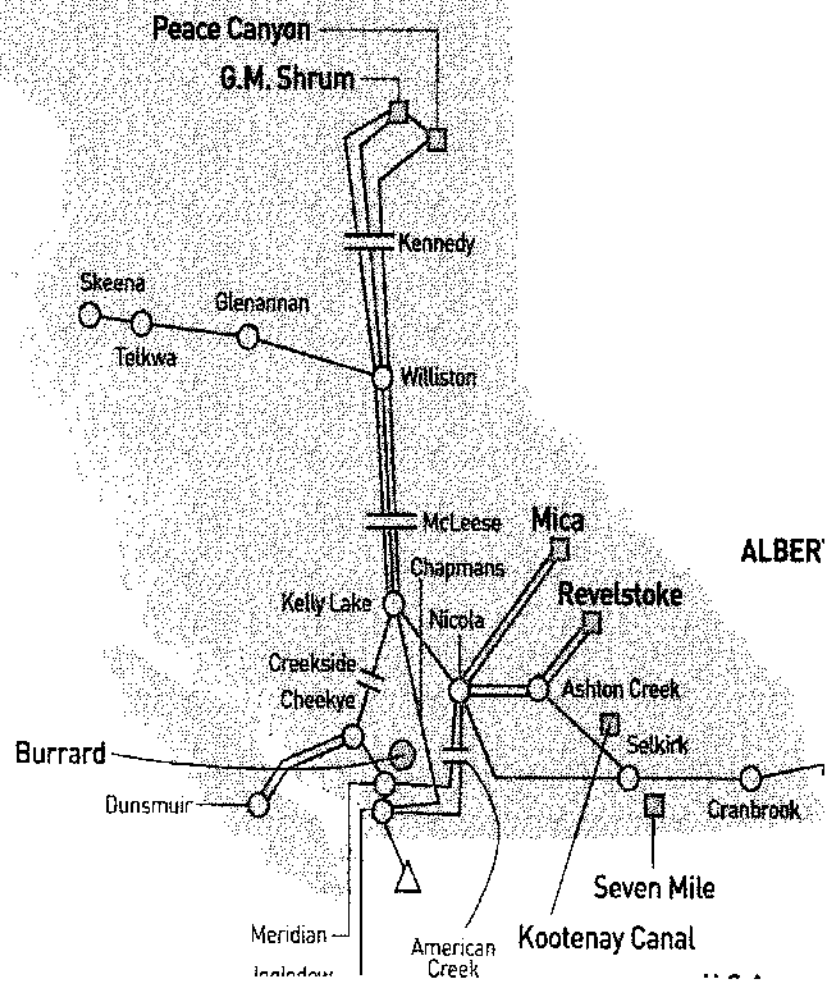
- 12,000 MW capacity
- 41 Dam sites, 31 Hydro facilities and 3 Thermal plants
- > 90% renewable

Transmission

- 500kV series-compensated backbone
- 18,000 km of transmission lines
- 260 substations
- Interconnected to US and Alberta

Distribution

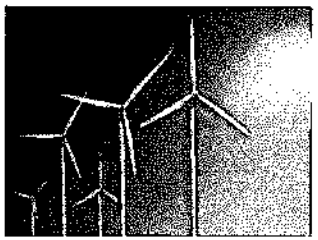
- 56,000 km of Distribution lines
- Approx. 900K poles
- Serve 17 Non-integrated areas

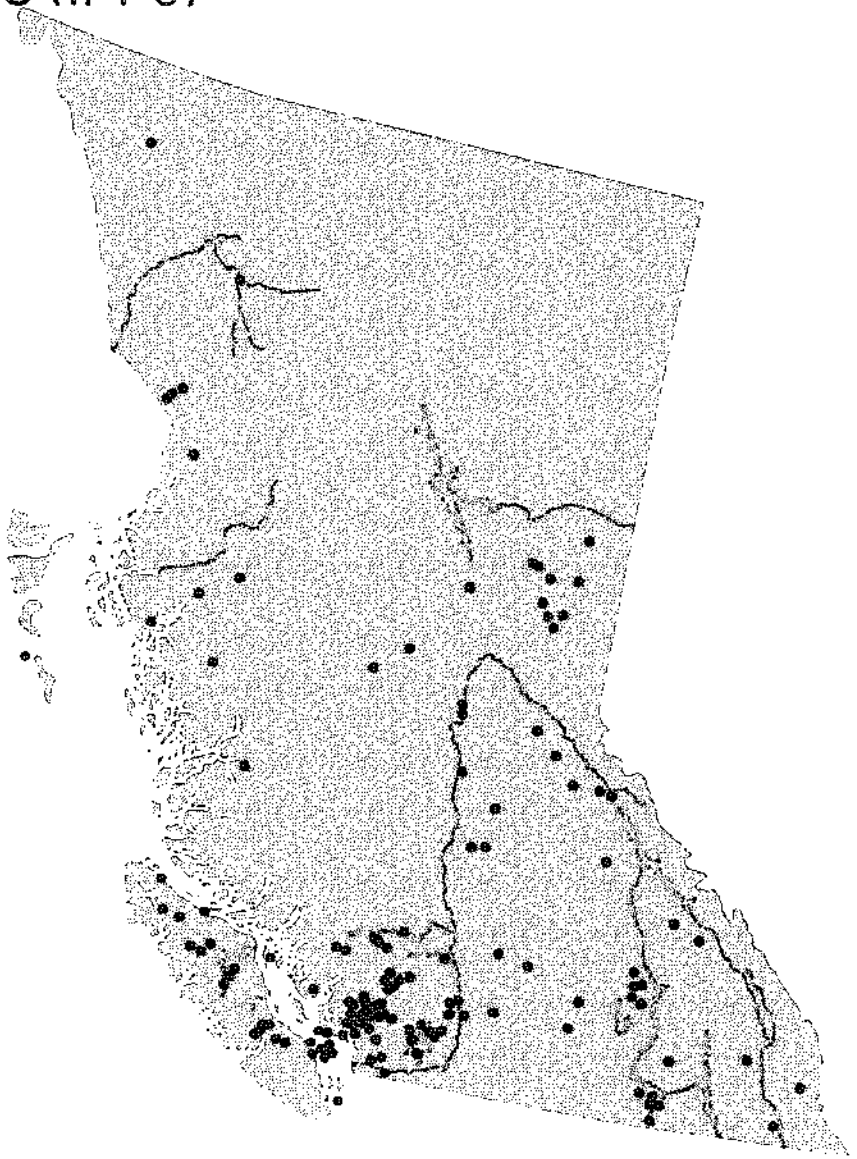


BC HYDRO SYSTEM OVERVIEW

INDEPENDENT POWER PRODUCERS (IPPs)

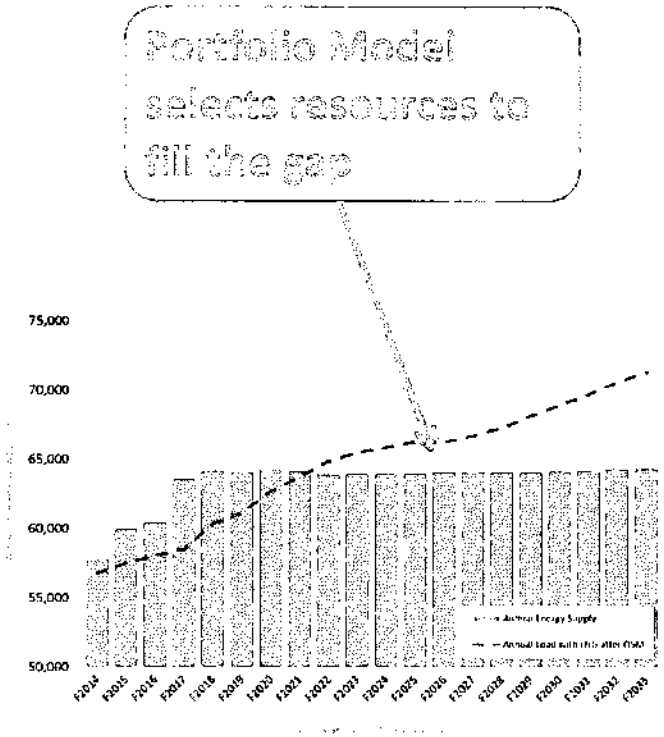
- About 80 Electricity Purchase Agreements (EPAs) in commercial operation
- Delivering about 15,500 GWh/year or about 25% of BC Hydro's domestic customers needs
- Over 120 EPAs awarded in total – in operation by 2016





PORTFOLIO MODELLING - OVERVIEW

- A mixed integer programming model that selects a portfolio of future resources that minimizes cost (PV over a 20-30 year period)
- Typical run takes between 2-5 days to complete using high performance computers



SYSTEM OPTIMIZER – IN ACTION

Portfolio model selects resources to fill the resource gap in the most cost effective way while considering key factors

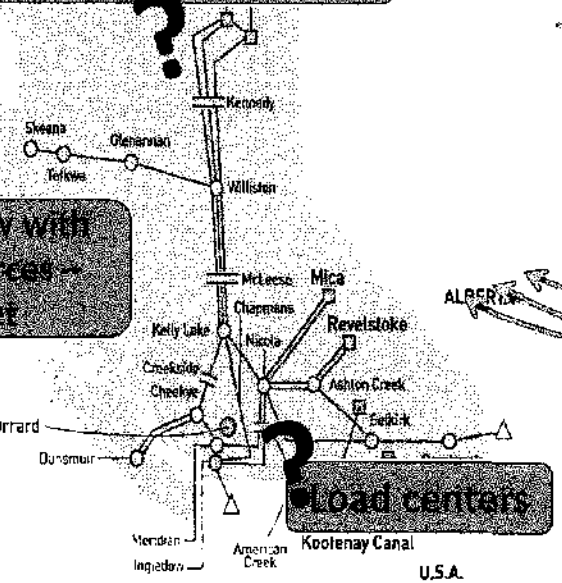
? Cheapest UEC

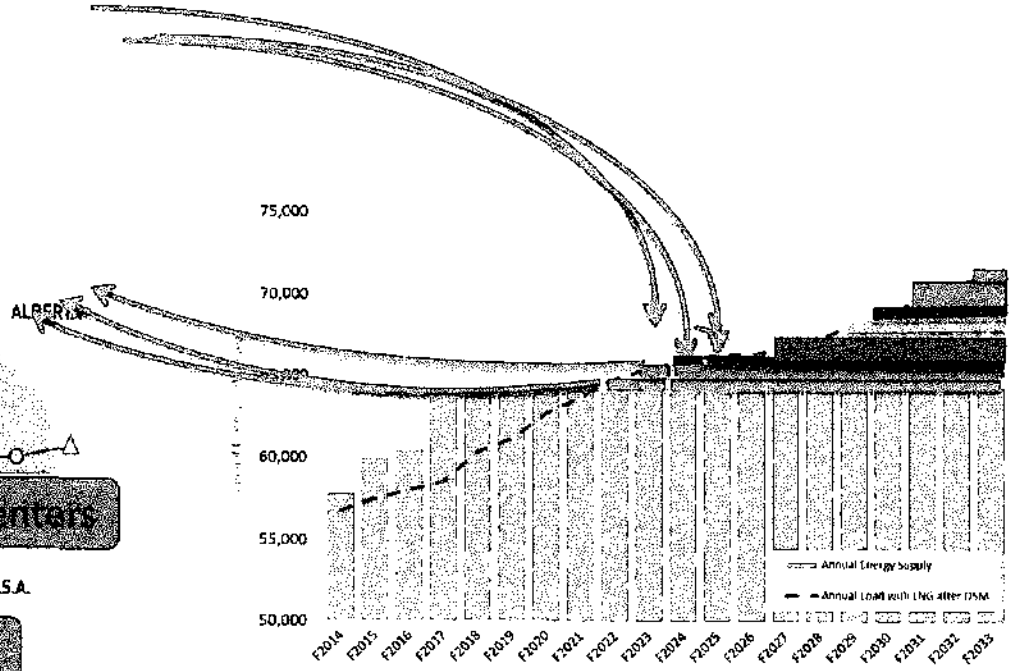
Transmission to move power

Integrating new with existing resources – e.g. freshet

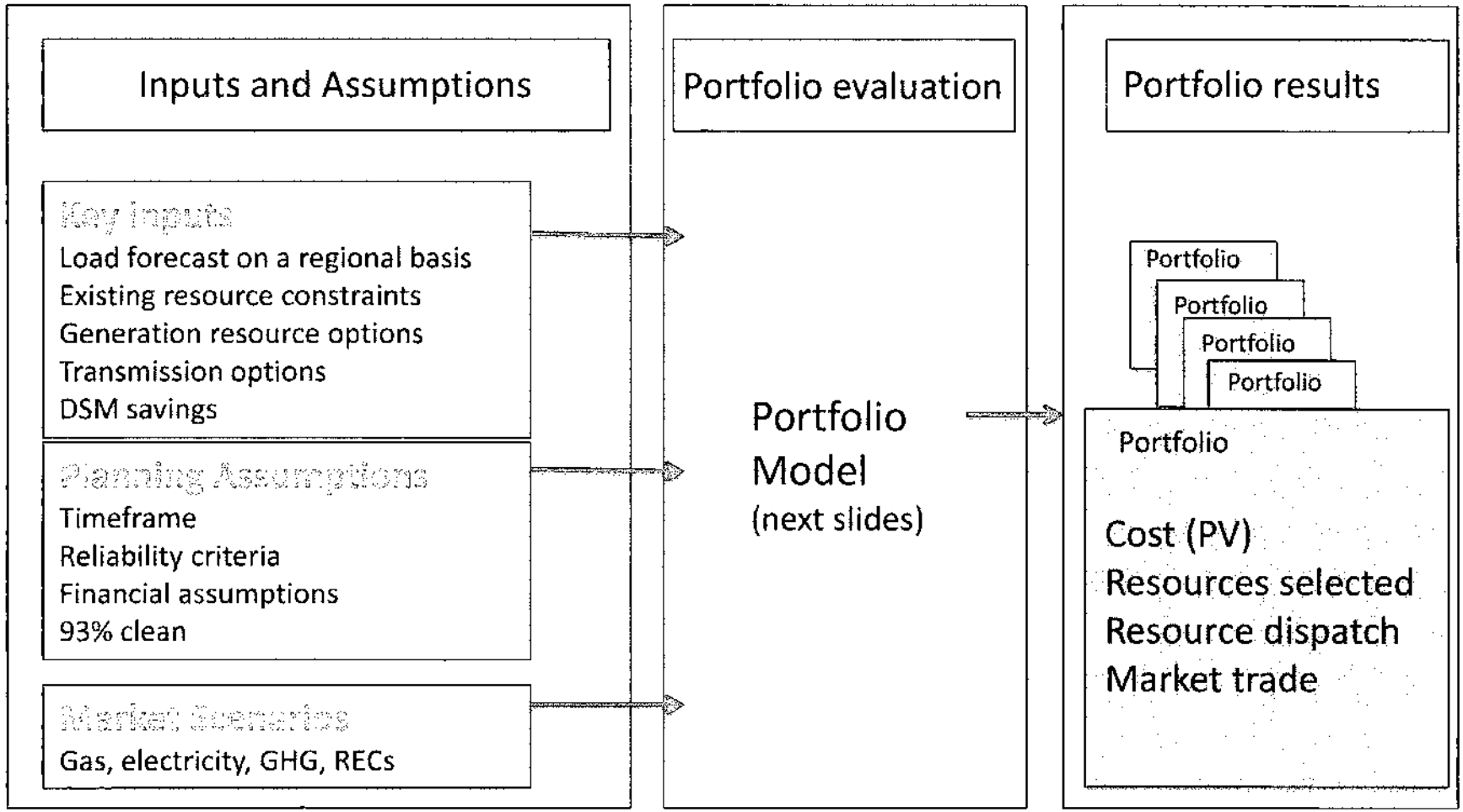
? Load centers

? Export market





SYSTEM OPTIMIZER – INPUTS AND OUTPUTS



VENTYX AND SYSTEM OPTIMIZER

- Ventyx is owned by ABB which is based in Switzerland with locations in ~100 countries – serves Mining, Chemical, Energy Markets, Utilities, and Oil & Gas sectors
- Ventyx offers an Energy Portfolio Optimization Solution that includes the System Optimizer software
- System Optimizer
  - commercially available program with annual licensing fees
  - used for integrated resource planning (e.g. Tennessee Valley Authority, Pacificorp, Tri-State Generation and Transmission Association, Basin Electric Power Cooperative)
  - models from other vendors that use optimization processes to minimize PV of investment and production costs are also available (Plexos from Energy Exemplar, AURORAxmp from EPIS)

PORTFOLIO MODELLING OVERVIEW

INPUTS and PORTFOLIO RESULTS

INPUTS

List of inputs

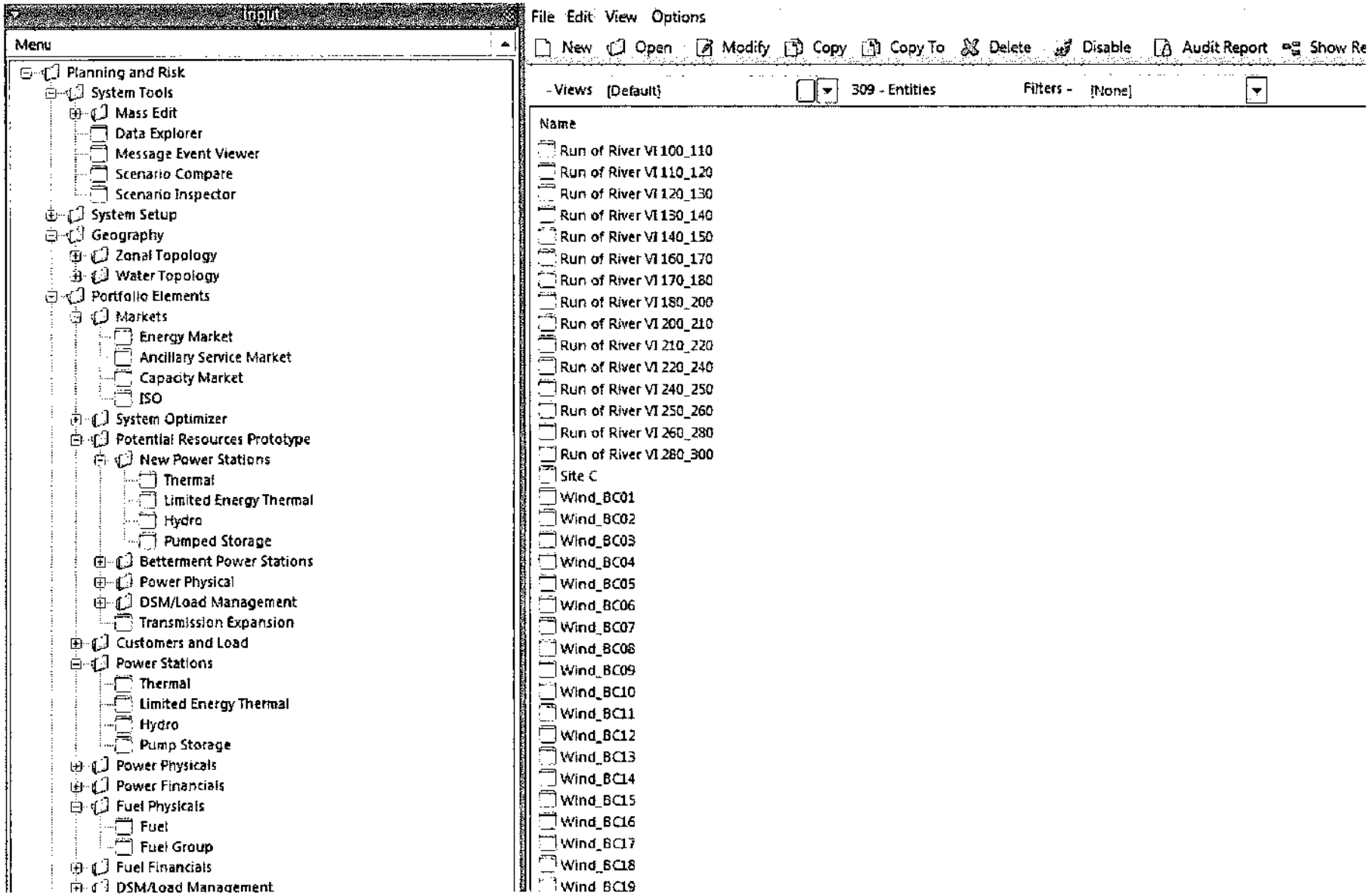
Inputs for a wind project

Inputs for a gas turbine

Inputs – transmission intertie to US

Setting up a portfolio run

LIST OF INPUTS



INPUTS FOR A WIND PROJECT

Variable List

System Optimizer

- New Limited Energy Thermal
  - Operational Characteristics
    - Planning Factors
      - Capacity Planning Factor
      - Annual Planning Energy Factor
    - Station Characteristics
      - Unit Type
      - Technology Group
      - Regulation Criteria
      - [illegible]
    - Capabilities
      - Name Plate Capacity
      - Maximum
        - Maximum Capacity Value
        - Maximum Capacity Index
      - Minimum
        - Minimum Capacity Value
        - Minimum Capacity Index
    - Heat Rate
    - Fuels
    - Optimization
      - Commit
      - Dispatch
    - Operation Cost
      - Dispatch Price Adder
      - Fixed Cost per Year
      - Demand Charge monthly ($/KW)
      - Variable O&M Cost
    - Energy Availability - Yearly Energy
      - Maximum Annual Energy
      - Energy Multiplier Index
    - Energy Profile
    - Maintenance
    - Emission Rates and Cost
  - Planning Characteristics
    - Month Project Begins
    - First Year Available
    - Last Year Available
    - First Year Fractional Units Allowed
    - Units Build Constraints
      - Maximum Cumulative Units
      - Maximum Annual Units
      - Minimum Annual Units
    - Capital Costs

Variable	Data Type	Values
Capacity Planning Factor	Constant	0.2256
Annual Planning Energy Factor	Constant	0.4306
Technology Group	Constant Relationship	Extended Values

Available	Selected
Name	Name
Bio_mass	Wind
CCGT	Renewables
OSB	BC_Clean
Existing_IPP	

Physical Location	Constant Relationship	BCH_pr
Name Plate Capacity	Constant	117.00
Maximum Capacity Value	Constant	117.00
Minimum Capacity Value	Annual Pattern	Extended Values

Date	Values
2011-01-01 12:00 AM	64.7997
2011-02-01 12:00 AM	52.8685
2011-03-01 12:00 AM	48.7573
2011-04-01 12:00 AM	42.6364
2011-05-01 12:00 AM	35.9954

Commit	Constant	Must run
Variable OM Cost	Constant	112.98
Maximum Annual Energy	Constant	459
Month Project Begins	Constant	Jan
First Year Available	Constant	2018
Last Year Available	Constant	2100
Maximum Cumulative Units	Constant	1
Maximum Annual Units	Constant	1
Minimum Annual Units	Constant	0

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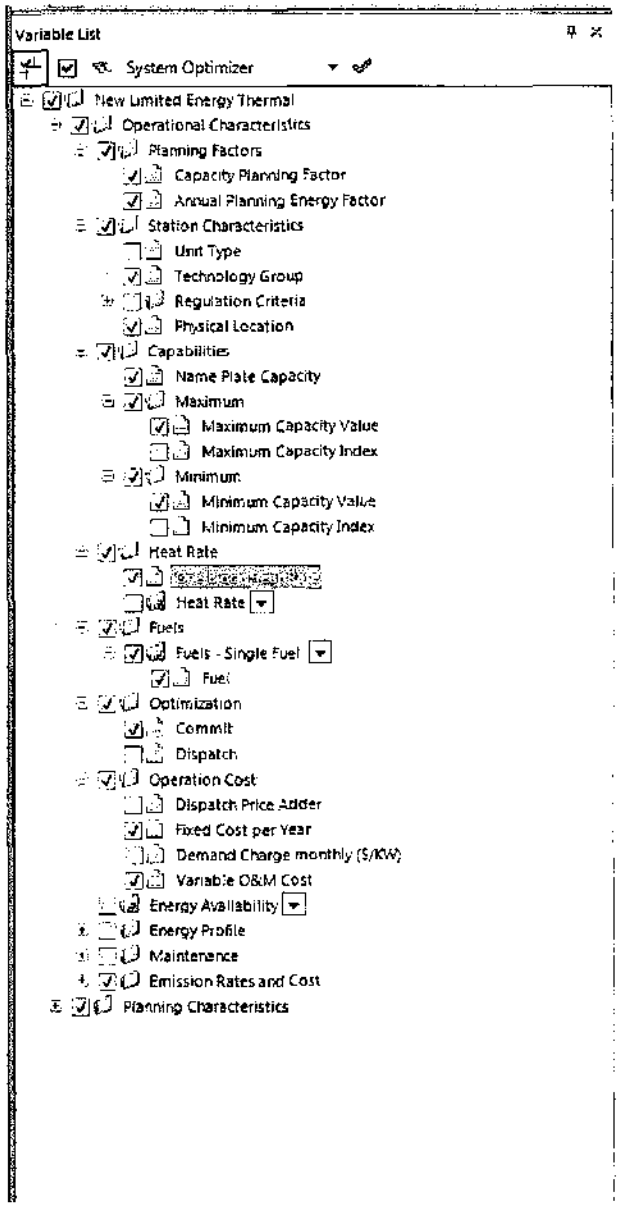
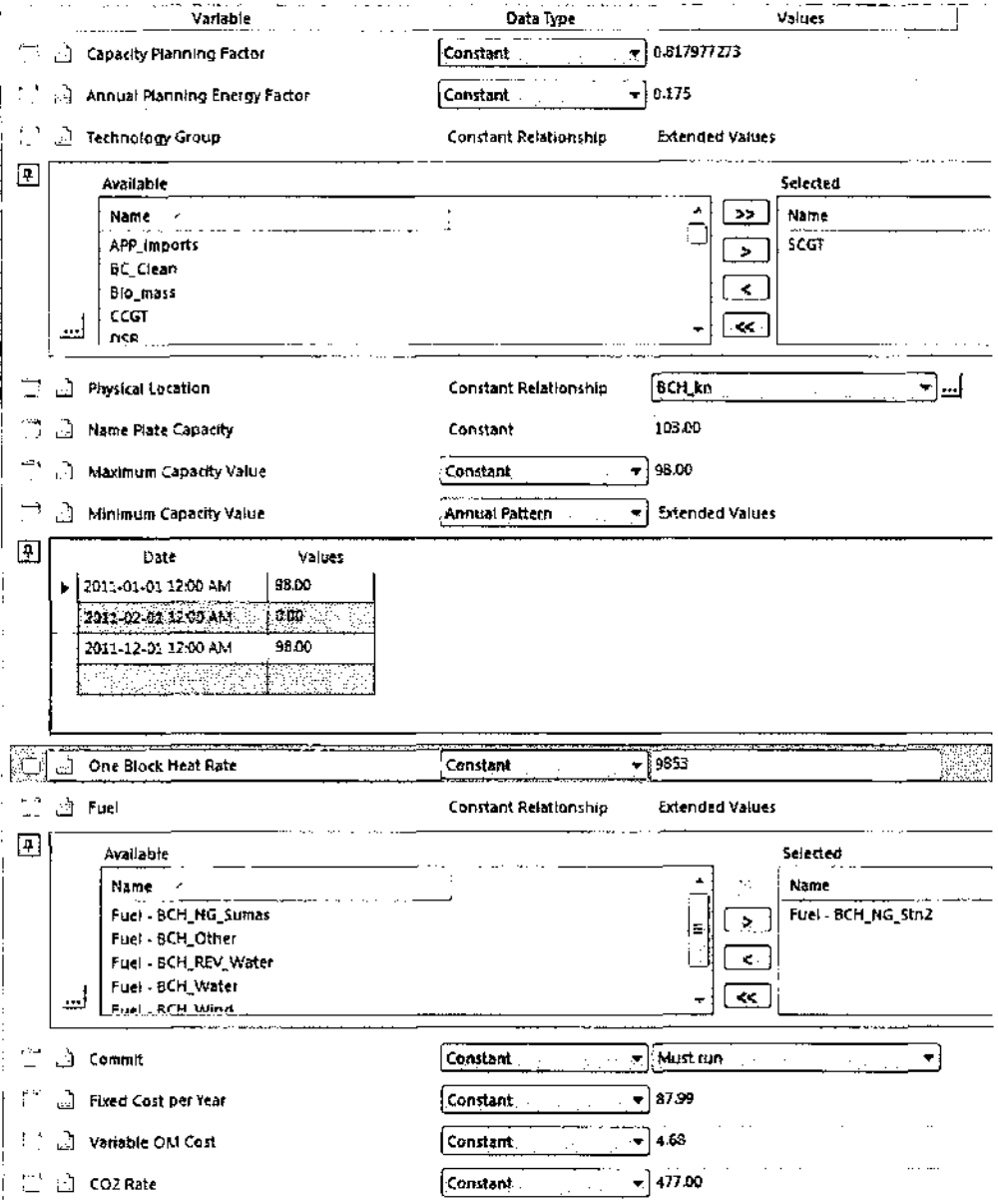
INPUTS FOR A GAS TURBINE





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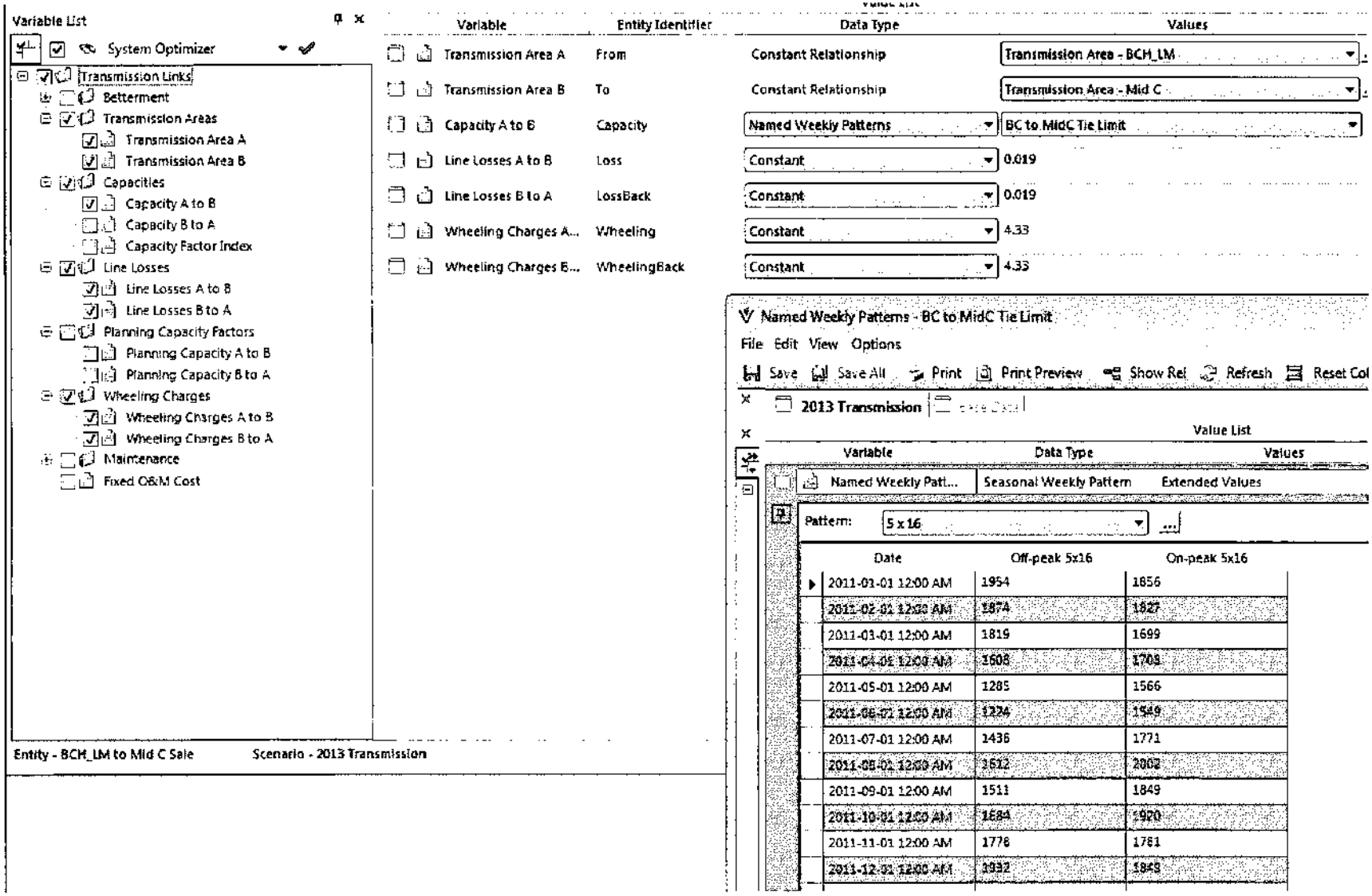
INPUTS – TRANSMISSION INTERTIE TO US



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PORTFOLIO RESULTS

Clean/thermal within 93% headroom:

1. With Site C
2. Without Site C

RESULTS – WITH SITE C

PV AND OTHER INFORMATION

	Discounted to January 2013 (F2013 $) - Jan DSM TRC
PV of G& T Resource cost - $ millions	6,023
PV of Trade Revenue - $ millions	(1,242)
PV of DSM Option cost - $ millions	2,977
PV of Total Portfolio Cost - $ millions	7,758

Supply Totals through 2020

	Wind	Small Hydro	Other	Site C	Total
Dep. Capacity (MW)	0	0	0	0	0
Firm Energy (GWh)	0	0	0	0	0

Supply Totals through 2030

	Wind	Small Hydro	Other	Site C	Total
Dep. Capacity (MW)	0	0	559	1,100	1,659
Firm Energy (GWh)	0	0	902	5,103	6,006

Supply Totals through 2040

	Wind	Small Hydro	Other	Site C	Total
Dep. Capacity (MW)	271	0	1,597	1,100	2,968
Firm Energy (GWh)	3,874	0	3,860	5,103	12,837

DSM Level in:

2020	7,606 GWh	1,421 MW
2030	11,190 GWh	2,036 MW
2040	14,572 GWh	2,652 MW

Clean Objective (%) - performance during the period 2016-2040

	Based on Generation	Based on Firm Capability
Average %	97%	94%
Lowest %	95%	93%

Transmission Expansion

Year	Project Description	Between	Capacity - MW
2019	Series compensation of WSN-GLN 500 kV line	CI to NC	500
2023	Series compensation 5L1_2_3_7 from GMS to WSN	PR to KN	360
2023	Series compensation 5L11_12_13 from WSN to KLY	PR to KN	390
2027	Shunt compensation at WSN KLY	PR to KN	650
2029	Shunt compensation at NIC and MDN	KN to LM	570
2033	500 kV circuit 5L46 between KLY and Cheekye	KN to LM	1384
2034	Series compensation of 5L91 and 5L98	SE to KN	147
[illegible]	[illegible]	[illegible]	[illegible]

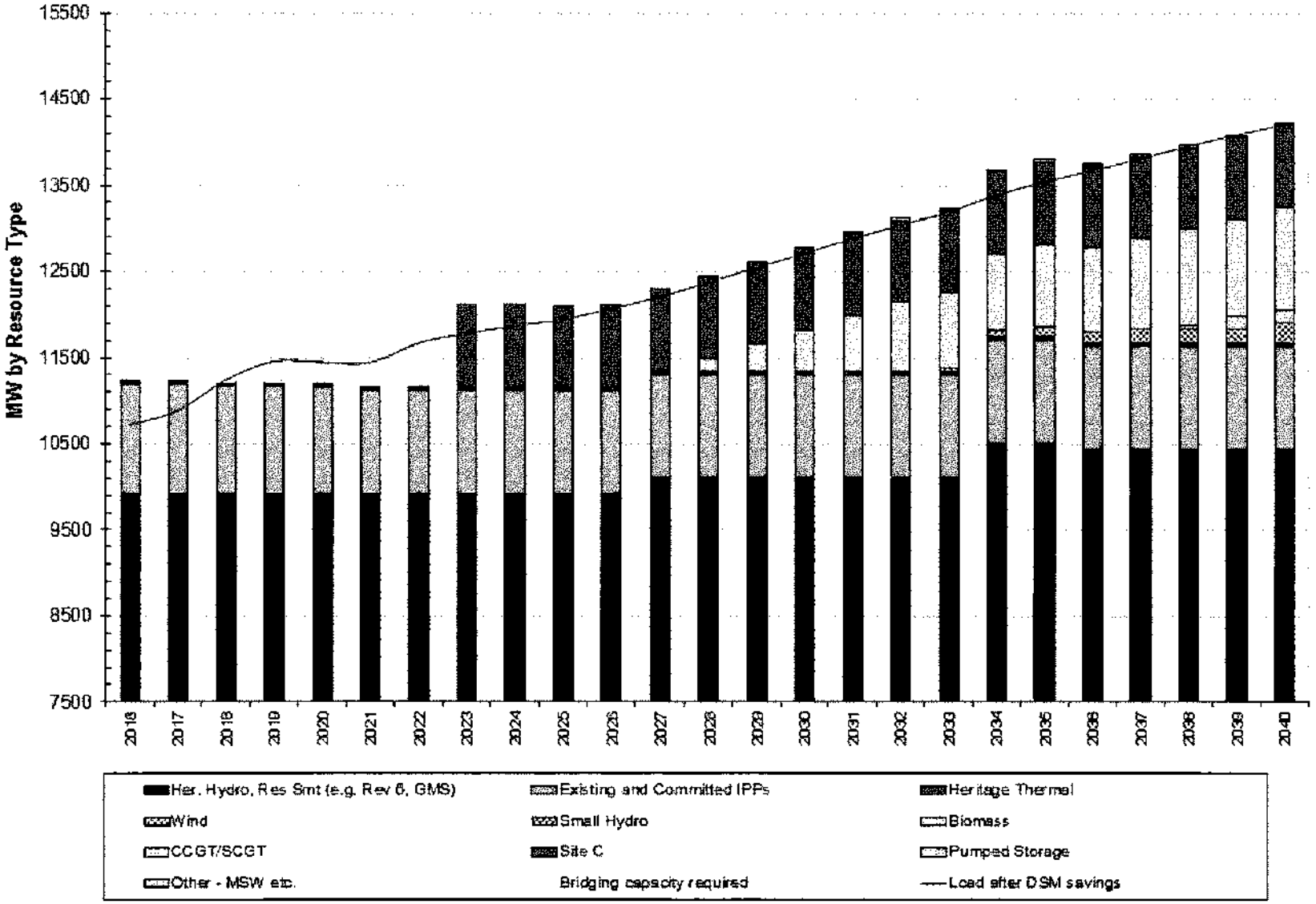
RESULTS – WITH SITE C

LIST OF RESOURCES SELECTED

			Capacity - MW		Energy - GWh		UEC / UCC
Year	Zone	Resource	Installed	Dependable	Firm	Total	$/MWh or $/kW-year
2023	BCH_PR	Site C	1100	1,100	5,100	5,100	79
2027	BCH_PR	GMS Units 1-5 Cap Increase	220	220			35
2028	BCH_NC	100 MW SCGT NC	206	196	300	300	88
2029	BCH_NC	100 MW SCGT NC	206	196	300	300	88
2030	BCH_NC	100 MW SCGT NC	103	98	150	150	88
2030	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2031	BCH_KN	100 MW SCGT KN	206	196	300	300	88
2031	BCH_LM	MSW2_LM	25	24	208	208	92
2032	BCH_KN	100 MW SCGT KN	206	196	300	300	88
2033	BCH_PR	Wind_PC28	153	40	591	591	111
2033	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2034	BCH_PR	Wind_PC13	135	35	541	541	113
2034	BCH_PR	Wind_PC21	99	26	371	371	112
2034	BCH_REV	Revelstoke Unit 6	500	488	26	26	50
2035	BCH_PR	Wind_PC19	117	30	441	441	113
2035	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2035	BCH_VI	MSW1_VI	12	12	100	100	127
2036	BCH_PR	Wind_PC16	99	26	377	377	116
2037	BCH_PR	Wind_PC14	144	37	527	527	117
2037	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2038	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2038	BCH_LM	Biomass_LM	30	30	239	239	143
2039	BCH_PR	Biomass_PR	28	28	223	223	141
2039	BCH_CI	Biomass_CI	41	41	327	327	147
2039	BCH_SE	Biomass_SE	33	33	263	263	141
2039	BCH_VI	Biomass_VI	30	30	239	239	142
2040	BCH_PR	Wind_PC10	297	77	1,023	1,023	118
2040	BCH_NC	100 MW SCGT NC	103	98	150	150	88

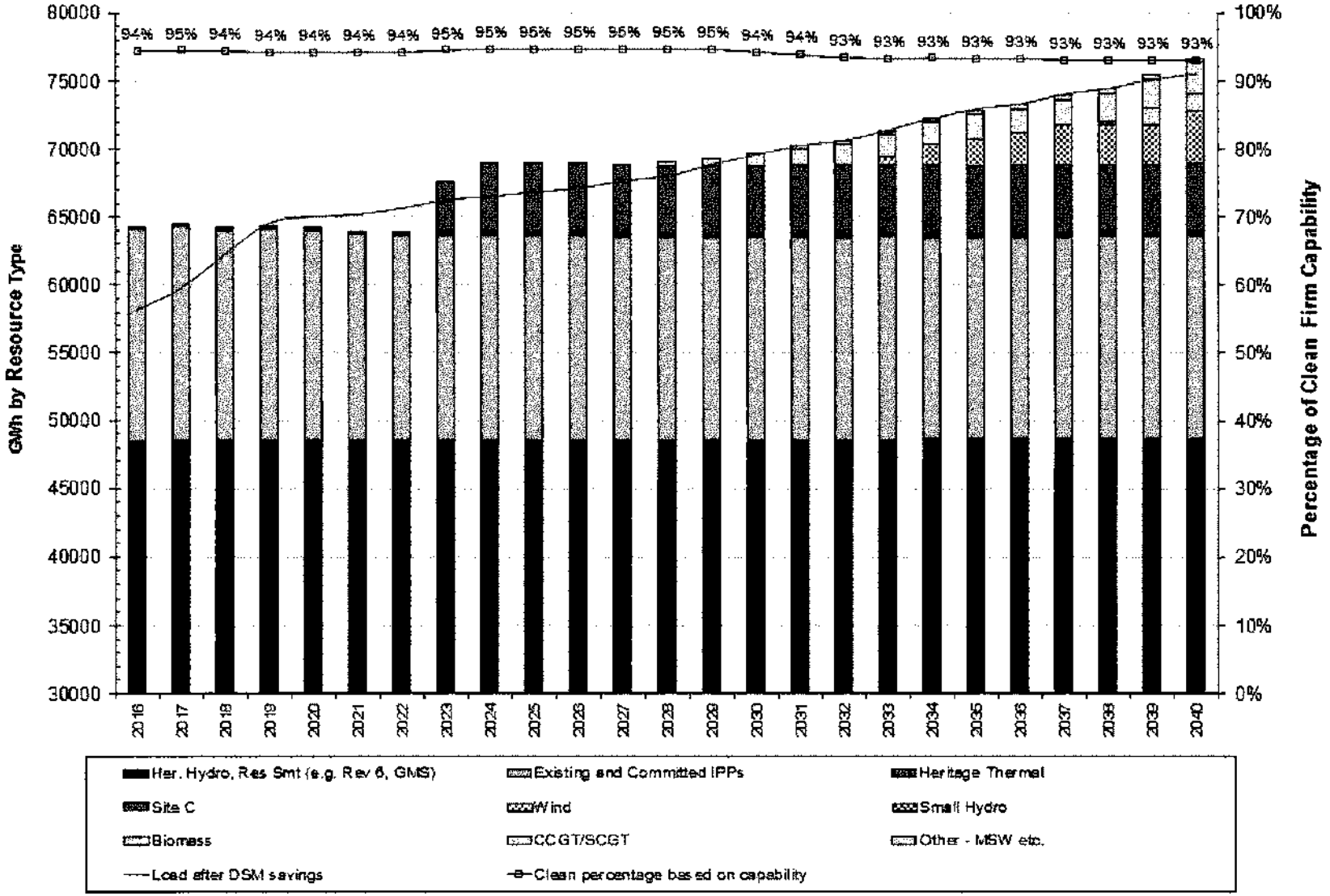
RESULTS - WITH SITE C

DEPENDABLE CAPACITY – SUPPLY DEMAND BALANCE



RESULTS – WITH SITE C

FIRM ENERGY – SUPPLY DEMAND BALANCE



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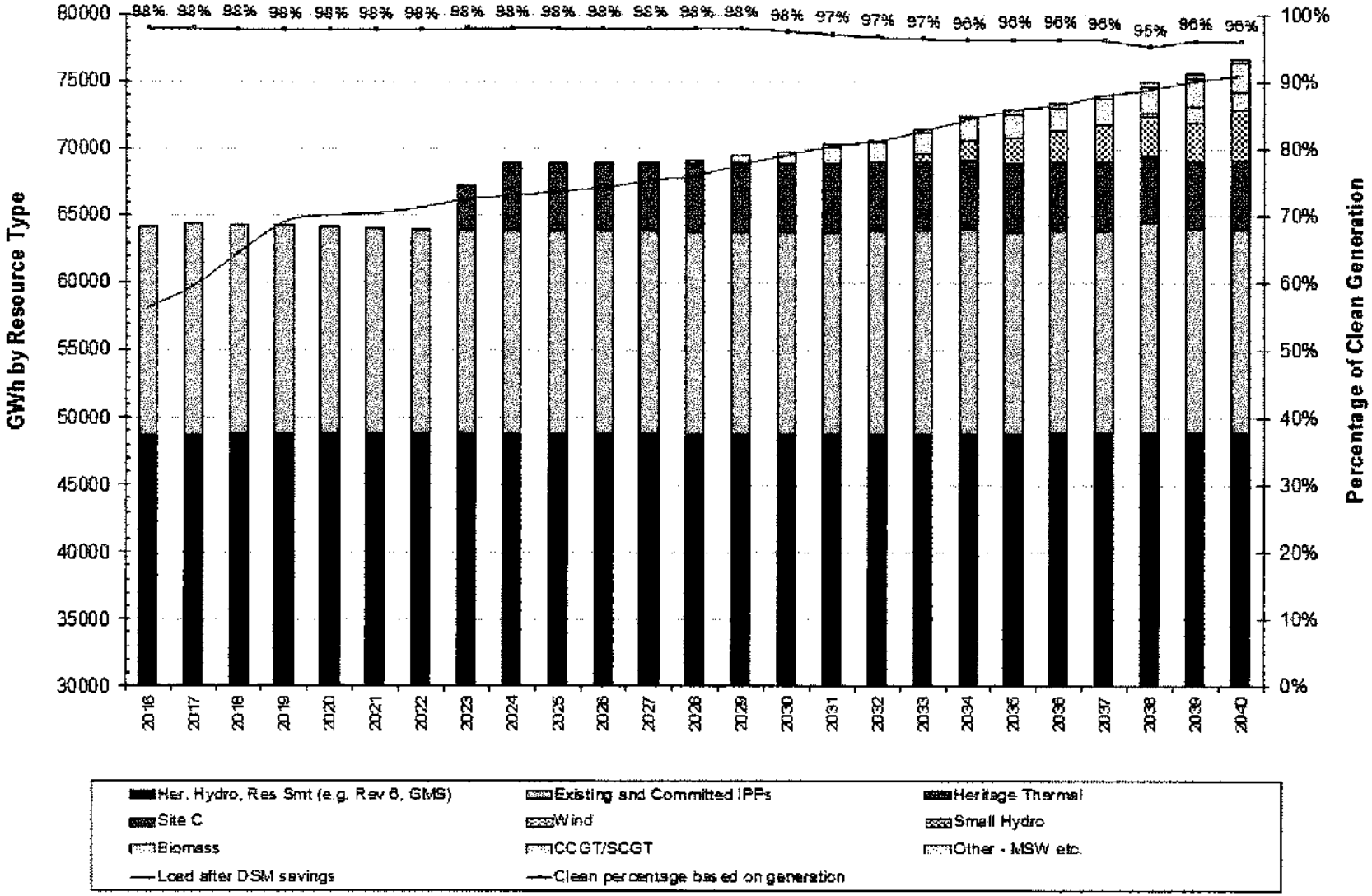
RESULTS – WITH SITE C

SIMULATED GENERATION AND LOAD



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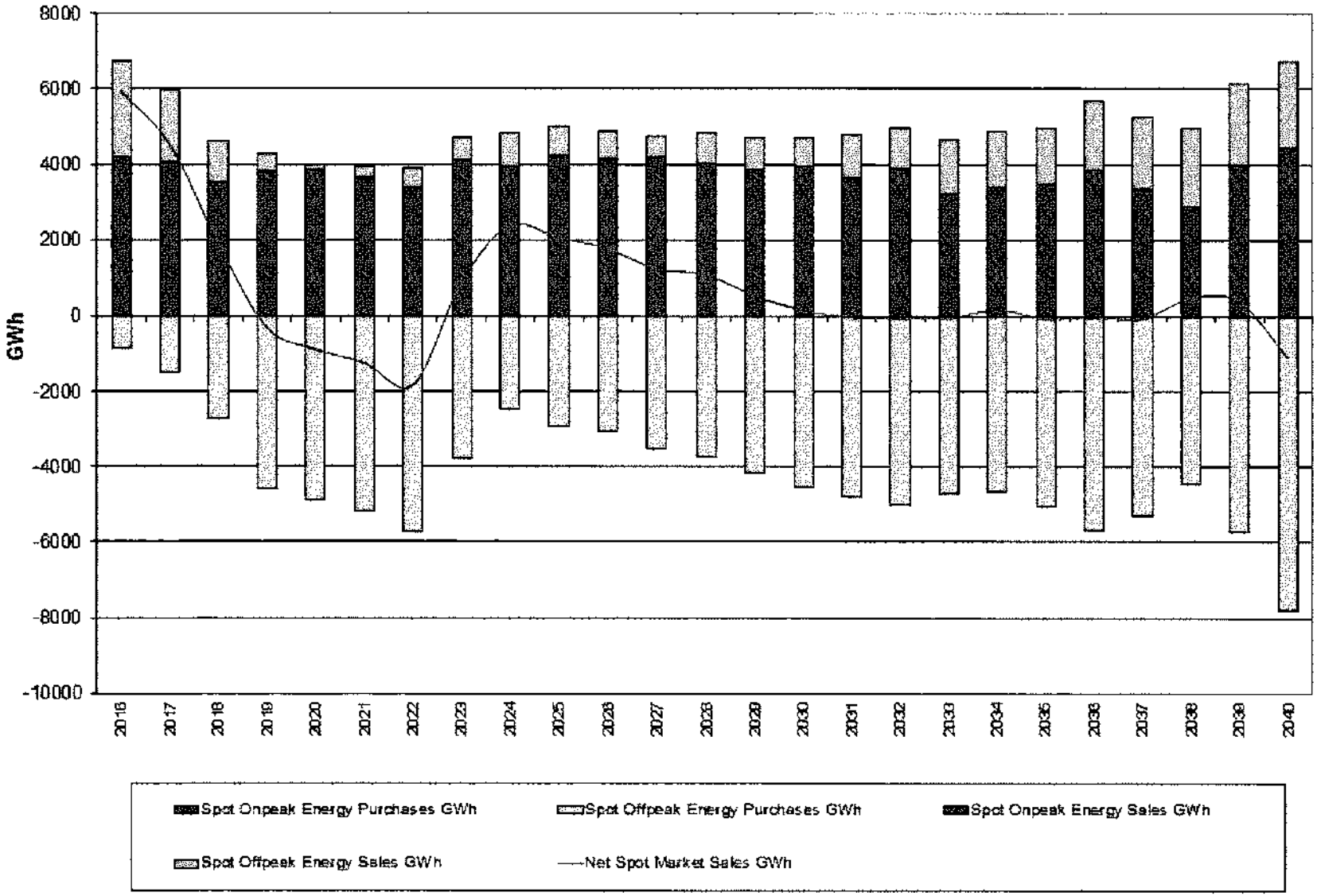
RESULTS – WITH SITE C

SPOT MARKET IMPORTS AND EXPORTS



RESULTS – WITHOUT SITE C

PV AND OTHER INFORMATION

	Discounted to January 2013 (F2013 $) - Jan DSM TRC
PV of G& T Resource cost - $ millions	7,083
PV of Trade Revenue - $ millions	(1,045)
PV of DSM Option cost - $ millions	2,977
PV of Total Portfolio Cost - $ millions	9,016

Supply Totals through 2020

	Wind	Small Hydro	Other	Site C	Total
Dep. Capacity (MW)	0	0	0	0	0
Firm Energy (GWh)	0	0	0	0	0

Supply Totals through 2030

	Wind	Small Hydro	Other	Site C	Total
Dep. Capacity (MW)	271	0	1,050	0	1,321
Firm Energy (GWh)	3,874	0	1,864	0	5,738

Supply Totals through 2040

	Wind	Small Hydro	Other	Site C	Total
Dep. Capacity (MW)	583	57	2,434	0	3,075
Firm Energy (GWh)	8,087	783	3,159	0	12,029

DSM Level in:

2020	7,606 GWh	1,421 MW
2030	11,190 GWh	2,036 MW
2040	14,572 GWh	2,652 MW

Clean Objective (%) - performance during the period 2016-2040

	Based on Generation	Based on Firm Capability
Average %	98%	94%
Lowest %	98%	94%

Transmission Expansion

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2029	Shunt compensation at WSN KLY	PR to KN	650
2029	Series compensation of 5L91 and 5L38	SE to KN	147
2029	Shunt compensation at NIC and MDN	KN to LM	570
2033	Series compensation 5L1_2_3_7 from GMS to WSN	PR to KN	360
2033	Series compensation 5L11_12_13 from WSN to KLY	PR to KN	390

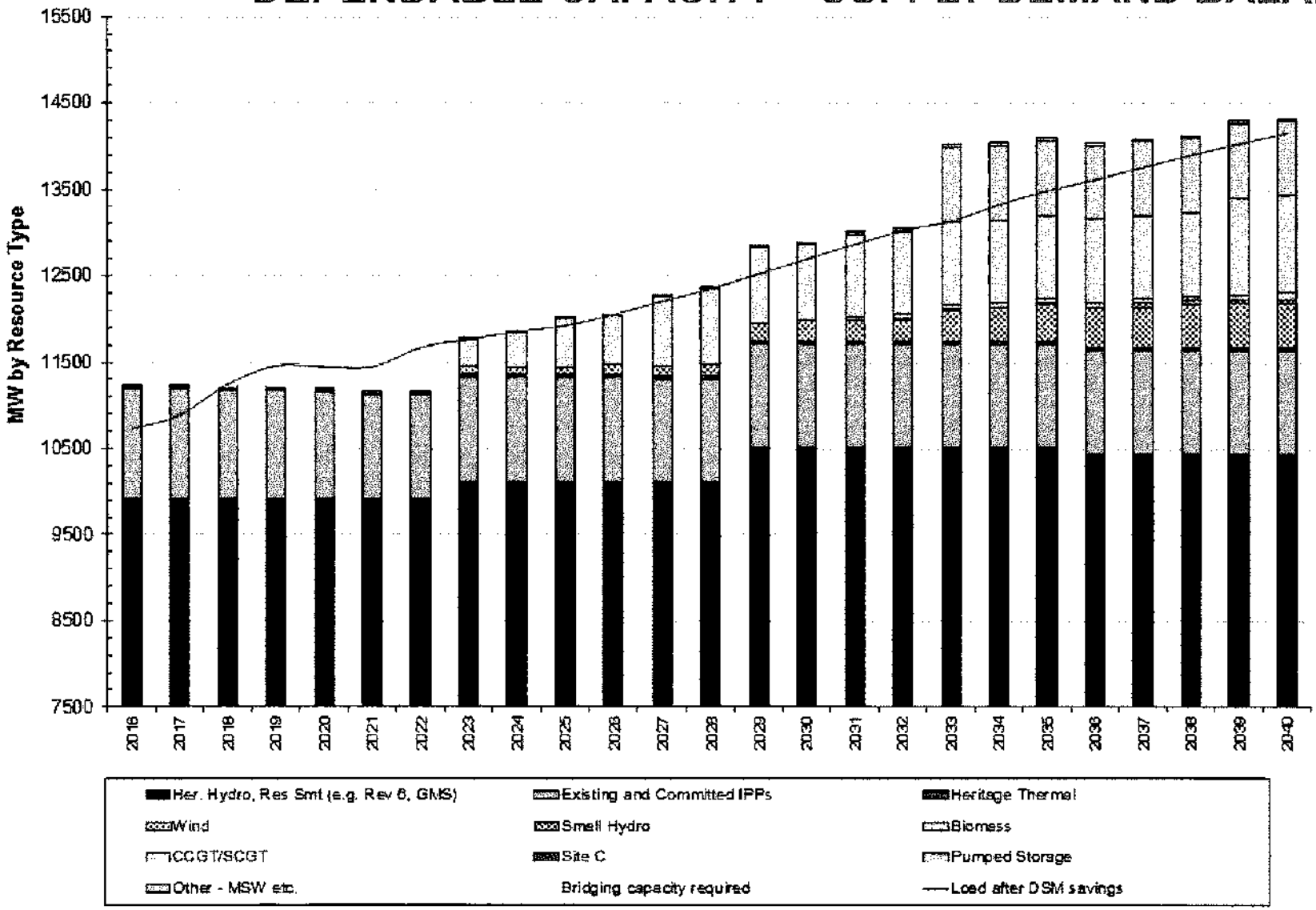
RESULTS – WITHOUT SITE C

LIST OF RESOURCES SELECTED

Year	Zone	Resource	Capacity - MW Installed	Capacity - MW Dependable	Energy - GWh Firm	Energy - GWh Total	UEC / UCC $/MWh or $/kW-yea
2023	BCH_PR	GMS Units 1-5 Cap Increase	220	220			35
2023	BCH_PR	Wind_PC19	117	30	441	441	113
2023	BCH_PR	Wind_PC21	99	26	371	371	112
2023	BCH_PR	Wind_PC26	153	40	591	591	111
2023	BCH_NC	100 MW SCGT NC	309	294	450	450	88
2023	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2023	BCH_LM	MSW2_LM	25	24	208	208	92
2024	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2025	BCH_NC	100 MW SCGT NC	103	98	150	150	88
2025	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2026	BCH_PR	Wind_PC13	135	35	541	541	113
2027	BCH_NC	100 MW SCGT NC	103	98	150	150	88
2027	BCH_KN	100 MW SCGT KN	206	196	300	300	88
2028	BCH_PR	Wind_PC16	99	26	377	377	116
2028	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2029	BCH_PR	Wind_PC10	297	77	1,023	1,023	118
2029	BCH_RE\	Revelstoke Unit 6	500	488	26	26	50
2030	BCH_PR	Wind_PC14	144	37	527	527	117
2031	BCH_KN	100 MW SCGT KN	103	98	150	150	88
2031	BCH_VI	MSW1_VI	12	12	100	100	127
2031	BCH_VI	Biomass_VI	30	30	239	239	142
2031	BCH_LM	Run of River LM 80_100	62	10	174	223	108
2032	BCH_VI	Wind_VI14	35	9	114	114	135
2032	BCH_LM	Biomass_LM	30	30	239	239	143
2033	BCH_PR	Wind_PC09	207	54	713	713	122
2033	BCH_PR	Wind_PC15	108	28	382	382	119
2033	BCH_PR	Wind_PC20	159	41	610	610	119
2033	BCH_LM	Pumped_Storage_LM	1000	1,000			126
2034	BCH_PR	Wind_PC11	126	33	473	473	122
2034	BCH_PR	Wind_PC41	45	12	155	155	122
2035	BCH_PR	Wind_PC18	138	36	486	486	123
2035	BCH_PR	Wind_PC42	63	16	219	219	122
2036	BCH_PR	Wind_PC26	126	33	416	416	127
2037	BCH_VI	Run of River VI 100_110	119	29	352	451	120
2037	BCH_LM	Run of River LM 100_110	102	18	256	330	115
2038	BCH_PR	Wind_PC48	152	40	505	505	126
2039	BCH_PR	Wind_PC43	41	11	138	138	148
2039	BCH_KN	100 MW SCGT KN	206	196	300	300	88

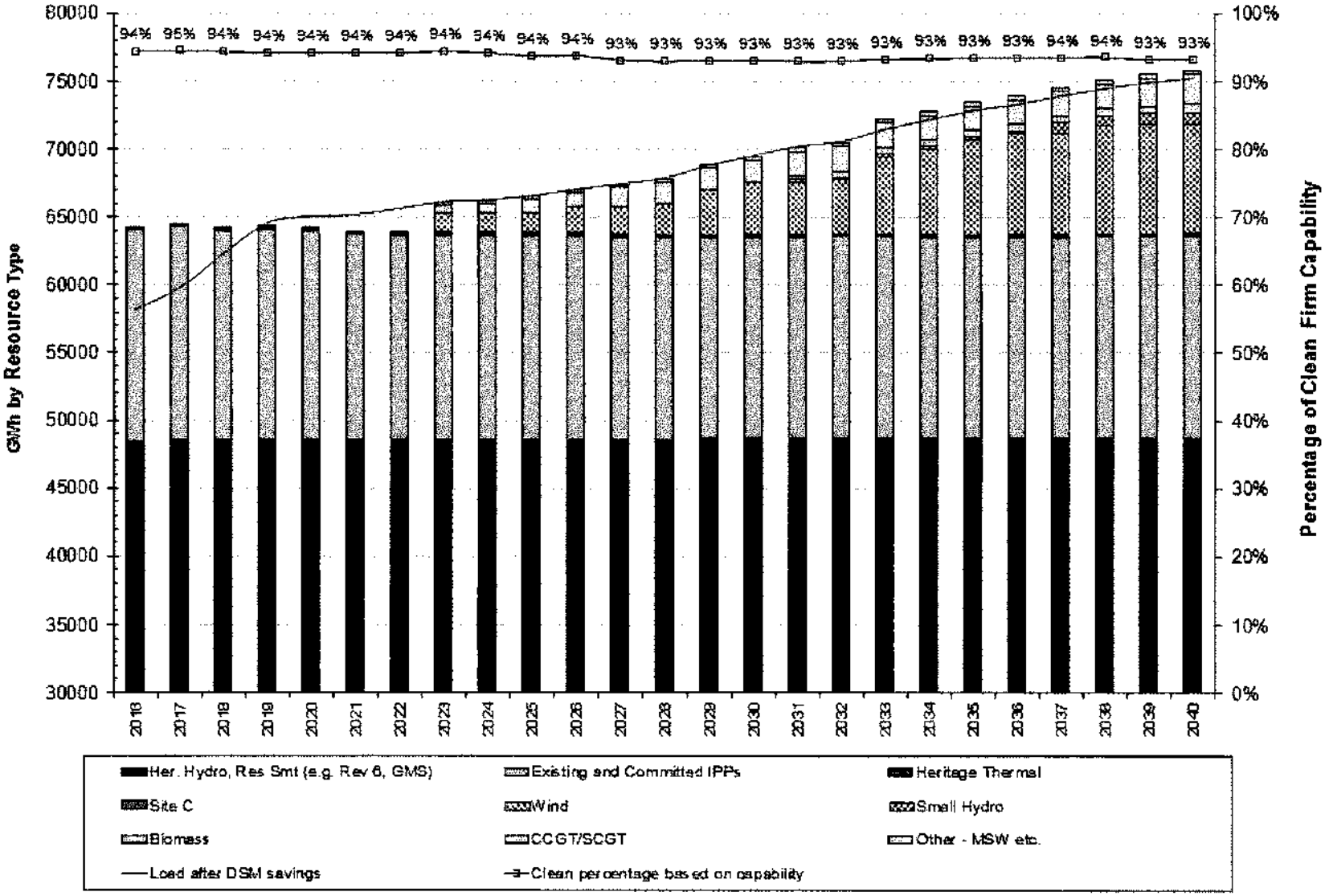
RESULTS – WITHOUT SITE C

DEPENDABLE CAPACITY – SUPPLY DEMAND BALANCE

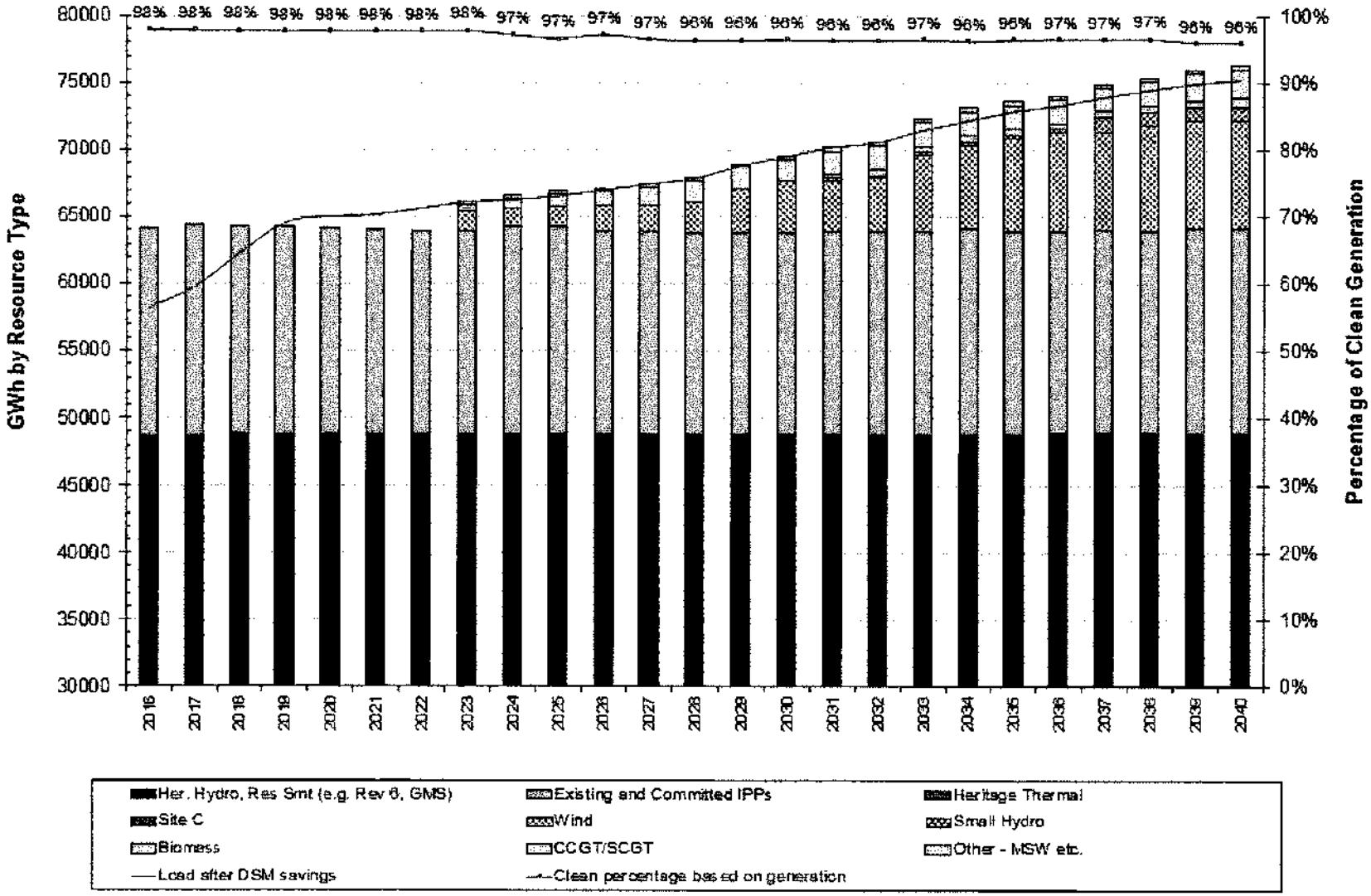


RESULTS – WITHOUT SITE C

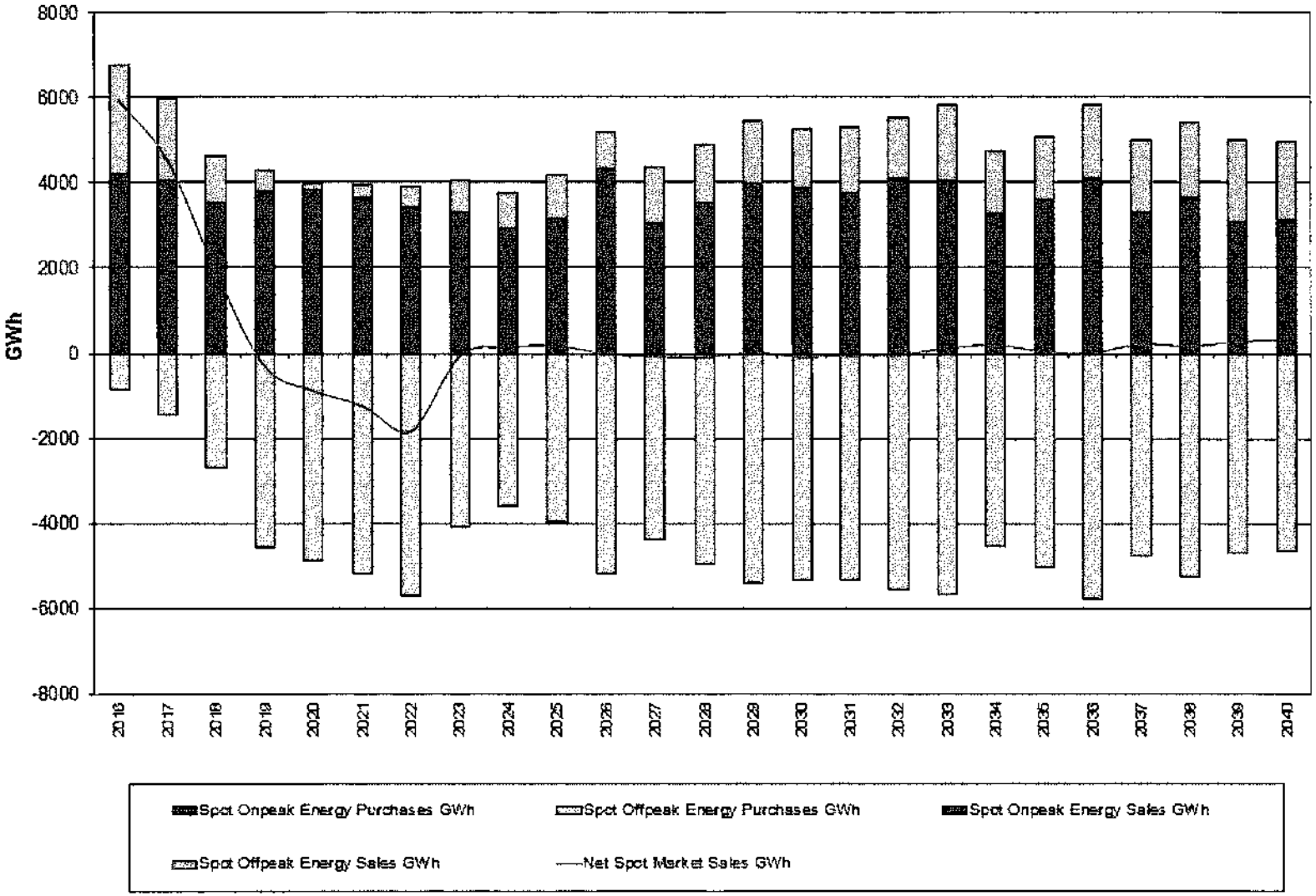
FIRM ENERGY – SUPPLY DEMAND BALANCE



RESULTS – WITHOUT SITE C
SIMULATED GENERATION AND LOAD



RESULTS – WITHOUT SITE C
SPOT MARKET IMPORTS AND EXPORTS



IRP PROCESS AND NIEX FRAMEWORK

HOW TO CONSIDER AND EVALUATE THE MAJOR UNCERTAINTIES

INPUTS

NEED
Load Forecast

RESOURCE OPTIONS
DSM
Supply Side – Site C, IPPs
Capacity Resources
Transmission Resources

MARKET CONTEXT
Market Scenarios
Gas Price Forecast
GHG Price Forecast
REC Price Forecast
Electricity Price Forecast

KEY ISSUES

DSM

Site C

Resource Acquisition

Transmission

ANALYSIS

PORTFOLIOS
20 year
30 year

OTHER ISSUES
Role of Gas
Reliability
Wind Integration
Expenditures

ACTIONS

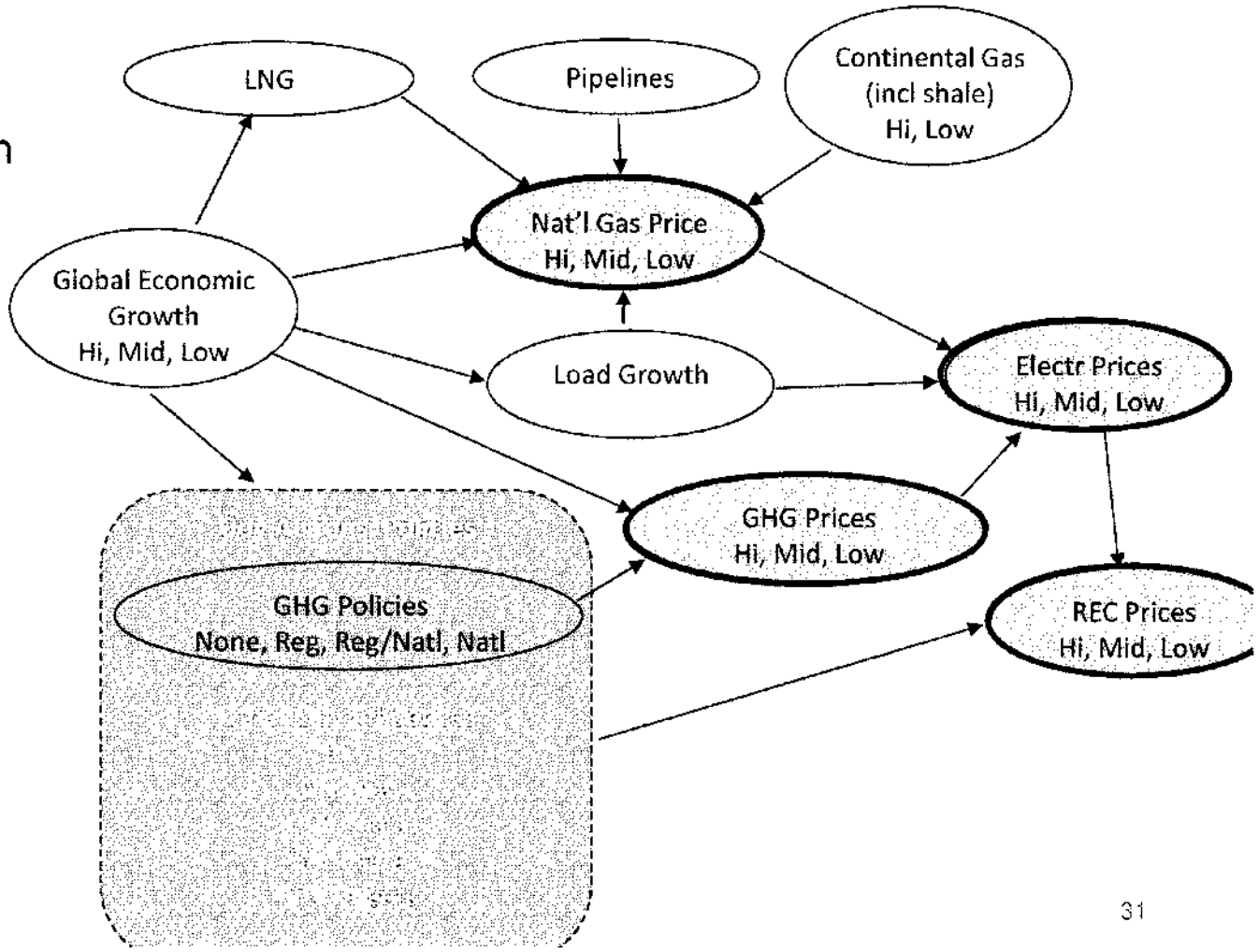
TREATMENT OF UNCERTAINTY

Approach	Brief Description	Examples
Parameterization of Observations	Sequences of past data to derive a statistical description of the range of uncertainty	Load forecast inputs - economic growth, housing starts, population growth
Subjective Prob. Elicitation	Where good historical data does not exist, uses knowledgeable specialists	DSM - codes and standards, rate structures and programs
Monte Carlo	Jointly calculate influence of several uncertain variables through computer modelling	• Load forecasting • DSM savings (bottom-up analysis)
Scenario Analysis	Jointly calculate influence of several uncertain variables using a few, select combinations	• Market price scenarios • Load/resource gap
Sensitivity Analysis	Testing one variable at a time to see whether different values within the range of uncertainty impact policy considerations	Site C capital cost Cost of capital - BC Hydro and IPPs Wind integration cost Compound - low gap, low market
Point Estimates	Single "conservative" point estimate	IPP hydro firm energy
Best Estimates	Uncertainty assumed to have a small or manageable impact	Energy from wind projects

MARKET SCENARIOS – SIMPLIFIED INFLUENCE DIAGRAM

Influence Diagram

- Simplified sketch of what impacts what
- Detailed modelling does this exactly



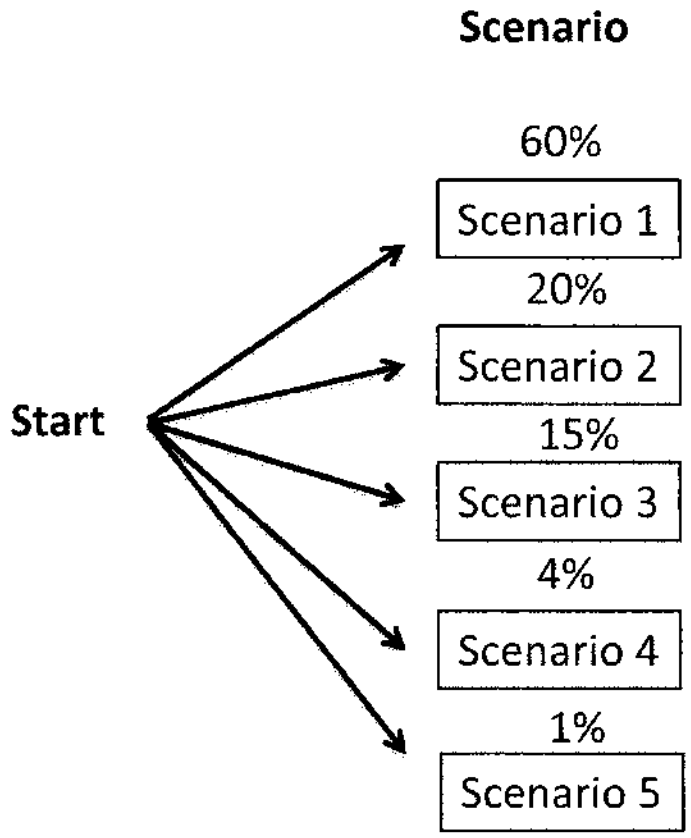
MARKET SCENARIOS – RELATIVE LIKELIHOODS

Market Scenario	1 Mid Electricity Mid GHG (Regional) Mid Gas	2 Low Electricity Low GHG (Regional) Low Gas	3 High Electricity High GHG (Regional) High Gas	4 Mid Electricity Mid GHG (Regional/Nat'l) Mid Gas	5 High Electricity High GHG (Regional/Nat'l) High Gas
Relative Likelihood	60%	20%	15%	4%	1%

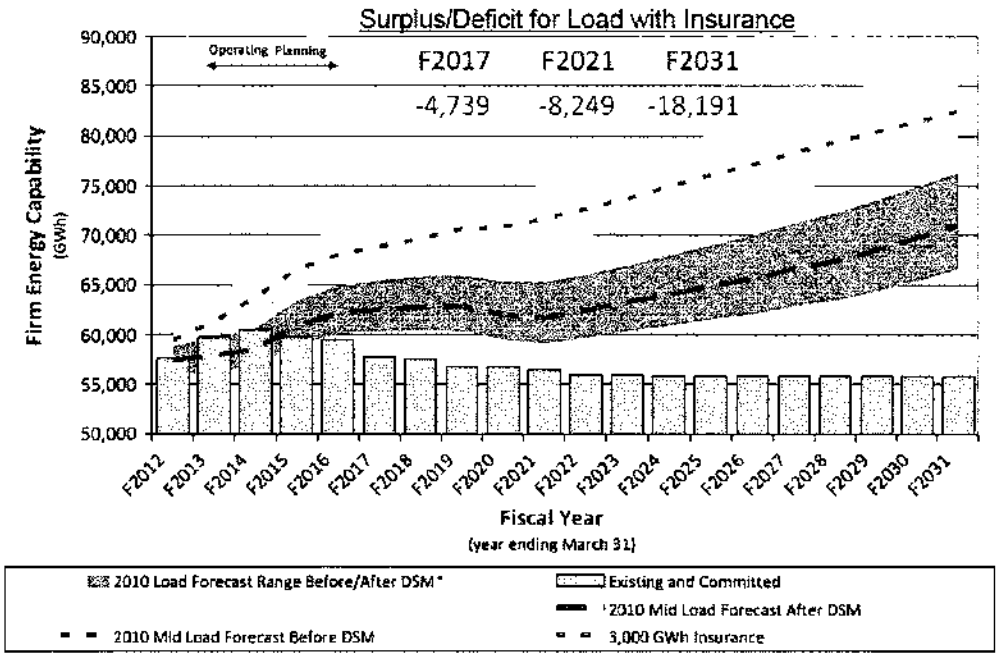
MARKET SCENARIOS -- INPUTS INTO THE RISK FRAMEWORK

Discussion

- Scenario 1 seems to be the 'most likely' scenario
- But how extreme are the others
- Need to derive relative likelihoods of each
- These will be best, current estimates
- Framework used will help in this process
- A mixture of art and science for this exercise
- Sensitivity analysis can be used to test importance



DETERMINING UNCERTAINTY AROUND "THE GAP"

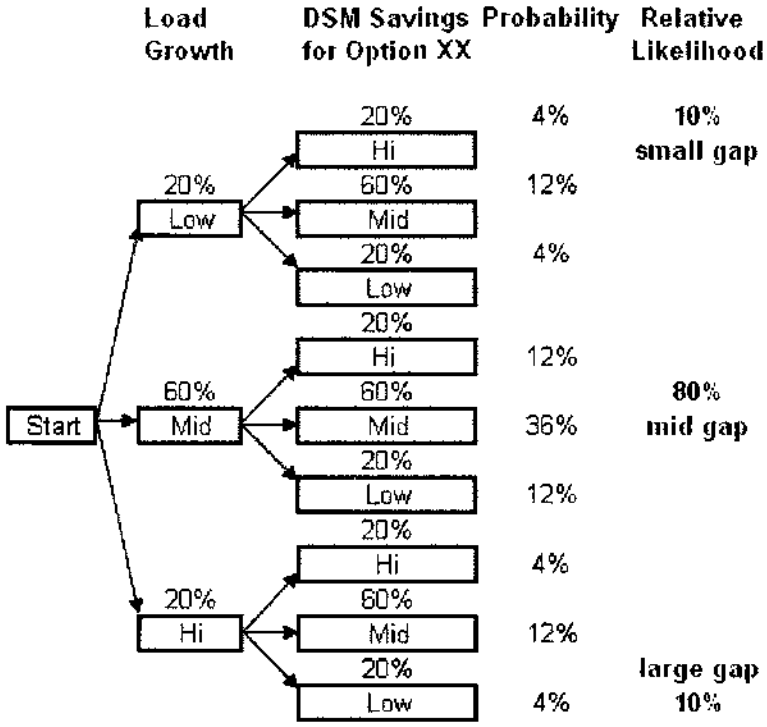


Two key uncertainties driving the net gap:

- Load growth uncertainty
- Uncertainty around DSM savings

COMBINING LOAD AND DSM – NET GAP SCENARIOS

- Load and DSM outcomes can be combined
- This gives us a set of three "Net Gap" scenarios
- Will be unique set for each DSM option
- Provides part of backdrop against which to test policy questions
- See Summary Brief for annual load amounts, by DSM option, and further explanation



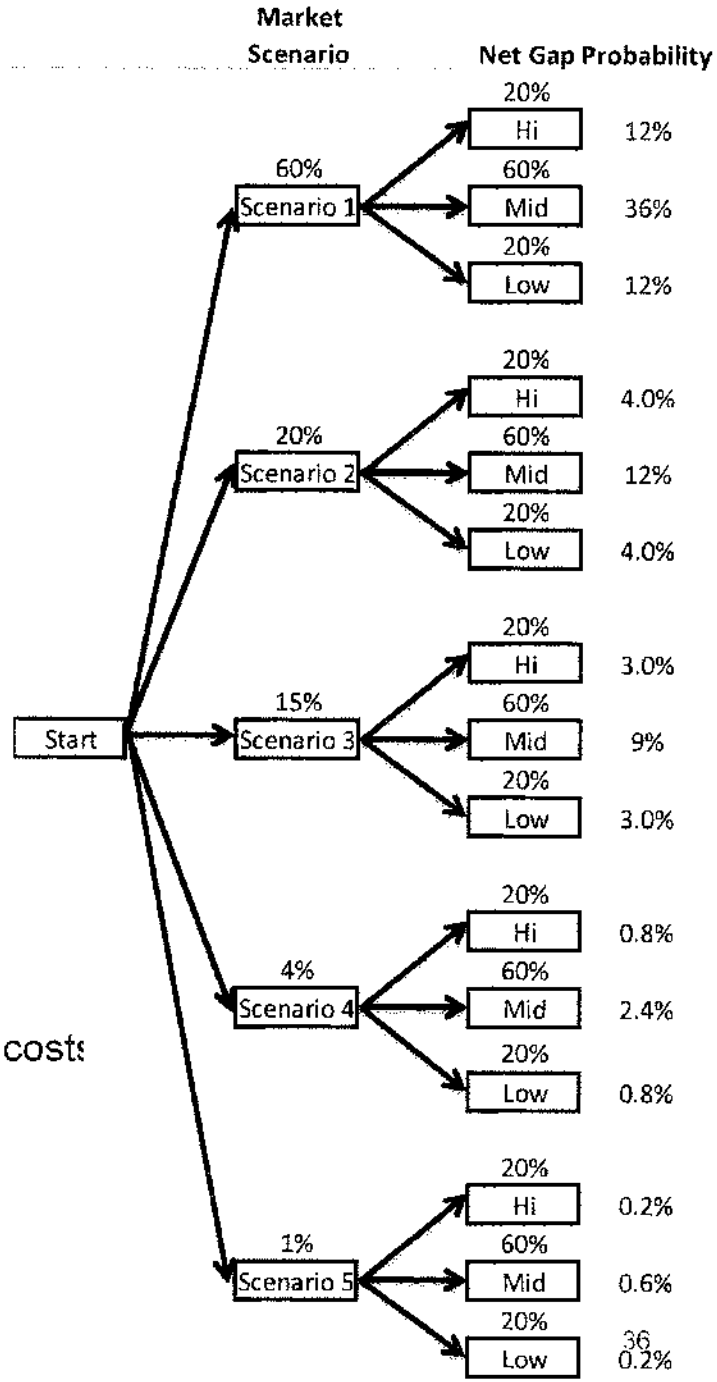
COMBINING MARKET AND GAP SCENARIOS

Risk Framework Probability Tree

- Mix of Market Scenarios and Net Gap Scenarios
- Each branch assigned a relative likelihood
- Each end node is a possible future
- Probabilities under development
- Net changes with DSM Options

Policy questions

- To be tested across 15 possible futures
- Will inform on the level, spread of possible future costs
- Will not be applied to non-financial impacts

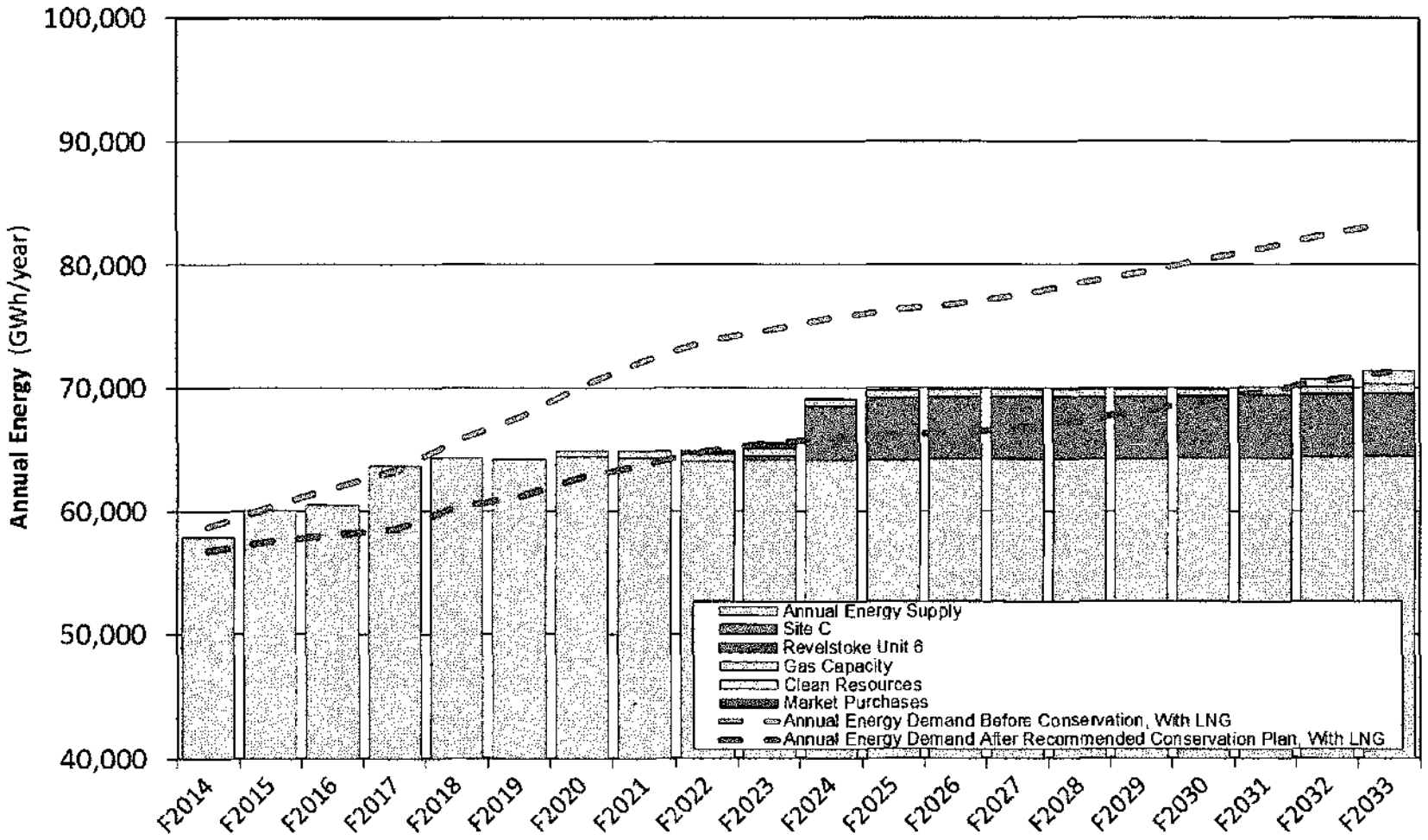


SUMMARY OF SENSITIVITY ANALYSIS OF SITE C BENEFITS (IRP TABLE 5-21)

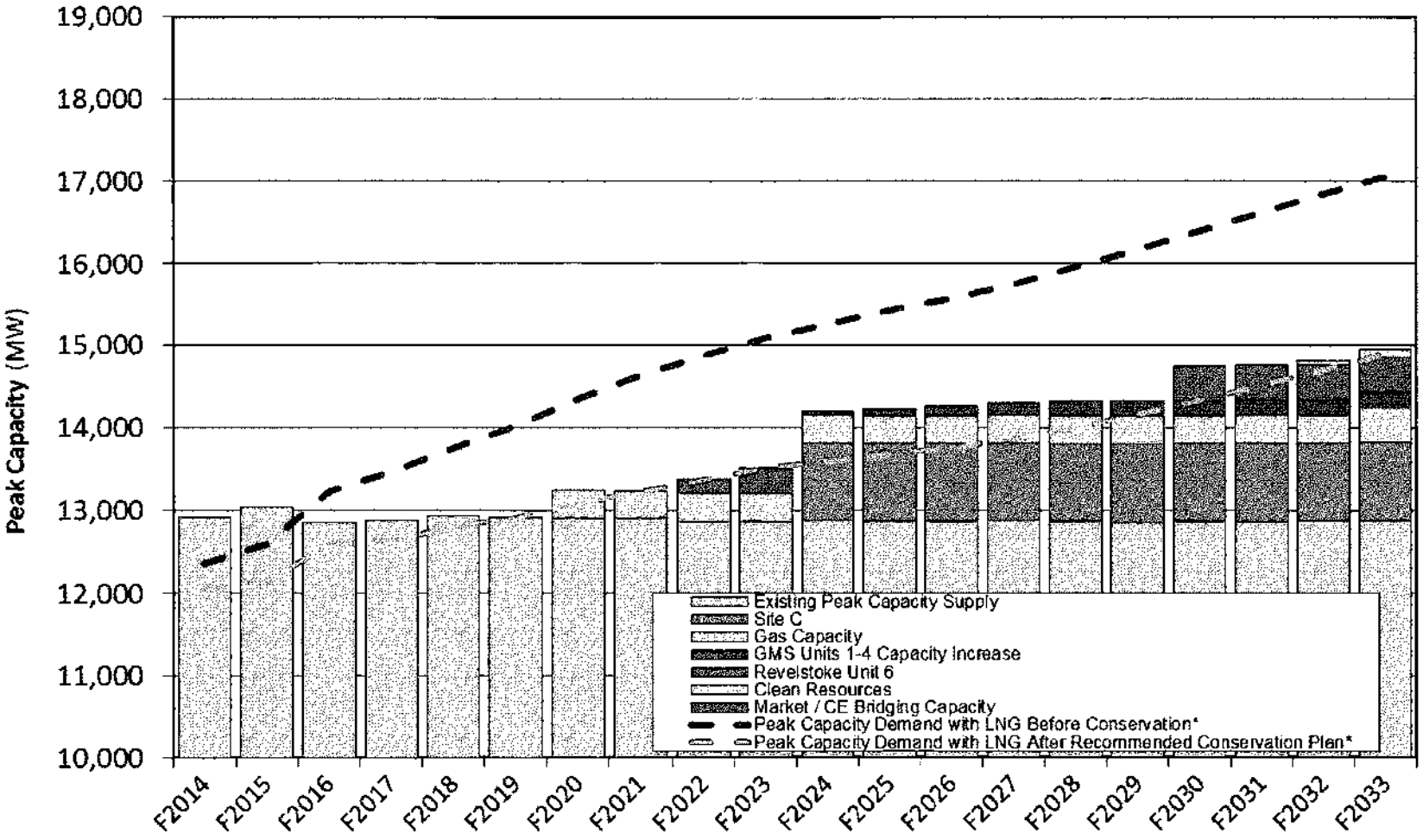
Difference in PV Cost (Portfolio without Site C minus with Site C) ($2013 million)	Clean Generation Portfolios		Clean + Thermal Generation Portfolios	
	F2024	F2026	F2024	F2026*
Base Case (Mid Gap, Mid-Market Price [Scenario 1], WACC Differential = 2%, Wind Integration Cost = $10/MWh	630	880	150	390
Large Gap	Note 1	Note 1	2,260	Note 1
Small Gap	(1,040)	(710)	(1,280)	(910)
With Expected LNG	1,850	Note 1	1,260	Note 1
High Market Price (Scenario 3)	830	1,030	470	660
Low Market Price (Scenario 2)	450	760	(90)	220
Site C Capital Cost +10%, alternatives held constant	360	650	(120)	170
Site C Capital Cost +15%, alternatives held constant	250	560	(230)	70
Site C Capital Cost +30%, alternatives held constant	(100)	270	(580)	(220)
Site C and Alternative Resource Options Capital Cost +30%	600	950	(60)	300
WACC Differential = 1%	420	670	20	230
Wind Integration Cost ($15/MWh)	720	Note 1	220	Note 1
Wind Integration Cost ($5/MWh)	530	Note 1	90	Note 1
Compound Low Scenario (Small Gap, Low Market Price, 10% Site C Capital Cost Increase)	Note 1	Note 1	(2,000)	(1,600)
Compound High Scenario (Large Gap, High Market Price, 10% Site C Capital Cost Decrease)	Note 1	Note 1	2,610	Note 1

Note 1:
The benefit for Site C in this scenario is expected to be higher than the comparative portfolio for the same sensitivity.

BASE RESOURCE PLAN WITH LNG - ENERGY



BASE RESOURCE PLAN WITH LNG - CAPACITY



Fiscal Year (year ending March 31)

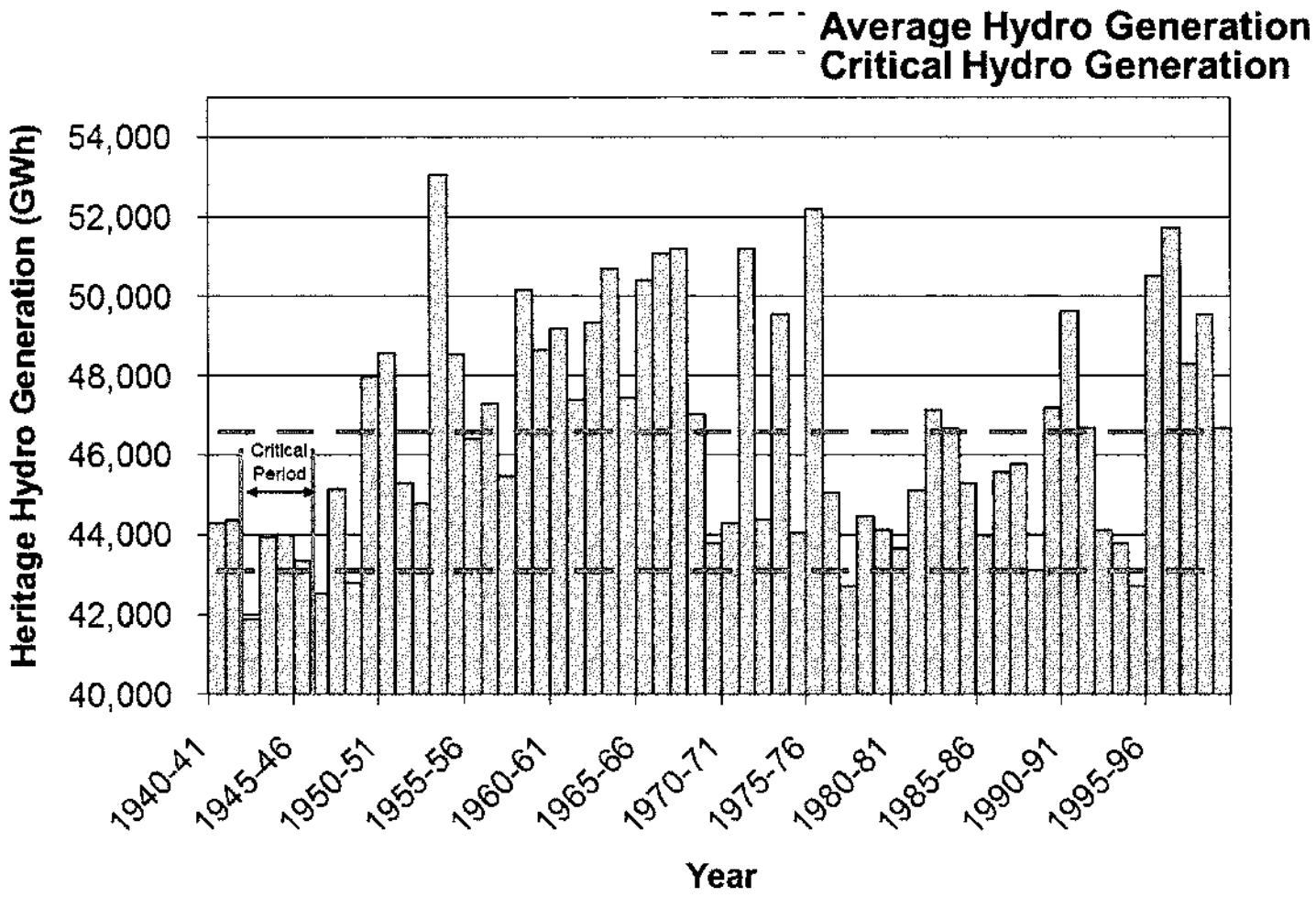
* including planning reserve requirements

TECHNICAL ISSUES

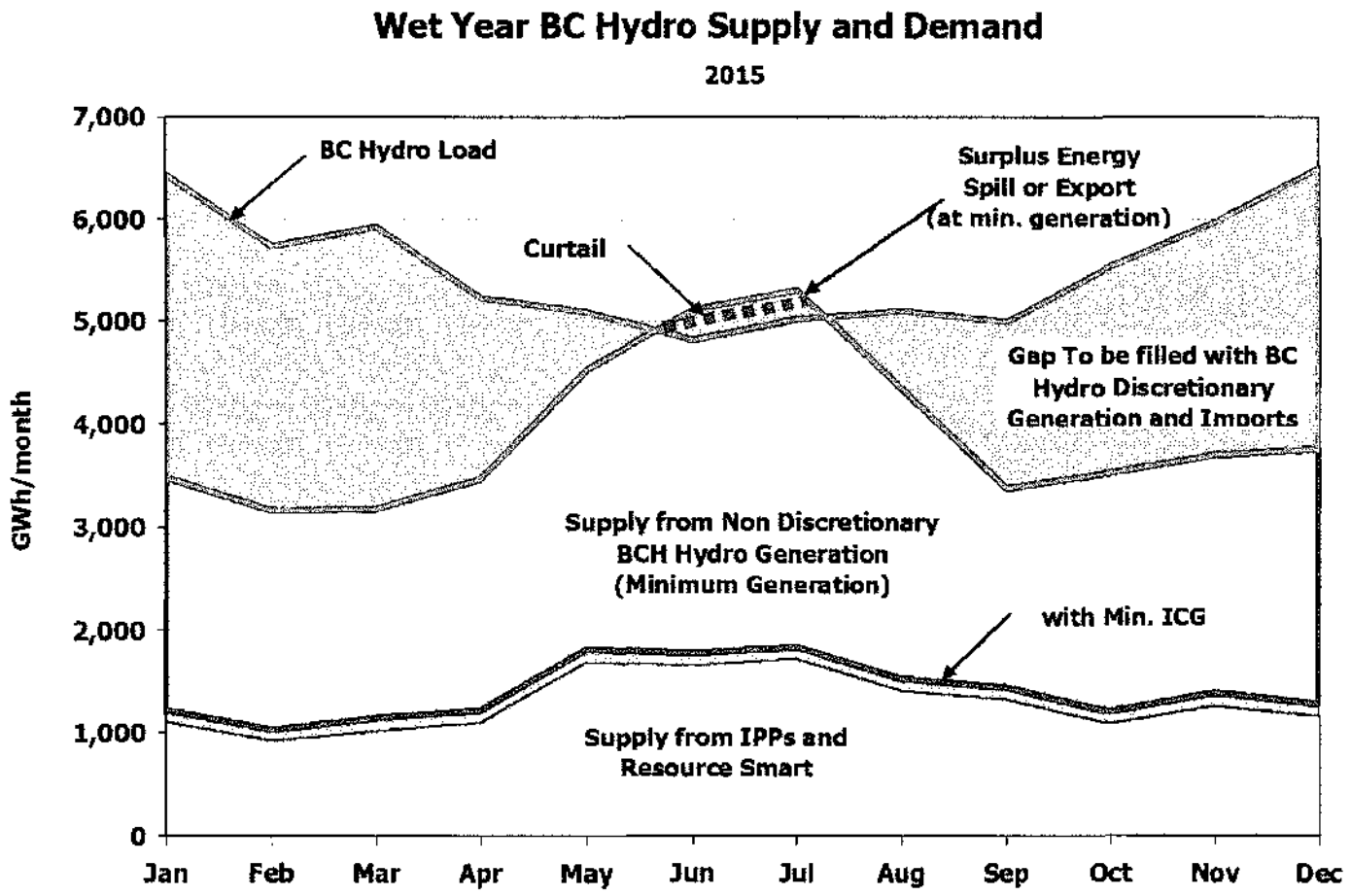
- FRESHET
- WIND INTEGRATION
- DEMAND SIDE MANAGEMENT (DSM)
- CAPACITY RESOURCES

HYDRO SYSTEM - FRESHET

INFLOW VARIABILITY

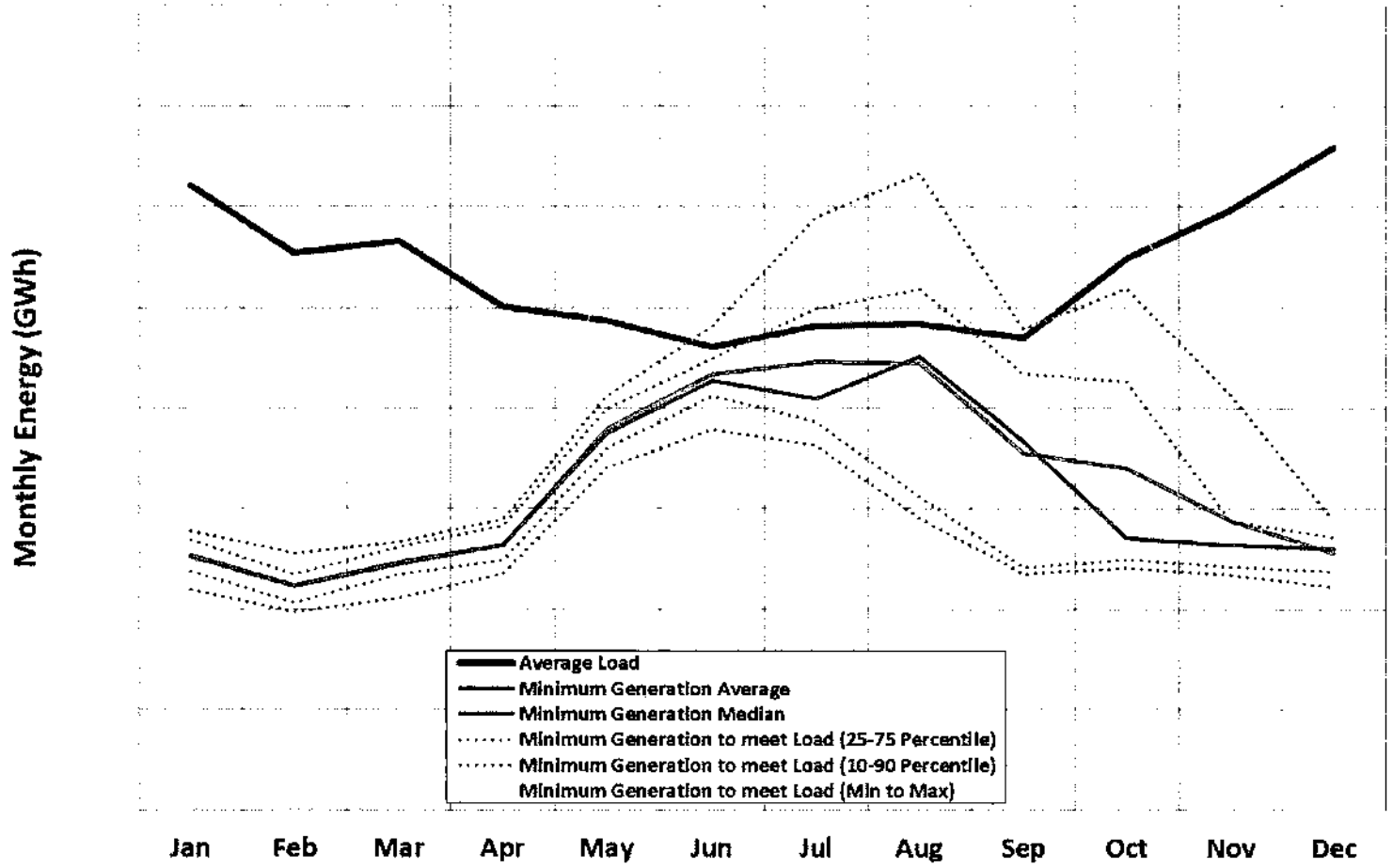


FRESHET – LIMITED ABILITY TO ABSORB ENERGY



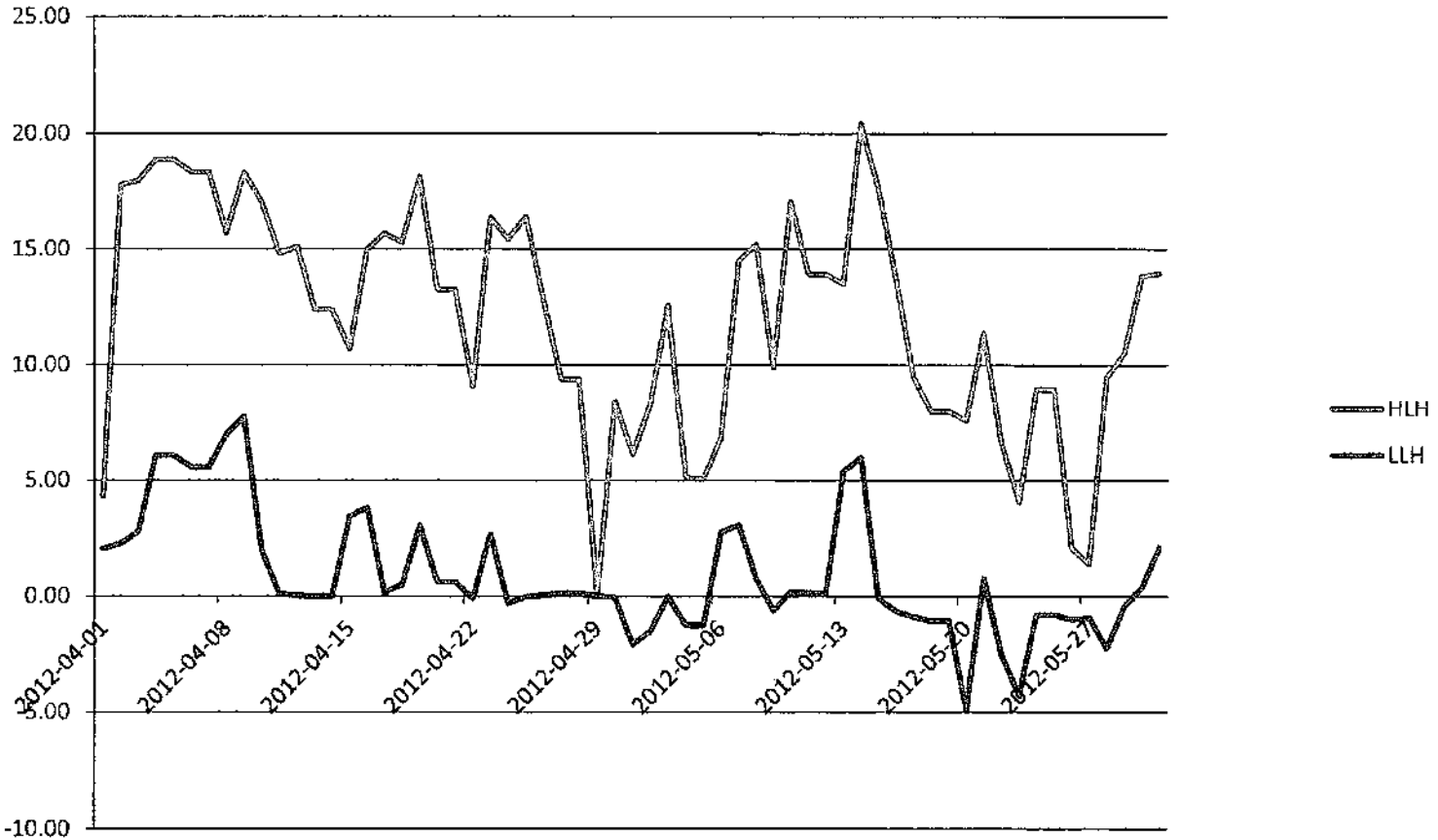
FRESHET –

LIMITED ABILITY TO ABSORB ENERGY



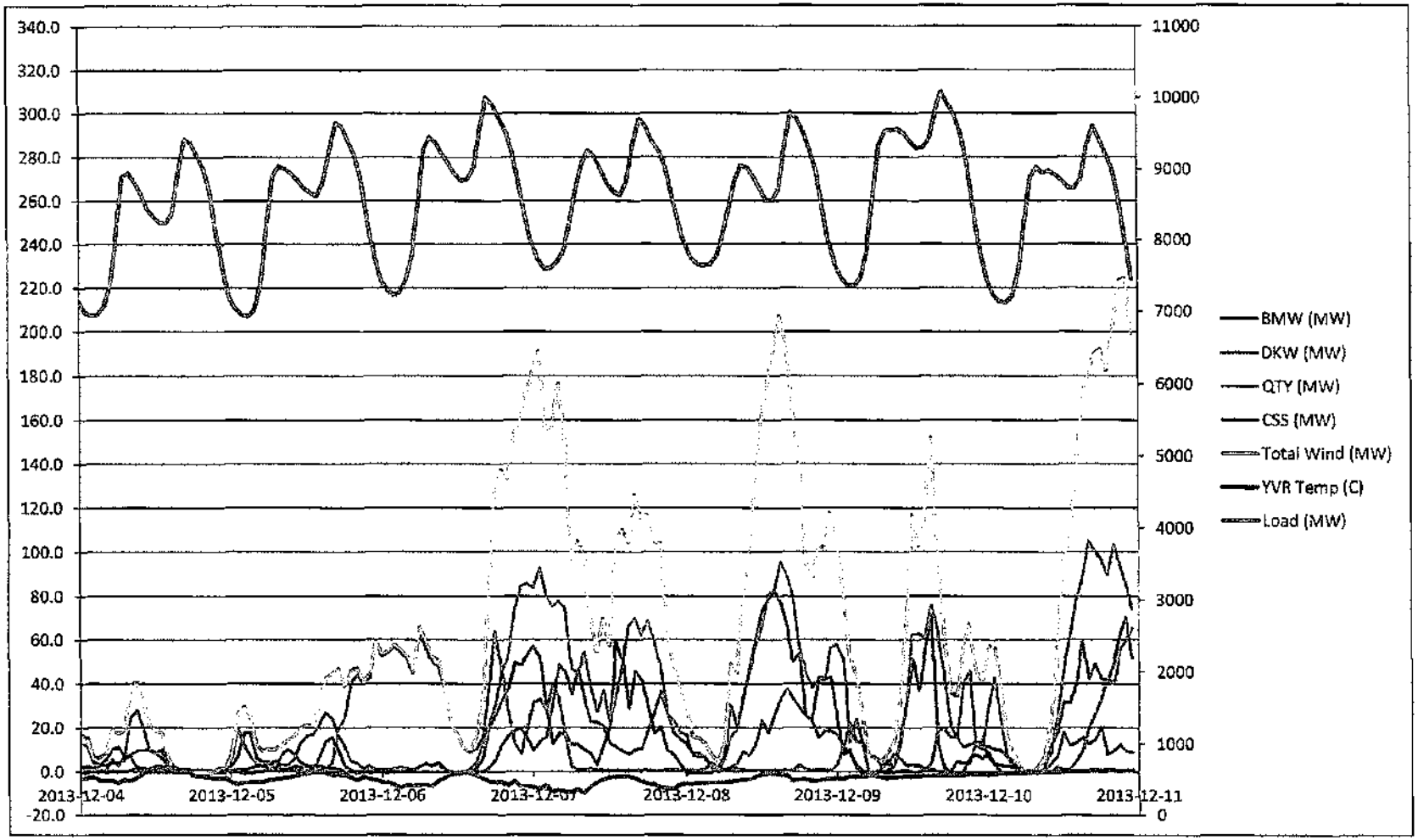
FRESHET

MID-C MARKET PRICES IN FRESHET 2012

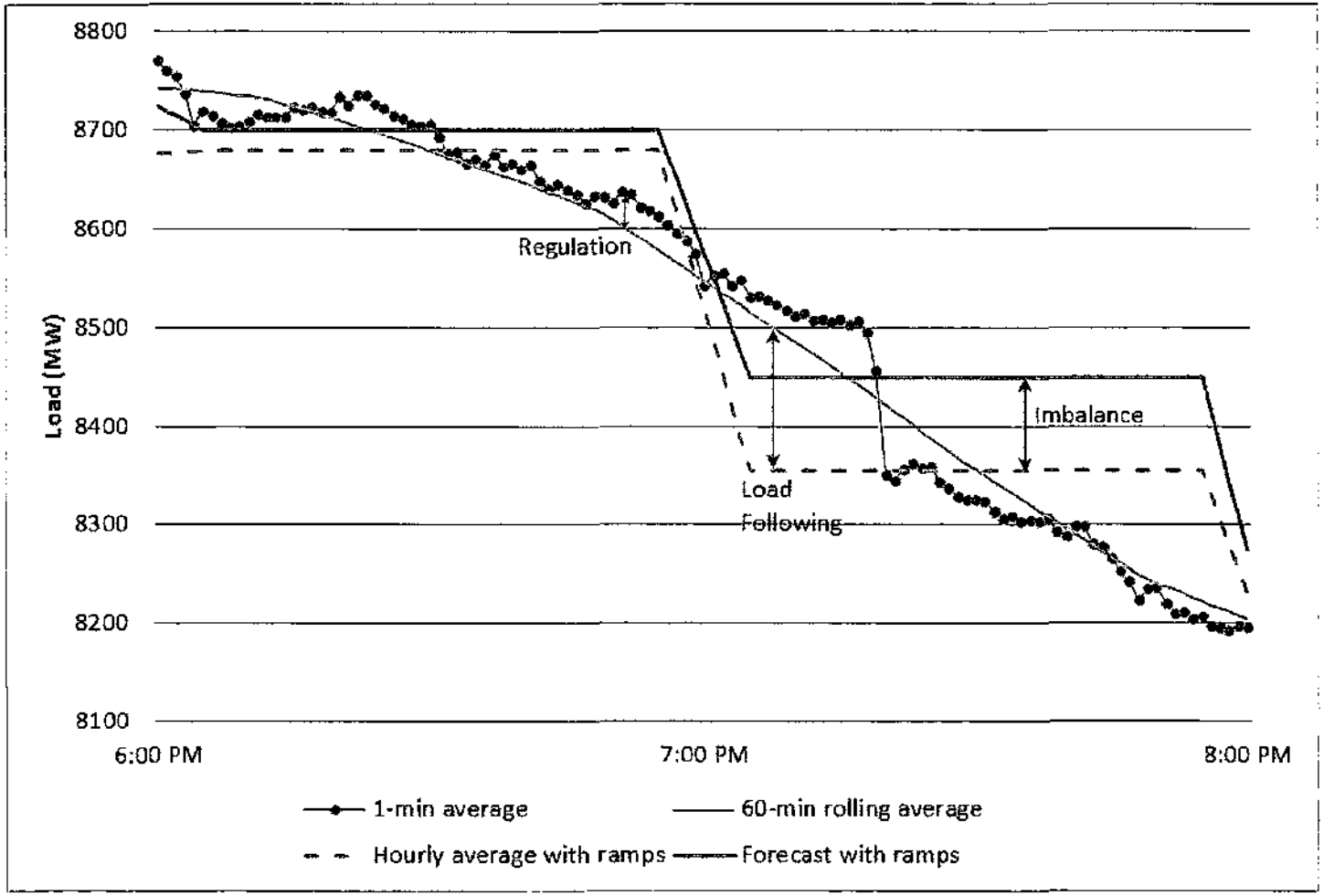


WIND INTEGRATION

CAPACITY CONTRIBUTION AND VOLATILITY

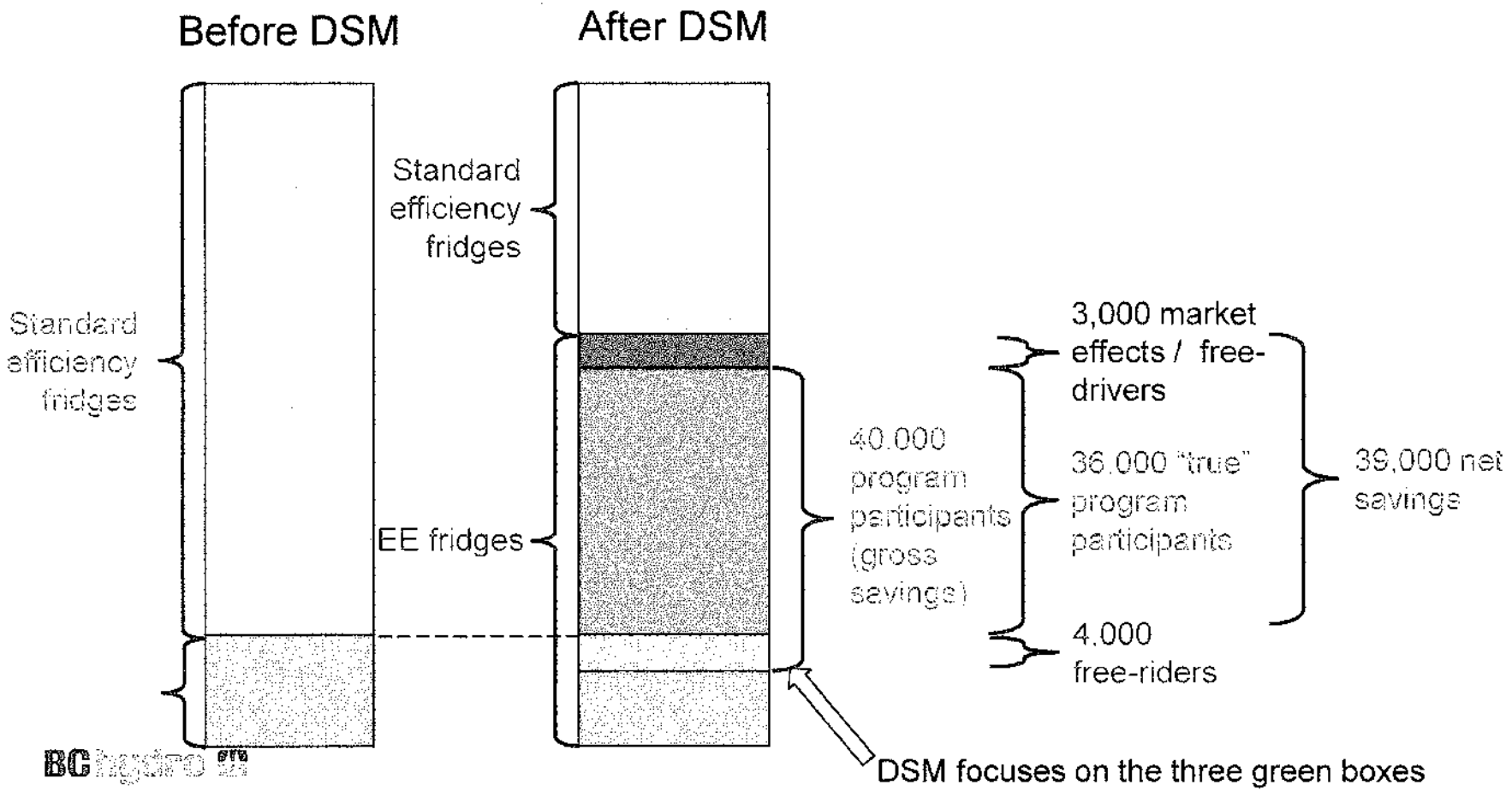


WIND INTEGRATION
RESERVE REQUIREMENTS

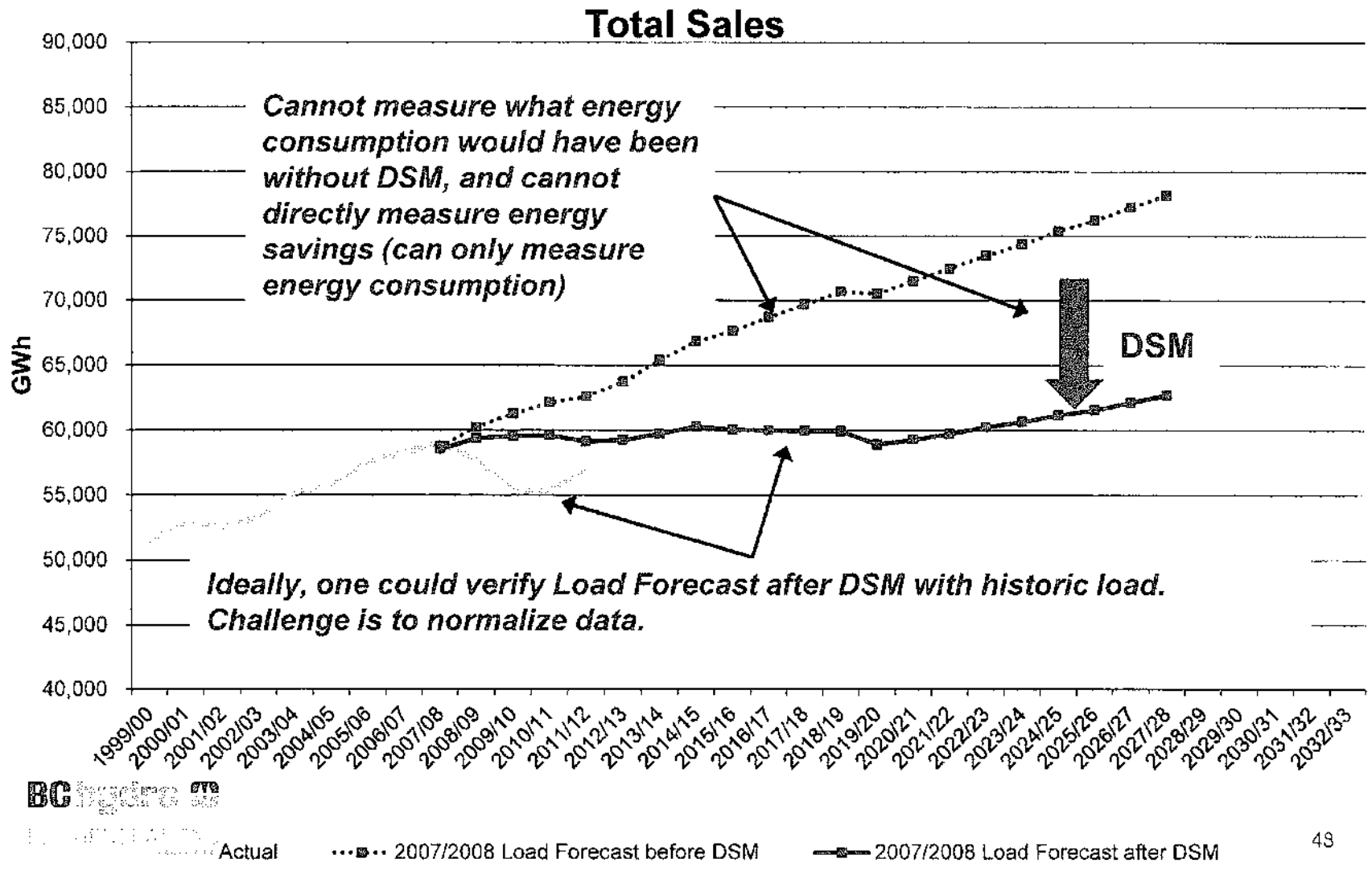


ESTIMATING DSM SAVINGS

100,000 replacement fridges (annually) - ILLUSTRATIVE

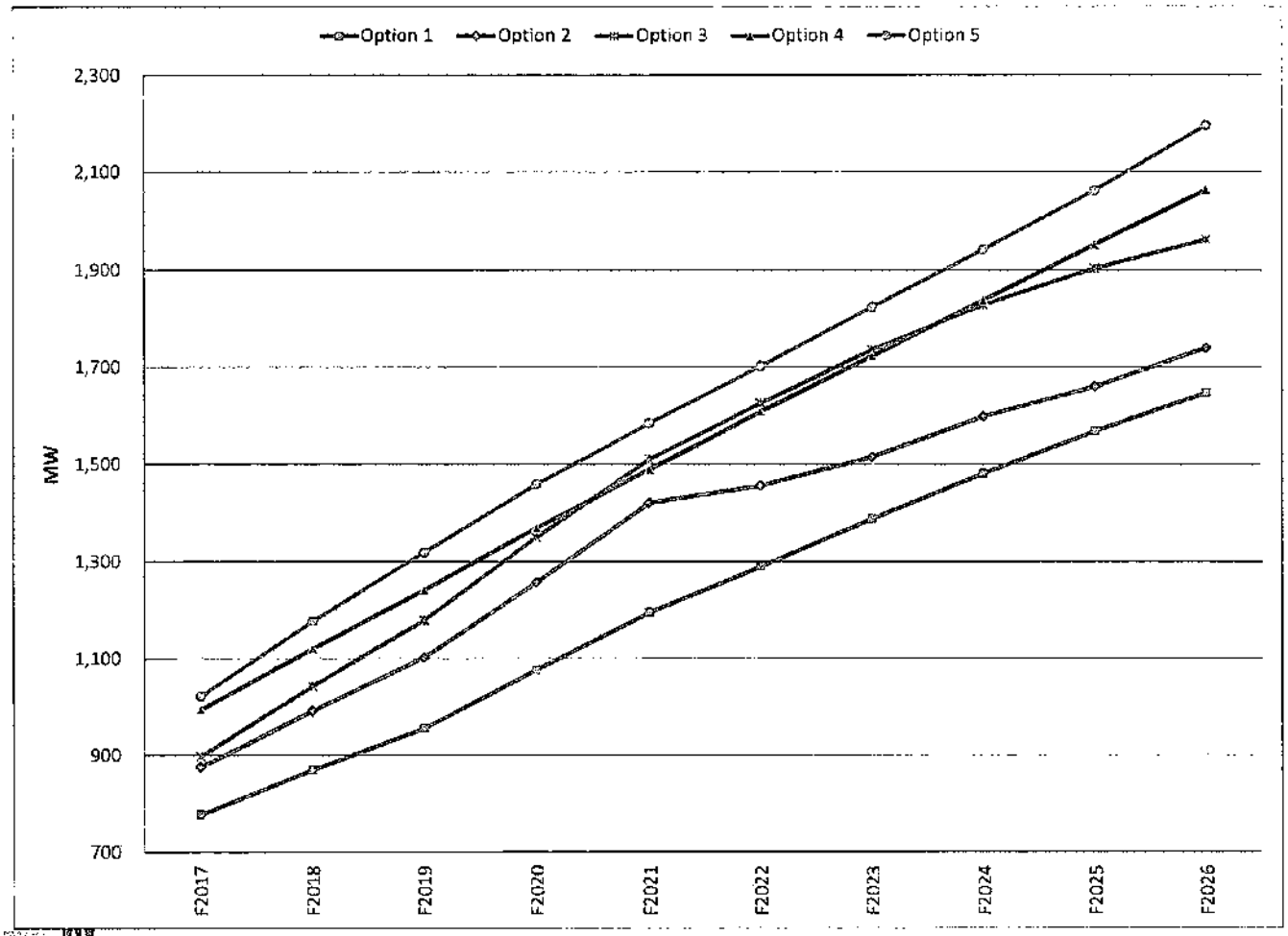


DEMAND SIDE MANAGEMENT VERIFICATION DILEMMA



DEMAND SIDE MANAGEMENT

RELIANCE AND UNCERTAINTY



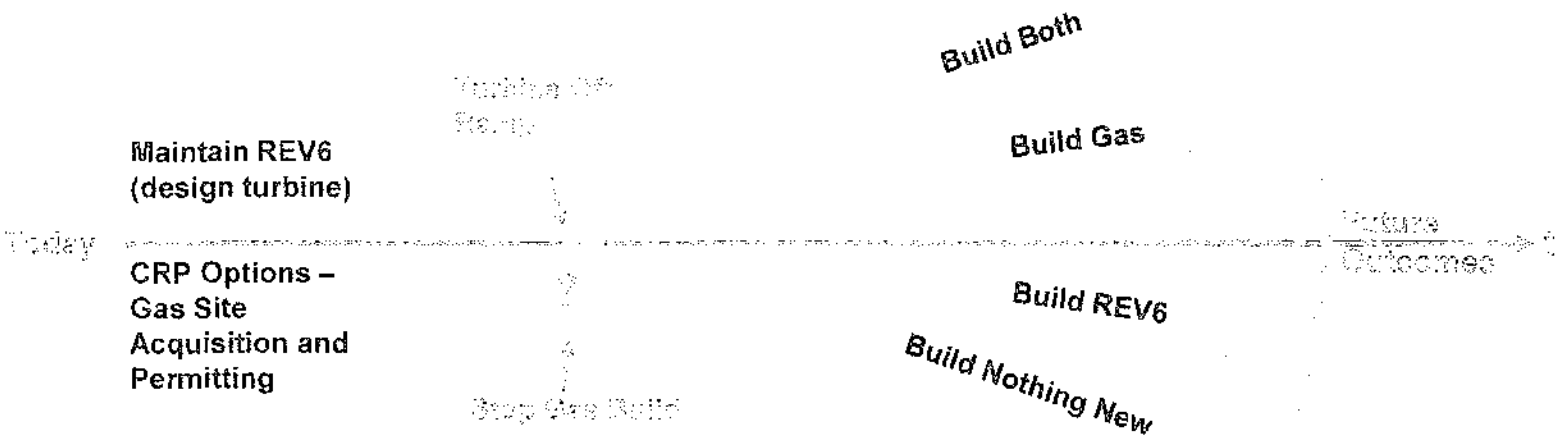
QUICK REVIEW OF AVAILABLE RESOURCE OPTIONS

Resource	Capacity	Energy	Seasonal Profile
DSM Options 1, 2, 3	Dependable	Yes	Similar to load
Site C	Dependable	Yes	Matched to load
Run-of-River	Intermittent	Yes	Primarily freshet
Onshore Wind	Intermittent	Yes	Similar to load
Wood-Based Biomass	Dependable	Yes	Flat
Natural Gas Peakers	Dependable	Limited due to GHGs	Matched to load
Resource Smart	Dependable	Minimal	n/a

CAPACITY RESOURCES – FUTURE NEEDS AND ROLE OF LOAD CONTROL

s13, s17, s21

FUTURE NEED UNCERTAINTY – MAINTAINING OPTIONS



Knowles, Jessica D FIN:EX

From: Al-Ashhab, Hilda <Hilda.Al-Ashhab@bchydro.com>
Sent: Tuesday, November 25, 2014 2:48 PM
To: MacLaren, Les MEM:EX; O'Riley, Christopher; Little, Doug; Fane, Lindsay; Reimann, Randy; Savidant, Michael; Foster, Doug FIN:EX; Chace, Julie MEM:EX; Milburn, Peter R FIN:EX
Cc: Little, Doug
Subject: BC Hydro Technical Briefing - Meeting Materials
Attachments: LNG supply and Site C surplus Version 2.pptx; Maclaren and Milburn Nov 2014 EXTRA.PPTX; Milburn_V3_20141124_final-new slide.pptx

Follow Up Flag: Follow up
Flag Status: Completed

Hello Everyone,

Enclosed please find materials for our today's 3 PM meetings: Documents are:

1) LNG supply and Site C surplus
2) Additional Load Forecast Slides
3) Additional Resource Planning Slide

Thank you, Hilda

Hilda Al-Ashhab, Q.A.A.
Administrative Assistant to Doug Little
Vice-President, Energy Planning & Economic Development
Generation

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LNG RATE AND COST OF SELF-SUPPLY

BC hydro
FOR GENERATIONS

LNG Rate

The LNG rate of $80/MWh increasing at CPI until Jan 1, 2023 and then staying constant is approximately equal to $75/MWh on a levelized basis (for a 20-year period starting in 202(

Site C and LNG Rate

Site C justified prior to considering LNG load.

Near term surplus of energy from Site C would be sold into US markets at ~ $35/MWh.

Site C UEC not used in LNG rate calculation.

Cost of LNG self-supply

LNG facilities have the option of self-supplying using gas turbines

Cost will be ~ 80 $/MWh when 20-year levelized cost from BC Hydro's expected gas price scenario ($4.6/GJ) and the Carbon tax is used

Self-supply cost is highly sensitive to assumption regarding gas price

A 1 $/GJ change in gas price will change the cost of energy by ~ 10 $/MWh

SUPPLY TO LNG

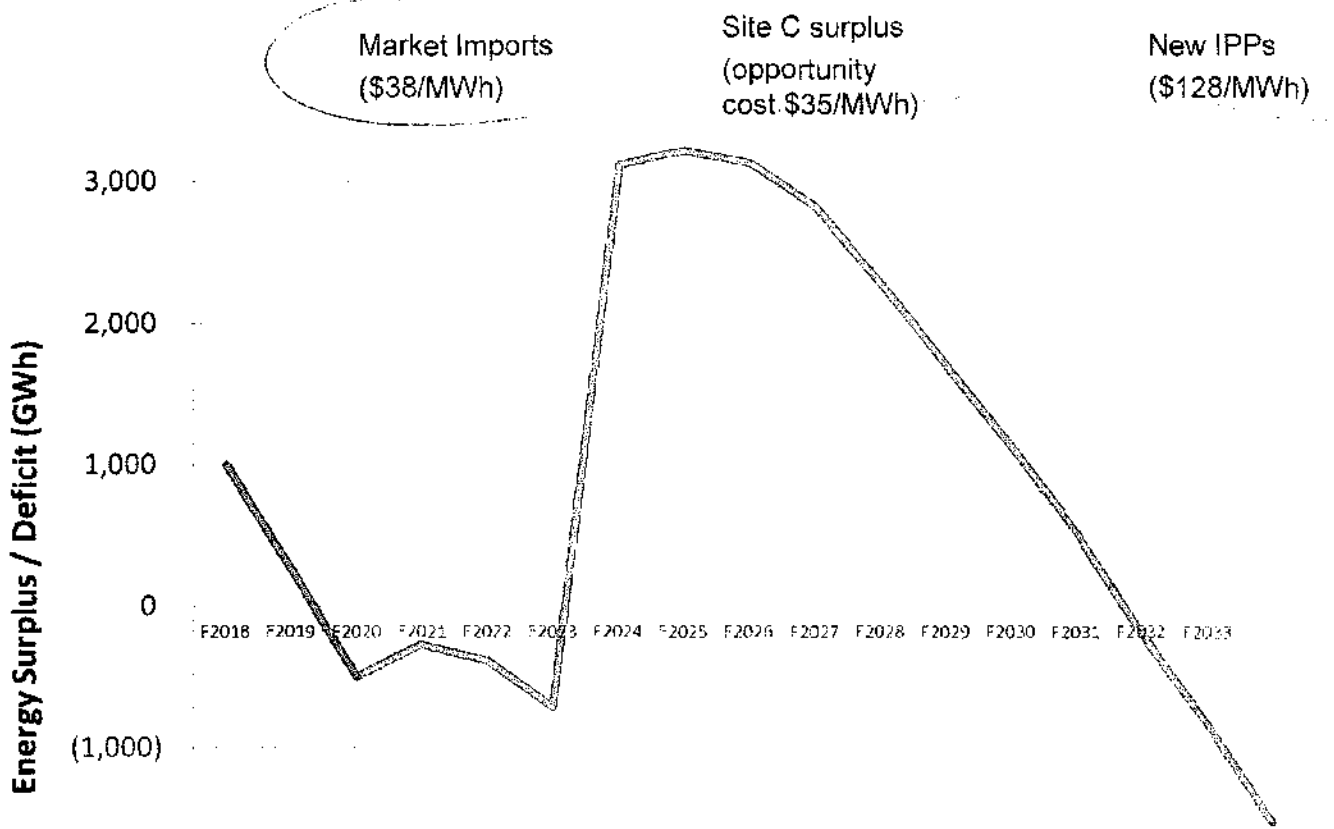
BC hydro
FOR GENERATIONS

Expected LNG load is 360 MW/3000 GWh. Timing is a few years before Site C.

LNG load is intended to be supplied in 3 stages, initially with gas-fired peakers and market energy, then gas coupled with Site C surplus and ultimately new renewable IPP purchases.

Site C UEC not used in calculation of LNG rate.

Levelized cost of supply over 20 years in $75/MWh (2014$)



s13

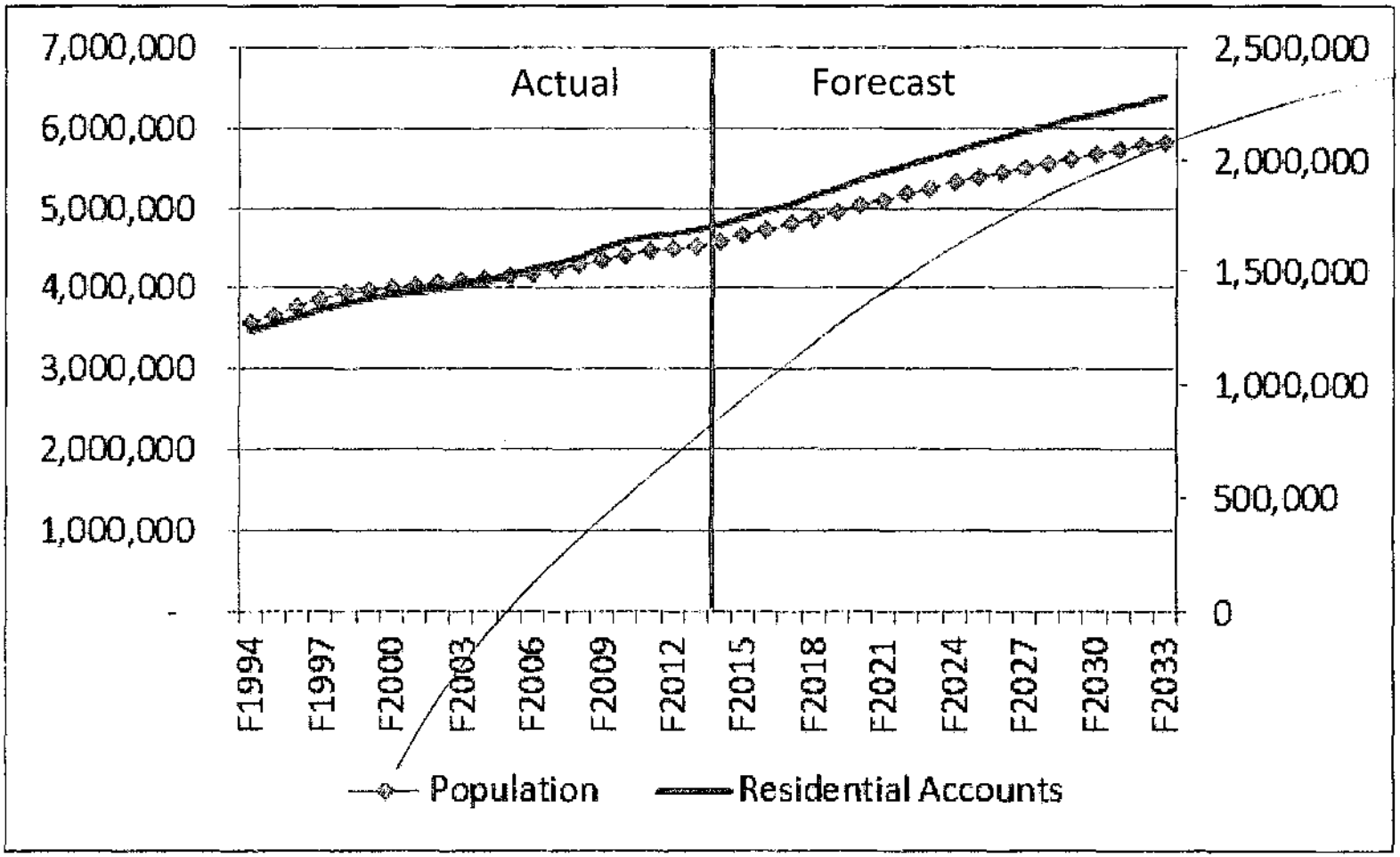
BC Hydro Load Forecast

David Ince

November, 2014

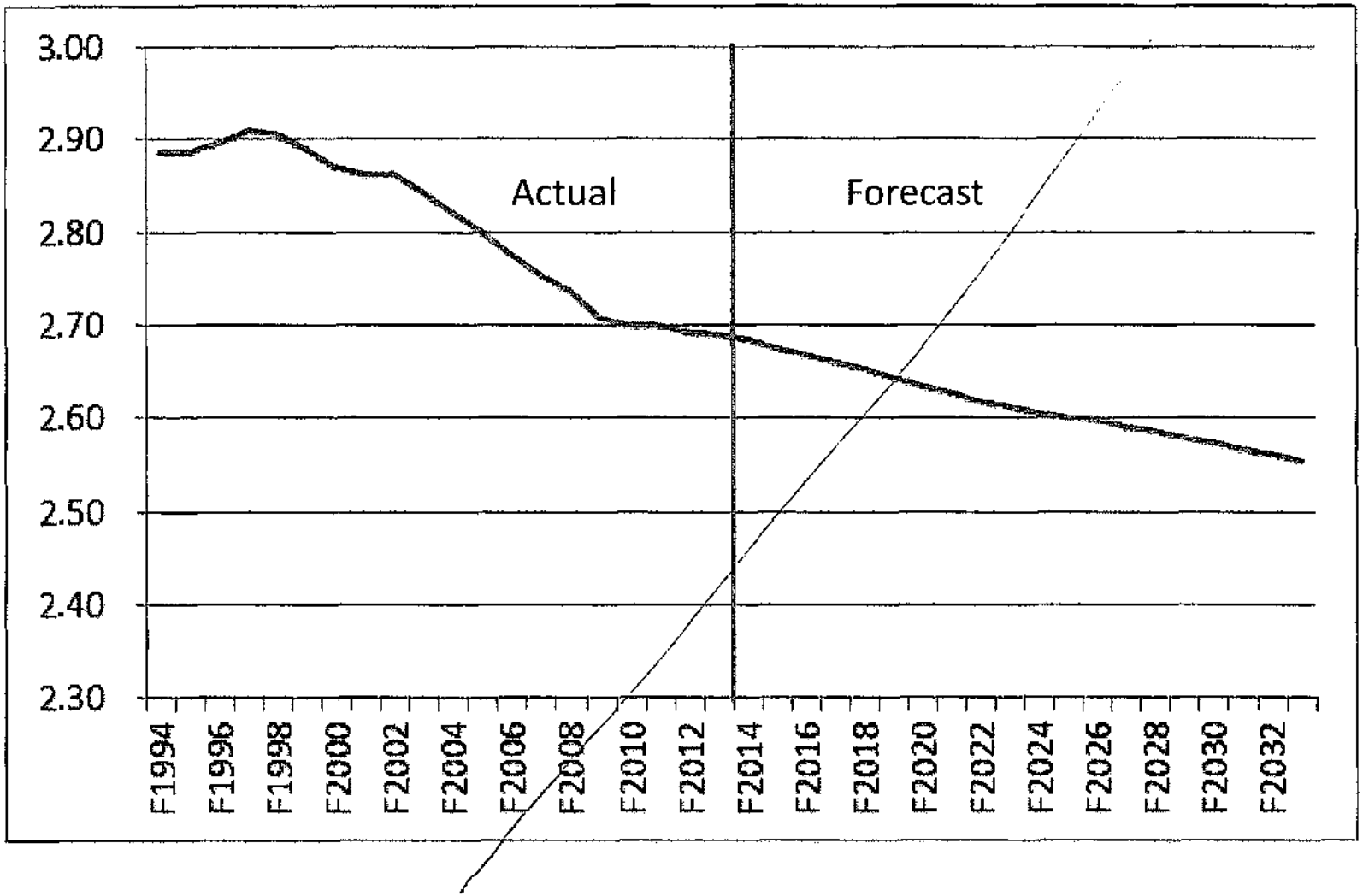
BC hydro

FOR GENERATIONS



Source: Population (BC Stats), Residential Accounts (BC Hydro)

Total Population per Residential Account



s13

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Page 107

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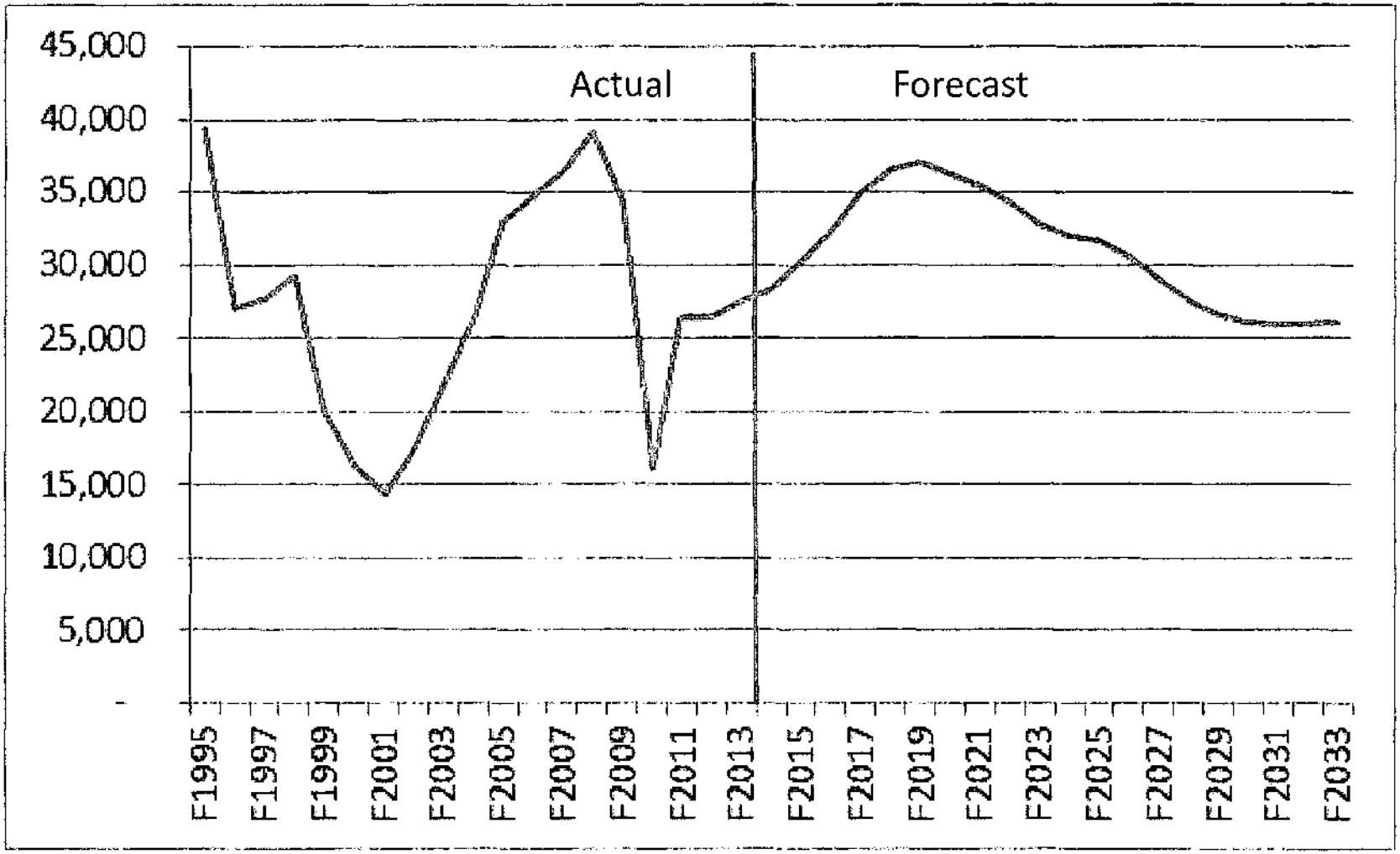
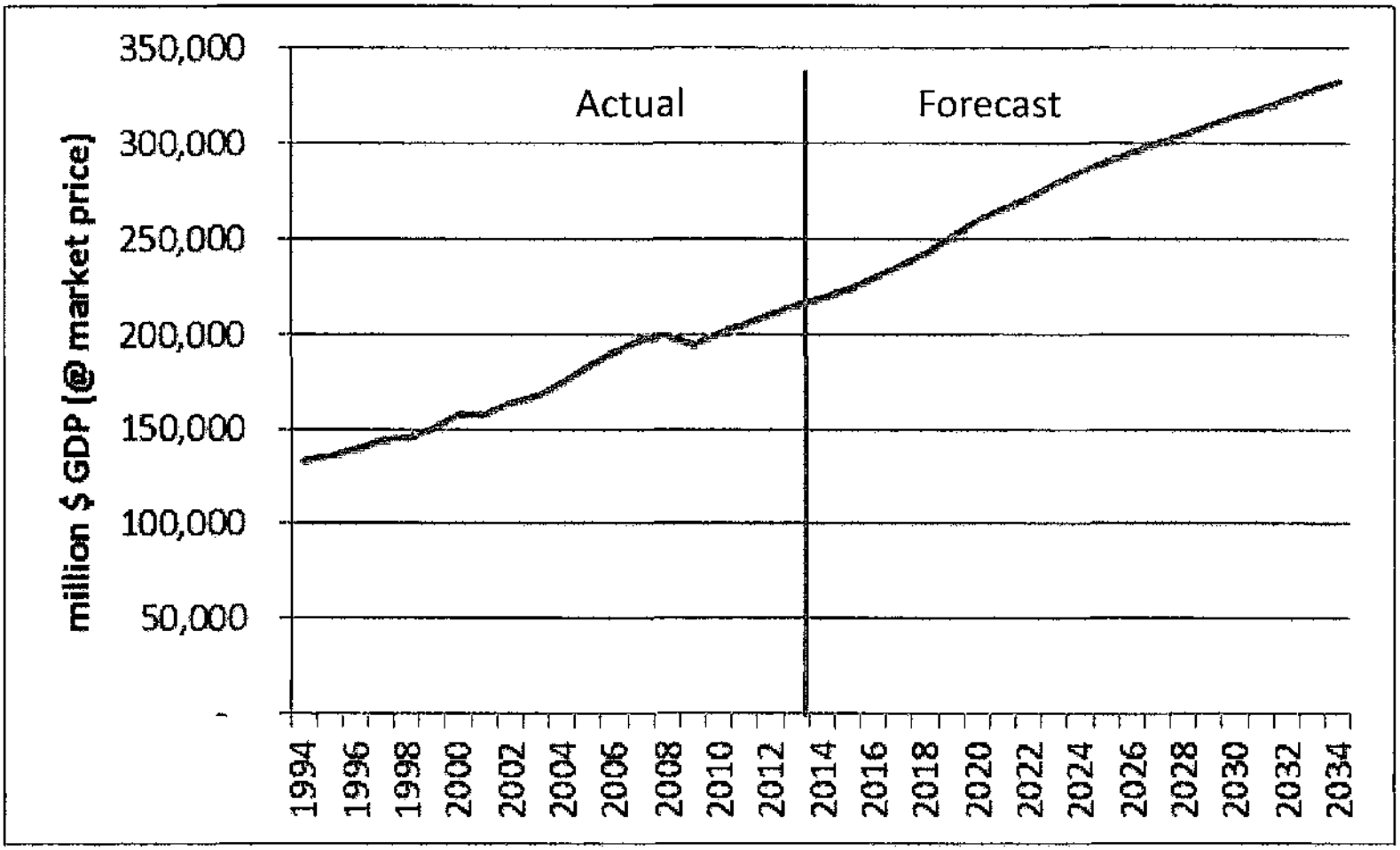
HOUSING STARTS



Source: Housing Starts (CMHC)

GDP

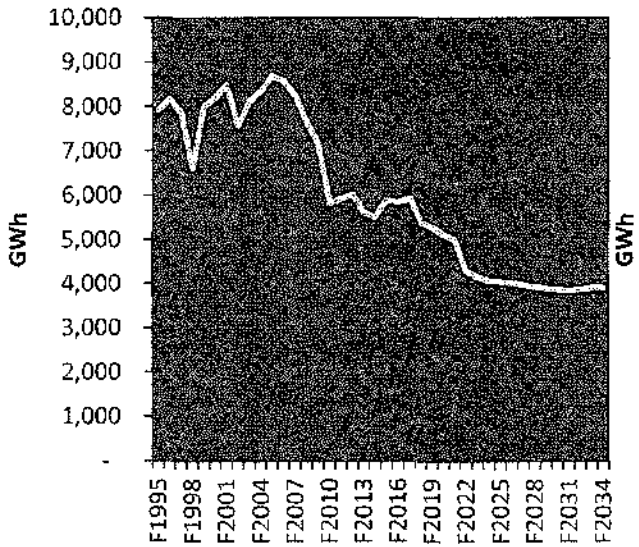


Source: GDP Forecast (1st 5 year of forecast – BC Budget; subsequent years - Stokes)

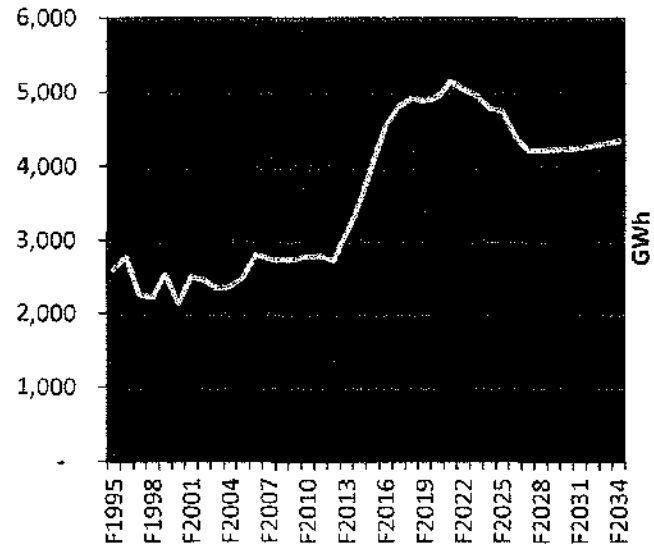
MAJOR INDUSTRIAL SECTORS

20 YEARS HISTORY AND 20 YEAR FORECAST

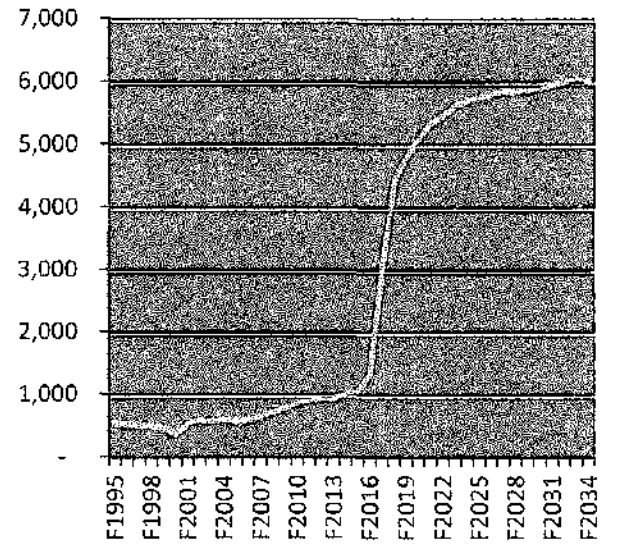
Pulp and Paper

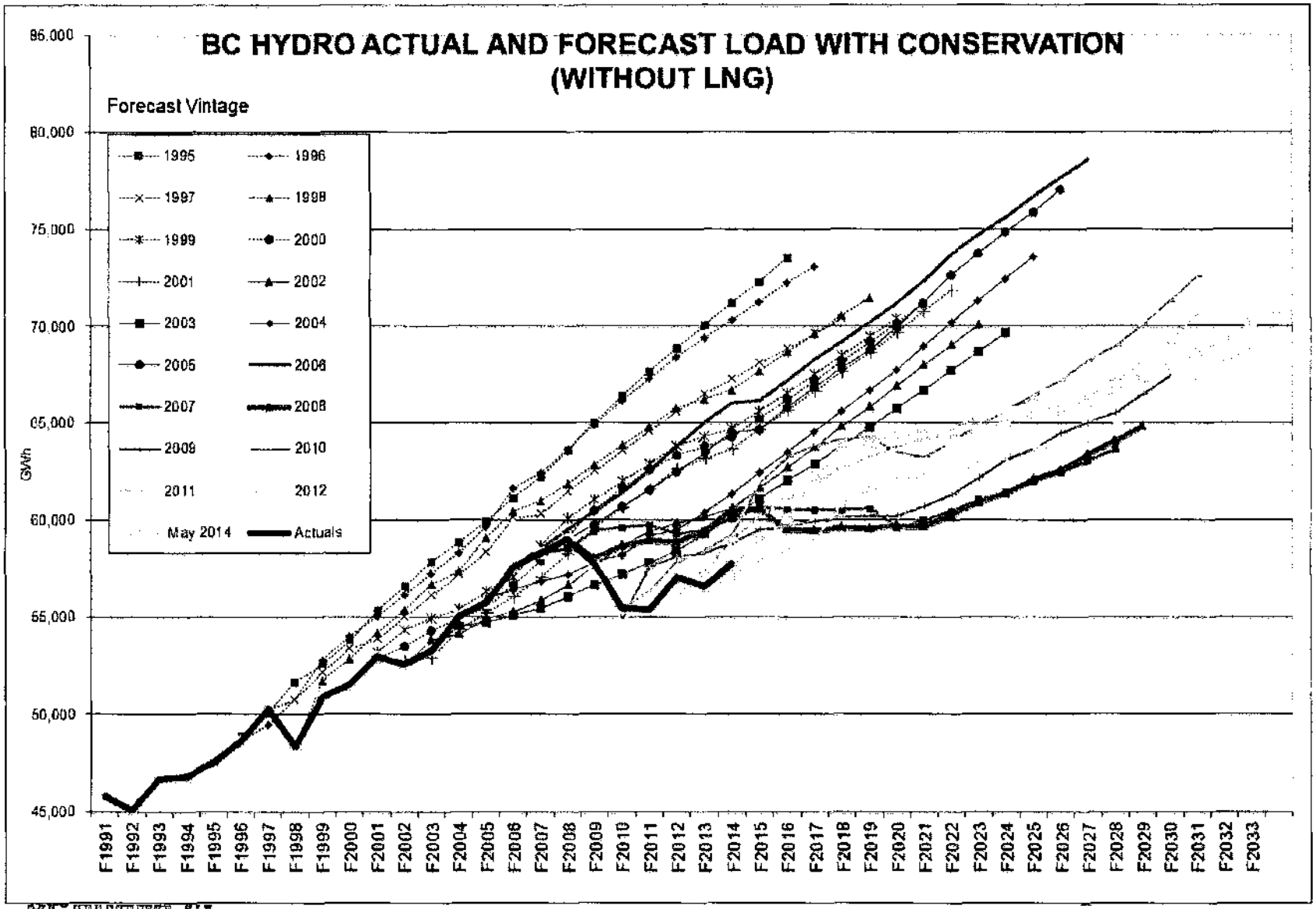


Mining



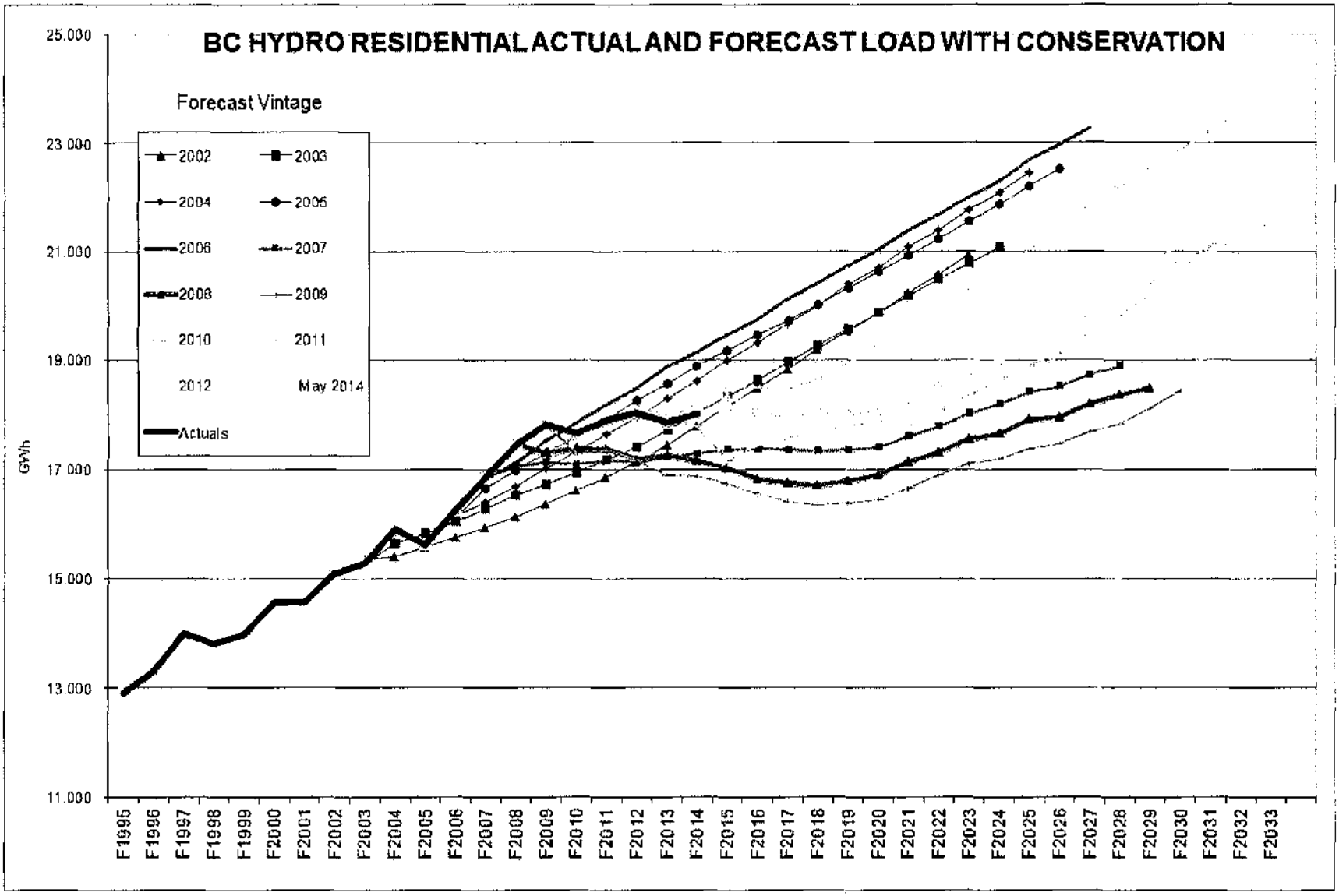
Oil and Gas





BCHydro

FOR GENERATIONS


BC HYDRO RESIDENTIAL ACTUAL AND FORECAST LOAD WITH CONSERVATION
Forecast Vintage
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
May 2014
Actuals
GWh
25,000
23,000
21,000
19,000
17,000
15,000
13,000
11,000
F1995
F1996
F1997
F1998
F1999
F2000
F2001
F2002
F2003
F2004
F2005
F2006
F2007
F2008
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F2010
F2011
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F2017
F2018
F2019
F2020
F2021
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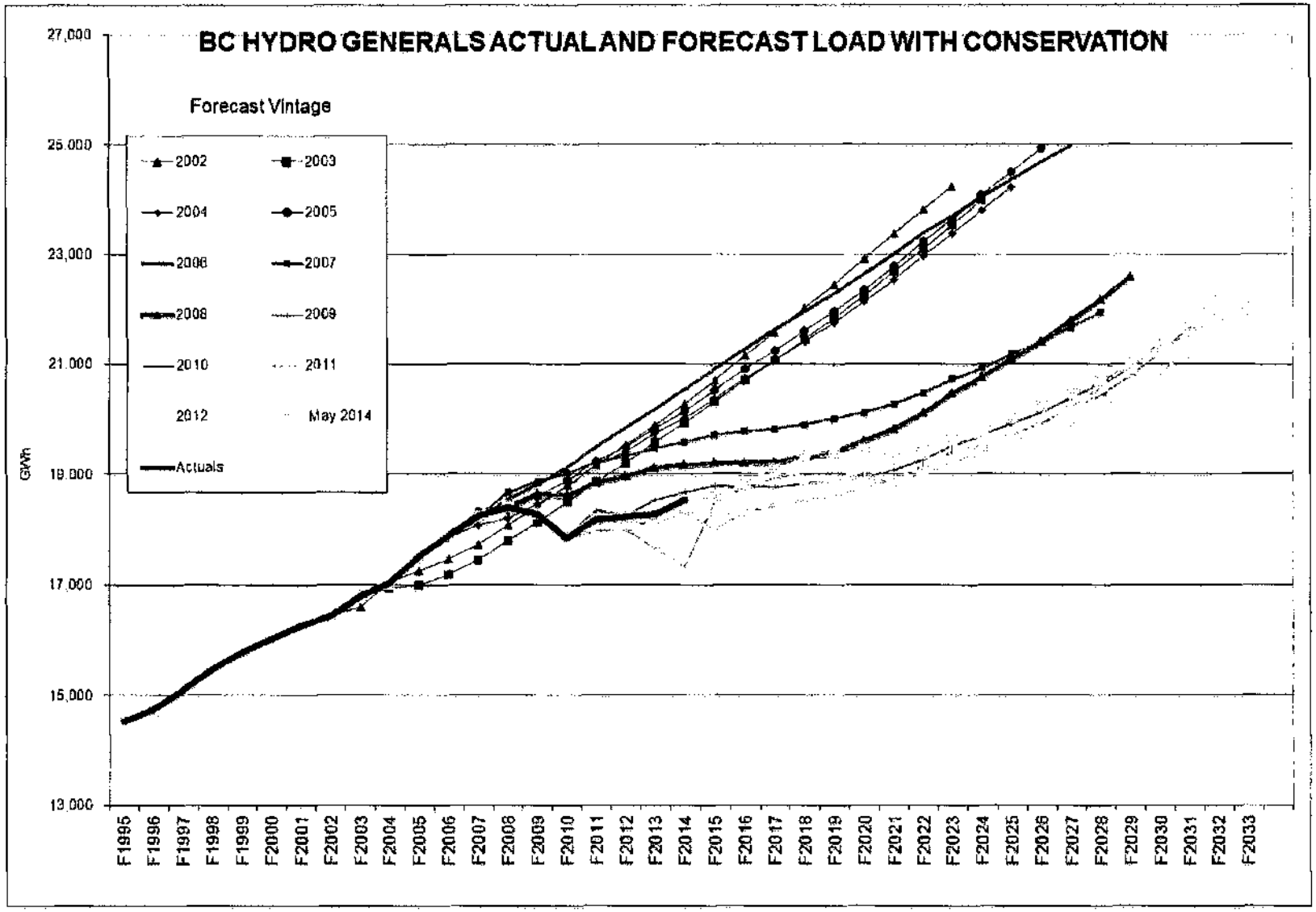
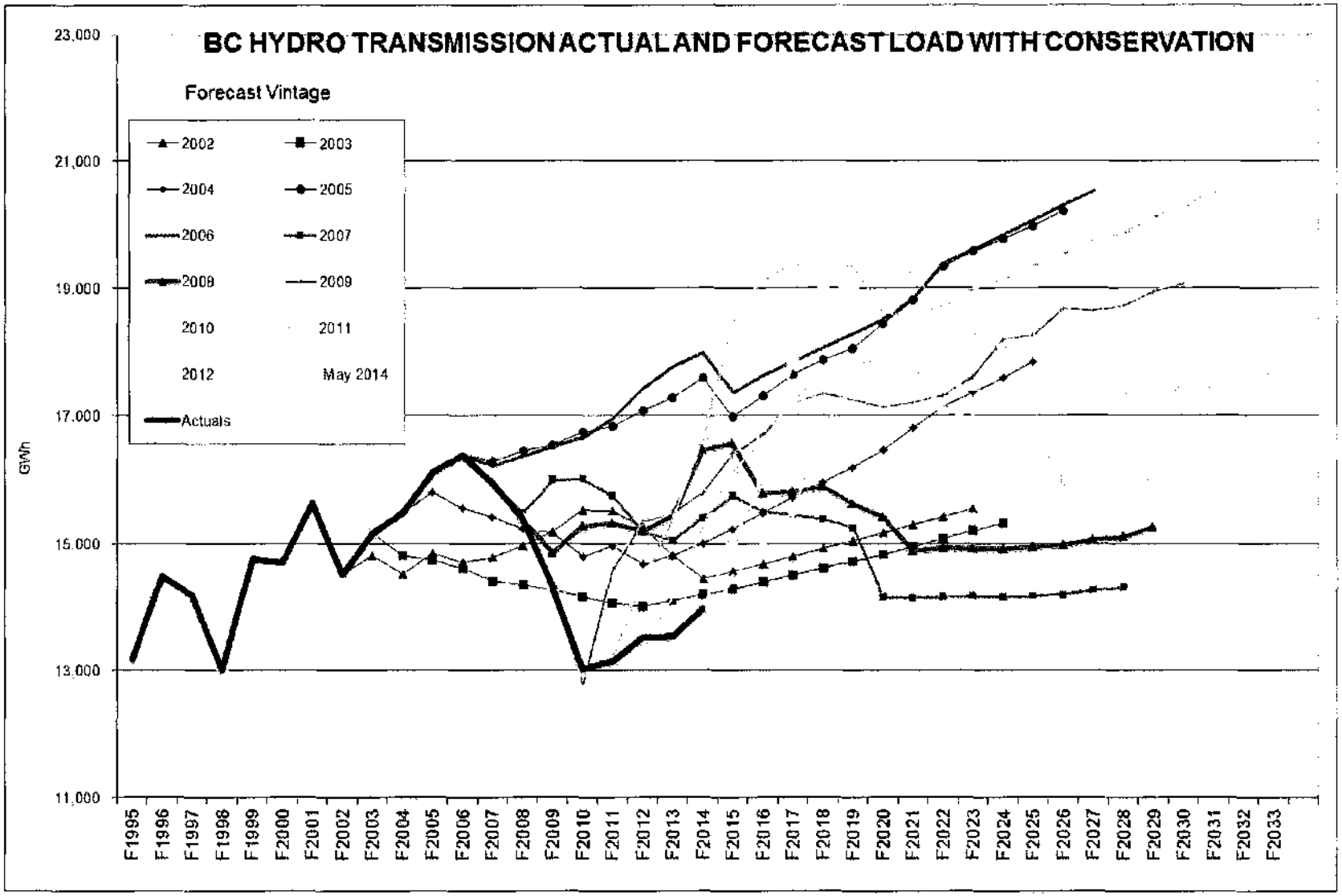
F2032
F2033



BC hydro

FOR GENERATIONS


BC HYDRO TRANSMISSION ACTUAL AND FORECAST LOAD WITH CONSERVATION
Forecast Vintage
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
May 2014
Actuals
GWh
23,000
21,000
19,000
17,000
15,000
13,000
11,000
F1995
F1996
F1997
F1998
F1999
F2000
F2001
F2002
F2003
F2004
F2005
F2006
F2007
F2008
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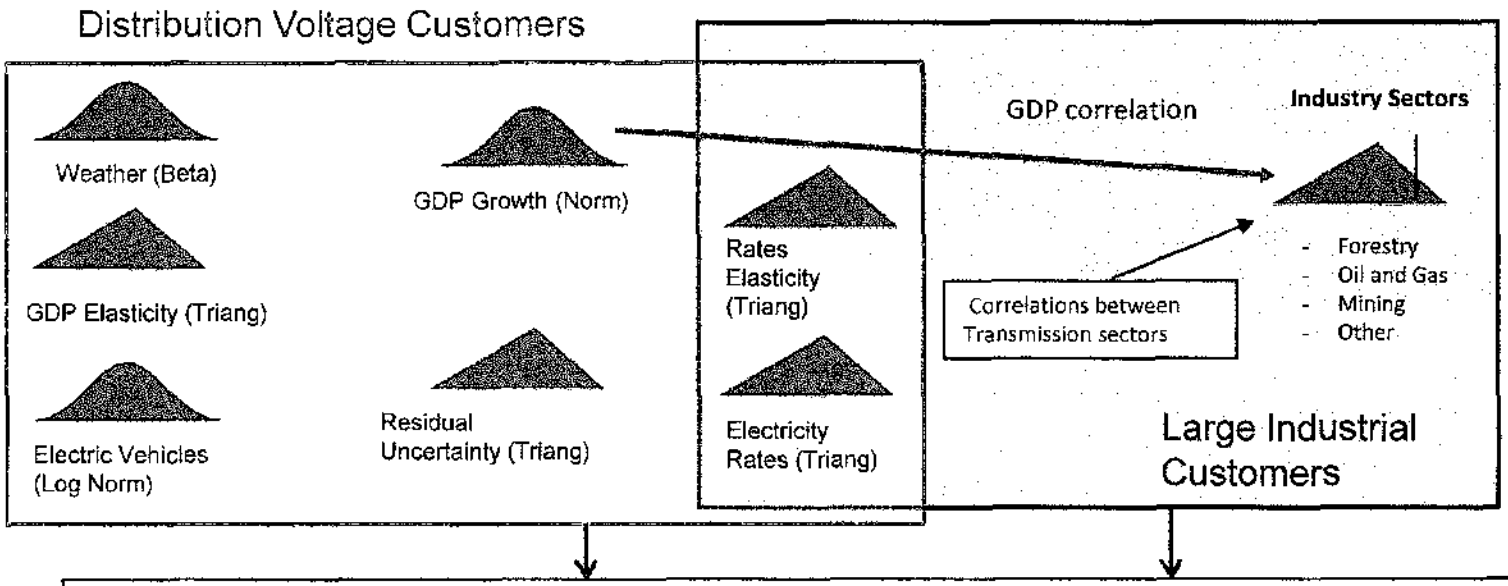
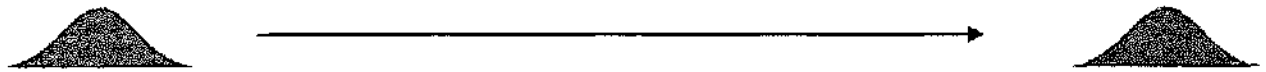
F2032
F2033

DRIVERS OF FORECAST UNCERTAINTY



1. Develop uncertainty distributions for key forecast drivers such as GDP. This mid points of these distributions are based on P50 forecasts. Bands are partially based on historical variations in the drivers (particularly weather).
2. Develop uncertainty distributions for individual transmission customer sectors (such as mining and pulp & paper). A correlation matrix between the customer sectors is applied to ensure consistency.
3. Distribution voltage customers (residential and small commercial) have specific uncertainty bands and correlations as indicated in attached document.
4. Monte Carlo model simultaneously generates uncertainty bands for total load.



Energy (GWh) → Peak (MW)

Total System Energy:

- Add Other utilities plus Losses = Total Load
- Mean of the upper tail is the high energy forecast

Total System Peak:

- Peak = Total Load / Load Factor
- Mean of the upper tail is the high peak forecast

SUMMARY OF SENSITIVITY ANALYSIS OF SITE C BENEFITS (IRP TABLE 6-21 + 100% DF FOR SITE C)

Difference in PV Cost (Portfolio without Site C minus with Site C) ($2013 million)	Clean Generation Portfolios		Clean + Thermal Generation Portfolios	
	F2024	F2026	F2024	F2026*
Base Case (Mid Gap, Mid-Market Price [Scenario 1], Site C @ 100% DF, IPP WACC = 7%, Wind Integration Cost = $10/MWh	920	1,170	440	680
Large Gap	Note 1	Note 1	2,550	Note 1
Small Gap	(750)	(420)	(990)	(620)
With Expected LNG	2,140	Note 1	1,550	Note 1
High Market Price (Scenario 3)	1,120	1,320	760	950
Low Market Price (Scenario 2)	740	1,050	200	510
Site C Capital Cost +10%, alternatives held constant				
Site C Capital Cost +15%, alternatives held constant				
Site C Capital Cost +30%, alternatives held constant				
Site C and Alternative Resource Options Capital Cost +30%				
IPP WACC = 6%	710	960	310	520
Wind Integration Cost ($15/MWh)	1,010	Note 1	510	Note 1
Wind Integration Cost ($5/MWh)	820	Note 1	380	Note 1
Compound Low Scenario (Small Gap, Low Market Price, 10% Site C Capital Cost Increase)	Note 1	Note 1		-1,600
Compound High Scenario (Large Gap, High Market Price, 10% Site C Capital Cost Decrease)	Note 1	Note 1		Note 1

Note 1:
The benefit for Site C in this scenario is expected to be higher than the comparative portfolio for the same sensitivity.

BC hydro
FOR GENERATIONS

Knowles, Jessica D FIN:EX

From: Farkas, George FIN:EX
Sent: Friday, November 28, 2014 11:59 AM
To: Foster, Doug FIN:EX
Subject: FW: Cabinet Presentation - Credit Rating and Capital Spending - 11-27-14.pptx
Attachments: Cabinet Presentation - Credit Rating and Capital Spending - 11-27-14.pptx

Follow Up Flag: Follow up
Flag Status: Flagged

From: Farkas, George FIN:EX
Sent: Thursday, November 27, 2014 3:50 PM
To: MacLean, Shelley FIN:EX
Cc: Hopkins, Jim FIN:EX; Milburn, Peter R FIN:EX
Subject: Cabinet Presentation - Credit Rating and Capital Spending - 11-27-14.pptx

Shelly, for Peter's review and then forward to MO for our meeting tomorrow. Jim and I just walked through the presentation together.

Credit Rating Status and Capital Investment Opportunities/Risks

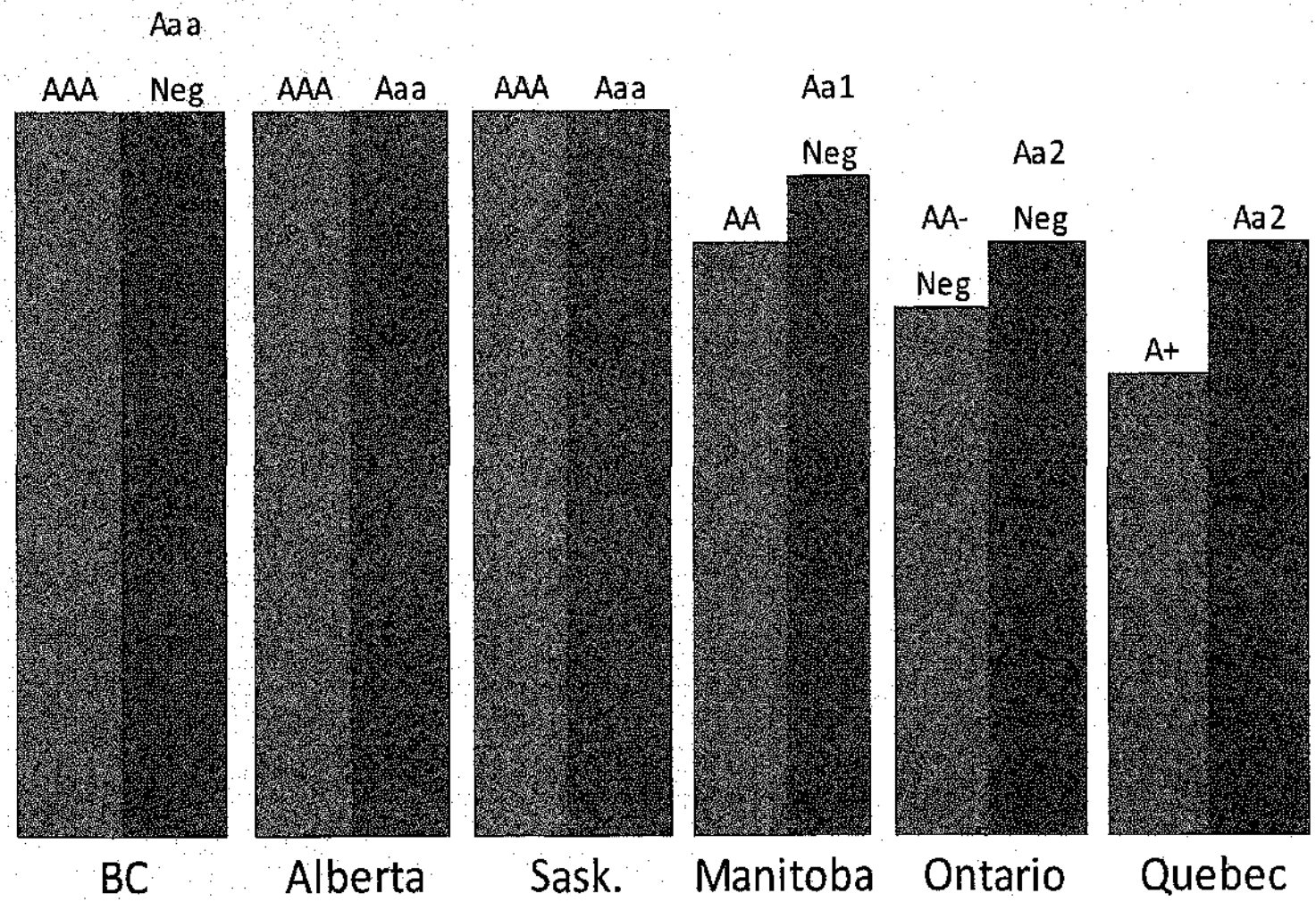
November 27, 2014

BRITISH COLUMBIA

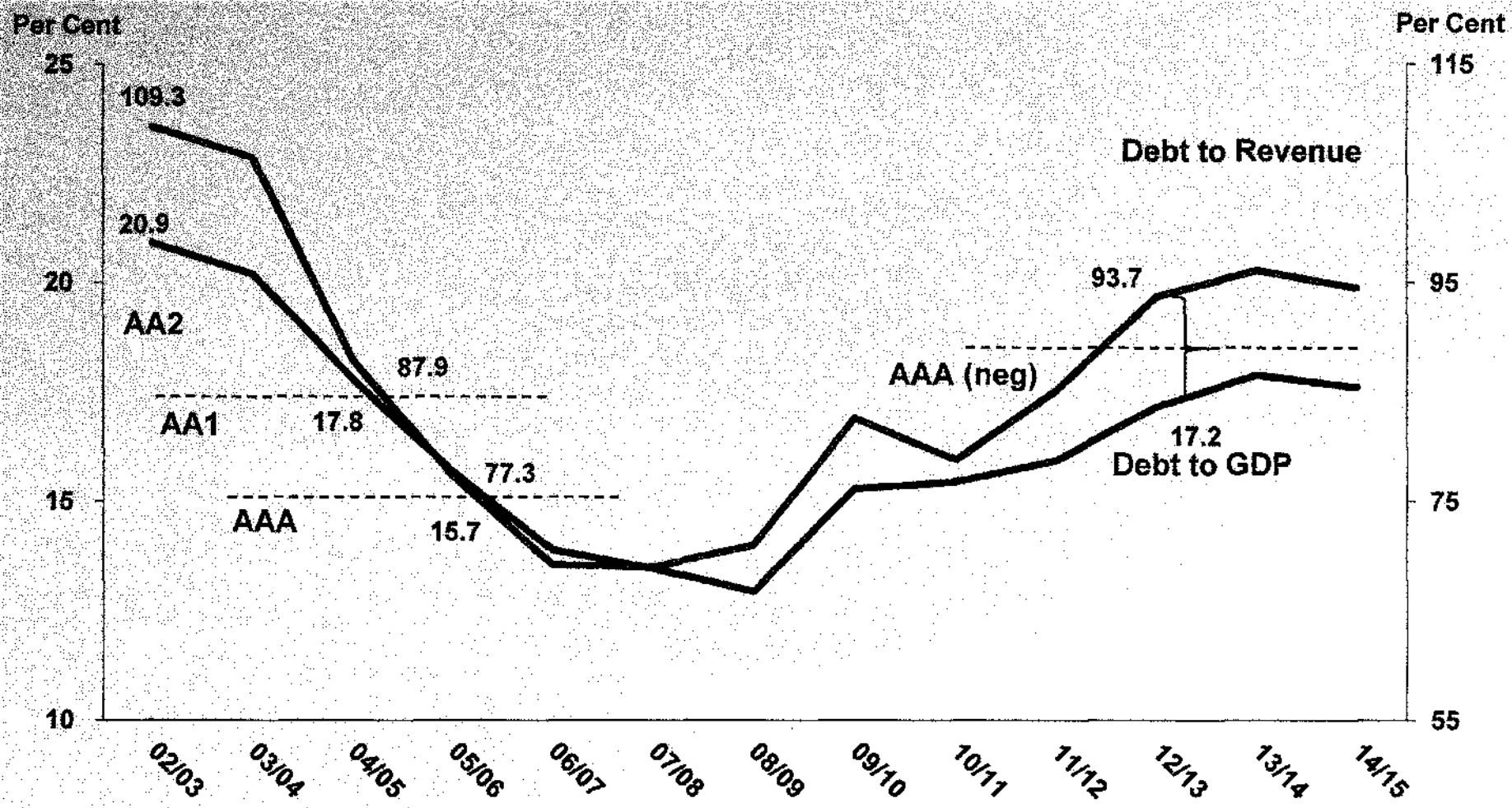
Trusted financial and economic leadership for a prosperous province

One of Three Triple-A Rated Provinces

Ratings	
S&P	Moodys
AAA	Aaa
AA+	Aa1
AA	Aa2
AA-	Aa3
A+	A
A	A1
A-	A2
	A3
BBB	Baa
BB	Ba
B	B



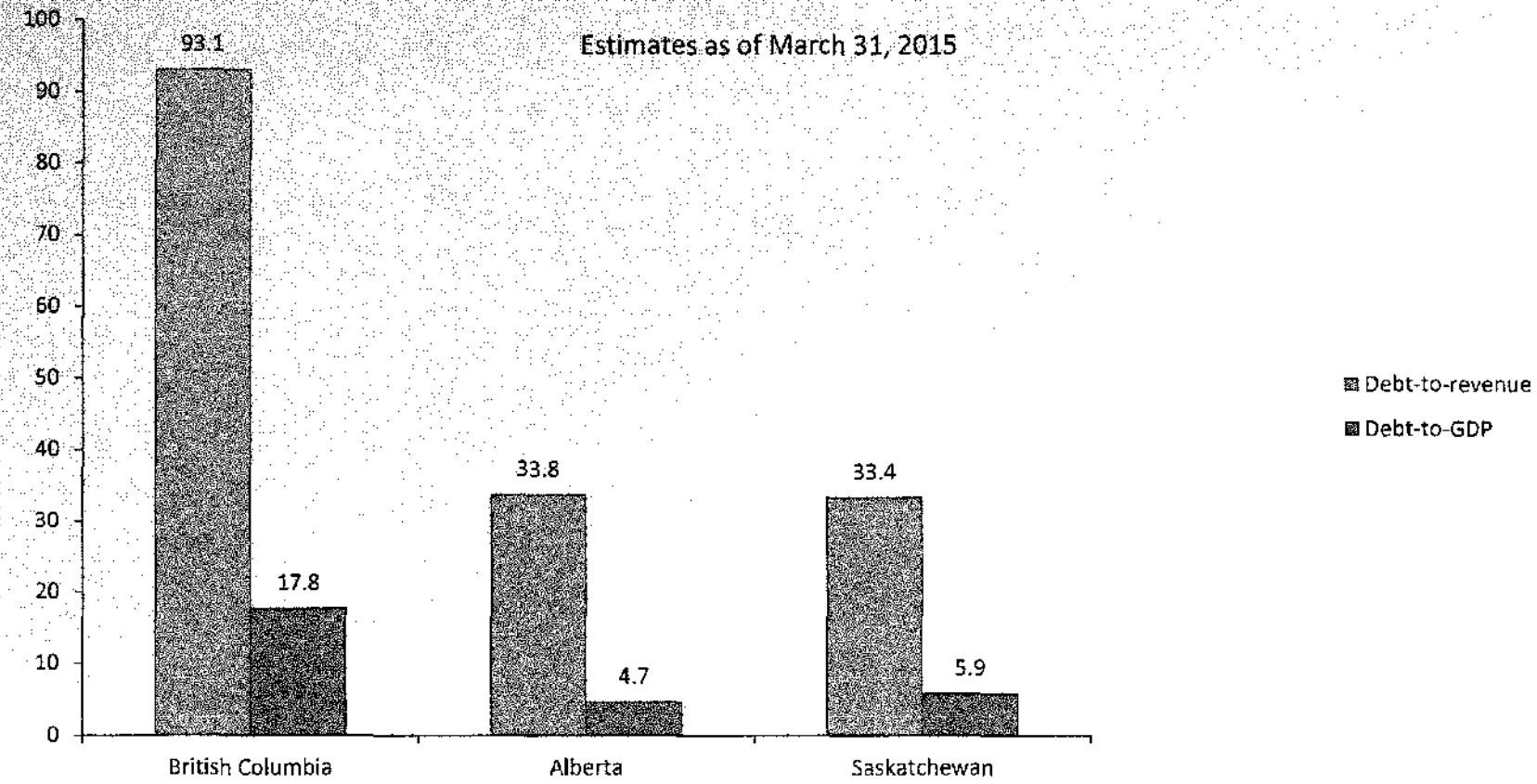
Key Rating Agency Indicators



Prepared for the Advice of Treasury Board

Pages 121 through 122 redacted for the following reasons:
- -
s12, s13

BC Compared to Other Jurisdictions



* Based on March 31, 2014 actual results. Metrics based on budget projections unavailable.
Source: Moody`s

Page 124 redacted for the following reason:
- -
s12, s13, s17

Knowles, Jessica D FIN:EX

From: MacLaren, Les MEM:EX
Sent: Friday, November 28, 2014 1:34 PM
To: Foster, Doug FIN:EX
Subject: FW: Document for Cabinet
Attachments: Site_C_Technical Briefing.pptx

Follow Up Flag: Follow up
Flag Status: Flagged

As discussed. No rocket science.

From: Sandve, Chris MEM:EX
Sent: Thursday, November 27, 2014 4:07 PM
To: Finkel, Paul PREM:EX
Cc: MacLaren, Les MEM:EX
Subject: RE: Document for Cabinet

Here you go – thanks!

Chris

Chris Sandve
Chief of Staff to the Hon. Bill Bennett
Minister of Energy and Mines and Minister Responsible for Core Review
Office: 250-356-9944 | Cell: 250-818-4306 | E-mail: chris.sandve@gov.bc.ca

From: Finkel, Paul PREM:EX
Sent: Thursday, November 27, 2014 4:04 PM
To: Sandve, Chris MEM:EX
Subject: Document for Cabinet

Hello Chris, if you could email the PPT to me in the next 15 minutes that would be appreciated. Thanks.

Paul Finkel | Cabinet Operations
Room 049 | 617 Government St. | Victoria, BC | V8W 9V1
☎250.387.0728 | cell: 250.508.1748 | 250.387.7392

SITE C | CLEAN ENERGY PROJECT

SITE C CLEAN ENERGY PROJECT

Technical Briefing

December 2014

Confidential and not for distribution: Prepared for the advice of Cabinet

BC hydro

FOR GENERATIONS

Page 127 redacted for the following reason:
- -
s12, s13

1. What is our current system, and what are the challenges in meeting the long-term demand for electricity?

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B.C.'s ELECTRICITY SYSTEM

BC Hydro serves 95% of B.C.'s population

- 1.9 million customers including residential, commercial, industrial
- 31 hydroelectric facilities
- 3 thermal generating plants
- 6 brownouts
- 77,000 km of transmission and distribution lines
- 93 per cent clean electricity
- ~25 per cent of system from Independent Power Producers (IPPs)
- 3rd lowest residential and commercial rates in North America
- 4th lowest industrial rates in North America

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Pages 130 through 131 redacted for the following reasons:
- -
s12, s13

2. How do we determine future demand, how accurate have our previous forecasts been and what do we forecast for future demand?

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HOW DO WE PLAN OUR SYSTEM?

- **Step 1:** Estimate how much electricity B.C. will require by forecasting Load (both capacity and energy)
- **Step 2**: Determine the gap between what we have (existing supply)and what we will need in the future
- **Step 3:** Determine what can be achieved through conservation and efficiency and then evaluate supply-side resource options that are economically and technically feasible
- **Step 4:** Conduct analysis of combinations of viable resources to fill the gap, with consideration of risks and uncertainties
- **Step 5:** Identify the preferred alternatives

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HOW DO WE FORECAST LOAD?

- Complete detailed analysis of all customer sectors
- Create a low, medium and high load forecast
- Use a state-of-the-art modeling approach
- Significant input from external experts
- As per policy and prudent utility practice, plan to meet the mid-load forecast

Residential & Commercial

Econometric modeling – statistically adjusted end-use models

End-use analysis – survey major electricity consuming equipment

Industrial

Bottom up modeling by sectors by accounts

Information from Key Account Managers

Inputs from sector-specific experts for:

- Oil & Gas
- Forestry
- Mining
- LNG

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ARE THE LOAD FORECASTS ACCURATE?

- The load forecasting methodology has been the subject of extensive reviews and accepted by the British Columbia Utilities Commission
- 2011 Government Review concluded that:
  - *"Electricity Load Forecasts from 2006 to 2010 reveal forecasts accurate to within 1% of actual results, based on the annual service plans."*
- The Joint Review Panel concluded that:
  - *"The Panel concludes that BC Hydro's forecasting techniques are sound, but uncertainties necessarily proliferate in long-term forecasts."*
- Load forecast was comprehensively reviewed by external expert Mark Gilbert
  - *"The BCH forecast methodology and process is representative of good utility practice. In particular, the company's forecast methodology for sales and peak are sound and useful for planning. The sales methodology is state-of-the-art….While Gilbert has noted one potential improvement worth considering, the peak methodology is essentially state-of-the-art. Processes used by BCH's staff appeared to be effective and thorough."*

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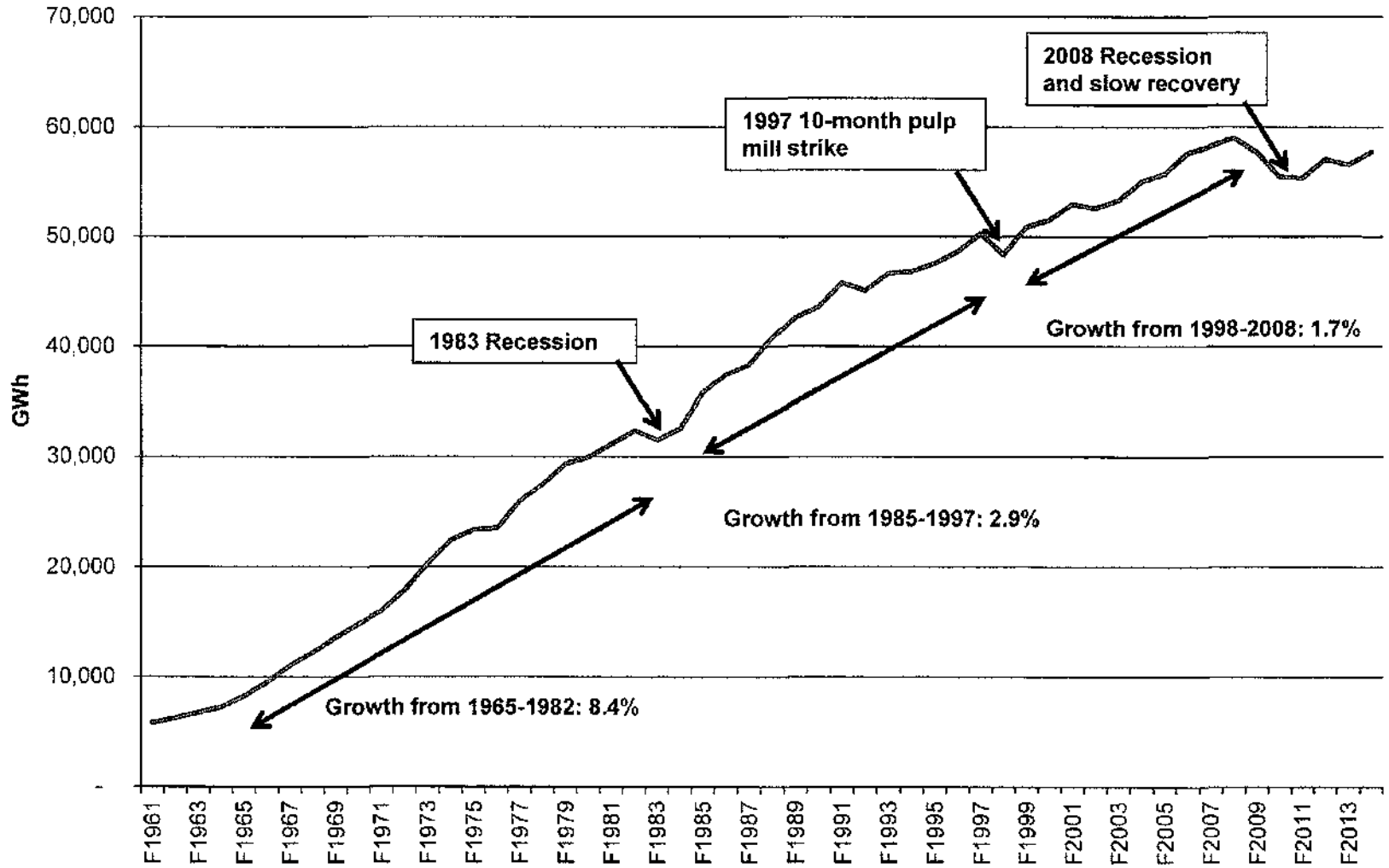
WHAT IS THE HISTORY OF B.C.'s LOAD?

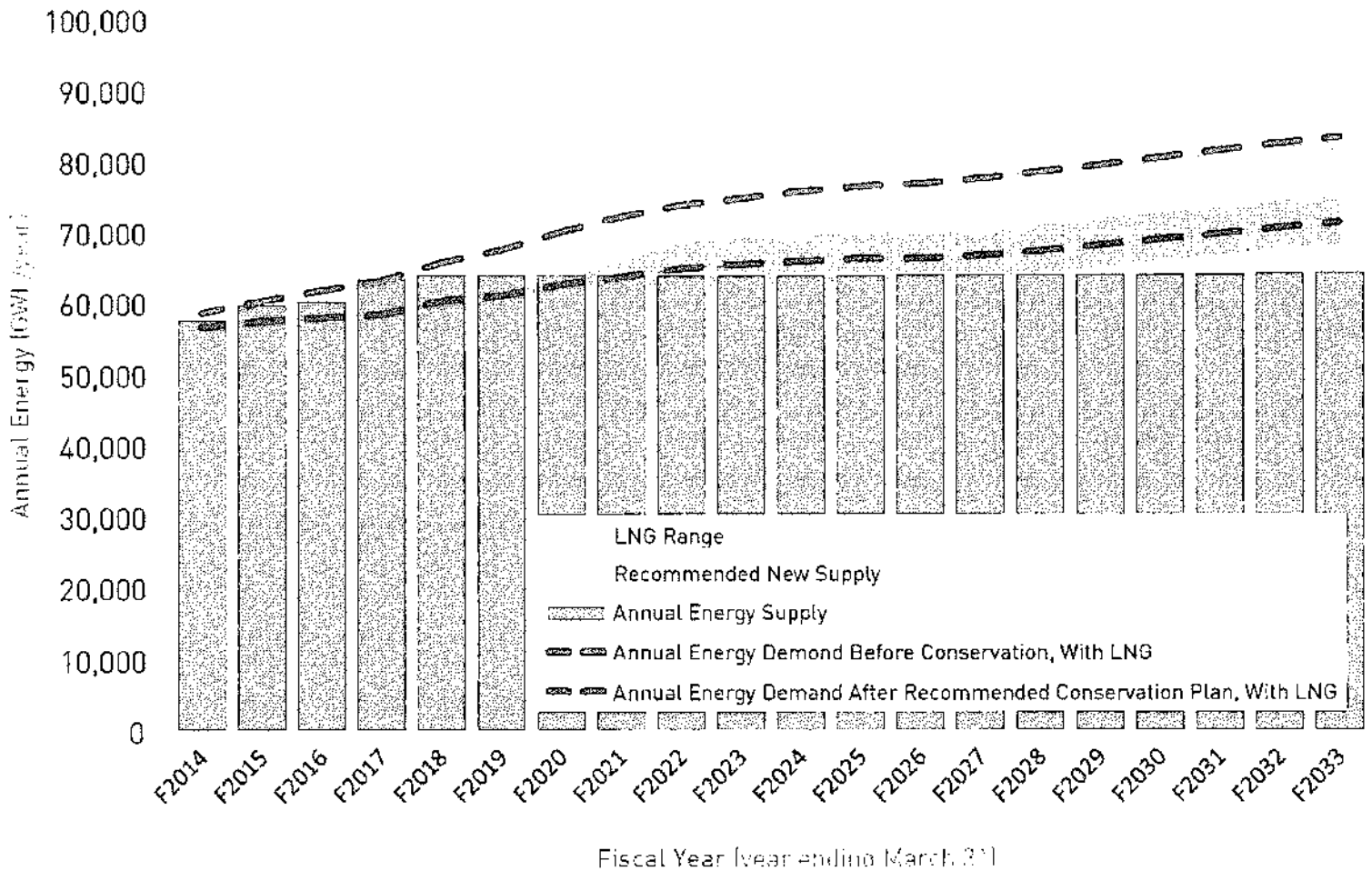
Actual long-term load growth in the past has trended higher than current long-term projection (except for unusual events such as 2008 recession)



WHAT IS OUR FORECASTED LOAD GROWTH?

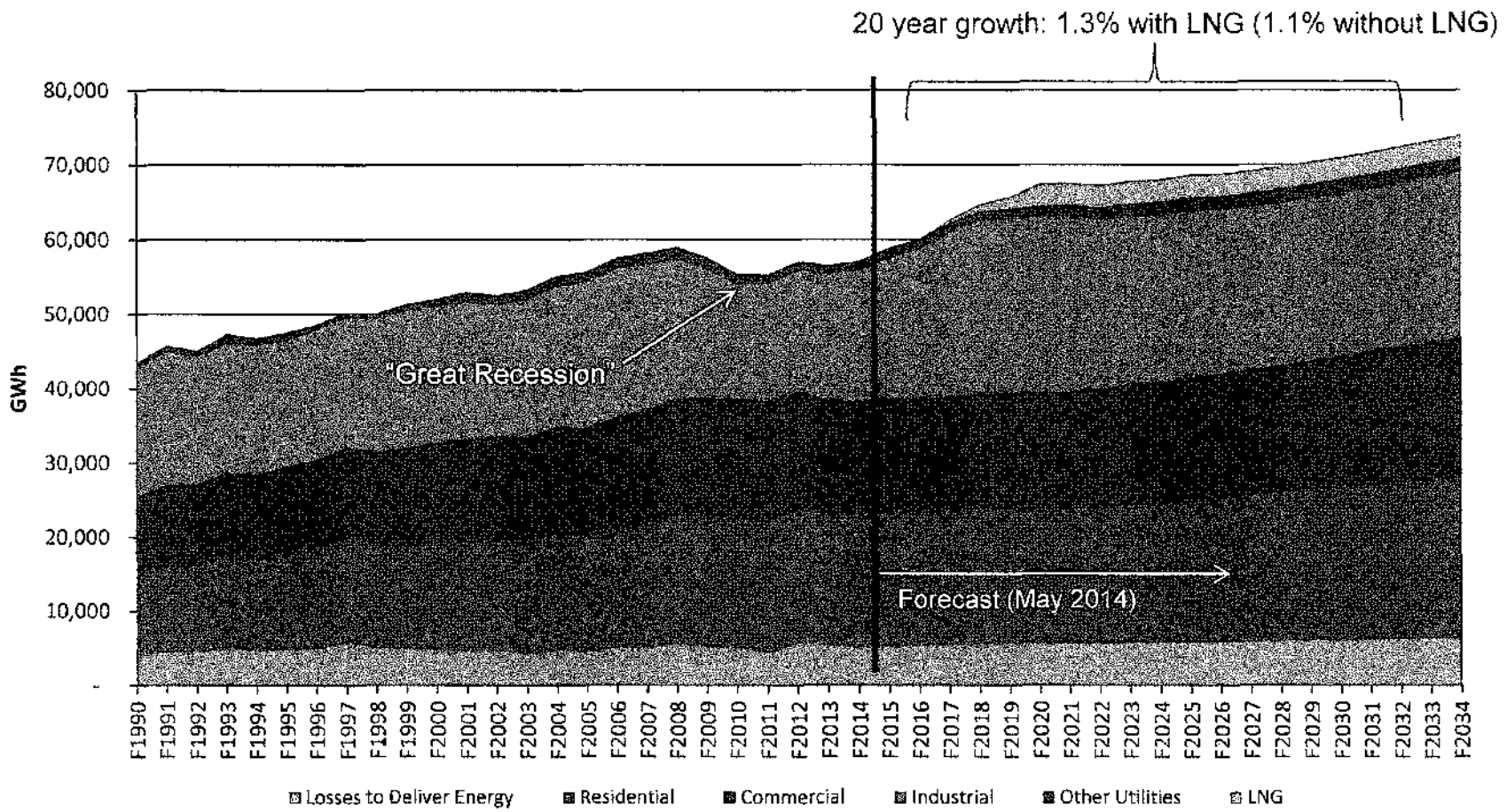
Demand forecast to grow by 40% over next 20 years

~22% of load growth to be met with new supply



DEMAND EXPECTED TO GROW IN ALL SECTORS

Demand increasing with or without LNG



Pages 139 through 148 redacted for the following reasons:
- -
s12, s13
s12, s13, s17

INTEGRATED RESOURCE PLAN APPROVED IN NOVEMBER 2013 RECOMMENDS BUILDING SITE C

- IRP is a long-term plan to meet B.C.'s electricity needs for the next 20 years
  - Analysis based on Resource Options Report, developed with industry and independent electricity sector experts
  - Examined portfolios of resources to identify which blend of conservation measures and generation resources could meet demand
  - Informed by three rounds of consultation including 17 First Nations meetings, 27 stakeholder meetings, and 17 open houses
  - Identified the preferred actions to meet demand in the planning period
  - Includes contingency resource plans to address uncertainty
- IRP concluded that:
  - *"even in a no LNG load scenario, portfolios with Site C are more cost competitive than portfolios without Site C…."*

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Pages 150 through 159 redacted for the following reasons:
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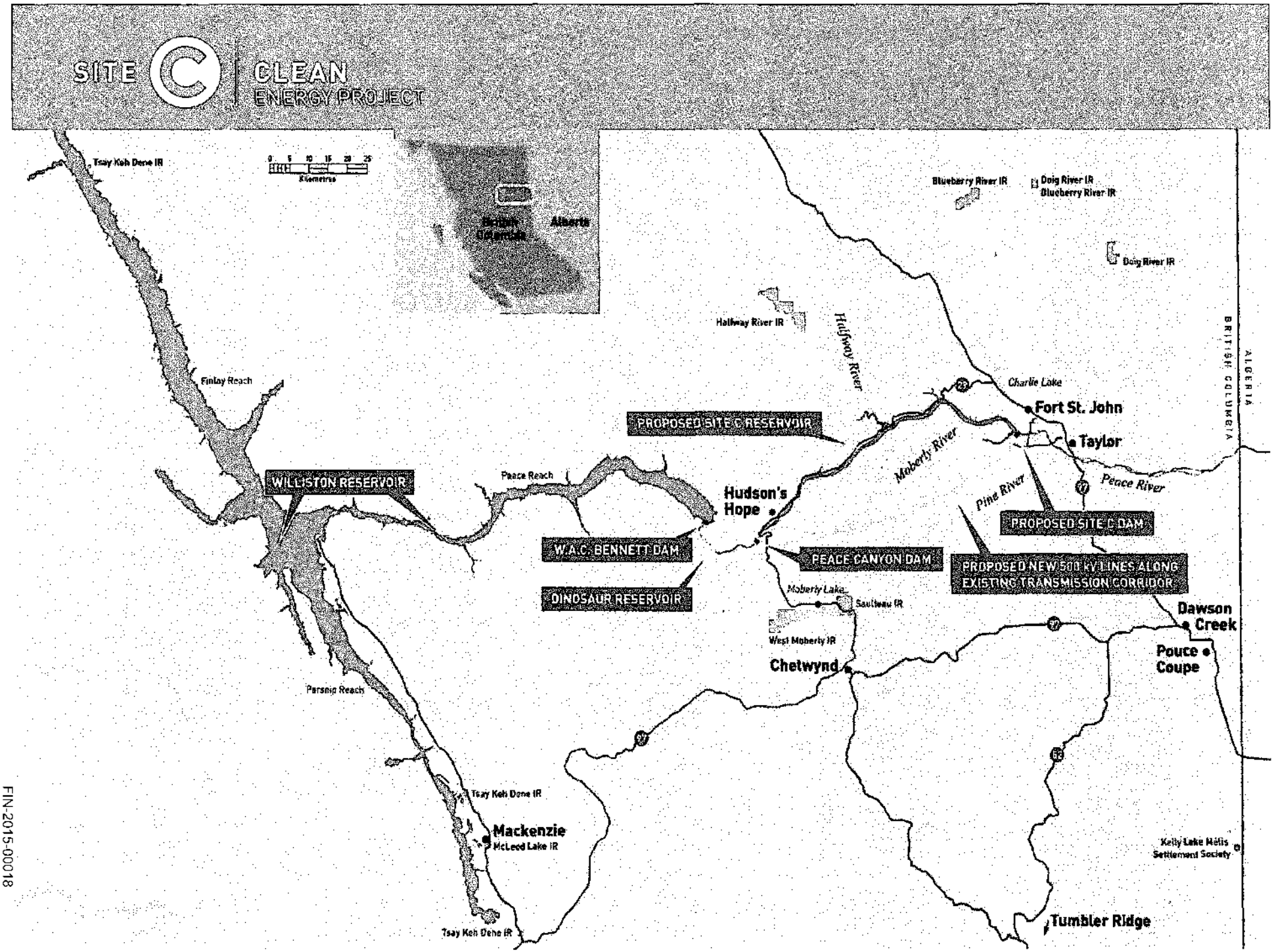
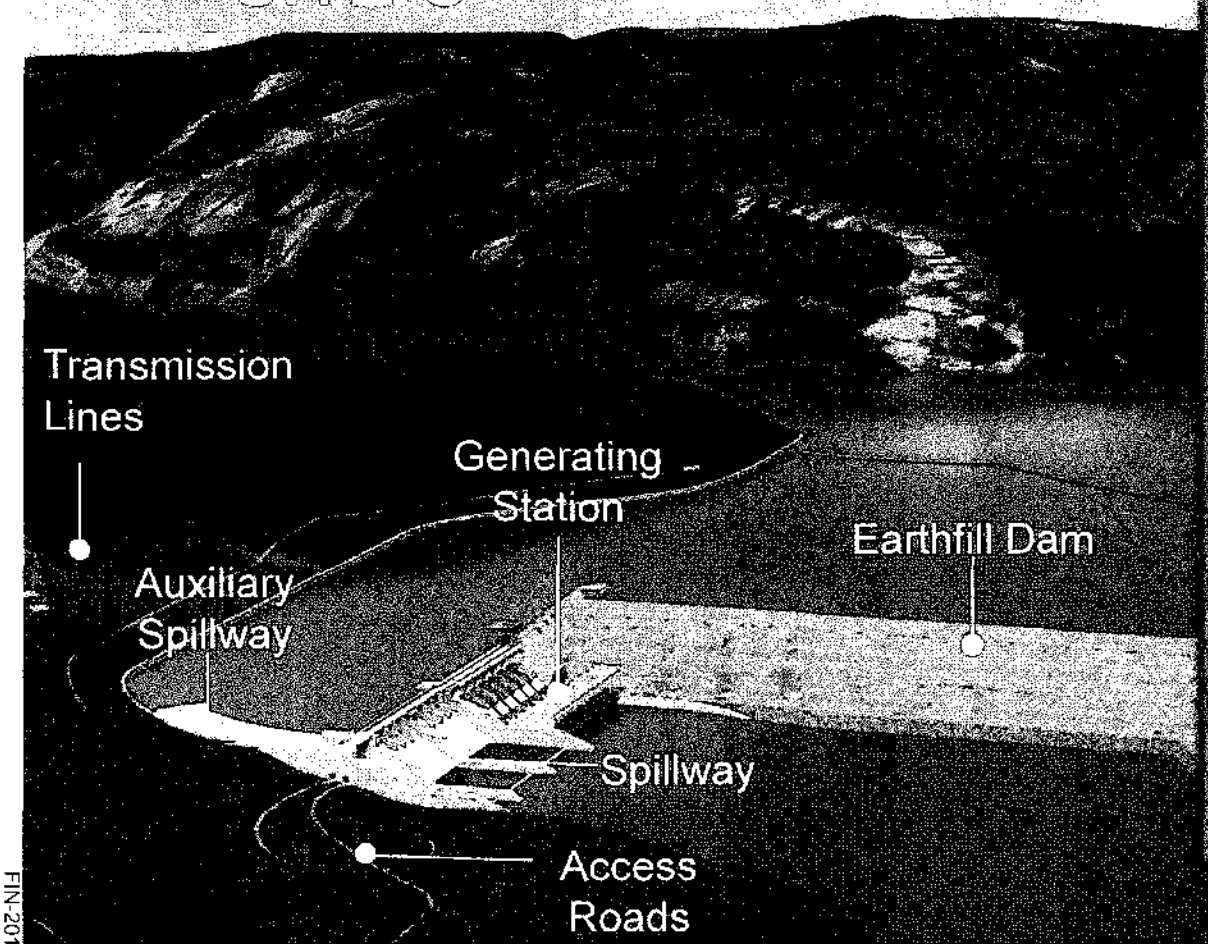
s12, s13
s12, s13, s17


SITE C
CLEAN ENERGY PROJECT
Tsay Keh Dene IR
Kilometres
British Columbia
Alberta
Finlay Reach
WILLISTON RESERVOIR
Peace Reach
Parsnip Reach
W.A.C. BENNETT DAM
DINOSAUR RESERVOIR
Hudson's Hope
PROPOSED SITE C RESERVOIR
PEACE CANYON DAM
PROPOSED SITE C DAM
PROPOSED NEW 500 kV LINES ALONG EXISTING TRANSMISSION CORRIDOR
Halfway River IR
Halfway River
Moberly River
Pine River
Peace River
Charlie Lake
Fort St. John
Taylor
Blueberry River IR
Doig River IR
Moberly Lake
Saulteau IR
West Moberly IR
Chetwynd
Dawson Creek
Pouce Coupe
Tumbler Ridge
Kelly Lake Métis Settlement Society
Mackenzie
McLeod Lake IR
ALBERTA
BRITISH COLUMBIA

SITE C



OTHER PROJECT COMPONENTS

- Realignment of 30 kilometres of Highway 29
- Shoreline protection at Hudson's Hope
- Two new 500 kilovolt AC transmission lines
- Access roads and a temporary construction access bridge
- Two ten-metre-diameter tunnels and associated cofferdams
- Worker accommodation

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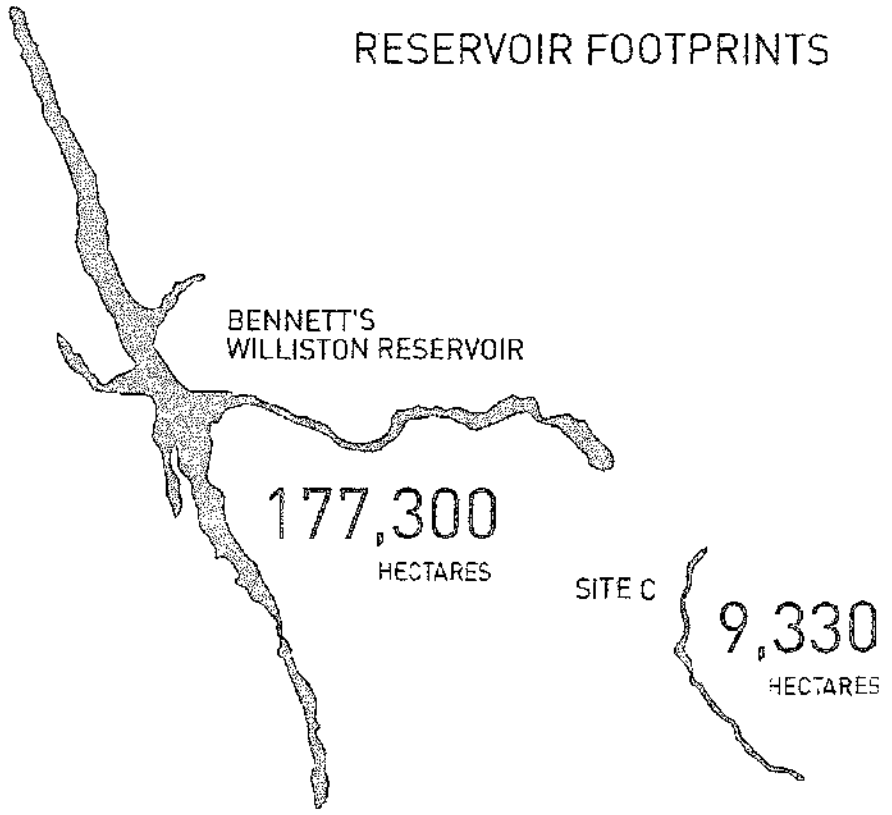
BUILDS ON EXISTING RESOURCES

- As third project on Peace River, Site C would rely on Williston Reservoir for most of its water storage
- Enables Site C to produce 35% of energy of WAC Bennett Dam with 5% of the reservoir area



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Pages 163 through 165 redacted for the following reasons:
- -
s12, s13

7. What does the Site C budget include and how reliable are the budget estimates?

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DEVELOPMENT OF 2010 COST ESTIMATE
Bottom-up estimate, peer-reviewed

- Bottom-up cost estimate done in 2010 based on upgraded project design and includes all project components, contingency, development costs, mitigation, benefit agreements, inflation and interest during construction
- Cost estimate reviewed and validated throughout development by:
  - Site C Integrated Engineering Team
  - BC Hydro Generation Engineering estimators
  - BC Hydro Principal Engineer's team
  - External advisors (Pacific Liaicon and Partnerships BC)
- External peer review by KPMG; confirmed that process for developing assumptions and construction of financial model were appropriate

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Pages 168 through 169 redacted for the following reasons:
- -
s12, s13, s17

CONCLUSION OF 2014 COST REVIEW

- Project cost estimate re-confirmed at $7.96 billion
  - Notional allocation of $110 million from contingency to improve worker accommodation and labour conditions to ensure labour strategy is competitive
  - With allocation, contingency remains at $620 million; appropriate given the advanced level of design
- KPMG reviewed and confirmed methodology and assumptions
- Independent contractors panel confirmed validity of estimate
- Project cost of $7.96 billion remains appropriate

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INDEPENDENT CONTRACTORS' REVIEW

"Overall, it is the panel's conclusion that the estimate is sufficient for the proposed scope and schedule of Site C. The estimate has an appropriate level of accuracy for making a final investment decision. Further, there are some opportunities for cost reduction available."

"The direct cost estimate has been prepared to higher level of detail than typical owner's estimates and at a similar level of detail as a Contractor in the Private Sector".

"The direct cost estimate appears to be sufficiently complete and adequate to cover all anticipated costs associated with constructing the works in the planned time schedule".

"The estimate has sufficient allowances/contingency to cover any reasonable increase in cost resulting from design development or cost estimate uncertainty."

Panel of Independent Contractors, October 20, 2014

Frank Margitan, Chair

Pages 172 through 173 redacted for the following reasons:
- -
s12, s13, s.16
s12, s13, s16, s17

FEDERAL/PROVINCIAL REVIEW OF ABORIGINAL CONSULTATION AND ACCOMMODATION

"Having regard to the overall process of consultation, as part of the EA for the proposed Project, the Agency and EAO conclude that consultation has been carried out in good faith and that the process was appropriate and reasonable in the circumstances."

"The Agency and EAO are of the view that there has been meaningful consultation with the potentially affected Aboriginal groups, to understand the potential impacts of the proposed Project on Aboriginal Interests, and to develop substantive accommodation measures that are intended to reduce, mitigate or offset these impacts."

Canadian Environmental Assessment Agency and B.C. Environmental Assessment Office, September 7, 2014

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Pages 175 through 185 redacted for the following reasons:
- -
s12, s13
s12, s13, s16, s17
s12, s13, s17

Provincial Direction and Project Governance

FIN-2015-00018
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Pages 187 through 189 redacted for the following reasons:
- -
s12, s13
s12, s13, s16

COMMUNICATIONS PLAN

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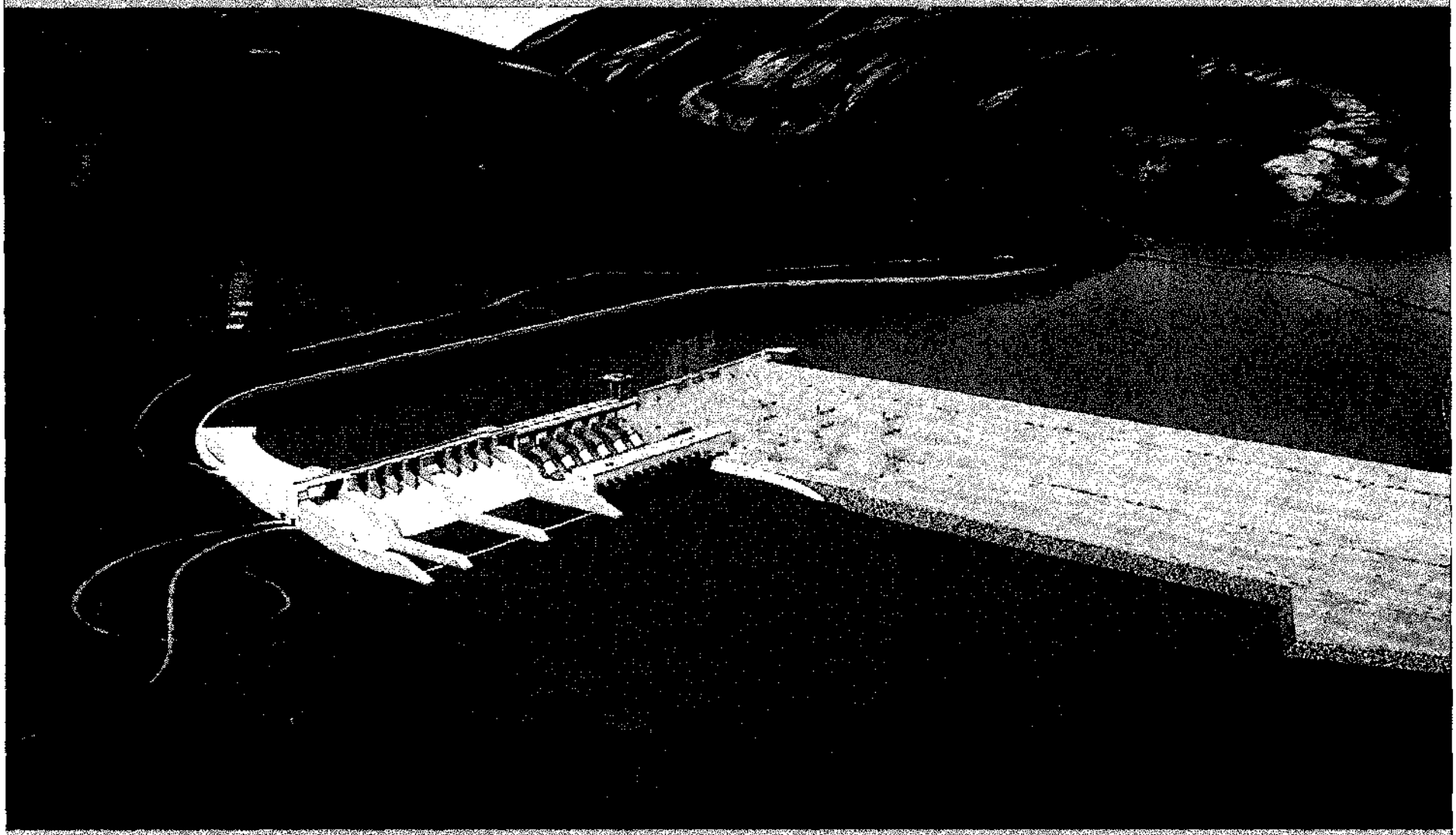
Page 190

Pages 191 through 193 redacted for the following reasons:
- -
s12, s13

QUESTIONS?



www.sitecproject.com

Page 157 to/à Page 180

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Mark Aiello
Senior Vice President

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Fax +1 416 868 2526
mark.aiello@marsh.com
www.marshriskconsulting.com/canada

Thomas Assimes
Chief Financial Officer, Site C Project
BC Hydro
333 Dunsmuir
Vancouver, B.C.
V6B 5R3

11 August 2014

Subject: Review of Site C Project Enterprise Risk Management Framework

Dear Mr. Assimes:

Marsh Risk Consulting (Marsh) has completed a review of the Enterprise Risk Management framework for the Site C Project (the Framework). Marsh was asked to review and comment on the risk management approach and framework put in place by the Site C Project team. The review was conducted to ensure that the Framework aligned with industry best practice.

Project Scope

The program review was intended to provide an objective, third party to ensure that the Framework meets leading practices and is effectively positioned to effectively support BC Hydro in managing the risks associated with the Site C project.

The scope of our review was to focus solely on the underlying framework and approach, including program communication and governance. The scope did not address the actual risks identified and evaluated within the Framework.

Approach

The program review consisted of two core elements:

1. Developing an Understanding of the Current Program
2. Reviewing the Current Program Against Leading Practice

Developing an Understanding of the Current Program

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To gain the appropriate understanding of the framework and context around its development, the Marsh team reviewed all framework and communication documentation that has been developed for the Site C program. This documentation included:

- Risk Management Plan – March 2014
- Short Form Risk Register – June 2104
- Preliminary Risk Report Main Civil Works Package – June 2014
- Main Civil Works Consolidated Minutes

Along with the document specific to the Site C risk management framework, Marsh reviewed a number of BC Hydro's corporate risk management governance documents and templates.

In addition to the document review, Marsh gained additional context by conducting one-on-one interviews with seven key personnel within the Site C team. These interviews provided details on how the Framework is put to practical use on an ongoing basis.

Reviewing the Current Program Against Leading Practice

The second core element of the review was to evaluate the Framework against recognized leading practice. The framework was evaluated against:

- Marsh's proprietary risk management framework
- ISO 31000 risk management framework
- BC Hydro Corporate risk management framework

The focus of the review was to ensure that the framework adopted by the Site C team was in alignment with recognized leading practice and with BC Hydro's corporate program.

Findings

We evaluated the framework on a number of key elements:

- Framework Foundation
- Stakeholder Engagement and Integration with Operations & Project Management
- Communication and Accountability

Framework Foundation

The Framework consists of five elements:

- Risk Management Planning
- Risk Identification
- Risk Analysis & Evaluation
- Risk Response Planning
- Risk Monitoring & Control

The Framework is designed to be iterative with a continuous improvement focus. The elements of the Framework align with Marsh's risk management framework as well as the ISO 31000 framework. Further, we are comfortable that the Framework is consistent with the spirit and approach of BC Hydro's corporate risk management framework.

Stakeholder Engagement and Integration

A best practice risk management framework should engage stakeholders at different levels of the organization in the development and execution of the program. Further, adoption and integration into day-to-day processes is an important element to ensuring an effective, sustainable program.

Our analysis has shown:

- Every level of the project team (e.g. Board, Executive Team, Area Planners etc.) has bought into the importance of the risk management program
- A high level of engagement from senior leadership has provided a solid foundation and has established a level of engagement expectation from area planners
- The risk management framework is effectively integrated into the everyday operations at every level of the project
- Partnering organizations (e.g. Ministry of Transportation etc.) are involved in the process and kept informed of relevant risks

In summary, the Site C framework has a high level of engagement from key stakeholders and is well integrated into project operations and decision making.

Communication and Accountability

Regular, clear and effective communication is a critical element of a best practice program. Our review revealed that:

- Communication between the leadership team, area managers, work package managers etc. is very effective
- Risks are reported and communicated from a top-down and bottom-up approach improving the decision making process as detailed, relevant information is conveyed
- Risks are assigned to their appropriate owners and responsibility is passed down to area planners
- High level of accountability has been established by the work package managers which has driven the high level of communication and integration

The Site C project team has developed an effective communication framework with respect to its risk management program that ensures a regular exchange of relevant information to all necessary parties.

Accountability

An effective risk management program must assign risk management responsibilities to appropriate stakeholders and ensure that those stakeholders are accountable for their identified risk areas. Our analysis has shown that:

- Risks are assigned to their appropriate owners and responsibility is passed down to area planners
- High level of accountability has been established by the work package managers which has driven the high level of communication and integration

Summary

In our view, BC Hydro's Site C Risk Management team has done a very good job developing its project risk plan and is well positioned to implement risk management planning as the project continues to mature.

A strong foundation for risk management has been developed for the Site C project. As the project evolves, the team is in a good position to sustain effective risk management.

Sincerely,

Mark Aiello
Senior Vice President
document3

Pages 223 through 224 redacted for the following reasons:
- -
s22

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Friday, November 28, 2014 7:58 PM
To: Milburn, Peter R FIN:EX
Subject: RE: scenarios question

Follow Up Flag: Follow up
Flag Status: Flagged

thx

From: Milburn, Peter R FIN:EX
Sent: Friday, November 28, 2014 7:58 PM
To: Foster, Doug FIN:EX
Subject: RE: scenarios question

s13

From: Foster, Doug FIN:EX
Sent: November-28-14 7:00 PM
To: Milburn, Peter R FIN:EX
Subject: scenarios question

As you know, the scenarios I've been looking at are:

s13, s17

Given your discussion today on the rating agencies check in, is FID date the most critical anymore, or is it when actual major construction (and hence debt) actually starts?

d.

Knowles, Jessica D FIN:EX

From: Bernard, Marion M FIN:EX
Sent: Monday, December 1, 2014 5:32 PM
To: Chipper, Tammy L FIN:EX
Cc: Ty, Marie FIN:EX; Farkas, George FIN:EX; Foster, Doug FIN:EX
Subject: FW: Site C - Final Signed
Attachments: 05 14 15 Site_C_TB_Sub_FID_1-12-14 Signed.pdf; 05 14 15 TB - Appendix A-C 1-12-14 FINAL.docx; 05 14 15 Deferral Analysis - Core Report v4 1-12-14.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Tammy, please log, etc.

Everyone else, FYI – version from earlier today is now signed.

From: De Champlain, Rhonda MEM:EX
Sent: Monday, December 1, 2014 5:26 PM
To: Bernard, Marion M FIN:EX
Cc: De Champlain, Rhonda MEM:EX
Subject: Site C - Final Signed

Hello Marion,

Attached is the Minister-signed Site C Business and Risk Management Plans Treasury Board Submission.

TB Submission
Appendices A – D
Analysis of Delay to Final Investment Decision

Please let me know if you need anything further.

Thank you.

Rhonda De Champlain
Director
Cabinet and Legislative Initiatives
Deputy Minister's Office
Ministry of Energy and Mines
Ministry of Natural Gas Development and
Minister Responsible for Housing
(250) 952-0253

BRITISH COLUMBIA

Treasury Board Submission - Request for Decision

Minister: Honourable Bill Bennett

Ministry: Ministry of Energy and Mines

Date: December 1, 2014 Ministry Document #: TB 05-14/15

Title: Site C Business and Risk Management Plans

s12, s13, s17

Pages 228 through 253 redacted for the following reasons:
- -
s12, s13, s17

BRITISH COLUMBIA

s12, s13

Contact: Dave Nikolejsin, Deputy Minister
(250) 952-0120

Honourable Bill Bennett
Minister of Energy and Mines

December 1, 2014
Date Signed

Pages 255 through 268 redacted for the following reasons:
- -
s12, s13
s12, s13, s17

BRITISH COLUMBIA

s12, s13, s17

Due Diligence and Peer Reviews

The Site C project has undergone a number of topic specific reviews including:

- Environmental assessment by the Joint Review Panel
- Topic-Specific Reviews by independent third parties:
- Engineering and design - International Technical Advisory Board (hydraulic & dam design experts)
- Constructability review of major procurement – Experienced contractor panel (independent)
- Review of public consultation - Kirk & Co
- Review of adequacy of Aboriginal consultation - Fasken Martineau
- Supply-side alternatives review - Synapse Energy Economics
- Site C financial model and cost estimate methodology - KPMG

- Direct construction costs – Experienced contractor panel (independent)
- Risk management plan - Marsh Canada (insurance and risk services provider)
- Load Forecast Methodology review - Consultant Mark Gilbert
- Further work by the Ministry and independent consultants to assess assumptions.

Several of these reviews are highlighted below.

BC Hydro Load Forecast

An external review of BC Hydro's electric load forecast methodology was conducted by Mark P Gilbert, LLC. Mark Gilbert held the lead managerial or director position in load forecasting at utilities over a career-span of more than 30 years. Gilbert's review concluded:

"The BCH forecast methodology and process is representative of good utility practice. In particular, the company's forecast methodology for sales and peak are sound and useful for planning. The sales methodology is state-of-the-art....While Gilbert has noted one potential improvement worth considering, the peak methodology is essentially state-of-the-art. Processes used by BCH's staff appeared to be effective and thorough."

Mark P. Gilbert, LLC, September 2014

Alternatives Assessment Methodology

Synapse Energy Economics is a research and consulting firm specializing in energy, economic, and environmental topics. Synapse was retained by BC Hydro to conduct a review of its 2013 Integrated Resource Plan (IRP) and to prepare a report detailing whether specific input assumptions and the methodology for analyzing resource alternatives align with good utility resource planning practices. This external review of BC Hydro's alternatives assessment methodology concluded that:

"With respect to the WACC, BC Hydro has selected reasonable values and has given proper consideration and quantification of resource cost uncertainty through sensitivities. The Company's alternatives analysis methodology and tools are consistent with good utility practice and includes valuable elements."

Synapse Energy Economics, September 2014

Pages 271 through 275 redacted for the following reasons:
- -
s12, s13
s12, s13, s17

BRITISH COLUMBIA

s12, s13

Biography of Mark P. Gilbert

Mr. Gilbert held the lead managerial or director position in forecasting at three electric utilities over a career of 33 years. The last 13 years were at AEP, which serves 5 million customers through seven electric operating companies doing business in 11states and 16 jurisdictions. Shale gas extraction exists in four of these states. The sales mix of AEP is weighted slightly toward industrial with nearly a40% retail share. Mr. Gilbert and his team produced 16 operating company jurisdictional forecasts each forecast cycle.

Over the span of his career, Mr. Gilbert built and forecast from modeling systems starting with econometric models, then large scale end use models (REEPS, COMMEND, INFORM, HELM), and finally SAE models. He and the companies he worked for participated in the development of many of the models of the time as first users and beta testers and were active members of ITRON's Energy Forecast Group

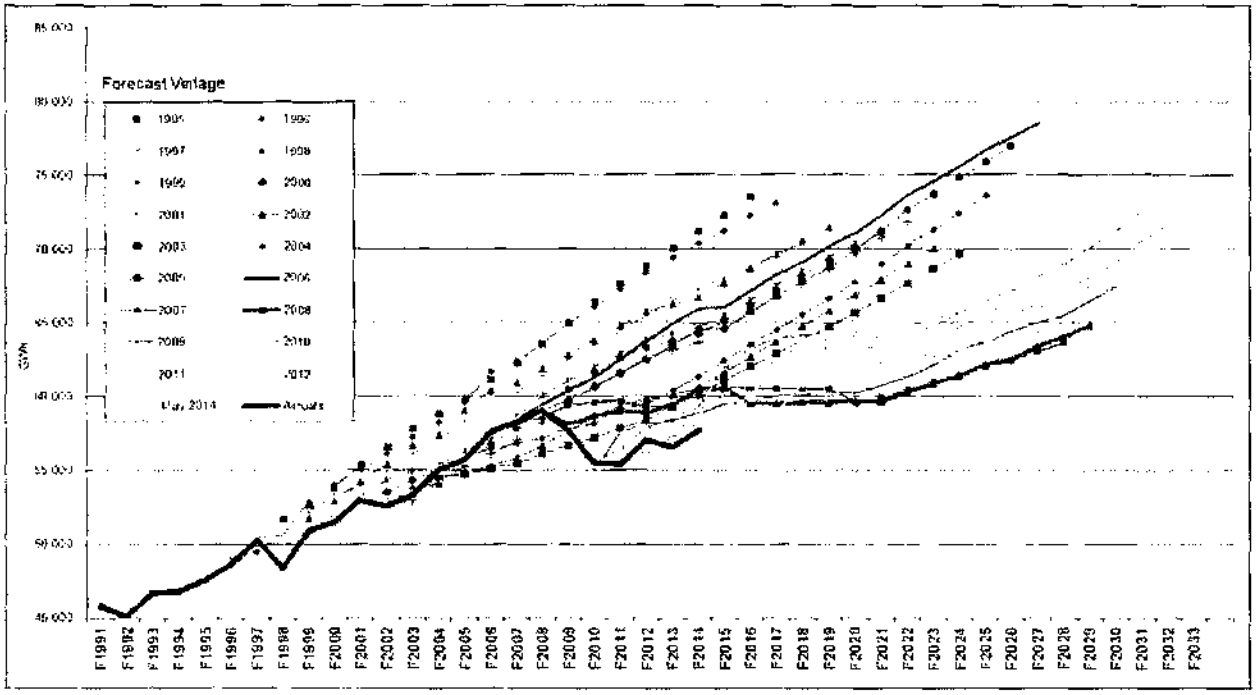
s12, s13

Page 277 redacted for the following reason:
- -
s12, s13

BRITISH COLUMBIA

Historical Accuracy of BC Hydro's Load Forecast

Figure 1: BC Hydro Actual and Forecast Load with Conservation (without LNG)



s12, s13

Pages 279 through 328 redacted for the following reasons:
- -
s12
s12 s13
s12, s13
s12, s13, s16, s17
s12, s13, s17
s12,s13, s17

TREASURY BOARD MEETING

CONFIDENTIAL

Thursday Dec 4, 2014 9:00 – 1:00 pm

(PVO/Chambers via video conference)

Members

De Jong	√ PVO	Thomson	√ PVO
Lake	√ PVO	Ashton	√ PVO
Bond	√ PVO (LV @12:30)	Gibson	√ PVO
Cadieux	√ PVO	Kyllo	√ PVO
Coleman	√ Chambers	Stilwell	√ Chambers
Letnick	√ PVO		

Process:

1. Presenting Minister and support staff invited in at onset of issue presentation unless TB members and/or the TB Chair choose differently.
2. TBS introduce ministry request, highlight issues for TB consideration, and provide TBS recommendation.
3. Minister presenting issue may be asked to highlight ministry issues and any concerns with TBS recommendation.
4. Ministry takes questions from TB members.
5. Following Q&A and discussion, Minister and support staff may be asked to leave to allow for further deliberation by TB members, as required.
6. Item is concluded by confirming the Treasury Board Decision.

9:00 – 1:00

Tab 1	**BC Hydro Financial Forecast and Site C - MEM**

Doug Foster will introduce MEM's request for approval of BC Hydro's Business and Risk Management Plans for Site C and expected net borrowing of $5.6B.

Doug Foster*, ADM, FIN
Marion Bernard, TB Analyst, TBS

Hon. Bill Bennett*, MEM
Dave Nikolejsin, DM, MEM
Les MacLaren, ADM
Jessica McDonald, CEO, BC Hydro?

s12, s13

Premier's Office Attendees:
Dan Doyle, Chief of Staff, PREM
Neil Sweeney, DM, PREM
Kim Henderson, DM, PREM

Government Communications and Public Engagement Attendees:
John Paul Fraser, DM, GCPE

Treasury Board Staff Attendees:
Peter Milburn, Secretary to Treasury Board
George Farkas, Deputy Secretary to Treasury Board
Marie Ty, Executive Director, TBS
Jennifer Michell, Manager TB Operations, TBS

*Presenter
1 Undertaking of Confidentiality signed

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 11:16 AM
To: Milburn, Peter R FIN:EX
Cc: MacLaren, Les MEM:EX
Subject: FW: Bird window discussion

Follow Up Flag: Follow up
Flag Status: Flagged

s13, s17

From: MacLaren, Les MEM:EX
Sent: Tuesday, December 2, 2014 10:06 AM
To: Foster, Doug FIN:EX
Subject: RE: Bird window discussion

s13, s17

Hope this helps.

Les

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 9:56 AM
To: MacLaren, Les MEM:EX
Subject: FW: Bird window discussion

s13

From: Savidant, Michael [mailto:michael.savidant@bchydro.com]
Sent: Monday, November 24, 2014 2:32 PM

To: Foster, Doug FIN:EX
Subject: Bird window discussion

s13

Michael Savidant
Commercial Manager
Site C Clean Energy Project

BC Hydro
Suite 600, Four Bentall Centre
1055 Dunsmuir Street
PO BOX 49260
Vancouver, BC V7X 1V5
(Couriers and visitors, please go to the 6th floor reception desk)

Office: 604.695.5271
Fax: 604.695.5290
Email: michael.savidant@bchydro.com

bchydro.com/sitec

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Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 11:37 AM
To: Milburn, Peter R FIN:EX
Subject: FW: Bird window discussion

Follow Up Flag: Follow up
Flag Status: Flagged

Status of the other stuff too. D.

From: MacLaren, Les MEM:EX
Sent: Tuesday, December 2, 2014 11:31 AM
To: Foster, Doug FIN:EX
Subject: RE: Bird window discussion

I am working on material with them.

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 11:13 AM
To: MacLaren, Les MEM:EX
Subject: RE: Bird window discussion

Did hydro get the charts done and get the other stuff on range probability and wage risk?

From: MacLaren, Les MEM:EX
Sent: Tuesday, December 2, 2014 10:06 AM
To: Foster, Doug FIN:EX
Subject: RE: Bird window discussion

s13

Hope this helps.

Les

Page 334 redacted for the following reason:
- -
s13

Michael Savidant
Commercial Manager
Site C Clean Energy Project

BC Hydro
Suite 600, Four Bentall Centre
1055 Dunsmuir Street
PO BOX 49260
Vancouver, BC V7X 1V5
(Couriers and visitors, please go to the 6th floor reception desk)

Office: 604.695.5271
Fax: 604.695.5290
Email: michael.savidant@bchydro.com

bchydro.com/sitec

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Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 11:39 AM
To: Knowles, Jessica D FIN:EX
Subject: FW: Australia experience - LNG and wage rates
Attachments: wage chart.PNG; wage comparison.PNG

Follow Up Flag: Follow up
Flag Status: Flagged

Can you print this please? Thx. D.

From: Bernard, Marion M FIN:EX
Sent: Tuesday, December 2, 2014 11:26 AM
To: Foster, Doug FIN:EX
Subject: Australia experience - LNG and wage rates

Hi Doug,
Summary of interesting stats I found were that for a tradesperson working on an LNG facility, salaries increased 47% from 2007-13 (wage chart) and hourly manufacturing wages in Australia increased by over 40% (in US dollars, builds in a 20% increase in the value of the Australian $) between 2009-2012 (wage comparison chart).

Reports and articles:

This Nov 2014 report "Oil and Gas Industry Cost Trends" done for the Australian Petroleum Production & Exploration Association (APPEA) has a good section on labour costs (p15-17 – copied below) with a great chart (attached).

http://www.appea.com.au/wp-content/uploads/2014/11/APPEA-Cost-Report_Final.pdf

Copyright

Copyright

Copyright

Copyright

Let me know if any of the links don't work or if you are looking for something more specific.

Marion M. Bernard
Treasury Board Analyst
Performance Budgeting Office
Ministry of Finance
ph: (250) 952-6200
cell: (250) 580-7381

Page 209 to/à Page 210

Withheld pursuant to/removed as

Copyright

Pages 341 through 342 redacted for the following reasons:
- -
s13

Knowles, Jessica D FIN:EX

From: MacLaren, Les MEM:EX
Sent: Tuesday, December 2, 2014 1:50 PM
To: Foster, Doug FIN:EX
Subject: RE: Responses to Questions

Follow Up Flag: Follow up
Flag Status: Flagged

Tech Briefing is 3-5:30 at PVO.

Mike got some stuff from Ince on the 90/10 which was confusing and asked for clarification. I'll shake his chain. Should see him in 10 minutes for a pre-pre-brief.

Les

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 1:47 PM
To: MacLaren, Les MEM:EX
Subject: Re: Responses to Questions

Thx. What time is hydrol at cab?
Did hydro get the 90/10 confidence and probability analysis done yet?

From: MacLaren, Les MEM:EX
Sent: Tuesday, December 02, 2014 12:52 PM Pacific Standard Time
To: Foster, Doug FIN:EX
Subject: RE: Responses to Questions

s13

Les.

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 12:40 PM
To: MacLaren, Les MEM:EX
Subject: Re: Responses to Questions

What does this mean for a feb fid?

From: MacLaren, Les MEM:EX
Sent: Tuesday, December 02, 2014 12:29 PM Pacific Standard Time
To: Foster, Doug FIN:EX
Subject: RE: Responses to Questions

How about:

s13

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 12:06 PM
To: MacLaren, Les MEM:EX
Subject: FW: Responses to Questions

They may need a one-pager on the diversion window issue. D.

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 12:05 PM
To: Milburn, Peter R FIN:EX
Subject: FW: Responses to Questions

They're still working on question. D.

From: Foster, Doug FIN:EX
Sent: Tuesday, December 2, 2014 12:04 PM
To: 'Savidant, Michael'
Cc: MacLaren, Les MEM:EX; Yurkovich, Susan; Assimes, Thomas; Melchior, Danielle
Subject: RE: Responses to Questions

What is cost compared to base case and MEM option?
The diversion window issue may become new element of confusion?
d.

From: Savidant, Michael [mailto:michael.savidant@bchydro.com]
Sent: Tuesday, December 2, 2014 11:56 AM
To: Foster, Doug FIN:EX
Cc: MacLaren, Les MEM:EX; Yurkovich, Susan; Assimes, Thomas; Melchior, Danielle
Subject: RE: Responses to Questions

Sorry Doug. Updated response on FID delay below.

FID Delay to February

Question
If government expects a LNG FID in February, what would be the impacts and how would you mitigate them if Site C FID was delayed to then (assuming the LNG FID actually happens)

Answer

Pages 345 through 350 redacted for the following reasons:
- -
s13

Knowles, Jessica D FIN:EX

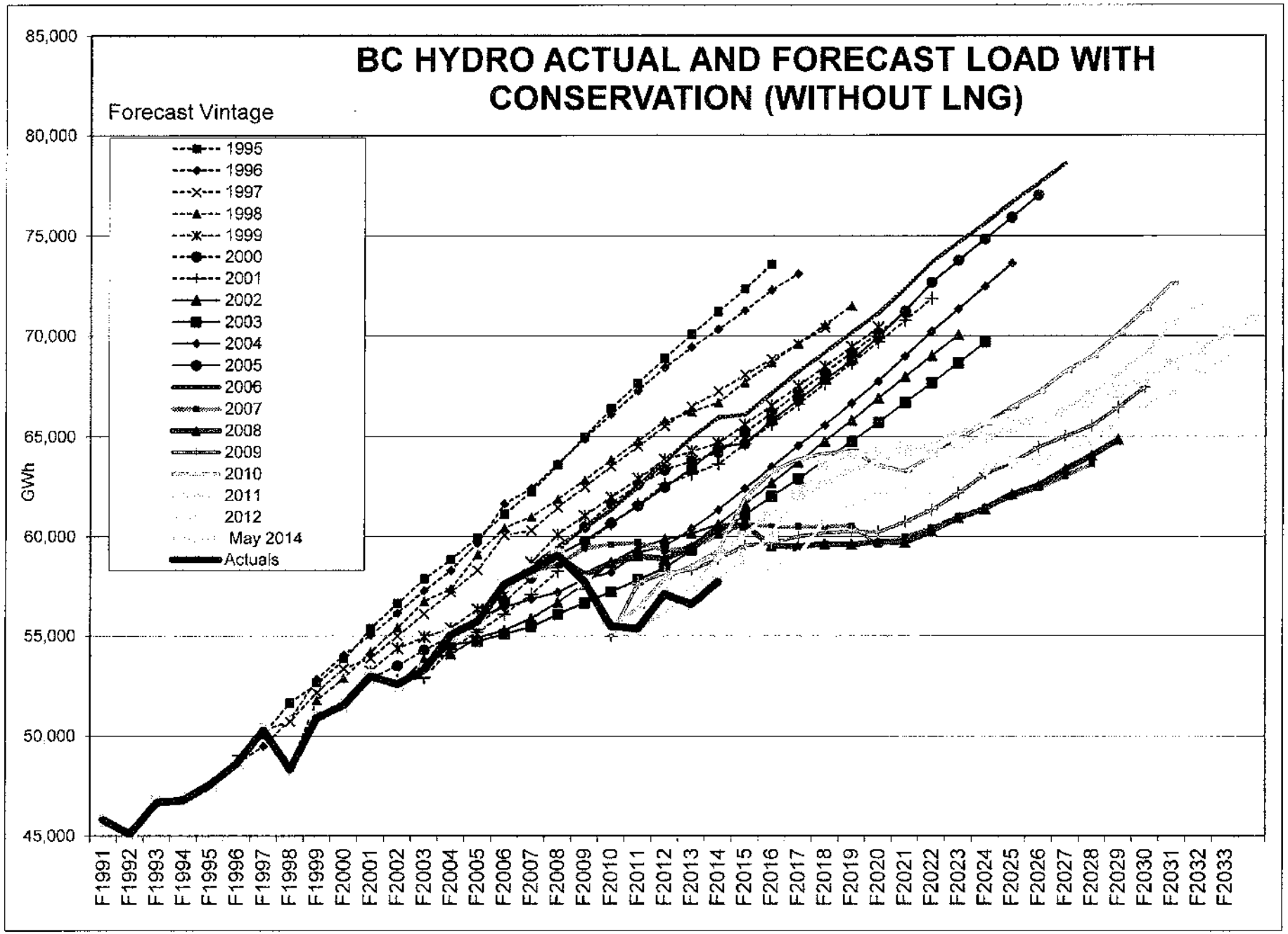
From: MacLaren, Les MEM:EX
Sent: Tuesday, December 2, 2014 3:06 PM
To: Bremner, Virginia PREM:EX
Cc: Foster, Doug FIN:EX
Subject: Updated Featherduster by sector Nov 2014.xlsx
Attachments: Updated Featherduster by sector Nov 2014.xlsx

Follow Up Flag: Follow up
Flag Status: Completed

Could I also please get 4 copies of two of the tabs at the bottom of this worksheet – Track Table and Variance Chart.

Many thanks

Les


BC HYDRO ACTUAL AND FORECAST LOAD WITH CONSERVATION (WITHOUT LNG)
Forecast Vintage
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
May 2014
Actuals
GWh
85,000
80,000
75,000
70,000
65,000
60,000
55,000
50,000
45,000
F1991
F1992
F1993
F1994
F1995
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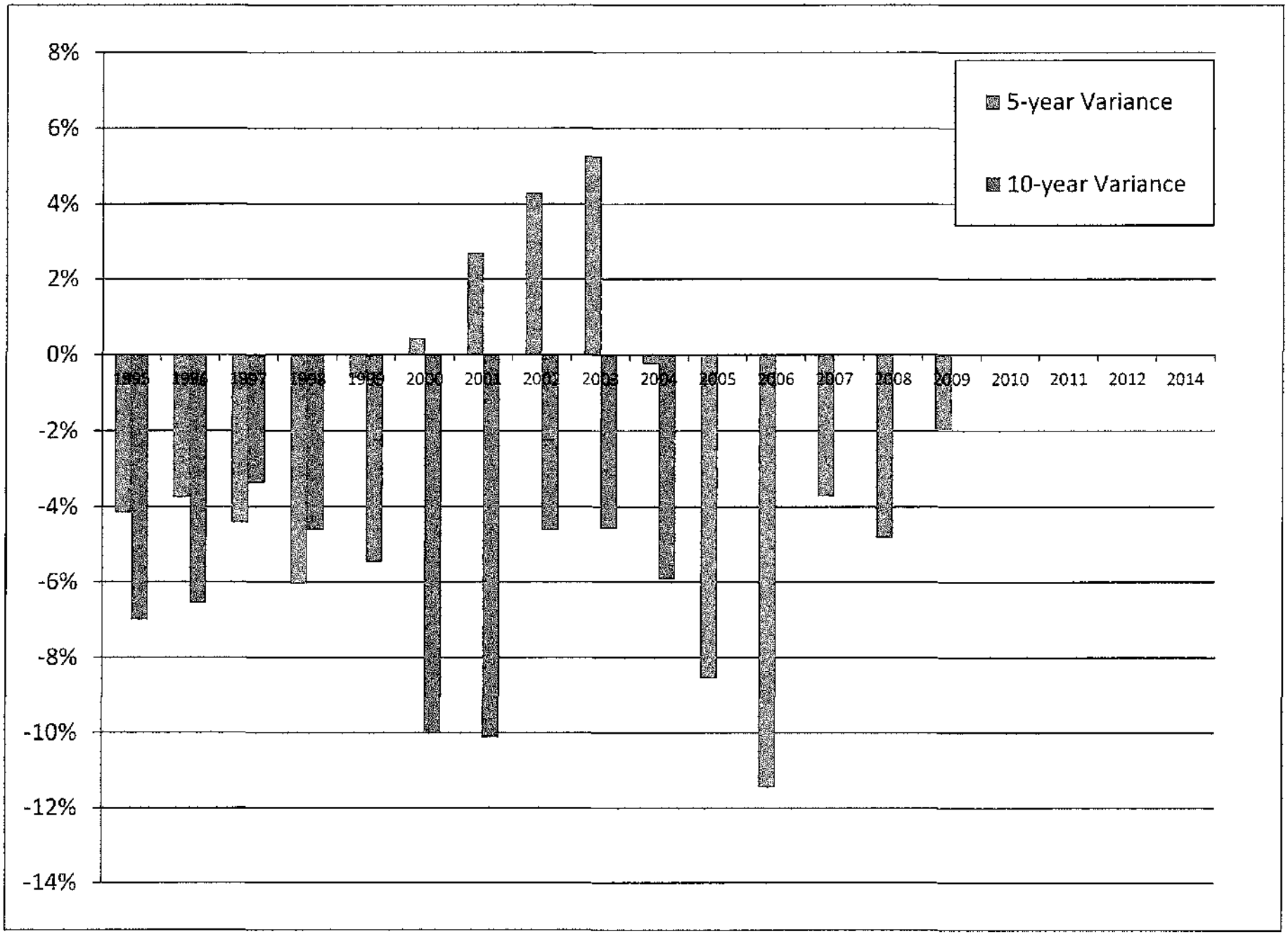

8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
-14%
5-year Variance
10-year Variance
2009
2010
2011
2012
2014

Pages 354 through 358 redacted for the following reasons:
- -
s13

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Wednesday, December 3, 2014 7:04 AM
To: Milburn, Peter R FIN:EX
Subject: minister's decision matrix
Attachments: Site 1 - Minister decision matrix.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Attached as he described.
d.

Site C Decision Matrix

Question/Issue	Commentary	Score

s12, s13

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Thursday, December 4, 2014 6:35 AM
To: Milburn, Peter R FIN:EX
Subject: FW: Finance material
Attachments: Labour Rate Increase Scenario Graph.pptx; a MEM - Site C - TBS BN draft - DF3.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Info. d.

From: Foster, Doug FIN:EX
Sent: Thursday, December 4, 2014 6:34 AM
To: Bremner, Virginia PREM:EX
Cc: MacLaren, Les MEM:EX
Subject: Finance material

Virginia, would it be possible for you to print 20 stapled copies of the attached briefing note in color for this morning's Treasury Board meeting?
I am attaching:

1) A briefing note; and
2) Slide that I can hand out if needed.

Item 2) would be separate from item 1.
Thanks very much.

d.

Page 362 redacted for the following reason:
- -
s12, s13, s17

TREASURY BOARD STAFF BRIEFING NOTE

REQUEST NO.: 05 -14/15 **T.B. MEETING DATE: DECEMBER 4, 2014**

TITLE: BC HYDRO SITE C BUSINESS CASE AND RISK MANAGEMENT PLANS

s12, s13, s17

Pages 364 through 372 redacted for the following reasons:
- -
s12, s13, s17

s12, s13

TBS Contact: Doug Foster FIN DMO/ Marion Bernard TBS

Date: December 4, 2014

Draft sub. 1st received: Oct 23, 2014	**Final draft received:** Nov 10	**Signed sub. received:** Dec
TB briefing note provided to the Ministry:		
Draft sent: Nov 13	**Final sent:** Nov 17	**Min. DM fact sign-off:**

Pages 374 through 383 redacted for the following reasons:
- -
s12, s13

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Thursday, December 4, 2014 7:53 AM
To: Henderson, Kim N PREM:EX
Subject: Fw: Finance material
Attachments: Labour Rate Increase Scenario Graph.pptx; a MEM - Site C - TBS BN draft - DF3.docx
see documents in 6:35am email
Follow Up Flag: Follow up
Flag Status: Flagged

From: Foster, Doug FIN:EX
Sent: Thursday, December 04, 2014 06:33 AM Pacific Standard Time
To: Bremner, Virginia PREM:EX
Cc: MacLaren, Les MEM:EX
Subject: Finance material

Virginia, would it be possible for you to print 20 stapled copies of the attached briefing note in color for this morning's Treasury Board meeting?
I am attaching:

1) A briefing note; and
2) Slide that I can hand out if needed.

Item 2) would be separate from item 1.
Thanks very much.

d.

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Friday, December 5, 2014 2:52 AM
To: Farkas, George FIN:EX; Milburn, Peter R FIN:EX
Subject: RE: c MEM - Site C - Minute
Attachments: c MEM - Site C - Minute.docx

Follow Up Flag: Follow up
Flag Status: Flagged

s12, s13

From: Farkas, George FIN:EX
Sent: Thursday, December 4, 2014 4:59 PM
To: Milburn, Peter R FIN:EX; Menzies, Brian FIN:EX
Cc: Foster, Doug FIN:EX
Subject: Fwd: c MEM - Site C - Minute

Small edit to minute -- to reflect that bc hydro s13

Sent from my iPhone

Begin forwarded message:

> **From:** "Ty, Marie FIN:EX" <Marie.Ty@gov.bc.ca>
> **Date:** December 4, 2014 at 4:56:54 PM PST
> **To:** "Holt, Lynne PREM:EX" <Lynne.Holt@gov.bc.ca>, "MacMillan, Elizabeth PREM:EX" <Elizabeth.MacMillan@gov.bc.ca>, "Farkas, George FIN:EX" <George.Farkas@gov.bc.ca>
> **Cc:** "Michell, Jennifer FIN:EX" <Jennifer.Michell@gov.bc.ca>
> **Subject: c MEM - Site C - Minute**
>
> Hi Lynne. Further to your discussion with George, attached is a revised version of the TB Minute. Pls discard the previous version and use this one. Thanks.

TREASURY BOARD MINUTE

REQUEST NO.: 05-14/15 T.B. MEETING DATE: DECEMBER 4, 2014

TITLE: BC HYDRO FINANCIAL FORECAST AND SITE C

s12, s13

Pages 387 through 389 redacted for the following reasons:
- -
s12, s13

KPMG LLP
777 Dunsmuir Street
Vancouver BC
V7Y 1K3

Telephone (604) 691-3000
Fax (604) 691-3031
www.kpmg.ca

Ms. Susan Yurkovich
Executive Vice-President, Site C Clean Energy Project
BC Hydro
333 Dunsmuir
Vancouver, BC
V6B 5R3

December 4, 2014

Dear Ms. Yurkovich,

Re: Site C Clean Energy Project - Project Review

Further to our meeting today, I would like to follow up and to provide some additional context around our cost estimate process reviews. This context is around observations on four key elements that made up the Site C Project team's cost estimate and due dilligence process.

1 Basis of Estimate

KPMG first carried out a review of the estimating process on the Site C Project in 2011 prior to the start of the regulatory process. This review was on the approach to developing the 2010 cost estimate, the basis of which was already the culmination of the information and designs that had evolved over many years. This 2010 estimate was based on a preliminary design level of information that was then costed along the lines of a construction style bottoms up estimate.

As you know, I have 30 years experience advising on large-scale projects undertaken by the public sector. In preparing their estimate, the Site C team used methods normally used by a Contractor. In my experience this is unprecedented for a pre-contract estimate let alone a pre-regulatory estimate.

Since the 2010 estimate, KPMG performed another thorough review of the 2014 cost estimate process and again we found the extensive process exemplary. Further independent review of the design and constructability inputs has occurred, and BC Hydro has also had an independent estimating review performed by retired experienced contractor estimators, in addition to a comprehensive value engineering (VE) process. The VE is a common practice that has been used successfully in many other capital projects. However, the contractors' bottoms up peer reviewed estimate is not and should provide a higher confidence in the estimation of the direct capital costs.

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.

2 Expert Estimator Panel - the expert panel of construction estimators that independently reviewed the major components of the estimate was again a level of diligence that increases the confidence of the estimate compared with other capital projects. This panel looked at the reasonableness of the multiple inputs that are used to estimate any one item of work that included breakdowns of:

- Labour – including varying skill levels, rate, resource allocation, productivity etc.
- Equipment– including cost, types used, usage, downtime, maintenance etc.
- Material – including supply, delivery handling and bulking factors etc.

The level of detail of this panel review was comprehensive and was performed by reviewing backup information and interviewing the estimating team. They concluded that the direct cost was reasonably conservative through a bidding contractor's viewpoint, and if they were to bid for the packages at the time felt that they could find efficiencies in the estimate. This process provided additional confidence in the direct cost component of the estimate.

3 Risk Review Process - in reviewing the risk review process it was evident that the project team had done a good job at looking at the impact of delay to the project and the risks that could affect the success of the project. The team had also built in mitigation strategies to deal with many of the risks and a process to ensure that the strategies are incorporated into commercial and management processes going forward. KPMG worked with Partnerships BC to ensure that the approach in assessing and valuing risks on the Site C project was consistent with the standard approach developed and implemented on other Government projects.

4 As discussed in our Commentary letter dated October 20, 2014, it is reasonable to contain an allocation of a management reserve on a project of this size and complexity that will address unforeseen events that occur outside the control of the project team, such as, unforeseen ground conditions, extreme natural events etc. Based on input from the project team and our experience with other projects adopting a management reserve of at least 5% of the direct costs would be a reasonable practice.

Regards,

Gary Webster
Partner, Global Infrastructure Advisory
KPMG LLP
604-646-6367

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.

KPMG Confidential

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Friday, December 5, 2014 10:08 AM
To: Menzies, Brian FIN:EX
Cc: Milburn, Peter R FIN:EX; Farkas, George FIN:EX
Subject: speaking notes for cabinet today
Attachments: hydro 2 speaking notes.docx

Follow Up Flag: Follow up
Flag Status: Flagged

Attached is my attempt at speaking notes based on the discussions yesterday.
Would you kindly give this to the minister for review?
Thx. D.

Cabinet Item – Hydro Site C

s12, s13

Pages 394 through 395 redacted for the following reasons:
- -
s12, s13
s12, s13, s17

BACKGROUNDER

GROWING DEMAND FOR ELECTRICITY

A growing population and economy

Over the next 20 years, B.C.'s population is expected to grow by 1.1 million people. As our population grows, we are also using more power than ever before because of devices like smartphones and big screen TVs, and emerging technologies like electric vehicles.

At the same time, there is new activity expected in mining, oil and gas and an emerging liquefied natural gas (LNG) sector. In fact, long-term demand will increase across all customer groups.

Taken together, this means B.C.'s electricity needs are forecast to increase by 40 per cent over the next 20 years.

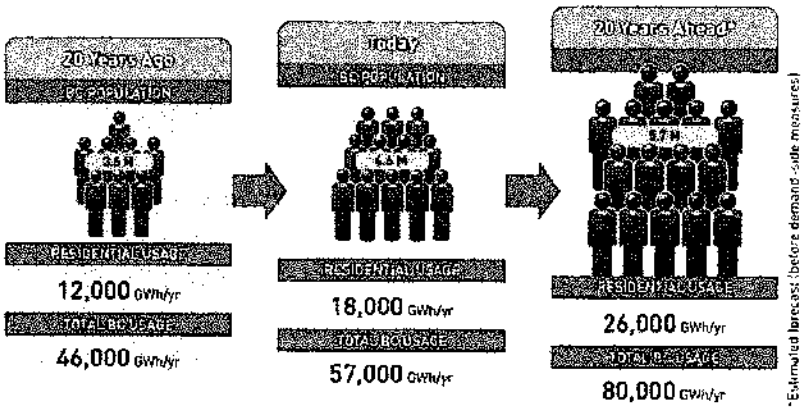
Conserving First

To meet this future need, BC Hydro will continue one of the most ambitious conservation programs in North America, taking every step possible to avoid building new generation facilities. This will keep costs down and rates low.

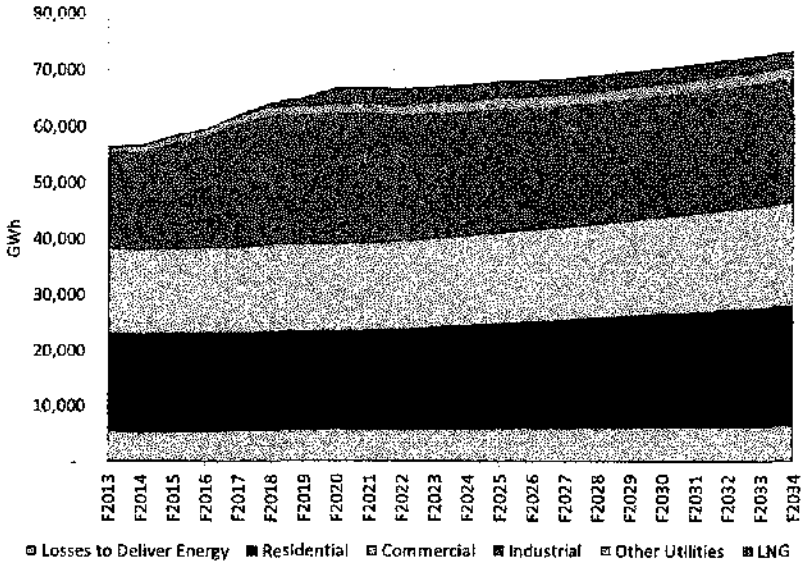
In fact, BC Hydro is planning to meet 78 per cent of new load growth through conservation and efficiency initiatives by 2021.

As part of its commitment to conservation, BC Hydro will continue to offer incentives to help homeowners and businesses become

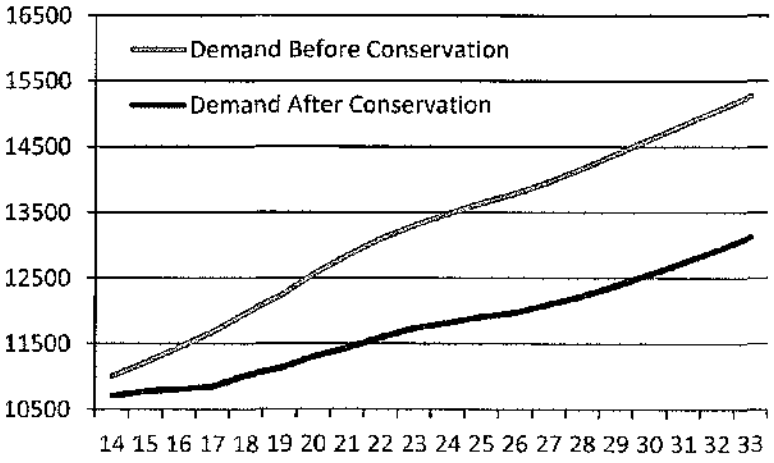
Population growing by 1.1 million



Electricity demand is increasing in all sectors



Taking every step possible to conserve and keep costs down



more energy efficient and lower their electricity costs and will also work with its large industrial customers to explore opportunities for load curtailment and displacement.

Conservative Forecast

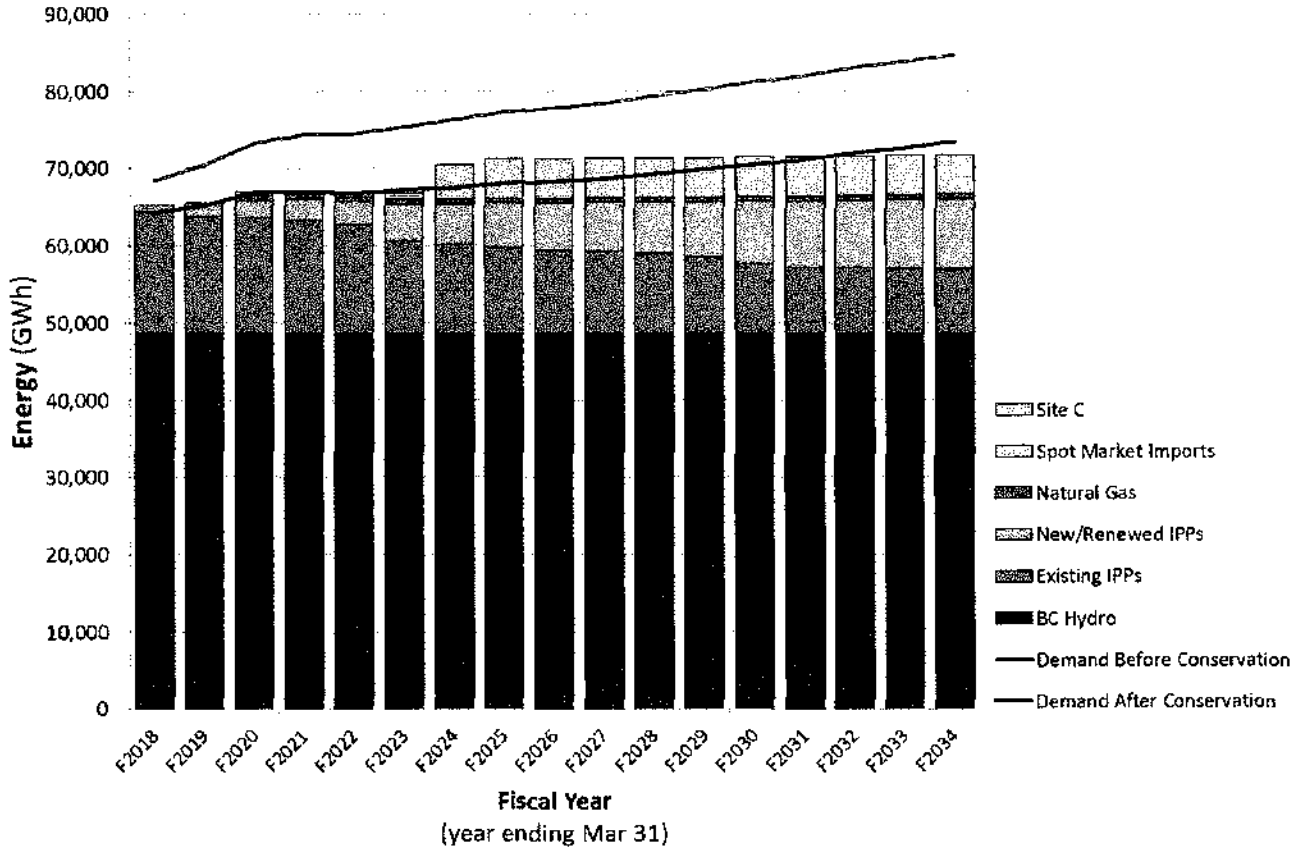
With an ambitious conservation program, the actual increase in demand that will need to be met with new sources of power is about one per cent per year. This is lower than historical growth and in line with the Canadian National Energy Board forecast for Canada as well as forecasts in other North American jurisdictions.

A Mix of Resources to Meet Future Demand

Along with an ambitious conservation program, BC Hydro is investing $1.7 billion per year to maintain and expand its existing system including upgrades that maximize the capacity of current facilities such at G.M. Shrum and Revelstoke.

In addition, the amount of power provided by independent power projects continues to grow as projects under construction come online, existing contracts are renewed and new projects are developed through BC Hydro's Standing Offer Program. However, even with all of these steps, British Columbia will still need a new source of dependable capacity – Site C.

Meeting Demand through a Mix of Resources



Need for both Energy and Dependable Capacity

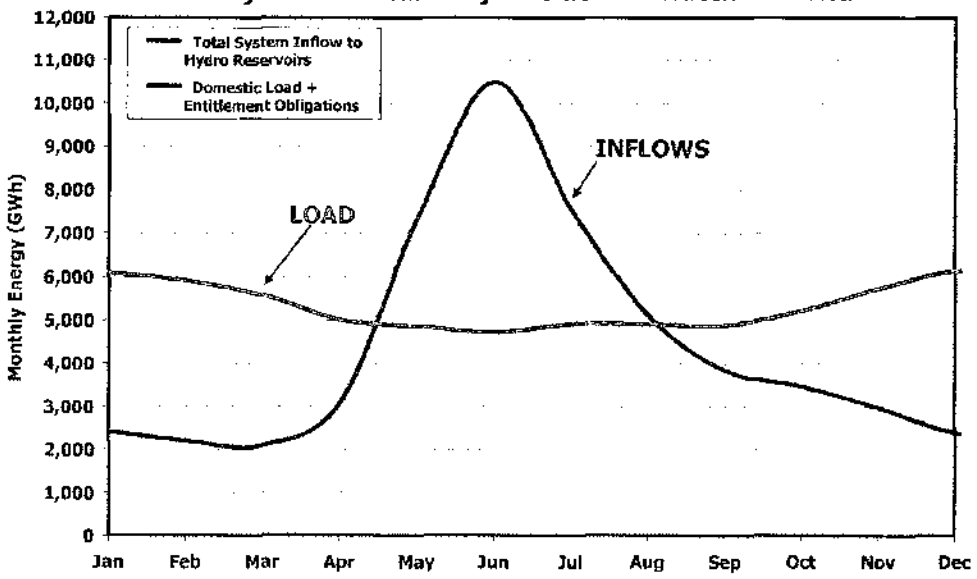
Electricity systems need both energy and dependable capacity. Some energy resources, such as wind or run-of-river, are intermittent which means they are not always available to generate electricity (e.g., when there is no wind or when rivers are not flowing). This means they must be backed up by dependable capacity which is always available.

Hydroelectric dams with storage, like Site C, are a key source of dependable capacity because water can released when needed or and stored to be used later to create electricity when demand is high, such as on a cold evening in winter or to take advantage of high prices on the export market.

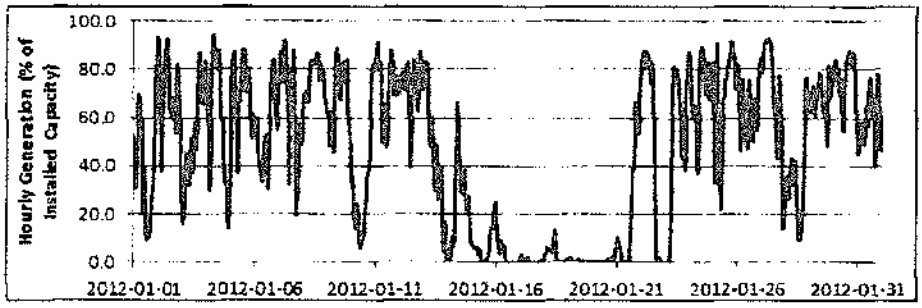
Run-of-river generation varies with the natural flow in the river, which is high during the spring and early summer. Wind generation depends on wind speed, which is highly variable.

Site C will provide 1,100 megawatts of dependable capacity, and produce 5,100 gigawatt hours of clean energy every year – an eight per cent increase in supply to the system. The dependable capacity from Site C will increase the amount of intermittent energy that BC Hydro's system can support going forward.

Run of River: Natural inflows do not match demand



Wind: Generation depends on speed which is highly variable



Due Diligence

As part of the due diligence process, a third-party review of BC Hydro's load forecast methodology was commissioned from an independent energy consultant with over 33 years of experience in load forecasting who concluded that:

- *"BC Hydro is using state-of-the-art methodologies for forecasting sales.*
- *"The company utilizes several methodologies to produce peak forecast methods, all of which are among state-of-the-art methods."*

Mark P. Gilbert, LLC (September 2014)

✓

Contact: Jake Jacobs
Media Relations
Ministry of Energy and Mines and Responsible for Core Review
250 952-0628

Connect with the Province of B.C. at: www.gov.bc.ca/connect

EVENT PLAN: SITE C CLEAN ENERGY PROJECT ANNOUNCEMENT

ANNOUNCEMENT – Province Approves Site C Construction

PROPOSED ANNOUNCEMENT:

Premier's Message
Affordable, reliable, clean electricity is the backbone of British Columbia's economy. Site C will attract investment, grow the economy and support our quality of life for decades to come.

Minister's Message
After eight years of development, assessment and review, the successful completion of the federal and provincial environmental assessment processes, and an extensive due diligence process undertaken by the Ministries of Energy and Finance, it is clear that to keep rates low, we need to build Site C.

HEADLINE:

Site C to provide more than 100 years of affordable, reliable, clean power

KEY MESSAGES

Powering the Economy / Jobs / Low Rates / Accommodation

- Our electricity rates are among the lowest in North America
- Affordable, reliable, clean electricity is one of British Columbia's key advantages – it means we can attract investment, grow our economy and have a better quality of life
- We're building Site C because we believe in BC and because it is the most responsible thing we can do to maintain our affordable, reliable and clean power advantage
- This investment in the future of our province will create thousands of new jobs.
- We understand the concerns of First Nations, landowners and others opposed to the project and will continue to engage extensively with those impacted to identify opportunities for benefits and accommodation

Electricity Needs / Due Diligence / Lowest Cost

- Our electricity needs are growing and we're taking a responsible approach to meeting them
- We don't want to build new generation unless we have to. That's why our plan begins with one of the most ambitious conservation programs in North America

- Even with that though, we will need new electricity and an extensive due diligence process has now concluded that Site C would provide the province with more than 100 years of the most affordable, reliable, clean power
- Independent Power Producers supply 25% of BC's electricity today and will continue to play an important role

EVENT:

- Location: BC Hydro's Trades Training Centre in Surrey, to reinforce the economy/jobs message
- Technical briefing led by Minister Bennett with BC Hydro, MEM staff and independent validators.
- Official announcement with the Premier attended by BC Hydro workers and key project stakeholders.
- Local media availability with MLAs Pat Pimm and Mike Bernier

VISUAL:

- Desired picture (still): Premier surrounded by BC Hydro workers wearing hard hats with electrical equipment in background
- Desired picture (video): Premier, BC Hydro workers and validators wearing hard hats, b-roll of Site C
- Speaking backdrop: Electrical equipment outside truck bay, workers in hard hats
- See attached photos of Surrey Trades Training Facility.
- Technical briefing would take place in the meeting room.
- Announcement would be in the 'hangar' facility with room for about 200 in the audience of BC Hydro workers and stakeholders.

EVENT DATE/TIME:

- Tuesday December 16, 2014Technical Briefing: 11:00 pm to 12:00pm
- Break: 12:00 pm to 12:30 pm
- Announcement: 12:30 pm to 1:00 pm

PRE-EVENT:

- Media Advisory issued afternoon prior (TBD)
- Invitations issued day before
- Key phone calls in advance (morning of) the event:
    - Minister Bill Bennett or Jessica McDonald
        - Aboriginal Leaders:
            - Doig River First Nations
            - Saulteau

- West Moberly
- Halfway
- McLeod Lake
- Blueberry
- Prophet River

- Local Governments Mayors:
  - City of Fort St. John
  - Taylor
  - Peace River Regional District
  - Hudson's Hope
  - Dawson Creek
  - Chetwynd
- Key Messages for phone calls:
  - Advise that announcement will be made approving Site C
  - Offer an in-person meeting in the new year
  - Offer a brief in-person meeting within 2-3 days

TECHNICAL BRIEFING:

Province of B.C.
- Minister Bill Bennett
- Dave Nikolejsin, DM, MEM
- Les Maclaren, ADM, MEM

BC Hydro:
- Jessica McDonald, President and CEO
- Susan Yurkovich, EVP, Site C
- Chris O'Riley, EVP, Generation

Independent Reviewers:
- Frank Margitan, (Ex VP Kiewit), lead of the independent contractor's review for Site C project cost estimate
- KPMG (Gary Webster) on BC Hydro's Site C project cost estimate

Validators / BC Hydro key customers: (TBD)
- Michael McPhie, Executive Chairman, IDM Mining Ltd.
- Gavin Dirom, President, Association of Mineral Exploration
- Phil Hochstein, ICBA
- Keith Sashaw, Association of Consulting Engineers of BC
- John Winter / Jon Garson, BC Chamber of Commerce

Media Lock-up:

- Provincial media
- Regional media (in consultation office in Fort St. John)

Visuals:

- Screen for PowerPoint
- Backdrop: Site C Dam Rendering –sign
- Option: Site C Infographics - signs

Materials

- PowerPoint
- Media Kit
    - News Release
    - Backgrounders:
        - Growing Demand for Electricity
        - Site C Capital Cost Estimate Comparing the Options
    - About Site C Technical Briefing PowerPoint
    - USB with materials above, plus:
        - B-Roll of Project Animation
        - Due diligence documents
        - One pager of materials / graphics available at www.sitecproject.com
        - Infographics
            - Site C Economic Benefits
            - Site C and Community Benefits
            - Environmental Benefits of Site C
        - Project Images / Renderings
          Map of Peace region and BC Hydro facilities
          Graphics:
            - Economic Development
            - Job Creation
            - Low Greenhouse Gas Emissions

ANNOUNCEMENT:

Province of B.C.

- Premier
- Minister Bill Bennett

BC Hydro

- Jessica McDonald, President and CEO
- Susan Yurkovich, EVP, Site C
- Stephen Bellringer, BC Hydro Board Chair
- Brad Bennett, BC Hydro Board member

Visuals:

- Stage and Site C backdrop (TBD)
- Approximately 200 BC Hydro workers, executive / Board, stakeholders – in hard hats

Media

- Provincial media
- Regional media via conference call

Attendees: (Approximately 225 standing room – to be verified)

- BC Hydro:
  - Board & Executive members
  - Site C project staff
- Stakeholders

**See appended lists.*

APPENDICES

- Invitation List
- Draft Graphics:
  - Hard Hats – design
  - Backdrop
  - Display Stands (single panel)
- Visuals: BC Hydro's Surrey Training Facility (separate attachment)
- Fort St. John Event Plan (to come)

INVITATION LIST

Organization	Names	Numbers
BC Hydro Executive, Board and Site C Project Team		**200**
Stakeholders		
Major Customers	Michael McPhie - IDM Mining Darby Kreitz - Allnorth Consultants Andrew Purdy - Ruskin Construction Jeff Stibbard - JDS Energy and Mining Gavin C. Dirom - Association for Mineral Exploration BC Bing Giraud – Woodfibre	6
BC Chamber of Commerce	John Winter Jon Garson	2
Independent Contractors & Businesses Association	Philip Hochstein plus 4-5 members	1
BC Business Council	Greg D'Avignon Jock Finlayson Ken Peacock Tom Syer	4
Association of Consulting Engineering Companies – BC	Keith Sashaw	1
New Car Dealers Association of BC	Blair Qualey	1
BC Roadbuilders & Heavy Construction Association	Jack Davidson	1
Cement Association of Canada	Ken Carrusca	2
Canadian Manufacturers & Exporters	Craig Williams	1
Canadian Homebuilder's Association - Northern BC	Gordon Bliss	1
Building Owners and Managers Association	Paul LaBranche	1
BC Construction Association	Manley McLachlan Rosalind Thorn	2
Others	Senator Richard Neufeld Henry Wakabayashi Blair Lekstrom	3
BC Hydro Power Pioneers (retirees)	Don Swoboda, plus 4-5 retirees	5
	Total =	**~235**

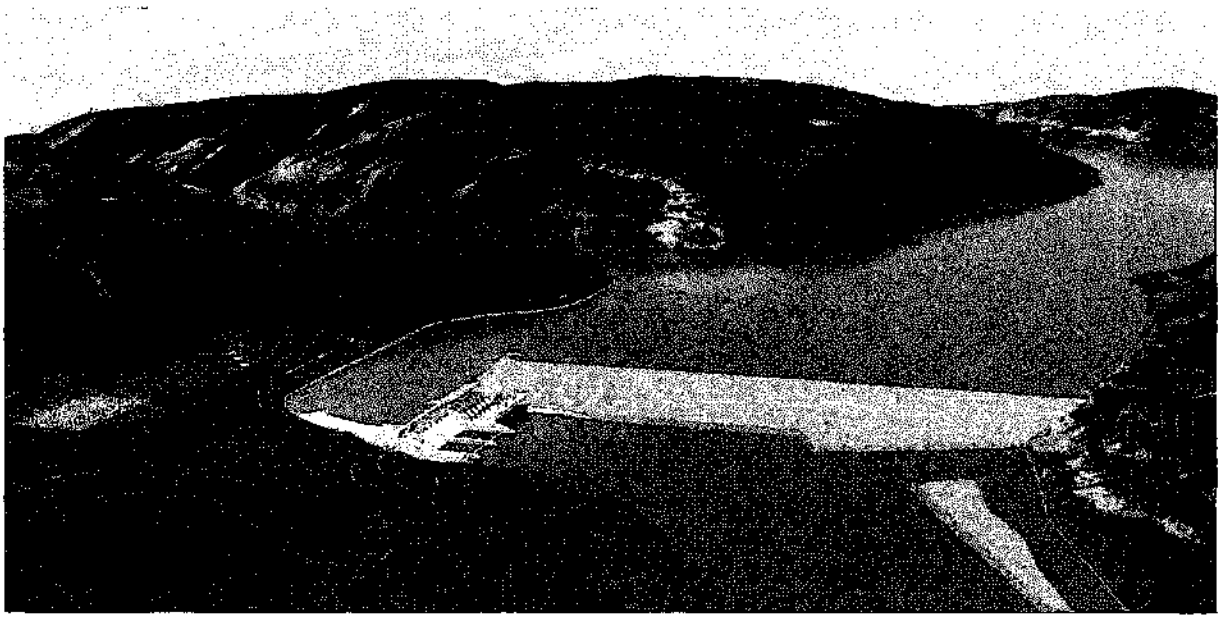
DRAFT GRAPHICS

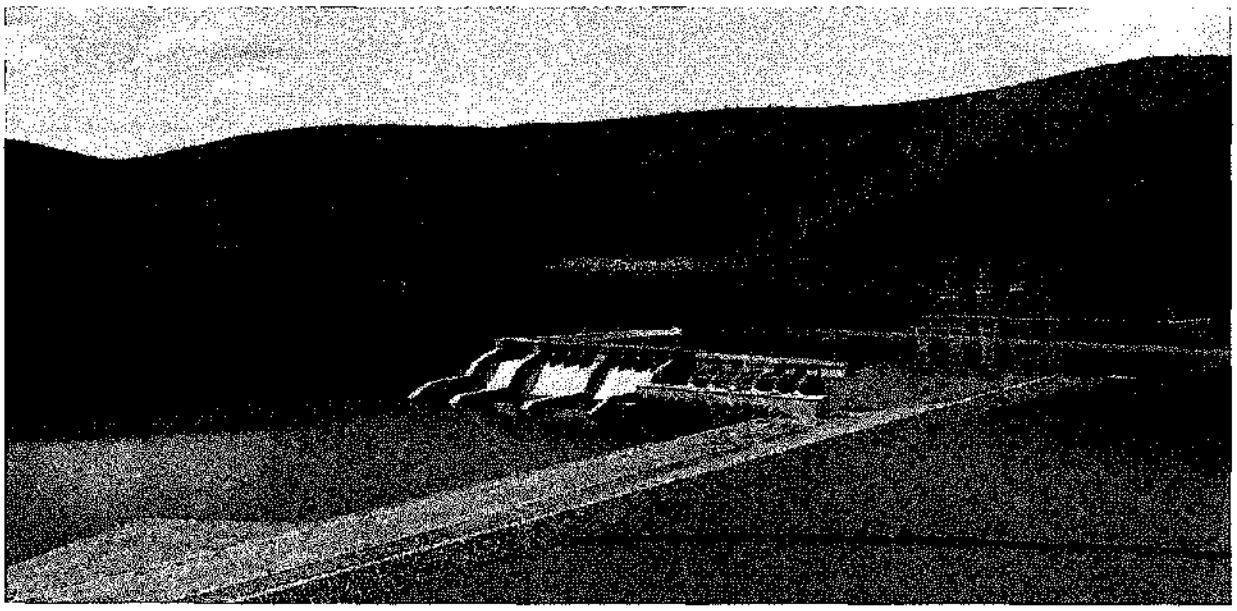
Backdrop Display - Text would be updated:

Site C: Affordable, Reliable and Clean Electricity for more than 100 years

- ~7.5 feet high, ~10 feet wide
- Production time: 7 business days (after artwork sign off)

ADDITIONAL GRAPHICS EXAMPLES





Display Stands - Four single-panel (pop-up) display stands:

1. **About Site C**: Includes general information about the project and a map of the area.
2. **Project Components**: Includes general information about the procurement approach and a detailed rendering.
3. **Site C and Community Benefits** Infographic
4. **Economic Benefits from Site C** Infographic

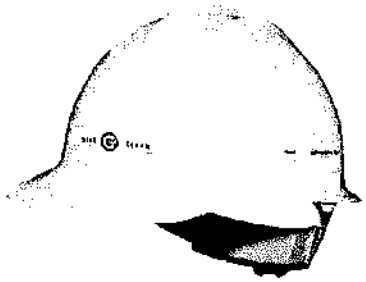
- ~6 feet high, 2 feet wide each
- Production time: 7 business days (after artwork sign off)

Note – TEXT TO BE UDPDATED ON #1 AND #2

s13

s13

HARD HAT GIVEAWAYS TO INVITED GUESTS TO WEAR AT ANNOUNCEMENT



Front Side Logo

Option 1 [Random Logo on one side]

Option 2 [Separated Logo on each side]

Pages 411 through 416 redacted for the following reasons:
- -
s12, s13

Due Diligence: Review of Load Forecast

- A third-party review of BC Hydro's load forecast methodology was commissioned from an independent energy consultant with over 33 years of experience.

Key Findings:

- *"BC Hydro is using state-of-the-art methodologies for forecasting sales."*
- *"The company utilizes several methodologies to produce peak forecast methods, all of which are among state-of-the-art methods."*

Mark P. Gilbert, LLC, September 2014

FIN-2015-00018
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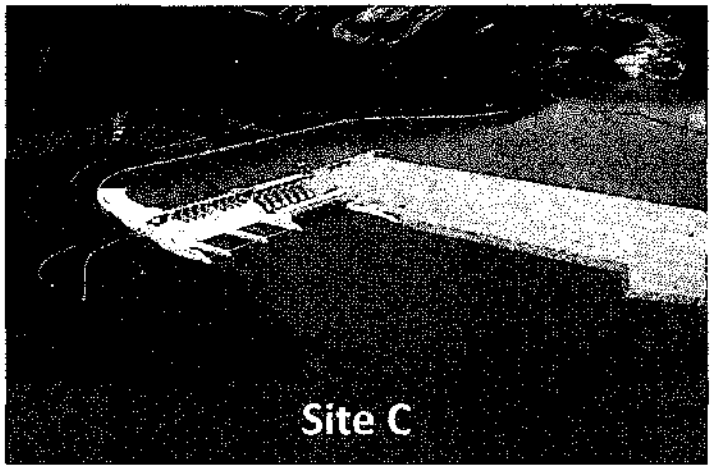
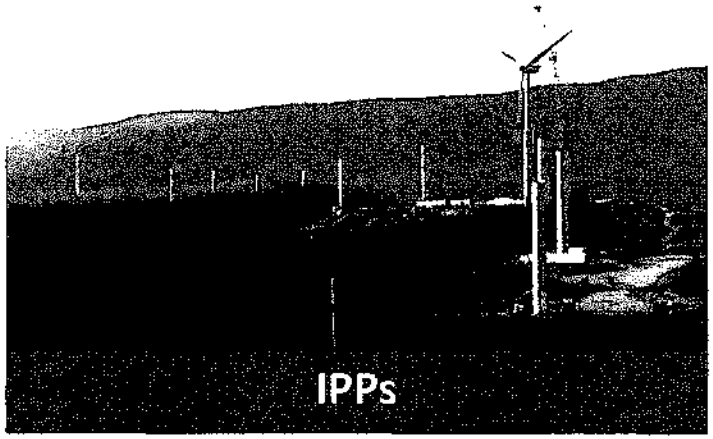
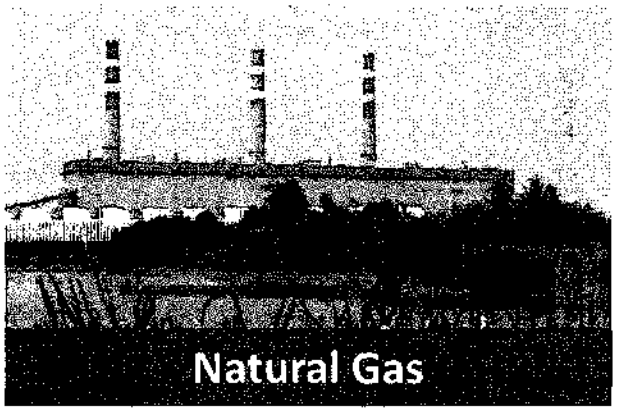
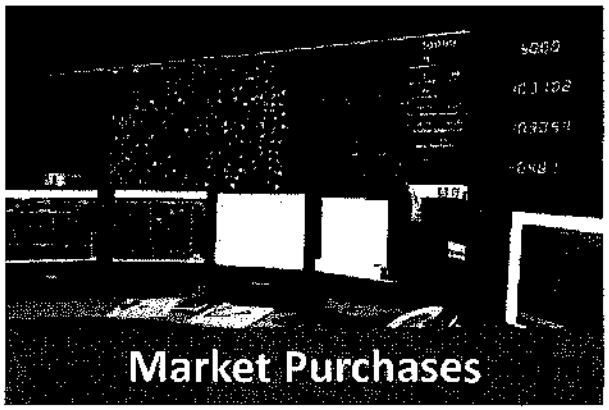
253 of 348

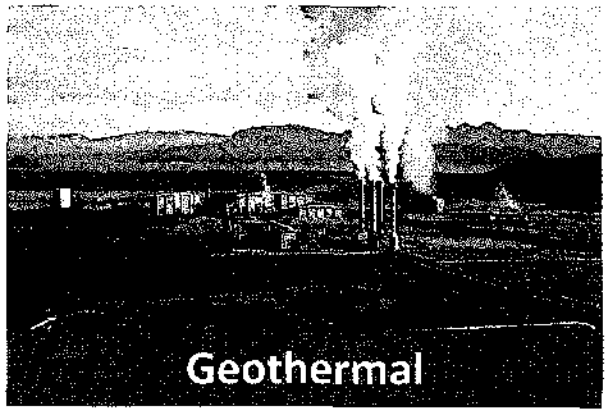
Comparing the Options







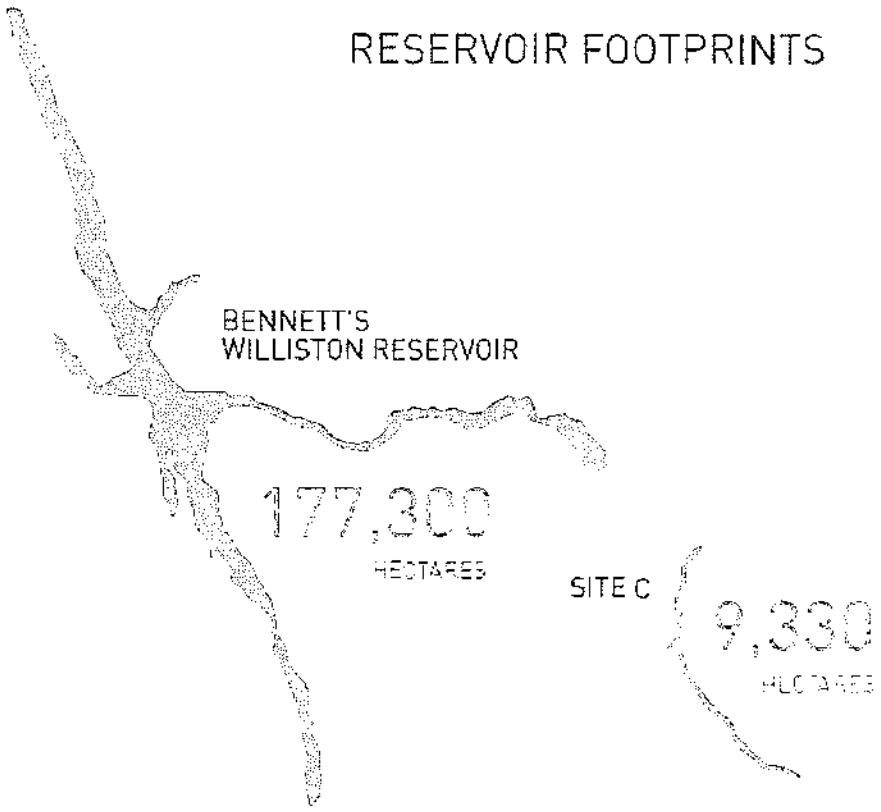




Page 419 redacted for the following reason:
- -
s12, s13

About Site C

- As third project on Peace River, Site C would rely on Williston Reservoir for most of its water storage
- Enables Site C to produce 35% of energy of WAC Bennett Dam with 5% of the reservoir area



Pages 421 through 435 redacted for the following reasons:
- -
s12, s13

BRITISH
COLUMBIA
QUESTIONS

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Sunday, December 14, 2014 12:29 PM
To: MacLaren, Les MEM:EX; Bernard, Marion M FIN:EX
Subject: FW: Latest Materials
Attachments:

s13

Importance: High

Follow Up Flag: Follow up
Flag Status: Completed

Keeping you in the loop. D.

From: Foster, Doug FIN:EX
Sent: Sunday, December 14, 2014 12:28 PM
To: Edwardson, Jamie GCPE:EX; Clarke, Brennan GCPE:EX
Subject: FW: Latest Materials
Importance: High

s13

s13

Thought more important to get what I have to you now. D.

d.

From: Edwardson, Jamie GCPE:EX
Sent: Saturday, December 13, 2014 9:19 AM
To: Foster, Doug FIN:EX; Clarke, Brennan GCPE:EX
Subject: Fw: Latest Materials
Importance: High

Thanks,

Jamie Edwardson
250 888 0021

From: Gordon, Matt GCPE:EX <Matt.Gordon@gov.bc.ca>
Sent: Saturday, December 13, 2014 09:18
To: Edwardson, Jamie GCPE:EX
Subject: FW: Latest Materials

From: Gordon, Matt GCPE:EX
Sent: Saturday, December 13, 2014 9:18 AM
To: Cadario, Michele PREM:EX; Doyle, Dan PREM:EX; Chin, Ben PREM:EX; Sweeney, Neil PREM:EX; Fraser, John Paul GCPE:EX
Cc: Gleeson, Kelly T GCPE:EX; Southern, Evan PREM:EX; Haslam, David GCPE:EX; Sandve, Chris MEM:EX; Mills, Shane LASS:EX
Subject: Latest Materials
Importance: High

Latest based on yesterday's meeting (added backgrounder on Site C and LNG. Itinerary is with MO, MEM Comms and myself...we will send once we are all good with it. I'll also be sending to Finance for thorough review of numbers.

s13

Knowles, Jessica D FIN:EX

From: Edwardson, Jamie GCPE:EX
Sent: Sunday, December 14, 2014 1:15 PM
To: Foster, Doug FIN:EX; Clarke, Brennan GCPE:EX
Subject: RE: Latest Materials

Thanks doug, really appreciate your thoroughness and care on this. I have moved them up.

From: Foster, Doug FIN:EX
Sent: Sunday, December 14, 2014 12:28 PM
To: Edwardson, Jamie GCPE:EX; Clarke, Brennan GCPE:EX
Subject: FW: Latest Materials
Importance: High

s13

s13

From: Edwardson, Jamie GCPE:EX
Sent: Saturday, December 13, 2014 9:19 AM
To: Foster, Doug FIN:EX; Clarke, Brennan GCPE:EX
Subject: Fw: Latest Materials
Importance: High

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From: Gordon, Matt GCPE:EX <Matt.Gordon@gov.bc.ca>
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Cc: Gleeson, Kelly T GCPE:EX; Southern, Evan PREM:EX; Haslam, David GCPE:EX; Sandve, Chris MEM:EX; Mills, Shane LASS:EX
Subject: Latest Materials
Importance: High

s13

Page 442 redacted for the following reason:
- - - - - - - - - - - - - - - - - - - -
s13

Knowles, Jessica D FIN:EX

From: Edwardson, Jamie GCPE:EX
Sent: Monday, December 15, 2014 4:19 PM
To: Foster, Doug FIN:EX
Subject: FW: Revised NR & BGs: tomorrow's announcement
Attachments: DRAFT.pdf; BG - About Site C.docx; BG - Comparing the Options.docx; BG - Growing Demand for Electricity.docx; BG - Site C and LNG.docx; BG - Site C Cost Estimate.docx

Importance: High

Final versions based on today's review.

Office of the Premier
Ministry of Energy and Mines and Responsible for Core Review

NEWS RELEASE
Site C to provide more than 100 years of affordable, reliable clean power

VICTORIA - Premier Christy Clark announced today the Province has approved the Site C Clean Energy Project, concluding it will provide British Columbia with the most affordable, reliable clean power for over 100 years.

"Affordable, reliable, clean electricity is the backbone of British Columbia's economy. Site C will support our quality of life for decades to come and will enable continued investment and a growing economy," said Premier Clark.

B.C.'s population and economy are growing, and the demand for power is expected to increase by 40% over the next 20 years. Site C will be required even with BC Hydro's ambitious Power Smart programs that are targeted to meet 78% of future electricity growth.

"British Columbia has the third-lowest electricity rates in North America and we need to meet our future needs in a way that keeps rates down," said Bill Bennett, Minister of Energy and Mines. "It's clear that to keep rates low, we must choose the option of building Site C."

Over the first 50 years, Site C's project life, ratepayers will save an average of $650 to $900 million each year, compared to alternatives. The project will generate a century of low-cost power, providing enough electricity for about 450,000 homes per year - an eight-per-cent increase in supply to BC Hydro's system in 2024.

As the third project on the Peace River, the firm energy it provides will support the development of more independent power projects (IPPs) by backing-up intermittent resources, such as wind. IPPs currently provide 25% of B.C.'s electricity and will continue to play a vital role in meeting the province's energy needs.

"Site C is essential to keeping the lights on while maintaining low rates for our customers," said Jessica McDonald, president and CEO of BC Hydro. "This project will build on the success of our existing hydroelectric system and benefit British Columbians for generations to come."

The capital-cost estimate for the project has been updated to $8.335 billion, and government has also established a project reserve of an additional $440 million to account for events outside of BC Hydro's control that could occur over an eight-year construction period, such as higher than forecast inflation or interest rates, for a total of up to $8.775 billion. The reserve is subject to provincial Treasury Board approval.

The project, which has undergone a thorough and independent multi-year environmental assessment process, will start construction in summer 2015 and will provide approximately 10,000 direct construction jobs.

"Today's announcement is a historic milestone and we look forward to building this important provincial project," said Susan Yurkovich, executive vice-president responsible for Site C. "We will continue to work with First Nations, communities and landowners to ensure that we deliver on our commitments and realize the many benefits of this project."

Backgrounders

* Growing Demand for Electricity
* Site C Capital Cost Estimate
* Comparing the Options
* About Site C
* Labour Requirements for Site C and LNG

Media Contact:

Media Relations
Ministry of Energy and Mines
250 952-0628

Connect with the Province of B.C. at: www.gov.bc.ca/connect

BRITISH COLUMBIA

NEWS RELEASE

Not Approved
December 16, 2014

Office of the Premier
Ministry of Energy and Mines and Responsible for Core Review

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Backgrounders

- Growing Demand for Electricity
- Site C Capital Cost Estimate
- Comparing the Options
- About Site C
- Labour Requirements for Site C and LNG

Media Contact:

Media Relations
Ministry of Energy and Mines
250 952-0628

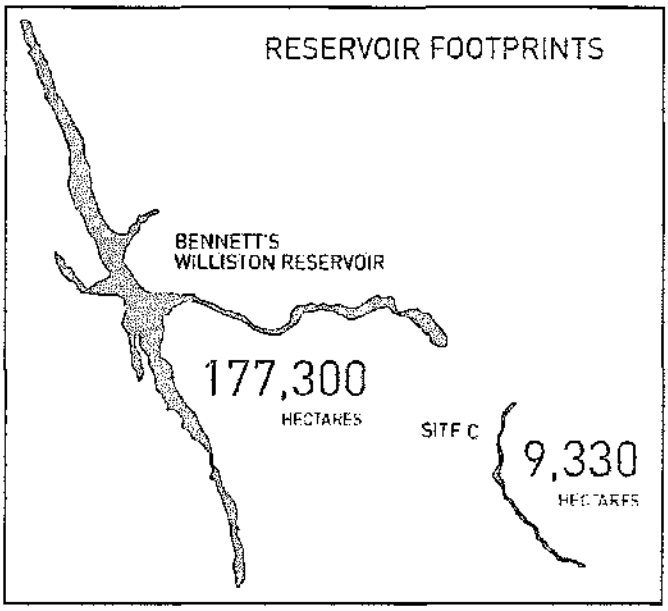
Connect with the Province of B.C. at: www.gov.bc.ca/connect

BACKGROUNDER

ABOUT SITE C

The Site C Clean Energy Project will provide 1,100 megawatts of capacity, and produce about 5,100 gigawatt hours of electricity each year – an eight-per-cent increase in energy supply to BC Hydro's system and enough to power about 450,000 homes per year.

As the third project on the Peace River, Site C will gain significant efficiencies by taking advantage of water already stored behind the existing W.A.C. Bennett Dam in the Williston Reservoir. This means that Site C will generate approximately 35% of the energy produced at the W.A.C. Bennett Dam with five per cent of the reservoir area.



Dam		Reservoir	
Type	Earthfill dam	Surface Area:	9,330 ha
Height	60 meters above riverbed	Flooded Land:	5,557 ha
Length	1,050 meters		93% public; 7% private
Capacity	1,100 MW	Length:	83 kilometers
Energy	5,100 GWh / year	Width:	2-3 times current river

Construction is scheduled to begin in summer 2015, with project completion expected in 2024.

Affordable Electricity

Once built, Site C will be a source of affordable, reliable and clean electricity for more than 100 years.

Over the first 50 years of Site C's project life, ratepayers will save an average of $650 to $900 million each year, compared to a portfolio of Independent Power Projects (IPPs) backed up by natural gas.

This amounts to average annual savings of approximately six to eight per cent for the typical household, compared to alternatives.

Economic Development and Labour

Site C will provide approximately 10,000 direct construction jobs. Construction will also provide significant opportunities for businesses of all sizes.

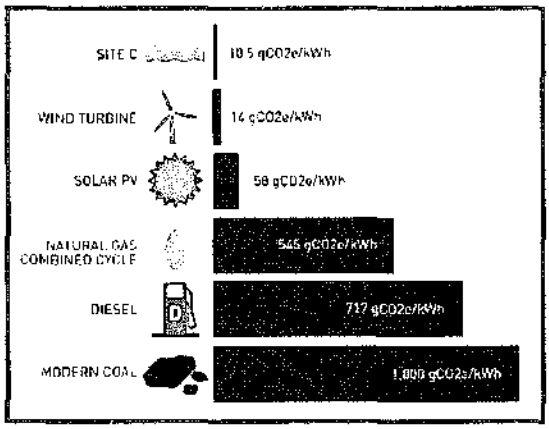
The construction of Site C is expected to result in an increase of $3.7 billion to provincial gross domestic product (GDP), including a $130 million increase in regional GDP during construction. Construction of Site C will result in increased government revenues at the regional, provincial and federal levels, including a total of $40 million in tax revenues to local governments.

BC Hydro's labour strategy for Site C will promote local and Aboriginal hiring and BC Hydro has supported opportunities for skills training through funding to: Northern Lights College Foundation, Northeast Native Advancing Society, Northern Opportunities Apprenticeship Program, School District No.60, and the College of New Caledonia.

Low Greenhouse Gas Emissions

Site C will produce among the lowest greenhouse gas emissions (GHGs), per gigawatt hour, when compared to other forms of electricity generation. The project will produce significantly less GHGs than fossil fuel sources such as natural gas, diesel or coal.

Emissions from Site C will fall within the ranges expected for wind, geothermal and solar energy.



Integrating Intermittent Energy

Site C will help integrate intermittent energy resources by quickly increasing or decreasing generation to match the availability of resources such as wind and run-of-river. For example, Site C generation could be increased when intermittent resources are not available (e.g., when the wind is not blowing), and decreased when intermittent resources are available.

Contact: Jake Jacobs
Media Relations
Ministry of Energy and Mines and Responsible for Core Review
250 952-0628

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BACKGROUNDER

COMPARING THE OPTIONS

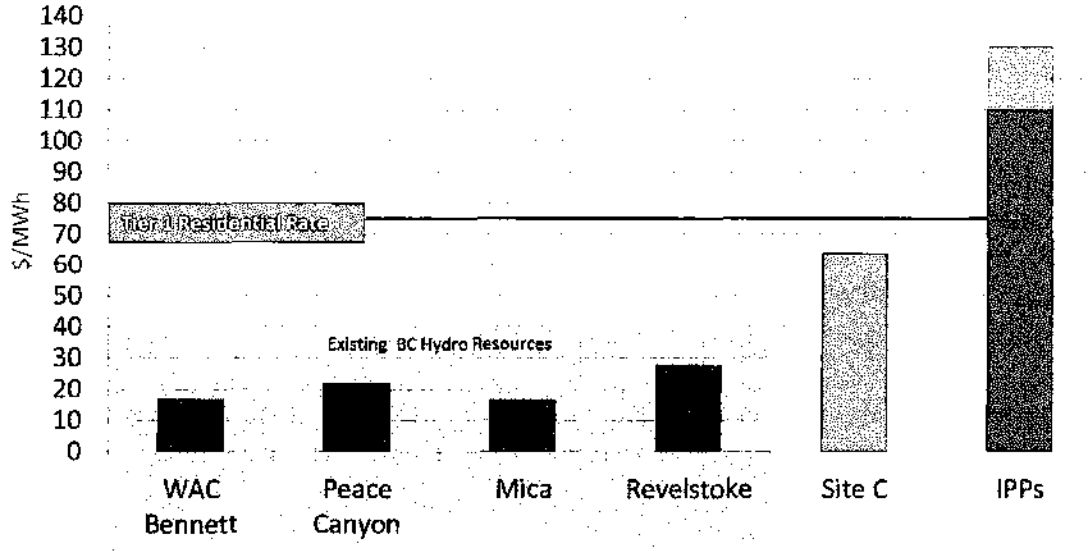
Site C provides the lowest cost electricity compared to alternatives and will deliver significant benefits for ratepayers.

Hydroelectric Dams are Cost Effective

Large hydro projects are cost-effective because after an upfront capital cost, they have low operating costs for more than 100 years and their costs to ratepayers decrease over time.

Today, the cost of electricity produced by B.C. Hydro's large hydroelectric facilities is far lower than the rate that residential customers pay for their power. BC Hydro's large hydroelectric facilities offset the costs of other more expensive new generation in the system.

Site C will provide more than a century of the same affordable, reliable and clean electricity that the W.A.C. Bennett, Peace Canyon, Mica and Revelstoke dams provide today, and will help keep overall electricity costs down and rates low.

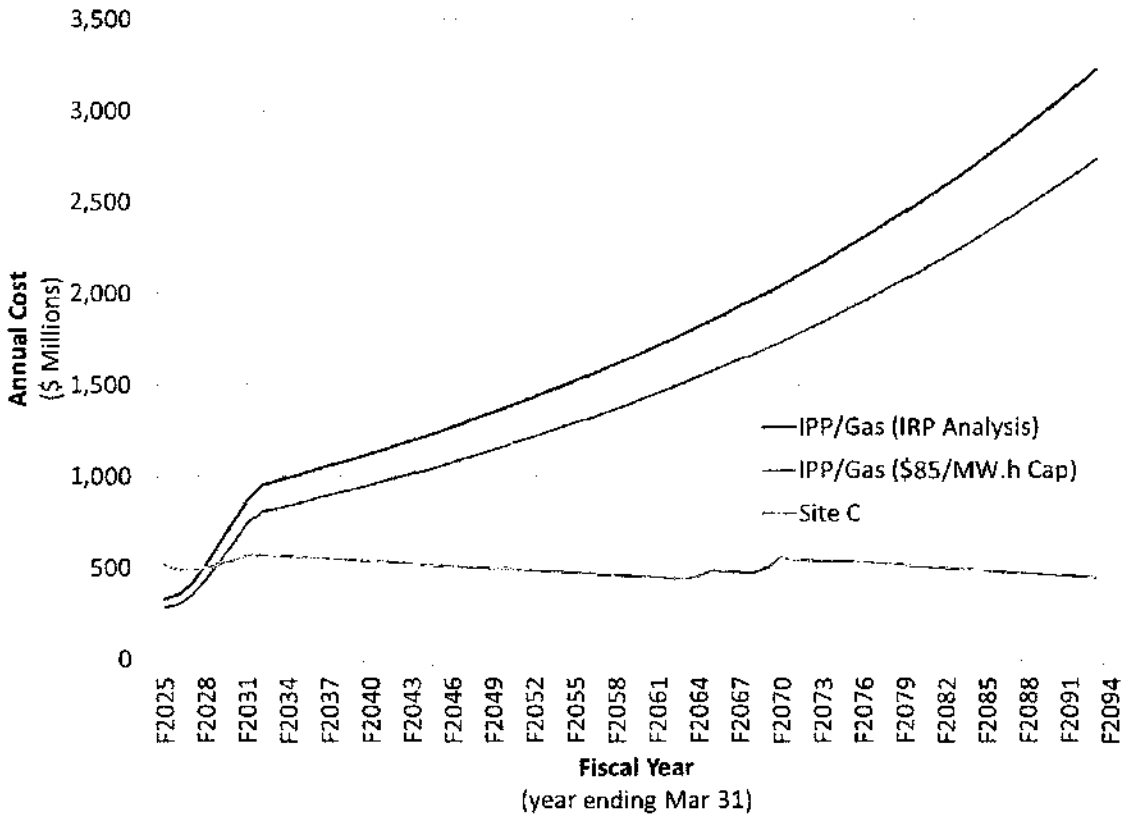


Site C - Significant Ratepayer Benefits

Like BC Hydro's other large hydroelectric facilties, the cost advantages of Site C will grow over time, resulting in significant benefits to ratepayers, compared to alternatives.

Over the first 50 years of Site C's project life, ratepayers will save an average of $650 to $900 million each year, compared to a portfolio of Independent Power Projects (IPPs) backed up by natural gas. This amounts to average annual savings of approximately 6 to 8 per cent for the typical household, compared to alternatives.

Over the long-term, as the capital costs of the project are paid down, the annual ratepayer savings will continue to increase each year for more than 100 years.



Impact on Ratepayers

The cost to ratepayers of the energy produced by a project depends on the capital costs as well as the ongoing operating costs and expected service life.

The cost to ratepayers for Site C reflects changes implemented as part of the government's 10 Year Plan for BC Hydro, as well as the updated capital cost estimate.

Site C Cost to Ratepayers (before changes)	**$83 / MWh**
Under the 10 Year Plan, the amount of net income that BC Hydro is required to earn each year will now be tied to inflation and will no longer increase when new assets like Site C are added to the system.	**- $26 / MWh**
The 10 Year Plan also reduced water rental charges for BC Hydro.	**- $1 / MWh**
The capital cost estimate for Site C has been updated from $7.9 billion to $8.335 billion.	**+ $2.25 / MWh**
Government has established a project reserve of an additional $440 million to account for events outside of BC Hydro's control that could occur over an eight-year construction period, such as higher than forecast inflation or interest rates. The reserve will be managed by the provincial Treasury Board.	**+ $2.50 / MWh** (if fully utilized)
Updated Site C Cost to Ratepayers	**$58 - $61 / MWh**

BC Hydro's Integrated Resource Plan, approved in November 2013, calculated a cost to ratepayers for IPPs of $96 / MWh. Government also conducted extensive consultations with the independent power industry to ensure its analysis reflected recent advances in technology and efficiency. Following these consultations, government adopted a cost of $85 / MWh for IPPs in its analysis.

When considering the impact on ratepayers, the costs of delivering the electricity must be accounted for. In addition, as IPPs are intermittent, the cost of backing them up with firm energy sources (e.g., natural gas) must be included. Also, IPPs do not have the same ability to store energy and take advantage of high prices on the export market, which reduces trade revenues.

Accounting for all of these factors, the final cost to ratepayers is $64 to $67 / MWh for Site C and $110 to $130 / MWh for IPPs.

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BACKGROUNDER

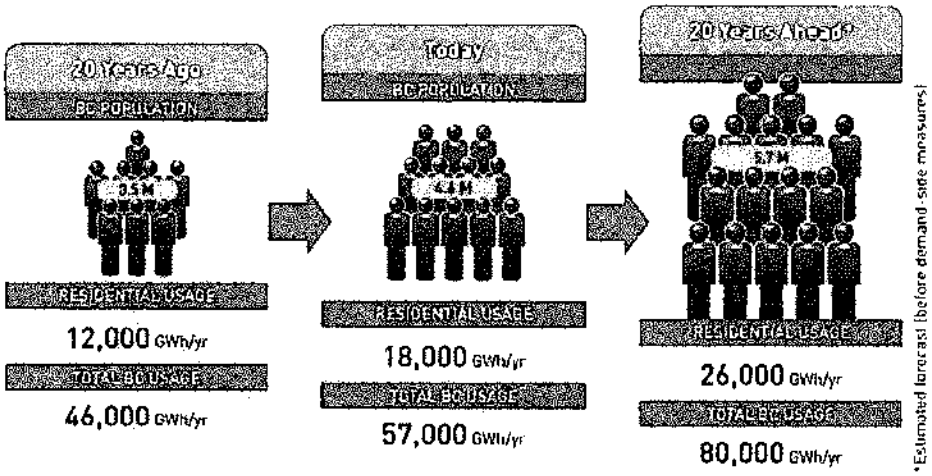
GROWING DEMAND FOR ELECTRICITY

A Growing Population and Economy

Over the next 20 years, British Columbia's population is expected to grow by more than a million people. As our population grows, we are also using more power than ever before because of devices like smartphones and big screen TVs, and emerging technologies like electric vehicles.

At the same time, there is new activity expected in the mining, oil and natural gas sectors. In fact, long-term demand will increase across all customer groups.

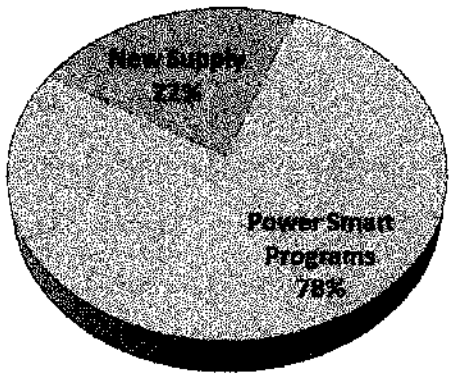
Taken together, this means B.C.'s electricity needs are forecast to increase by 40% over the next 20 years.



Conserving First

To meet this future need, BC Hydro will continue its ambitious Power Smart programs, taking every step possible to avoid building new generation facilities. This will keep costs down and rates low.

Meeting Future Demand



In fact, BC Hydro is planning to meet 78% of new electricity needs through conservation and efficiency initiatives by 2020. This means BC Hydro is planning to meet only 22% of expected load growth with new supply.

BC Hydro will continue to offer incentives to help homeowners, businesses and industrial customers become more energy efficient and lower their electricity costs.

A Conservative Forecast

With ambitious Power Smart programs, the actual increase in demand that will need to be met with new resources is about one per cent per year. This is lower than historical growth and in line with the Canadian National Energy Board forecast for Canada as well as forecasts in other North American jurisdictions.

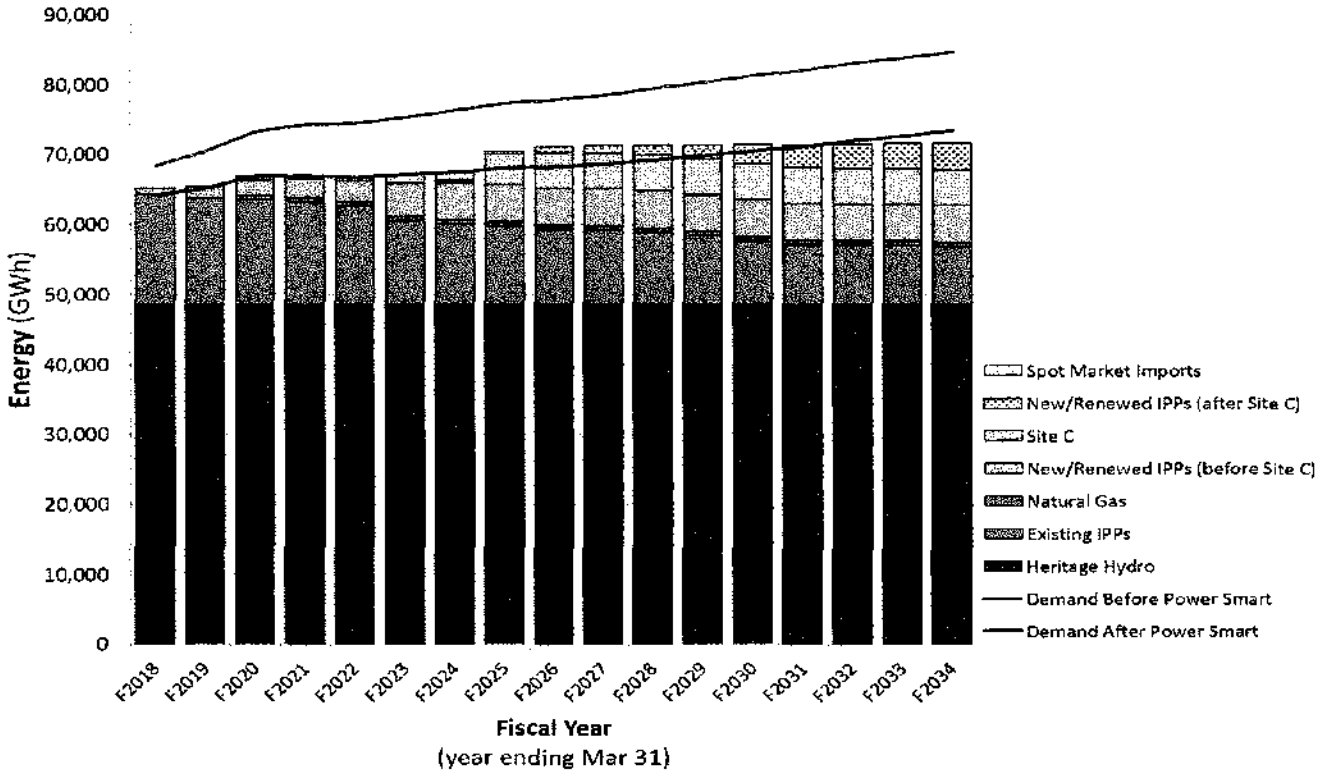
A Mix of Resources to Meet Future Demand

BC Hydro is investing $1.7 billion per year to maintain and expand its existing system, including upgrades to maximize the capacity of current facilities.

In addition, the amount of power provided by the independent power industry continues to grow as projects under construction come online, existing contracts are renewed and new projects are developed through BC Hydro's Standing Offer Program.

With all of these steps, British Columbia will still need a new source of energy and dependable capacity – Site C.

Meeting Demand Through a Mix of Resources



Need for Both Energy and Dependable Capacity

Electricity systems need both energy and dependable capacity. Some energy resources, such as wind or run-of-river, are intermittent which means they are not always available to generate electricity (e.g., when there is no wind or when rivers are not flowing). This means they must be backed up by dependable capacity which is always available.

Hydroelectric dams with storage, like Site C, are a key source of dependable capacity because water can be released when needed or stored to be used later to when demand is high, such as on a cold evening in winter.

Site C will provide 1,100 megawatts of dependable capacity, and produce 5,100 gigawatt hours of clean energy every year – an eight-per-cent increase in supply to the system. The dependable capacity from Site C will increase the amount of intermittent energy, like wind, that BC Hydro's system can support going forward.

Due Diligence

As part of the due diligence process, a third-party review of BC Hydro's load forecast methodology was commissioned from an independent energy consultant with over 30 years of experience in load forecasting who concluded that:

- "BC Hydro is using state-of-the-art methodologies for forecasting sales.
- "The company utilizes several methodologies to produce peak forecast methods, all of which are among state-of-the-art methods."

Mark P. Gilbert, LLC (September 2014)

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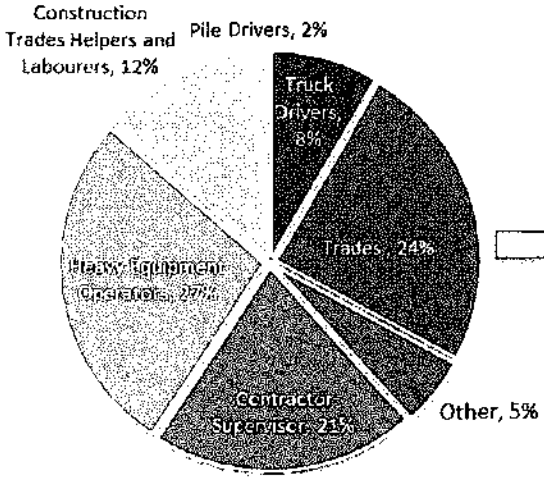
BACKGROUNDER

LABOUR REQUIREMENTS FOR SITE C AND LNG

To establish a new LNG industry, B.C. needs to be competitive, including when it comes to the availability of labour. BC Hydro has worked closely with the Ministry of Jobs, Tourism, and Skills Training, training institutions and industry associations to identify Site C labour requirements in relation to the development of the LNG industry to ensure they do not conflict.

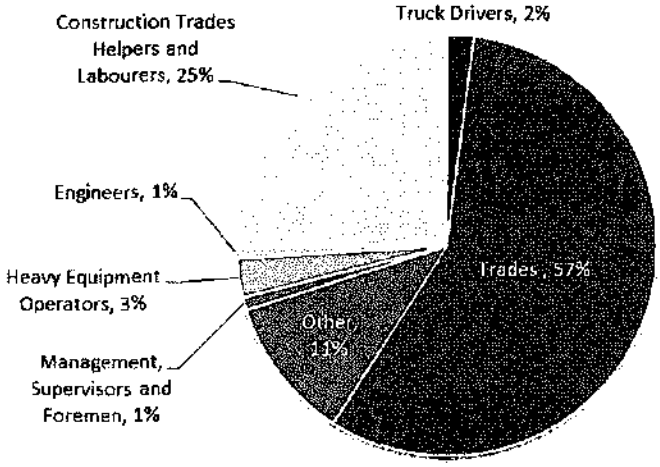
The conclusion of this work is that the labour requirements for Site C and LNG are largely different. While the workforce for Site C will be weighted towards heavy equipment operators to move large volumes of materials, like a mining operation, the LNG industry has a greater reliance on skilled trades. As a result, the labour requirements for Site C are not expected to interfere with the LNG industry.

Site C Construction Workforce Average



Trades included:	
Boilermaker	2%
Sheet Metal Worker	2%
Carpenter	8%
Cement Mason	1%
Electrician	5%
Ironworker	5%
Machinist/Millwright	2%
Painter	1%
Plumbers and Pipefitters	.25%

LNG Construction Workforce Needs at Peak



Trades included:	
Carpenters	4%
Concrete Finishers	3%
Electrical and Instrumentation	2%
Insulators	1%
Iron and Sheet Metal Workers	4%
Steamfitters, Pipefitters and Gasfitters	27%

SITE C CAPITAL COST ESTIMATE

The Site C capital cost estimate of $7.9 billion was developed in 2010 and included all construction, development, inflation and interest costs, as well as contingencies. The bottom-up estimate was completed by a team of internal and external engineering and construction experts, and underwent an external peer review by KPMG LLP to validate the methodologies and assumptions.

In 2014, BC Hydro conducted a cost refresh to reflect the advanced stage of project design and engineering and to prepare for a final investment decision by government. The refresh showed that while some costs had increased due to factors such as a longer environmental assessment process, enhancements to worker accommodation and larger diversion tunnels, the original cost estimate remained appropriate as these increases were largely offset by savings from lower than anticipated interest rates, efficiencies in project design and reduced excavation requirements.

As part of government's due diligence, the capital-cost estimate was reviewed and updated to $8.335 billion. Government also decided to establish a project reserve of an additional $440 million, to account for events outside of BC Hydro's control that could occur over an eight-year construction period, such as higher than forecast inflation or interest rates, for a total of up to $8.775 billion. The reserve is subject to provincial Treasury Board approval.

The increase to the capital cost estimate from $7.9 billion to $8.335 billion reflects:

- Costs associated with the change from the harmonized sales tax (HST) to the provincial sales tax (PST). If the capital cost estimate had not been updated to reflect this cost, BC Hydro would have been required to use funds from the project contingency budget. Government felt that it was prudent to increase the capital cost estimate so that the full contingency could be maintained.
- A revised construction start date of summer 2015 to allow more time to complete the permitting process. The revised start date results in a longer construction period which increases inflation and interest costs during construction.

As with other large capital projects, BC Hydro will be required to provide regular reports to both the British Columbia Utilities Commission and government, during construction.

Debt Impact

Site C will result in a net incremental increase to BC Hydro's forecast debt of approximately $6.4 billion. This is less than the capital cost estimate for the project due to lower dividend payments to government, costs that have already been incurred and the ability to defer other capital projects that would need to be built if Site C did not proceed.

For context, BC Hydro is currently investing an average of $1.7 billion per year to maintain and upgrade its existing system. With Site C, BC Hydro's total capital spending will average about $2.4 billion per year.

Due Diligence Reports

In 2014, external peer reviews were completed to validate the methodologies and assumptions of the project's capital cost estimate. The full reports are available online at www.sitecproject.com

KPMG LLP

KPMG conducted a review of the updated capital cost estimate and concluded that the level of care and diligence was consistent with an infrastructure project about to enter construction phase, that reasonable and appropriate processes were followed for developing the assumptions used in the Financial Model, and that the methodology behind the cost estimate was appropriate.

> "Since the 2010 estimate, KPMG performed another thorough review of the 2014 cost estimate process and again we found the extensive process exemplary."
>
> (December 2014)

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Panel of Independent Contractors

An additional review of the project's estimate of direct construction costs was undertaken by a panel of experienced independent contractors. The panel was made up of individuals that each have 35 to 50 years of experience in management and construction of major projects.

The panel concluded that the capital cost estimate was sufficient for the proposed scope and schedule of the project, contained an appropriate level of accuracy for making a final investment decision and was at a level of detail comparable to a private sector contractor estimate. The panel also concluded that the updated contingency was sufficient to cover any reasonable cost increases.

> "Overall, it is the panel's conclusion that the estimate is sufficient for the proposed scope and schedule of Site C. The estimate has an appropriate level of accuracy for making a final investment decision. Further, there are some opportunities for cost reduction available."

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(October 2014)

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Media Relations
Ministry of Energy and Mines and Responsible for Core Review
250 952-0628

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Knowles, Jessica D FIN:EX

From:	Foster, Doug FIN:EX
Sent:	Monday, December 15, 2014 4:38 PM
To:	MacLaren, Les MEM:EX
Subject:	FW: Revised NR & BGs: tomorrow's announcement
Attachments:	BG - Site C Cost Estimate.docx; BG - Growing Demand for Electricity.docx

-----Original Message-----
From: Foster, Doug FIN:EX
Sent: Monday, December 15, 2014 4:38 PM
To: Edwardson, Jamie GCPE:EX

s13

-----Original Message-----
From: Edwardson, Jamie GCPE:EX
Sent: Monday, December 15, 2014 4:19 PM
To: Foster, Doug FIN:EX
Subject: FW: Revised NR & BGs: tomorrow's announcement
Importance: High

Final versions based on today's review.

Office of the Premier
Ministry of Energy and Mines and Responsible for Core Review

NEWS RELEASE
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B.C.'s population and economy are growing, and the demand for power is expected to increase by 40% over the next 20 years. Site C will be required even with BC Hydro's ambitious Power Smart programs that are targeted to meet 78% of future electricity growth.

"British Columbia has the third-lowest electricity rates in North America and we need to meet our future needs in a way that keeps rates down," said Bill Bennett, Minister of Energy and Mines. "It's clear that to keep rates low, we must choose the option of building Site C."

Over the first 50 years, Site C's project life, ratepayers will save an average of $650 to $900 million each year, compared to alternatives. The project will generate a century of low-cost power, providing enough electricity for about 450,000 homes per year - an eight-per-cent increase in supply to BC Hydro's system in 2024.

As the third project on the Peace River, the firm energy it provides will support the development of more independent power projects (IPPs) by backing-up intermittent resources, such as wind. IPPs currently provide 25% of B.C.'s electricity and will continue to play a vital role in meeting the province's energy needs.

"Site C is essential to keeping the lights on while maintaining low rates for our customers," said Jessica McDonald, president and CEO of BC Hydro. "This project will build on the success of our existing hydroelectric system and benefit British Columbians for generations to come."

The capital-cost estimate for the project has been updated to $8.335 billion, and government has also established a project reserve of an additional $440 million to account for events outside of BC Hydro's control that could occur over an eight-year construction period, such as higher than forecast inflation or interest rates, for a total of up to $8.775 billion. The reserve is subject to provincial Treasury Board approval.

The project, which has undergone a thorough and independent multi-year environmental assessment process, will start construction in summer 2015 and will provide approximately 10,000 direct construction jobs.

"Today's announcement is a historic milestone and we look forward to building this important provincial project," said Susan Yurkovich, executive vice-president responsible for Site C. "We will continue to work with First Nations, communities and landowners to ensure that we deliver on our commitments and realize the many benefits of this project."

Backgrounders

* Growing Demand for Electricity
* Site C Capital Cost Estimate
* Comparing the Options
* About Site C
* Labour Requirements for Site C and LNG

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BACKGROUNDER

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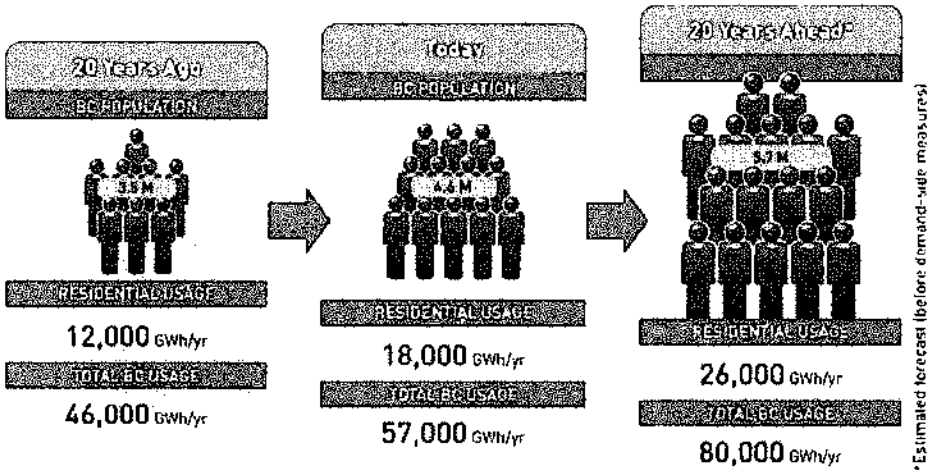

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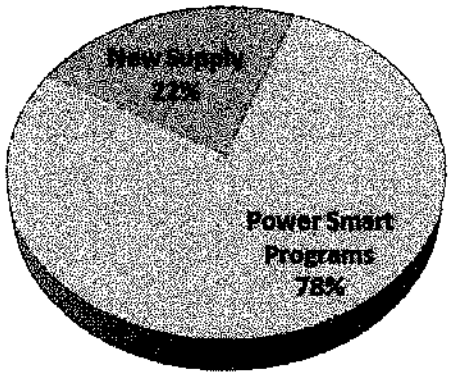

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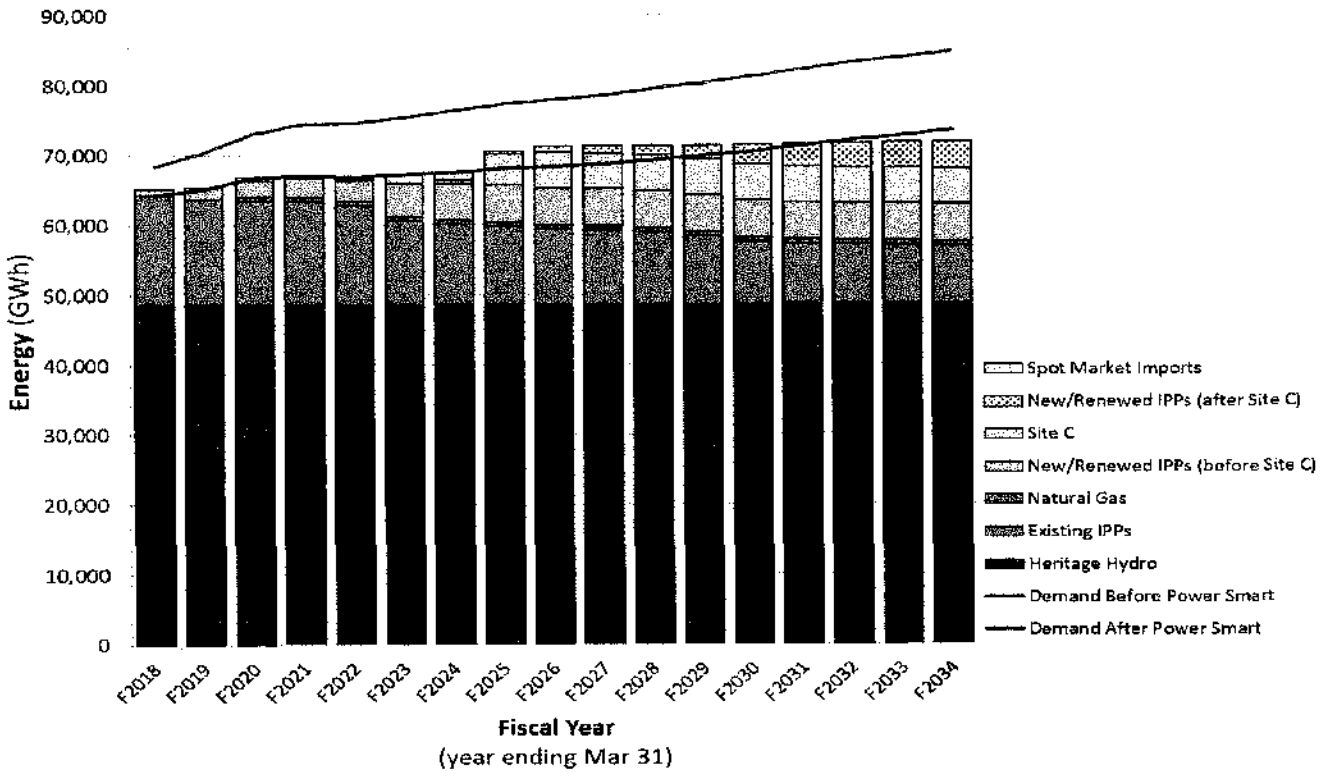

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Knowles, Jessica D FIN:EX

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Over the first 50 years, Site C's project life, ratepayers will save an average of $650 to $900 million each year, compared to alternatives. The project will generate a century of low-cost power, providing enough electricity for about 450,000 homes per year - an eight-per-cent increase in supply to BC Hydro's system in 2024.

As the third project on the Peace River, the firm energy it provides will support the development of more independent power projects (IPPs) by backing-up intermittent resources, such as wind. IPPs currently provide 25% of B.C.'s electricity and will continue to play a vital role in meeting the province's energy needs.

"Site C is essential to keeping the lights on while maintaining low rates for our customers," said Jessica McDonald, president and CEO of BC Hydro. "This project will build on the success of our existing hydroelectric system and benefit British Columbians for generations to come."

The capital-cost estimate for the project has been updated to $8.335 billion, and government has also established a project reserve of an additional $440 million to account for events outside of BC Hydro's control that could occur over an eight-year construction period, such as higher than forecast inflation or interest rates, for a total of up to $8.775 billion. The reserve is subject to provincial Treasury Board approval.

The project, which has undergone a thorough and independent multi-year environmental assessment process, will start construction in summer 2015 and will provide approximately 10,000 direct construction jobs.

"Today's announcement is a historic milestone and we look forward to building this important provincial project," said Susan Yurkovich, executive vice-president responsible for Site C. "We will continue to work with First Nations, communities and landowners to ensure that we deliver on our commitments and realize the many benefits of this project."

Backgrounders

* Growing Demand for Electricity
* Site C Capital Cost Estimate
* Comparing the Options
* About Site C
* Labour Requirements for Site C and LNG

Media Contact:

Media Relations
Ministry of Energy and Mines
250 952-0628

Connect with the Province of B.C. at: www.gov.bc.ca/connect

Knowles, Jessica D FIN:EX

From: Foster, Doug FIN:EX
Sent: Monday, December 15, 2014 5:22 PM
To: Edwardson, Jamie GCPE:EX
Subject: RE: Revised NR & BGs: tomorrow's announcement
Attachments: BG - Growing Demand for Electricity.docx

Thanks. D.

-----Original Message-----
From: Edwardson, Jamie GCPE:EX
Sent: Monday, December 15, 2014 4:42 PM
To: Foster, Doug FIN:EX

s13

Final versions based on today's review.

Office of the Premier
Ministry of Energy and Mines and Responsible for Core Review

NEWS RELEASE
Site C to provide more than 100 years of affordable, reliable clean power

VICTORIA - Premier Christy Clark announced today the Province has approved the Site C Clean Energy Project, concluding it will provide British Columbia with the most affordable, reliable clean power for over 100 years.

"Affordable, reliable, clean electricity is the backbone of British Columbia's economy. Site C will support our quality of life for decades to come and will enable continued investment and a growing economy," said Premier Clark.

B.C.'s population and economy are growing, and the demand for power is expected to increase by 40% over the next 20 years. Site C will be required even with BC Hydro's ambitious Power Smart programs that are targeted to meet 78% of future electricity growth.

"British Columbia has the third-lowest electricity rates in North America and we need to meet our future needs in a way that keeps rates down," said Bill Bennett, Minister of Energy and Mines. "It's clear that to keep rates low, we must choose the option of building Site C."

Over the first 50 years, Site C's project life, ratepayers will save an average of $650 to $900 million each year, compared to alternatives. The project will generate a century of low-cost power, providing enough electricity for about 450,000 homes per year - an eight-per-cent increase in supply to BC Hydro's system in 2024.

As the third project on the Peace River, the firm energy it provides will support the development of more independent power projects (IPPs) by backing-up intermittent resources, such as wind. IPPs currently provide 25% of B.C.'s electricity and will continue to play a vital role in meeting the province's energy needs.

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The project, which has undergone a thorough and independent multi-year environmental assessment process, will start construction in summer 2015 and will provide approximately 10,000 direct construction jobs.

"Today's announcement is a historic milestone and we look forward to building this important provincial project," said Susan Yurkovich, executive vice-president responsible for Site C. "We will continue to work with First Nations, communities and landowners to ensure that we deliver on our commitments and realize the many benefits of this project."

Backgrounders

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BACKGROUNDER

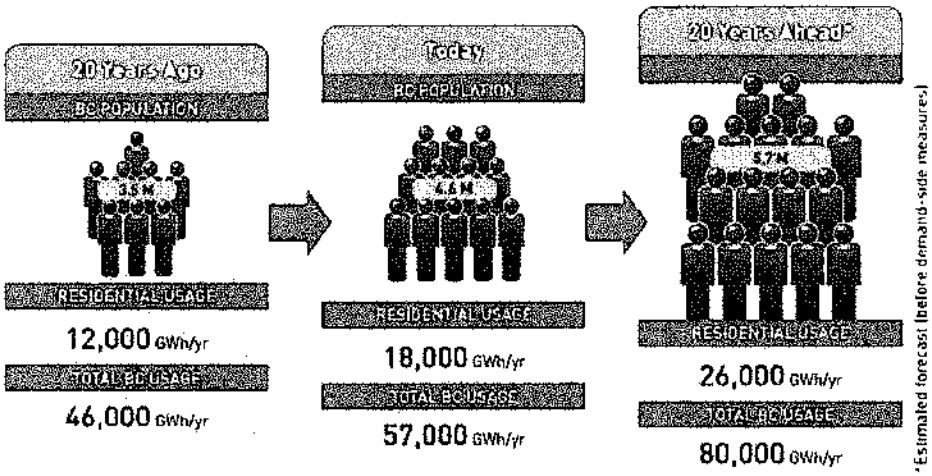
GROWING DEMAND FOR ELECTRICITY

A Growing Population and Economy

Over the next 20 years, British Columbia's population is expected to grow by more than a million people. As our population grows, we are also using more power than ever before because of devices like smartphones and big screen TVs, and emerging technologies like electric vehicles.

At the same time, there is new activity expected in the mining, oil and natural gas sectors. In fact, long-term demand will increase across all customer groups.

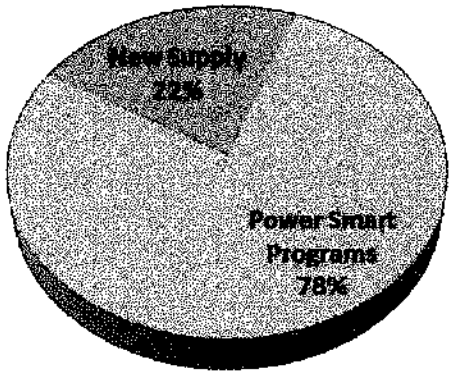
Taken together, this means B.C.'s electricity needs are forecast to increase by 40% over the next 20 years.



Conserving First

To meet this future need, BC Hydro will continue its ambitious Power Smart programs, taking every step possible to avoid building new generation facilities. This will keep costs down and rates low.

Meeting Future Demand



In fact, BC Hydro is planning to meet 78% of new electricity needs through conservation and efficiency initiatives by 2020. This means BC Hydro is planning to meet only 22% of expected load growth with new supply.

BC Hydro will continue to offer incentives to help homeowners, businesses and industrial customers become more energy efficient and lower their electricity costs.

A Conservative Forecast

With ambitious Power Smart programs, the actual increase in demand that will need to be met with new resources is about one per cent per year. This is lower than historical growth and in line with the Canadian National Energy Board forecast for Canada as well as forecasts in other North American jurisdictions.

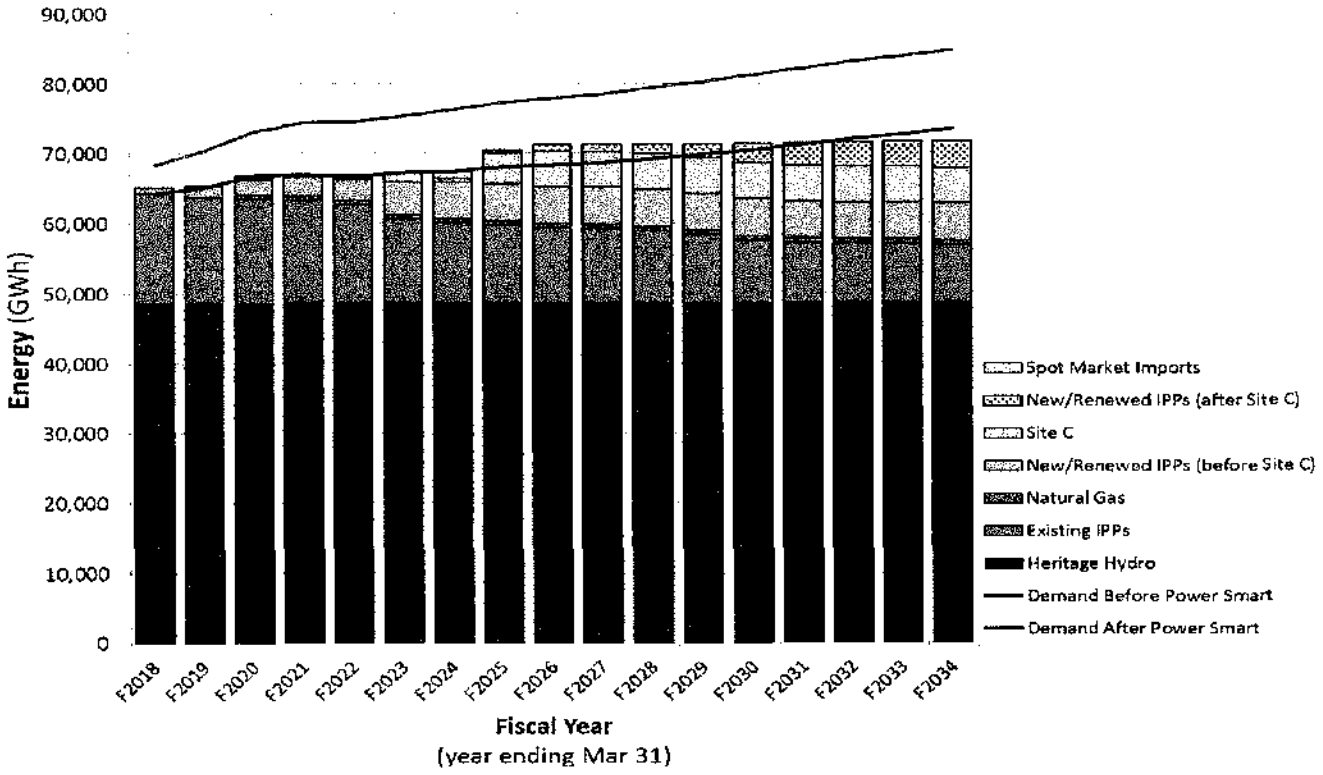
A Mix of Resources to Meet Future Demand

BC Hydro is investing $1.7 billion per year to maintain and expand its existing system, including upgrades to maximize the capacity of current facilities.

In addition, the amount of power provided by the independent power industry continues to grow as projects under construction come online, existing contracts are renewed and new projects are developed through BC Hydro's Standing Offer Program.

With all of these steps, British Columbia will still need a new source of energy and dependable capacity – Site C.

Meeting Demand Through a Mix of Resources



Need for Both Energy and Dependable Capacity

Electricity systems need both energy and dependable capacity. Some energy resources, such as wind or run-of-river, are intermittent which means they are not always available to generate electricity (e.g., when there is no wind or when rivers are not flowing). This means they must be backed up by dependable capacity which is always available.

Hydroelectric dams with storage, like Site C, are a key source of dependable capacity because water can be released when needed or stored to be used later to when demand is high, such as on a cold evening in winter.

Site C will provide 1,100 megawatts of dependable capacity, and produce 5,100 gigawatt hours of clean energy every year – an eight-per-cent increase in supply to the system. The dependable capacity from Site C will increase the amount of intermittent energy, like wind, that BC Hydro's system can support going forward.

Due Diligence

As part of the due diligence process, a third-party review of BC Hydro's load forecast methodology was commissioned from an independent energy consultant with over 30 years of experience in load forecasting who concluded that:

- "BC Hydro is using state-of-the-art methodologies for forecasting sales.
- "The company utilizes several methodologies to produce peak forecast methods, all of which are among state-of-the-art methods."

Mark P. Gilbert, LLC (September 2014)

Contact: Jake Jacobs
Media Relations
Ministry of Energy and Mines and Responsible for Core Review
250 952-0628

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Pages 476 through 480 redacted for the following reasons:
- -
s12
s12, s13, s17

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October 20, 2014

Thomas Assimes
CFO, BC Hydro Site C Clean Energy Project
Suite 1100, Four Bentall Centre
1055 Dunsmuir Street, P O Box 49260
Vancouver, BC, Canada V7X 1V5

Dear Mr. Assimes,

Re: Site C Clean Energy Project - Model Review

KPMG LLP ("KPMG"), acting in its role as commercial advisor to BC Hydro, was asked by BC Hydro to review a financial model ("Financial Model") and capital cost estimate prepared by BC Hydro in respect of the Site C Clean Energy Project ("Project"). Specifically, BC Hydro requested KPMG to comment on the logical and arithmetic integrity of the Financial Model, as well as the reasonableness and appropriateness of the approach, methods and processes used in developing the assumptions ("Assumptions") used to develop the project budget transcribed in the Financial Model.

In this context, it is our understanding that the objective of the Financial Model (the "Financial Model Objectives") is to function as a tool to consolidate key input data with respect to capital costs; calculate interest during construction; assess the financial implications of constructing the Project; and calculate the levelled unit energy cost for the Project.

KPMG conducted a similar review of the Financial Model in 2011 and our current review also focused on changes in processes from our 2011 review.

A. Scope of Review

KPMG reviewed the project documentation made available to us by the BC Hydro Integrated Team ("Project Team") and interviewed members of the Project Team, including the Project's cost estimators. Our review focused on the following:

1. the approach, methods and processes followed by the Project Team in developing the assumptions and cost inputs;

2. the incorporation of Assumptions into the Financial Model; and

3. the construction of the Financial Model, insofar as its logical and arithmetic integrity is concerned, as an analytical tool that BC Hydro may use to achieve the Financial Model objectives.

KPMG LLP is a Canadian limited liability partnership and a member firm of the KPMG network of independent member firms affiliated with KPMG International Cooperative ("KPMG International"), a Swiss entity. KPMG Canada provides services to KPMG LLP.

Our work did not include any of the following:

1. assessing or verifying the commercial risks associated with the Project, nor commenting on the possibility of the financial projections contained in the Financial Model of being achieved;

2. reviewing consistency of the Financial Model with externally linked files or verification of the contents and calculations of externally linked files in any way;

3. considering any formula containing implicit assumptions, external references;

4. reviewing the accuracy or appropriateness of visual elements (such as graphs) included within the Financial Model;

5. assessing the completeness of the Assumptions or inputs used in the Financial Model;

6. reviewing or testing of any sensitivity analysis of the Financial Model, including assessing the impact in the Financial Model of differing assumptions; or

7. providing any opinion or assurance regarding the functionality, accuracy or correctness of Microsoft Excel, the software program in which the Model was developed and operates, not the operating system that any users uses to run the Financial Model in Microsoft Excel.

The procedure we used to perform the work set out above will not constitute an audit or review made in accordance with any generally accepted auditing standards, or company law, or assessment of the technical feasibility or technical engineering review, or compliance with application legislation.

B. Methodology

Our work was based on the following methodology:

1. Document Review – a review of project documents made available to us by the Project Team;

2. Interviewed Project Team Members – conducted interviews with Project Team Members and other relevant parties associated with the Project. The purpose of the interviews were to develop an understanding of the processes followed in creating the Assumptions contained in the Financial Model;

3. Reviewed the process employed to develop the Financial Model assumptions;

4. Reviewed the transcription of assumptions into the Financial Model – we compared the Assumptions contained in the project documentation that was made available to us to those inputs used in the Financial Model; and

5. Verified logical and arithmetic integrity of the Financial Model – we reviewed the formula contained in the Financial Model for logical and arithmetic integrity.

KPMG

C. Findings

Our observations regarding each item in the scope of work is addresses as follows:

1. **The approach, methods and processes followed by the Project Team in developing the Assumptions**

   The Financial Model was populated from Assumptions developed by the Project Team for direct construction costs, indirect construction costs, contingencies, loadings including inflation and interest during construction, and benefits including First Nations & Regional Benefits Agreement. The Assumptions are explained further in Appendix 1.

   In respect of this review, our observations are as follows:

   - **Estimating Team**: Various teams were involved in the development of the 2014 estimate. Estimating teams were broken down as per direct cost work packages, indirect cost, contingency and benefits The details of the teams involved in development of the Assumptions are summarized in Tables 1 and 2 in Appendix 1.

   - **BC Hydro Estimating Procedure:** The Assumption development process demonstrates a level of care and diligence consistent with an infrastructure project about to enter the construction phase. The estimating process appears to be in line with BC Hydro Estimating Procedure for Preliminary Design or EAR Estimates as applicable. The Project Team expects the accuracy of the 2014 estimate to range from +15% to -10%, very similar to AACEI Expected Accuracy Range for projects in Class 3 Budget, Authorization, or Control phase.

   - **Direct Construction Cost**: Integrated Engineering Team (IET) worked with the Site C Estimating Team in developing estimates for direct cost work packages - Main Civil Works and Generating Station & Spillways. IET performed the primary estimate and the secondary check estimate was conducted by BC Hydro Site C Estimating Team. The two estimates were reviewed and final numbers were agreed to carry and these were carried in the final primary estimate by IET. For the remaining direct cost work packages, the estimates were prepared by the Site C Team and subsequently reviewed by IET.

   - **Design Change Management**: Additional control measures have been implemented by the Site C Team including design change management process to ensure more visibility and control on design changes. All design changes that affected the cost and schedule were identified, formally recorded and reported, including the estimated impact on the project cost, scope or schedule. The 2010 design and the corresponding estimate was considered the baseline for the purpose of assessing the impact of the design change, and scope creep. The authorization of IET's Management Team was obtained prior to implementation of any proposed design changes, thereby managing scope creep that originated from within the IET or other parts of the Site C Team.

   - **Work Packages**: A major change from the 2010 estimate is in the repackaging of the direct cost elements from 18 major work packages to 14 major work packages to match the procurement model. Repackaging was done based on the Board approved Procurement Strategy. As the project progresses into the construction phase, only minimal changes would be required on the estimate in terms of combining work elements for procurement.

- **Labour rates:** Labour rates were validated against standard industry labour agreements and updated in the 2014 estimate. The BC Hydro Project Team changed the assumptions regarding the labour turnaround schedule in the 2014 estimate. The 2010 estimate was based on the assumption that people will work 5 weeks continuously before taking 1 week break (5:1 schedule). In 2014, the estimate was updated to include a 3:1 shift schedule – people will work 3 weeks continuously and then take 1 week break.

- **Commodity Prices:** BC Hydro has retained the services of MMK Consulting to conduct a study on Construction Cost Trends and Outlook. The report by MMK Consulting shows that prices of most commodities have remained largely flat during the last 4 years. Prices of commodities such as steel, cement, fly ash, diesel etc. have been reviewed and updated to reflect the trend in commodity prices

- **Supplier Costs:** Minimal new supplier costs were obtained because the project is now in active procurement. Relevant previous supplier quotes such as turbine and generators costs were carried from the 2010 estimate with escalation. Equipment rates were validated and updated as per rates published by Equipment Watch.

- **Indirect Construction Cost**: Indirect Costs were estimated by the BC Hydro Generation Estimating Team with assistance from Site C's Finance, Estimating, and Environment Teams as well as BC Hydro Corporate Finance Team. IET was not involved in developing the estimates for indirect cost items.The definition and regulatory cost estimate was based on BC Hydro accounting records for costs already incurred and reforecasting of remaining work. Management and Engineering costs were estimated based on a detailed resource plan of all activities required to execute the project. The 2014 estimate for regulatory mitigation and compensation remains unchanged compared to the 2010 estimate.

- **Insurance**: The Site C Team engaged Marsh Canada as the insurance advisor for the Project. Marsh has developed an insurance program for the Project and confirmed that the current estimate for insurance is sufficient based on current market pricing.

- **Contingency**: Contingency is an allowance to address risks that are reasonably within the control of the Project Team and which can be addressed through timely mitigation measures.

  In 2010, the Site C Integrated Engineering Team performed Monte Carlo analysis, a leading industry practice for quantitative risk analysis, in assessing project risks to calculate the amount of contingency for Site C. The analysis included an assessment of the adequacy of the contingency fund to address the potential of risks occurring as the project progresses to the procurement and construction phase. The Team also reviewed the uncertainty associated with the estimated cost of the direct cost work packages, with respect to scope changes, accuracy of estimate and labour cost fluctuations. The impact of variations in mark-up was also assessed as a total for the overall direct cost package. The contingency analysis was refreshed from the bottom up in the 2014 estimate by the Site Estimating Team.

  Overall, the Site C Team has diligently assessed project risk events and allowed for contingency to address such risks.

- **Project Reserve:** A Project Reserve is an allowance to address macro risks that are outside the control of the team managing the project.

  In 2010, the Site C team conducted a risk analysis to identify these risks and calculate a reserve. The most significant macro risks identified in 2010 included extraordinary delays in regulatory process and approvals, extraordinary incentives to attract labour, harsher than anticipated environment assessment certificate (EAC) requirements, exceptional fluctuations in interest or inflation rates, design errors/omissions, or diversion tunnel construction issues.

  Since 2010, the Project did indeed experience a delay in the regulatory process and extraordinary changes in labour conditions. These changes were largely offset by a positive movement in interest rates. The EAC requirements are in line with the original estimate. The changes have been incorporated in the 2014 Estimate.

  Considering the duration of Site C's construction schedule, KPMG recommends that the Team continue to update the Project Reserve calculation and measure the risk associated with macro events on the Project.

- **Escalation/Inflation**: MMK Consulting recommended allowances for short and long term, for construction costs at BC Hydro, in the range of 2% to 3.5% depending on the mix expenditures on a project. Based on the report by MMK Consulting, and discussions with other Utilities, BC Hydro's Principal Engineer recommended an inflation rate of 2% per annum for the 2014 estimate, at the lower end of the predicted construction inflation would be appropriate for mix of expenditures directly on the Site C Project.

- **Oversight**: For additional oversight, the process followed by the Site C Project Team also included consultation with its Technical Advisory Board and Executive Project Board. Also, a panel of industry experts with 35 to 50 year experience in the construction of heavy civil works were engaged to review the direct cost estimate. The review process was monitored by KPMG. A separate report was delivered to BC Hydro by the panel.

2. The incorporation of Assumptions into the Financial Model

In respect of our review of the financial model, our major observations are as follows:

- We observed a number of labelling inconsistencies that required clarification to confirm whether a number of core capital cost items were input in nominal or real dollars. These were confirmed with BC Hydro and have been updated in the current version of the draft model.

- We observed that Contingency was substantially similar to the prior 2010 estimate and that Contingency had been updated for the 2014 estimate primarily by applying actual BC Consumer Price Index inflation since 2010. To ensure that the Contingency amount remained sufficient, Site C subsequently performed a full Monte Carlo Analysis from the bottom-up.

- We observed several individual cost estimates that had not changed from the 2011 to the 2014 Capital Cost Model (i.e. same dollar value in 2010 and 2014 dollars indicating no inflation was applied since the last estimate) and communicated these items to BC Hydro for clarification. We understand this was intentional as these are sunk costs that are not subject to inflation.

KPMG

3. **The construction of the Financial Model, insofar as its logical and arithmetic integrity is concerned**

- We observed that Interest During Construction (IDC) was being calculated using a compounding interest rate and requested clarification if compounding or fractional interest rate methodology should be used to derive IDC. BC Hydro confirmed that the use of a compounding interest rate is intended at the direction of BC Hydro Treasury.

- We noted discrepancies in how inflation was applied to approximately $430 million of costs as it appeared the assumptions applied to these costs differed from the majority of costs. Upon clarification with BC Hydro it was confirmed that forecasted inflation (i.e. forecasted as of 2010 for the 2011-2014 period), rather than actual inflation was used to update these costs in parallel with BC Hydro's expectation at the time (i.e. in 2010) that these costs would increase at a rate faster than actual inflation. As forecasted inflation was higher than actual inflation, this assumption seems appropriate.

- We asked for clarification on the timing assumptions used for the calculation of net present value used to estimate the Unitized Energy Cost ("UEC"). We noted any change in assumptions would have an immaterial effect on UEC regardless of the outcome of this observation. BC Hydro confirmed that the timing assumptions used for the calculation of UEC were consistent with the nature of the calculations used in the model.

- On the core "RAW-DirectCF" tab we noted numerous hardcoded assumptions combined with references to other cells in individual formulas and flagged all instances of these formulas for clarification by BC Hydro. Upon clarification with BC Hydro it was confirmed by BC Hydro that these cells are effectively input cells so no further investigation was required after this confirmation.

- We noted some instances where inflation assumptions were hard coded into formulas (i.e. Cell X*1.02) but generally observed that the application of inflation was linked to a single input in a logical manner. BC Hydro has corrected all instances of this in the current version of model under review.

- We noted one core referencing error on "Calc-CASHFLOW" where approximately $54 million in costs were not referenced to the appropriate timing (shaping) sensitivity profile, thus potentially misrepresenting the timing of when those capital costs would be assumed to occur. We noted that in the current draft version of the model under review that the appropriate shaping sensitivity profile has been referenced.

D. Conclusion

We have reviewed the Assumption development process and it shows a level of care and diligence consistent with an infrastructure project about to enter the construction phase. Based on our review, it is our view that the Project Team has followed reasonable and appropriate processes for developing the Assumptions used in the Financial Model.

Overall, BC Hydro Project Team has diligently assessed project risk events and allowed for Project Contingency to address such risks.

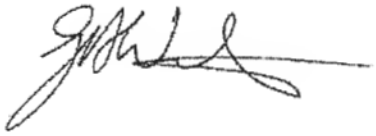
Based on our review, we believe that the Assumptions have been properly transcribed into the Financial Model. The Financial Model also appears to have been constructed appropriately, insofar as its logic and arithmetic integrity is concerned.

E. Restrictions

This report is addressed to BC Hydro. We will not accept responsibility to any other party to whom the report may be shown or who may acquire a copy of the report.

Our review findings, as set out in our report, apply only to the specified version of the Financial Model and that has been made available to us by the Project Team. We will not be under any obligation to perform any work, take account of or comment on any intervening events or model changes after the issue of our report in final form to BC Hydro.

Sincerely,



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KPMG

Appendix 1: Summary of Processes used to Develop Assumptions

This Appendix summarizes the processes used to develop the Assumptions contained in the capital cost component of the Financial Model.

The Financial Model is based on five categories of Assumptions:

1. Direct construction costs;
2. Indirect construction costs;
3. Contingencies;
4. Loadings including inflation and interest during construction; and
5. Benefits

Different teams were responsible for developing various elements of the Assumptions, as summarized in tables on the following pages. The process by which the Assumptions were derived are summarized thereafter by category.

Table 1: Assumption Categories

Category		Sub-Component		Developed By
1	Direct construction costs	A	Land & rights	Site C Properties Team, Integrated Engineering Team Site C Commercial Team
		B	Worker accommodation	Radloff/SSA
		C	Highway 29 realignment	Site C Highways Team, Tetratech
		D	Clearing	Site C Clearing Team
		E	Early works	Site C Estimating Team, Integrated Engineering Team, and Tetratech
		F	Main civil works	Site C Estimating Team, Integrated Engineering Team
		G	Generating station & spillways	Site C Estimating Team, Integrated Engineering Team
		H	Turbines & Generators	Site C Estimating Team
		I	Transformers	BC Hydro Site C Estimating Team
		J	Substation	Transmission & Distribution Estimating Team, Site C Estimating Team
		K	Peace Canyon 500kv upgrade	Transmission & Distribution Estimating Team, Site C Estimating Team
		L	Transmission line	Transmission & Distribution Estimating Team, Site C Estimating Team
		M	Miscellaneous items	Site C Estimating Team
		N	Construction management	Site C Estimating Team
2	Indirect construction costs	A	Definition & regulatory phase (including sunk costs)	Site C Finance Team
		B	Management and engineering costs	Site C Finance Team, Site C Estimating Team
		C	Construction insurance & bonding	Site C Finance Team, Premium supplied by BC Hydro Corporate Finance and Marsh Canada

Table 1: Assumption Categories				
Category		Sub-Component		Developed By
		D	Regulatory mitigation & compensation	Site C Environment Team
3	Project Risk Allowance	A	Contingency	Integrated Engineering Team, Site C Estimating Team, BC Hydro Generation Estimating Team, Site C Commercial Team
4	Cost loadings and inflation	A	Inflation	Site C Commercial Team, Rates supplied by BC Hydro's Treasury Group
		B	Interest during construction	Site C Commercial Team, Rates supplied by BC Hydro's Treasury Group
5	Benefits	A	First Nations and Regional Benefits Agreement	Site C First Nations Team, BC Hydro Commercial Team

Table 2: Teams Responsible for Developing Assumptions		
Team	Team Members	Team Leader
Integrated Engineering Team	Klohn Crippen Berger Ltd.	John Nunn
	SNC-Lavalin Inc.	Alfred Hanna
	BC Hydro Engineers	Andrew Watson
Site C Estimating Team	BC Hydro Cost Estimation Experts	Alan Le Couteur
BC Hydro Generation Estimating Team	BC Hydro Principal Engineer	John Boots/ Jeff Acland
BC Hydro Transmission & Distribution Estimating Team	BC Hydro Transmission & Distribution Experts	Matt Drown
Tetratech	Tetratech Cost Estimating Experts	Alex Izett
Radloff/SSA	Radloff/SSA Cost Estimating Experts	Bob Radloff
Site C Highways Team	Site C Highway Experts	Don Wharf
Site C Clearing Team	Site C Clearing Experts	Paul Veltmeyer
Site C Properties Team	Site C Property Experts	Judith Reynier
Site C Commercial Team	Site C Commercial Experts	Michael Savidant
Site C Finance Team	Site C Finance Experts	Kathy Young
BC Hydro Treasury Group	Site C Treasury Experts	James Le Lievre
Site C Environmental and Regulatory Group	Site C Environment Experts	Danielle Melchior
Site C First Nations Team	Site C First Nations Expert	Trevor Proverbs

A. Process Update

Several processes and changes were made to the BC Hydro estimating process since the 2010 estimate. These are summarized below:

Estimation Process: Site C Team has rearranged the direct cost elements from 18 work packages included in the 2010 estimate to 14 work packages in the 2014 estimate, in accordance with the procurement model. Repackaging was done based on the Board approved Procurement Strategy. BC Hydro has not obtained any formal approval on the work packages yet as some of the items in the scope are still being finalized. At this stage of the project, BC Hydro Project Team expects the accuracy of the 2014 estimate to be in the range of +15% to -10%, very similar to AACEI Expected Accuracy Range for projects in Class 3 Budget, Authorization, or Control phase.

Labour Rates: Site C Team has updated the labour rates in the 2014 estimate by taking into consideration standard industry labour agreement . The Site C Estimating Team Leader worked with labour relation team while updating the labour model. The revised labour model was uploaded to Heavy Bids and the estimate was recalculated accordingly. The Site C Project Team has changed the assumptions regarding labour turnaround schedule in the 2014 estimate. The 2010 estimate was based on the assumption that people will work 5 weeks continuously before taking a break for 1 week (5:1 schedule). In 2014, the estimate was updated to include 3:1 shift schedule – people will work 3 weeks continuously and then take a break for 1 week. Equipment rates have been updated as per Equipment Watch.

Design Change Management: The 2010 design and the corresponding estimate were considered as the baseline for the purpose of assessing the impact of design change. The current design change management process is applicable to any potential changes in design that could make an impact on the project scope, cost and schedule from the 2010 baseline. As per the process, the related Discipline Lead in the Integrated Engineering Team issues a Design Change Notice for a potential change. The Discipline Lead along with the Engineering Manager identifies the potential implications of the change in terms of scope and quantity. The related estimating team calculates the potential cost impact and the Engineering Area Manager and Work Package Manager confirms the changes to the project in terms of cost, schedule and scope. Subsequently, the Engineering Controls Manager issues a change order to formalize the change. The authorization of IET's Management Team was obtained before any proposed design changes were implemented, thereby managing scope creep that originated from within the IET.

B. Direct construction Costs

The processes followed by Site C to estimate major direct cost work packages are illustrated below:

Land and Rights: Site C Properties Team estimated the costs for Land and Rights. Some of the costs are sunk costs as BC Hydro continues to purchase the lands required for the Project. Judith Reynier, Site C Properties Team lead, has a map of all the properties that need to be acquired for the project and all the numbers are based on assessed land value.

Judith has a Diploma in Urban Land Economics, is a Member of the Real Estate Institute of BC, has significant experience in estimating property acquisition costs for major infrastructure projects and has over 35 years of experience in the acquisition and management of properties required for public purposes.

Worker Accommodation: Worker Accommodation costs were estimated by R. Radloff & Associates Inc. and SSA Quantity Surveyors Ltd. The 2014 estimate for Worker Accommodation was based on 30% complete design. In 2010, the estimate was based on vendor quotes. In 2014, R. Radloff & Associates Inc.

and SSA Quantity Surveyors Ltd. team used operational cost database to prepare the estimate and then compared the estimate against industry comparators including the camp costs of Manitoba Hydro and Quebec Hydro. The team focussed on the quality of service including the quality of food while doing the benchmarking and preparing an estimate for the Project. BC Hydro does not carry a separate % on escalation of direct cost items; however, worker accommodation estimate includes an escalation allowance for 1 year, indirectly buried in the cost.

Radloff & Associates Inc. and SSA Quantity Surveyors Ltd. was led by Bob Radloff, a Civil Engineer with over 36 years of progressive experience in the design, construction and operation of municipal infrastructure. He has worked extensively on both small and large systems, in First Nation's communities, as well as municipal, and industrial settings.

Highways: The estimate for Highway 29 realignment was prepared by the Site C Highways Team in collaboration with Tetratech. The 2014 estimate for Highways was based on a 40% complete design. This was done as a bottom-up exercise using TetraTech's road design. The costs were reviewed in August 2013 by the Site C team, including the Integrated Engineering Team.

The Site C Highways Team was led by Don Wharf. Don has been serving as Program Manager, Road Infrastructure for BC Hydro Site C Project since 2010, responsible for the planning, engineering, design and implementation of the Site C Roads Program. Don has over 31 years extensive experience with the Ministry of Transportation & Infrastructure of BC in project and program development and delivery, highway contract administration, and stakeholder relations.

Clearing: The estimate for Clearing was prepared by the Site C Clearing Team based on several seasons of ground truthing and reflecting Environmental Impact Statement (EIS) commitments. The design was 30% complete when the estimate was prepared. The estimate assumed Blue Book rates for equipment (and associated operators) as well as labour rates based on experience. BC Hydro has received initial submissions from several companies and the labour rates are 5 -20% higher than what BC Hydro used in the estimate. The Site C Team is currently in negotiation with those companies to get them to accept Blue Book rates for equipment and ensure that their labour rates are similar to those used for the 2014 estimate.

The Site C Clearing Team was led by Paul Veltmeyer. Paul is a Registered Professional Forester and has a Bachelor of Science degree in Forestry. Paul has over 25 years experience working in different capacities in companies in the Forestry industry. Since 2011, Paul has been serving as Forestry Lead for Site C Clean Energy Project responsible for developing and executing a Clearing and Debris Management Strategy for the Project.

Early Works: Early works were estimated by Tetratech in collaboration with the Site C Estimating Team. The Site C Estimating Team prepared approximately 10% of the package estimate, while Tetratech developed the rest including the estimate for road work. Tetratech did not use a bottom up approach to estimate the Early Works. Tetratech produced the estimate based on unit pricing comparable to what Ministry of Transportation and Infrastructure has experienced in that area. The estimates were subsequently reviewed for by the IET.

Tetratech Team was led by Alex Izett. Alex has a Bachelor of Science degree in Civil Engineering. Alex has over 15 years experience providing engineering and project management services to private sector and private sector clients in the transportation industry.

Main Civil Works: Main Civil works were estimated by the Site C Estimating Team in collaboration with the Integrated Engineering Team, based on 40% complete design. The preparation of the estimate was a 2 stage process - IET did primary estimate and a secondary check estimate was done by BC Hydro Site C Estimating Team. BC Hydro started with the 2010 estimate and refreshed quantities in line with design reports and incorporated costs for resources, equipment, material etc, using Heavy Bids. Michael Pauletto and Wendy Lannin developed the schedule and resourcing plan for Main Civil Works. Michael Pauletto is an external consultant serving the IET through SNC Lavalin and Wendy Lannin is IET Project Controls Manager. The two estimates were reviewed and final numbers agreed to carry and these were carried in the final primary estimate by the IET.

The estimate was also reviewed and validated by BC Hydro's Principal Engineer for Estimating and Scheduling and Site C's Estimating Team. The reasonableness of the final estimate was also validated against costs incurred for previous BC Hydro projects.

The work package was estimated based on the assumption that the work will be executed by a single large general contractor. Profit and overheads for the work package were determined mainly by BC Hydro's Principal Engineer for Estimating and Scheduling and Site C's Estimating Team Lead, based on their extensive experience from similar projects. BC Hydro has not allowed for any Joint Venture costs in its 2014 estimate for Main Civil Works. Contractor's contingency has not been allowed as BC Hydro's standard practice for the estimate. BC Hydro is carrying a significant portion of the risks except for the risks such as productivity, material logistics, and adverse weather conditions.
The credentials of the Integrated Engineering Team and Site C Estimating Team are summarized in Appendix 2.

Generating Station and Spillways: The estimate for Generating Station and Spillways ("GSS") was prepared by the Site C Estimating Team in collaboration with the Integrated Engineering Team, based on 30% complete design. The preparation of the estimate was a 2 stage process - IET did primary estimate and a secondary check estimate was done by the Site C Estimating Team .The two estimates were reviewed and final numbers agreed to carry and these were carried in the final primary estimate by the IET.

The Spillway is one of the largest scope change item when compared to the 2010 estimate. The overall dimensions of the spillway have changed and there was a reduction in parts designed for construction by Roller Compacted Concrete. This change reduced the cost of the Main Civil Works component, but the GSS cost has increased accordingly. The estimate for penstock was updated in the 2014 estimate from the low unit rates allowed in the 2010 estimate.

Turbines and Generators: The estimate for Turbines and Generators was prepared by the Site C Estimating Team. The design was in the feasibility stage at 10% of the overall design when the 2014 estimate was prepared. The 2010 estimate was based on quotes received from vendors. The 2014 estimate is based on the 2010 pricing, adjusted for inflation in the labour rate.

BC Hydro has also validated its assumptions on commodity prices through a study conducted by MMK Consulting. The report by MMK Consulting shows that prices of most commodities have remained largely flat during the last 4 years. Prices of commodities such as steel, cement, fly ash, diesel etc. have been reviewed and updated to reflect the trend in commodity prices. The 2014 estimate does not include any allowance for fluctuations in the currency rate as BC Hydro does not expect too much fluctuation in the currency rate over the duration of the project.

Substation, Transmission & Peace Canyon 500kv Upgrade: The estimate for substation, transmission & Peace Canyon 500kv upgrade was prepared by BC Hydro Transmission and Distribution Estimating

Team. A bottom-up approach was used to develop the estimate based on available designs. BC Hydro expects that some adjustments would be required in the final estimate once the location of the substation is finalized. BC Hydro is holding additional costs in Value Engineering for the new substation location. The estimate was reviewed and validated through the standard channels for such estimates, up to and including BC Hydro's Principal Engineer for Estimating & Scheduling.

BC Hydro Transmission and Distribution Estimating Team was led by Matt Drown. Mark is a Professional Engineer and certified Project Management Professional. Mark is a Transmission Project Management subject matter expert for PPM Committee and has substantial substation and transmission line design knowledge. Mark has worked at BC Hydro in several roles, including Mechanical Engineer- Stations Engineering, Stations Team Lead and Project Manager Transmission Engineering.

C. Indirect Construction Costs

The processes followed by BC Hydro to estimate indirect cost are illustrated below:

Definition and Regulatory Phase (including sunk costs): The Site C Finance Team estimated the definition and regulatory phase cost for the project. Approximately 84% of the costs are already sunk and actual at this stage of the project and BC Hydro Finance Team based its estimate on its accounting records. BC Hydro develops a baseline regulatory schedule at least once a year. The baseline schedule was last prepared in November, 2013 along with a forecast analysis for the rest of the regulatory phase. In addition, each month the Site C Finance Team reviews the Expected Total Cost to the end of the regulatory phase.

The Site C Finance Team was led by Kathy Young. Kathy has over 27 years experience in project cost control, project management, operations management and management accounting. Kathy is the Manager, Planning, Forecasting and Business Services for BC Hydro since 2010.

Management and Engineering: Management and engineering costs associated with the Project were estimated by BC Hydro Site C Estimating Team and based on a detailed resource plan of all activities required to execute the project. The hourly rates for Management and Engineering activities have not changed from the 2010 estimate. BC Hydro has not updated the quantities of Management and Engineering items except for the extra quantities added to account for the additional schedule duration for diversion and other related activities.

Construction Insurance and Bonding: Construction insurance and bonding estimate in the 2014 model remain unchanged from the 2010 estimate. The 2014 estimate was prepared by BC Hydro Site C Finance Team in collaboration with BC Hydro Corporate Finance Team. BC Hydro Site C Finance Team led by Kathy Young reviewed the insurance requirements based on the final scope of work and contract packages and then worked with BC Hydro Corporate Finance Team to estimate the insurance cost for the project. Subsequently, BC Hydro Site C Finance Team has retained Marsh Canada to review costs and develop an insurance program within the allocated budget. Marsh has confirmed the estimate is sufficient based on current market pricing.

Regulatory Mitigation and Compensation: The Site C Environmental and Regulatory Group estimated the allowance for regulatory mitigation and compensation associated with the environmental impacts of constructing a new dam. The Site C Environmental experts consulted with subject matter experts and external consultants while developing the estimate back in 2010 and the estimate for 2014 remains unchanged.

The Site C Environmental and Regulatory Group was led by Danielle Melchior. Danielle Melchior has a Bachelor of Arts and a Masters degree in Economics. Danielle has significant experience in investment analysis and project financing for large infrastructure projects in the oil and gas sector and has worked at BC Hydro in several roles, including Director of Finance Generation/EARG, Project Director Site C and Director of Environmental Assessment & Regulatory.

D. Project Risk Allowances

Allowances that address risks are usually split into two components – Project Contingency and Project Reserves. Project Contingency is to address risks that are reasonably within the control of the Project Team and which can be addressed through timely mitigation measures and Project Reserve is to address macro risks that are outside the control of the Project Team.

Project Contingency: In 2014, the BC Hydro Site C Estimating Team performed Monte Carlo analysis, a leading industry practice for quantitative risk analysis, in assessing project risks. Using Monte Carlo analysis, BC Hydro Site C Estimating Team assessed the adequacy of the contingency fund to address the potential of risks occurring as the project progresses to the procurement and construction phase.The Team reviewed the 14 major work packages with respect to: scope changes, accuracy of estimate and labour cost fluctuations. The analysis considered best and worst case scenarios on each line item in the estimate. The impact of variations in mark up was also assessed as a total for the overall direct cost package. The resulting construction contingency was reviewed by IET on a top-down basis, to ensure that it made sense at the overall project level.

Project Reserves: In 2010, the Site C Team with assistance from Partnership BC conducted a full assessment of the external macro risk events that the Site C Project is exposed to and calculated a Project Reserve to address such risks. A number of positive and negative reserve events have materialized and been absorbed in the 2014 estimate. The reserve events that have been absorbed in the 2014 estimate include: overtime premiums increased from the rates included in the 2010 estimate, extra cost included for flight for turnarounds, quality of the camp improved, a decrease in interest rates, and nearly 2 years of schedule delay in the regulatory process during Stage 3. Considering the long construction schedule of the Project, BC Hydro should continue to update the Project Reserve calculation in the event that additional reserve events occur.

E. Loadings Including Inflation and Interest During Construction

The Site C Commercial Team worked with BC Hydro Treasury Group to determine the inflation rate for the 2014 model. BC Hydro Commercial Team has validated the inflation rate against the rates provided by MMK Consulting in its Construction Cost Trends and Outlook 2014 Edition. MMK Consulting recommended allowances for short and long term, for all construction at BC Hydro, in the range of 2% to 3.5%. Based on the report by MMK Consulting, and discussions with other Utilities, BC Hydro Site C project Team included an inflation rate of 2% per annum for the 2014 estimate, at the lower end of the predicted construction inflation

Interest During Construction ("IDC") is based on long term interest rate and it was provided by BC Hydro Treasury. Long term interest rate was also verified against the rates forecasted by the BC Ministry of Finance. Policies related to how to account for IDC for the various components is being worked on.

The Site C Commercial Team was led by Michael Savidant. Michael is the Commercial Manager in Site C's Commercial Team, and led the team at the time the cost estimate was developed. Michael has a Bachelor of Applied Science degree in Engineering Physics as well as an MBA. Michael has 10 years of experience

in the energy industry and has experience in financial modelling for power projects and economic modelling for resource planning.

F. First Nations and Regional Benefits Agreement

Estimates for First Nations and Regional Benefits are based on the expected outcomes from negotiations with First Nations. The estimates were calculated by the Site C First Nations Team in collaboration with BC Hydro Site C Commercial Team.

The Site C First Nations Team was led by Trevor Proverbs who is responsible for consulting with and negotiating Benefit Agreements with Aboriginal groups in relation to the Site C Clean Energy Project.Trevor has a Bachelor of Arts degree in Sociology and 35 years' experience working in the areas of fisheries and aboriginal relations, serving as Chief Negotiator for British Columbia for 15 years. Trevor has concluded both treaties and reconciliation agreements with the Nisga'a Nation, Lheidli T'enneh First Nation, Sliammon First Nation, In-SHUCK-ch First Nation, K'omoks First Nation and the Haida Nation.

G. Oversight

The development of the Assumptions and the resulting cost estimate has been reviewed internally by various boards. The Technical Advisory Board reviews major decisions on the project, including the general arrangement and the robustness of the design, upon which the cost estimate is based. We understand that the process followed by the Site C Project Team also included consultation with its Technical Advisory Board and Executive Project Board. The boards that have an oversight role with respect to Site C are outlined in Table 4.

Table 4: Role of Oversight Groups with respect to Site C

Board	Chair of Board	Executive Members (non-exhaustive)	Role with respect to Site C
BC Hydro Board	Chair BC Hydro	Stephen Bellringer (Chair); Bill Adsit; W.J. Brad Bennett, O.B.C.; Larry Blain; James M. Brown; James P. Hatton, Q.C.; John Knappett; Tracey L. McVicar; Janine North, ICD.D; John Ritchie; Jack Weisgerber	• Overall approvals on project goals, scope, budget and schedule; • Approval of any significant changes to budget, scope and schedule; • Approval on contract awards over $50 million; and •
Executive Project Board	Chair BC Hydro	Stephen Bellringer (Chair) ; John Ritchie; Brad Bennett; Janine North	• Provide guidance and oversight to project staff and to the CEO on project strategy as well as on regulatory, First Nations, procurement and other issues as required

Table 4: Role of Oversight Groups with respect to Site C			
Board	Chair of Board	Executive Members from Board level	Role with respect to Site C
Executive Team	President and Chief Executive Officer	President and CEO, BC Hydro; Senior Vice-President & Chief Human Resources Officer; President & Chief Executive Officer, Powerex; Executive Vice-President, Transmission & Distribution; Executive Vice-President, Generation; Executive Vice-President, Site C Clean Energy Project; Executive Vice-President & Chief Financial Officer; Senior Vice-President, Corporate Resources and General Counsel;	• Advise Executive Vice-President, Site C Clean Energy Project regarding the project and integration with other BC Hydro operations and considerations
Technical Advisory Board	Dr Norbert Morgenstern, Geological Engineer	International panel of experts in the development of major hydro-electric projects: • Dr Norbert Morgenstern, Geological Engineer • Karl Rytters, Hydraulics Engineer • Wynfrith Riemer, Geologist • Cassio Viotti, Dam Engineer	• Advise Executive Vice-President, Site C and Executive Project Board regarding the engineering and technical decisions related to project design consistent with best practices and current international guidelines

KPMG

Appendix 2: Integrated Engineering Team & BC Hydro Site C Estimating Team

The Site C Integrated Engineering Team comprised engineers and cost estimators from Klohn Crippen Berger, SNC-Lavalin and BC Hydro, and was led by John Nunn, Alfred Hanna and Andrew Watson. Klohn Crippen Berger is an internationally-recognized engineering and environmental services firm. SNC-Lavalin is an internationally-recognized engineering, procurement, construction and related technical services firm. Each of the team leaders (John Nunn, Alfred Hanna and Andrew Watson) is a senior engineer with several decades of relevant professional experience.

John Nunn has a Bachelor of Science degree in Civil Engineering, a Master of Science degree in Soil Mechanics & Foundation Engineering and is a Professional Engineer with 35 years' experience. Previous project roles have included Project Director and Design Manager.

Alfred Hanna has a Master of Engineering degree in Civil Engineering, a Doctorate in Geotechnical Engineering and is a Professional Engineer with 35 years' experience. Previous project roles have included Project Manager and Project Director.

Andrew Watson has a Master of Engineering degree in Geotechnical Engineering and is a Professional Engineer. Andrew is the Engineering Division Manager for BC Hydro and has worked on the Site C project since 2007. Andrew has worked as Lead Project Engineer for a variety of dam safety deficiency investigations, seismic upgrades and remediation projects within the past ten years at BC Hydro. Prior to joining BC Hydro Andrew gained several years' experience in the mining and engineering consulting fields

BC Hydro Site C Estimating Team was led by Alan Le Couteur. Alan is a Certified Management Accountant and has a Bachelor of Science degree in Forestry. Alan has significant experience in financial modelling and analysis, business case development and risk management of projects and has taken up various roles in BC Hydro since 2006.

Jeff Acland is BC Hydro's Estimating Team Lead. Jeff has a Bachelor of Applied Science degree in Engineering and is a Professional Engineer. Jeff has 16 years of construction and engineering experience, including significant experience estimating costs for major projects.

John Boots is BC Hydro's Principal Engineer for Estimating and Scheduling. John has a Bachelor of Applied Science degree in Civil Engineering and is a Professional Engineer. John has 33 years of experience in heavy civil construction and hydroelectric engineering, and is a member of the Association for the Advancement of Cost Engineering, and the BC Labour Market Industry.

Pages 498 through 564 redacted for the following reasons:
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Pages 567 through 584 redacted for the following reasons:
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BRITISH COLUMBIA

Contact: Dave Nikolejsin, Deputy Minister
(250) 952-0120

Honourable Bill Bennett
Minister of Energy and Mines

October xx, 2014
Date Signed

Pages 586 through 718 redacted for the following reasons:
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Pages 747 through 784 redacted for the following reasons:
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Site C
Final Investment Decision

Technical Briefing - December 16, 2014

BRITISH COLUMBIA

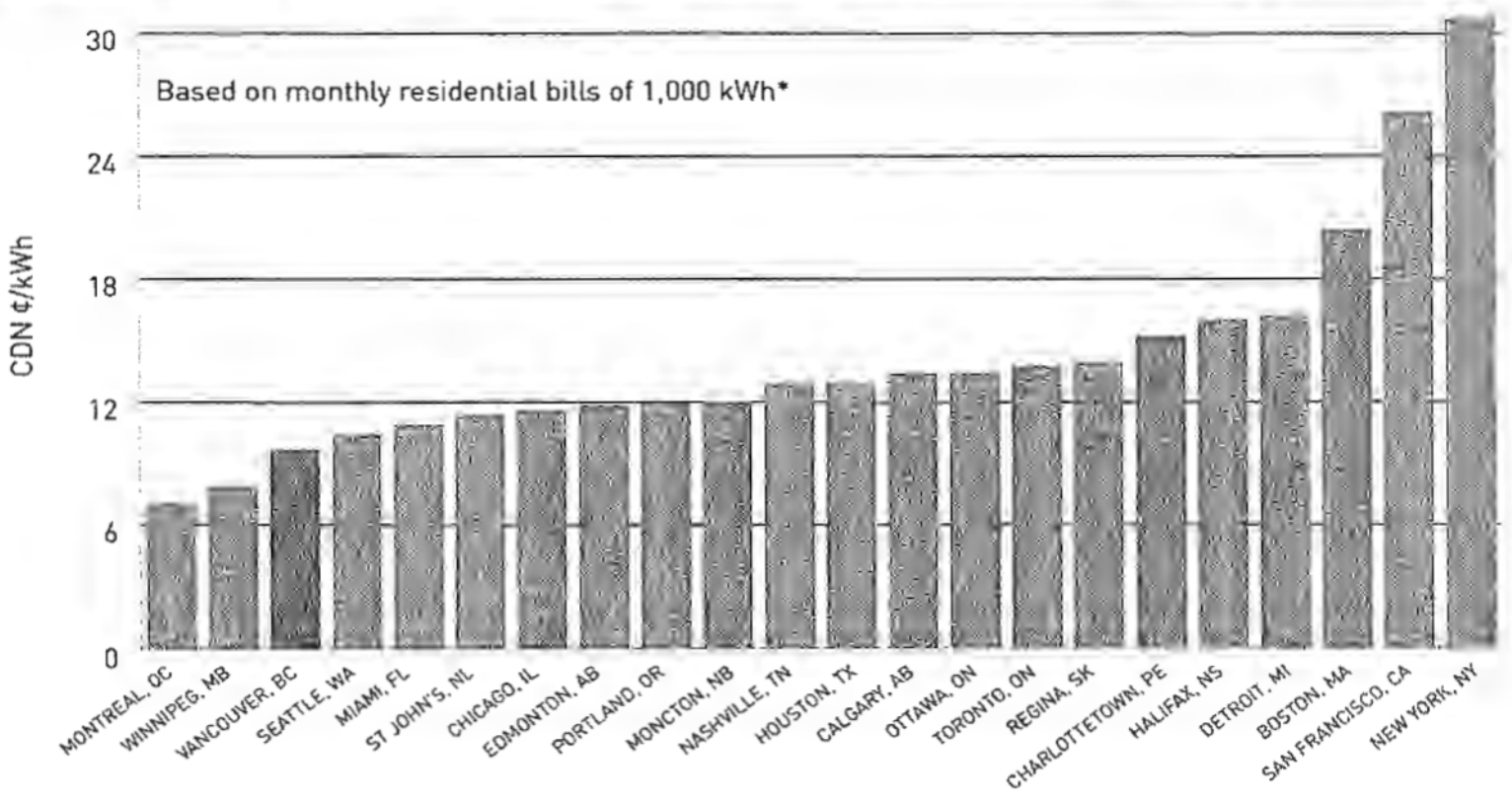
SITE C | CLEAN ENERGY PROJECT

BC hydro
FOR GENERATIONS

Agenda

1. BC Hydro's System Today
2. Growing Demand for Electricity
3. Comparing the Options
   a. *Limitations of some options*
   b. *About Site C*
   c. *Site C Capital Cost Estimate*
   d. *Due Diligence: Site C and IPPs*
4. Aboriginal Engagement
5. Questions

3rd Lowest Rates in North America

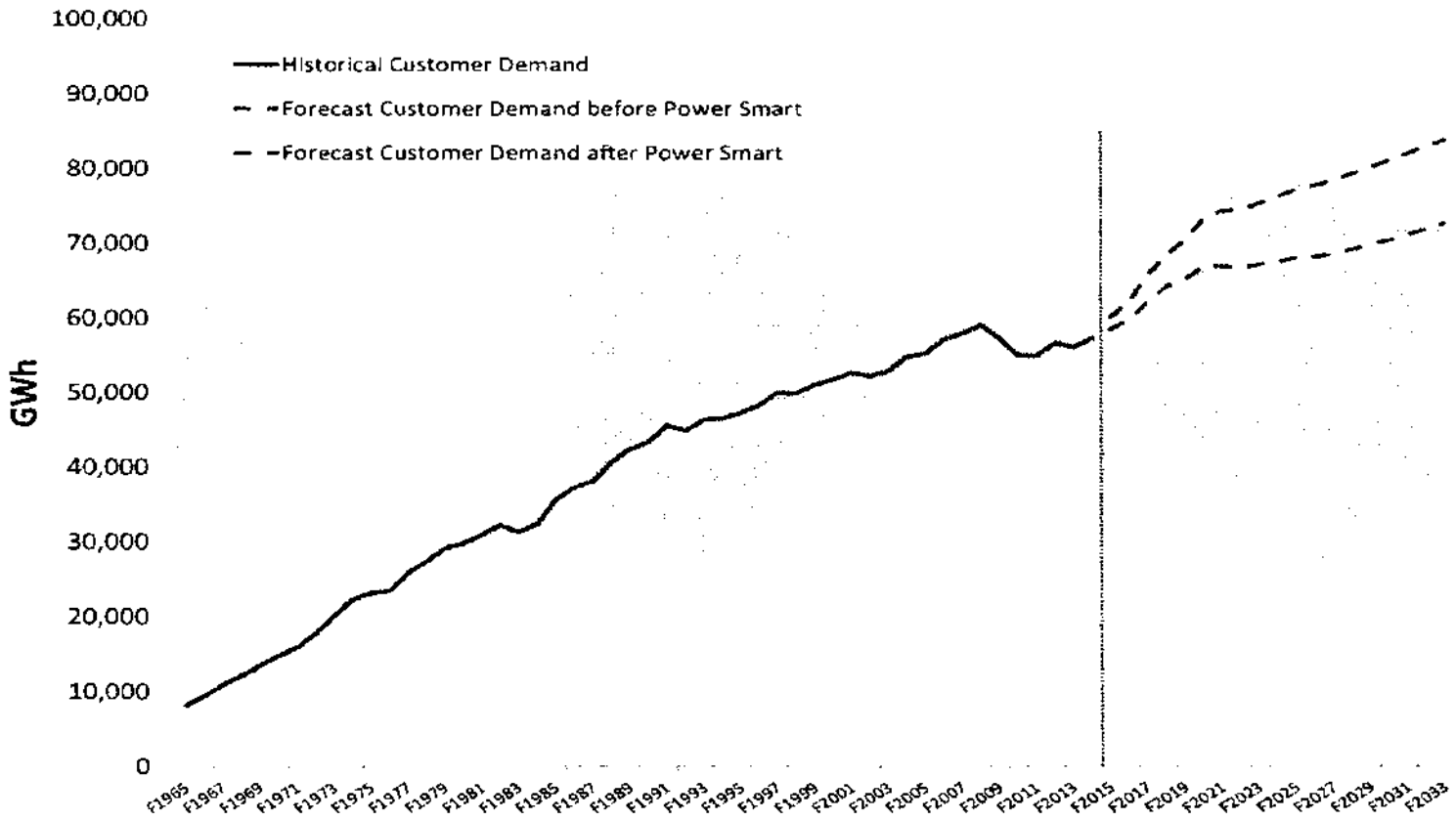


*Monthly bills as of April 1, 2014 (except BC Hydro May 1, 2014 bills), excluding taxes and levies.

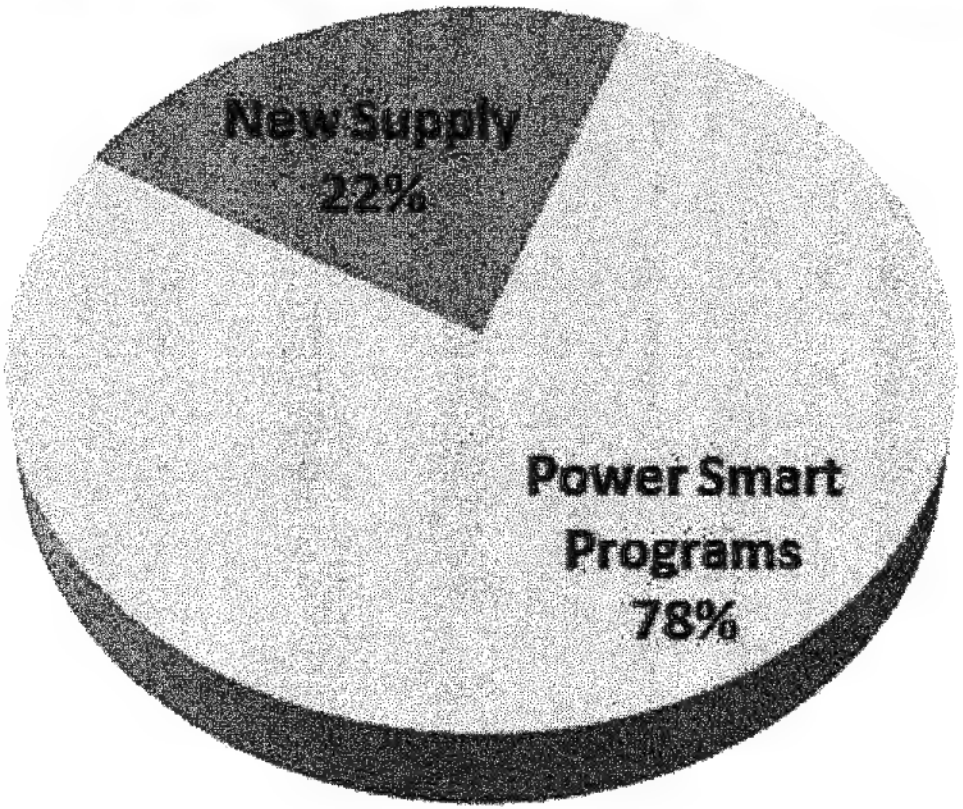
A Reliable and Clean System

- **95%** of B.C.'s population served by BC Hydro
- **1.9 million** customers including residential, commercial, industrial
- **31** hydroelectric facilities; **3** thermal generating plants
- **0 brownouts**
- **77,000 km** of transmission and distribution lines
- **93%** clean electricity
- **~25%** of power from independent power producers. The amount of power supplied by IPPs will continue to grow.

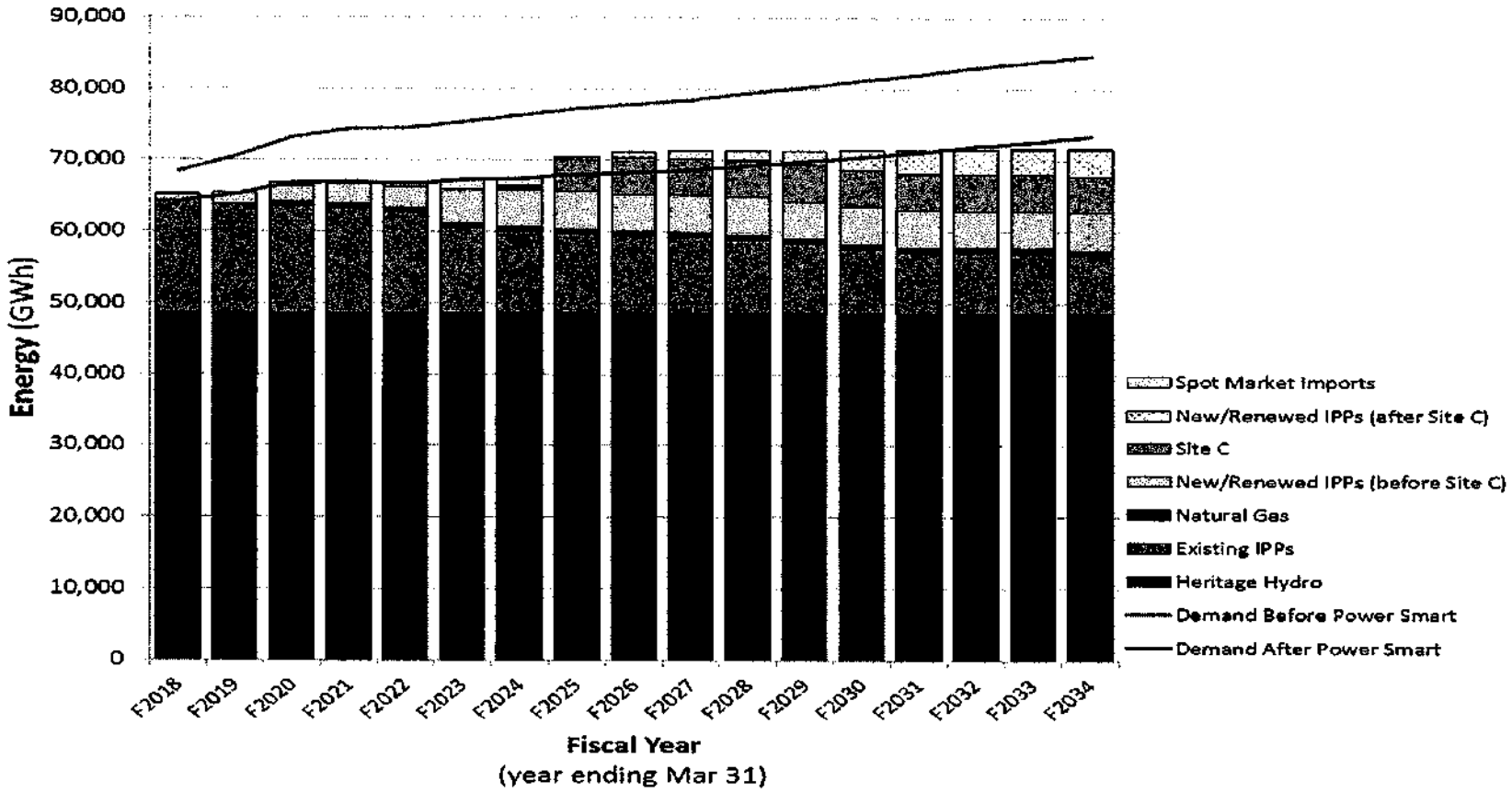
Demand Increasing by 40% Over 20 Years



Conserving First: Avoiding the Need to Build



Meeting Demand Through a Mix of Resources



Due Diligence: Review of Load Forecast

- A third-party review of BC Hydro's load forecast methodology was commissioned from an independent energy consultant with over 30 years of experience.

Key Findings:

- *"BC Hydro is using state-of-the-art methodologies for forecasting sales."*
- *"The company utilizes several methodologies to produce peak forecast methods, all of which are among state-of-the-art methods."*

Mark P. Gilbert, LLC, September 2014

Comparing the Options

Site C

IPPs

Natural Gas

Market Purchases

Geothermal

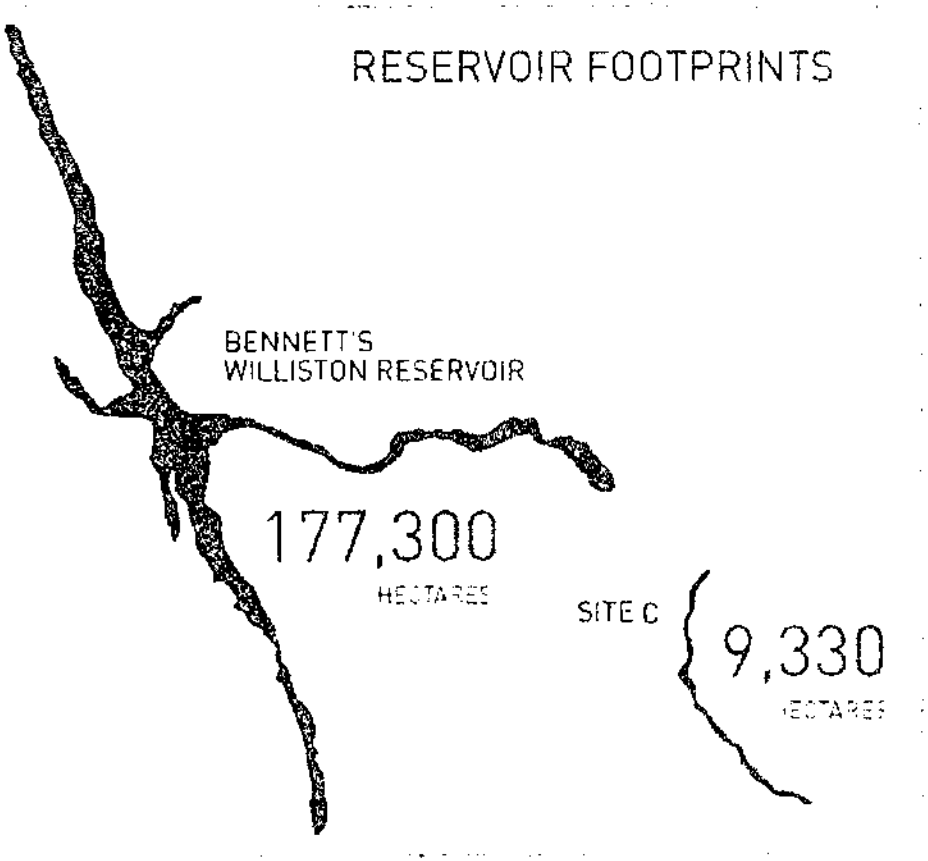
Some Options Have Limitations

- **Natural Gas?**
  - Would need to abandon commitment to 93% clean/renewable power
  - Significantly higher GHG emissions; historical challenges to permitting
  - Exposes ratepayers to gas and carbon price volatility
  - Due diligence analysis showed this option would be more expensive
- **Market Purchases?**
  - Transmission interconnection limits
  - Cost uncertainty; exposed to market volatility
- **Geothermal?**
  - Slow to develop; no proven track record in BC
  - 12 permits have been issued but none have bid into recent power calls
  - Identification of resource can be very expensive and risky

About Site C

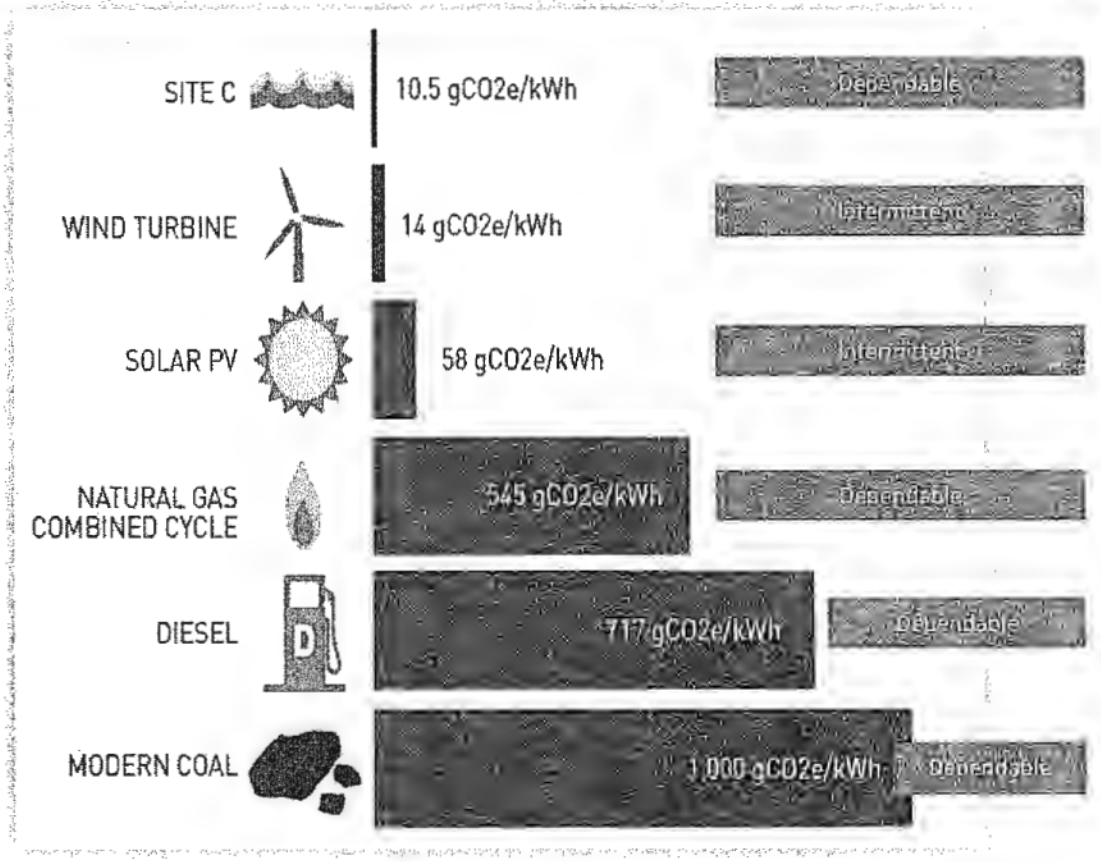
- As the third project on the Peace River, Site C will rely on the Williston Reservoir for most of its water storage.

- This enables Site C to produce 35% of energy of WAC Bennett Dam with 5% of the reservoir area.



About Site C

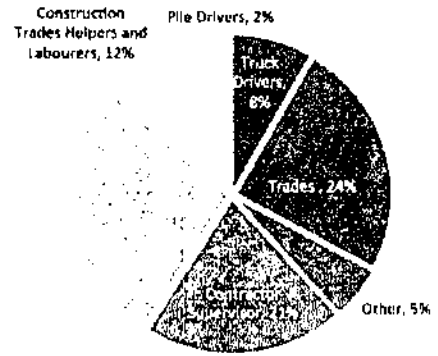
- **100+ years** of clean and renewable electricity
- **Dependable capacity** to meet peak demand
- **Integrates intermittent power** from IPPs (e.g. wind and run-of-river)
- **Low GHG emissions**
- **~10,000** direct construction jobs



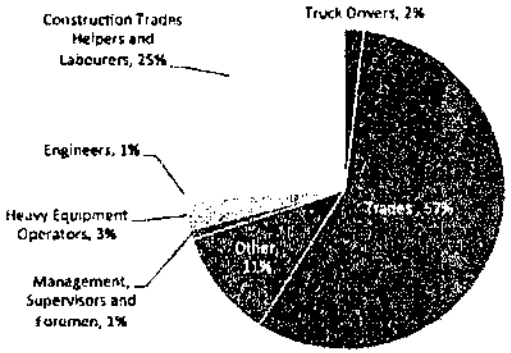
Labour

- BC Hydro worked with the Ministry of Jobs, Tourism, and Skills Training to ensure Site C and LNG labour requirements didn't conflict.
- The mix of labour needs for Site C and the LNG industry are different.
- BC Hydro's labour strategy for Site C will promote local and Aboriginal hiring.
- BC Hydro has supported opportunities for skills training through funding to:
  - *Northern Lights College Foundation*
  - *Northeast Native Advancing Society*
  - *Northern Opportunities*
  - *School District No.60*
  - *College of New Caledonia*

Site C Labour Needs



LNG Labour Needs



Updated Site C Capital Cost Estimate

- The Site C capital cost estimate of **$7.9 billion** was developed in 2010. In 2014, BC Hydro conducted a cost refresh that concluded the original cost estimate remained appropriate.
- As part of government's due diligence, the capital cost estimate was reviewed and updated to **$8.335 billion** to reflect:
- Costs associated with the change from the HST to the PST.
  - This means that BC Hydro will not need to cover these costs out of the project contingency budget.
  - Government felt it was prudent to increase the capital cost estimate so that the full contingency could be maintained.
- A revised construction start date of summer 2015.
  - Allows more time to complete the permitting process.
  - Results in a longer construction period which increases inflation and interest costs during construction.

Updated Site C Capital Cost Estimate

- Government also decided to establish a project reserve of an additional **$440 million**, to account for events outside of BC Hydro's control, that could occur during an eight-year construction period, such as higher than forecast inflation or interest rates, for a total of up to **$8.775 billion**.

- The reserve is subject to provincial Treasury Board approval.

- As with other large capital projects, BC Hydro will be required to provide regular reports to the British Columbia Utilities Commission and government during construction.

Debt Impact

- Site C will result in a net incremental increase to BC Hydro's forecast debt of approximately **$6.4 billion**.
- This is less than the capital cost estimate for the project due to:
  - lower dividend payments to government; and
  - costs that have already been incurred.

- For context, BC Hydro is currently investing an average of **$1.7 billion** per year to maintain and upgrade its existing system.
- With Site C, BC Hydro's total capital spending will average about **$2.4 billion** per year.

Impact on Ratepayers – Site C

Site C Cost to Ratepayers (before changes)	$83 / MWh
Under the 10 Year Plan, the amount of net income that BC Hydro is required to earn each year will now be tied to inflation and will no longer increase when new assets like Site C are added to the system.	- $26 / MWh
The 10 Year Plan also reduced water rental charges for BC Hydro.	- $1 / MWh
The capital cost estimate for Site C has been updated from $7.9 billion to $8.335 billion.	+ $2.25 / MWh
Government has established a project reserve of an additional $440 million to account for events outside of BC Hydro's control that could occur over an eight-year construction period, such as higher than forecast inflation or interest rates. The reserve will be managed by the provincial Treasury Board.	+ $2.50 / MWh (if fully utilized)
Updated Site C Cost to Ratepayers	**$58 - $61 / MWh**

Impact on Ratepayers – IPPs

- BC Hydro's Integrated Resource Plan, approved in November 2013, calculated a cost to ratepayers for IPPs of **$96 / MWh**.

- Government also conducted extensive consultations with the independent power industry to ensure its analysis reflected recent advances in technology and efficiency.

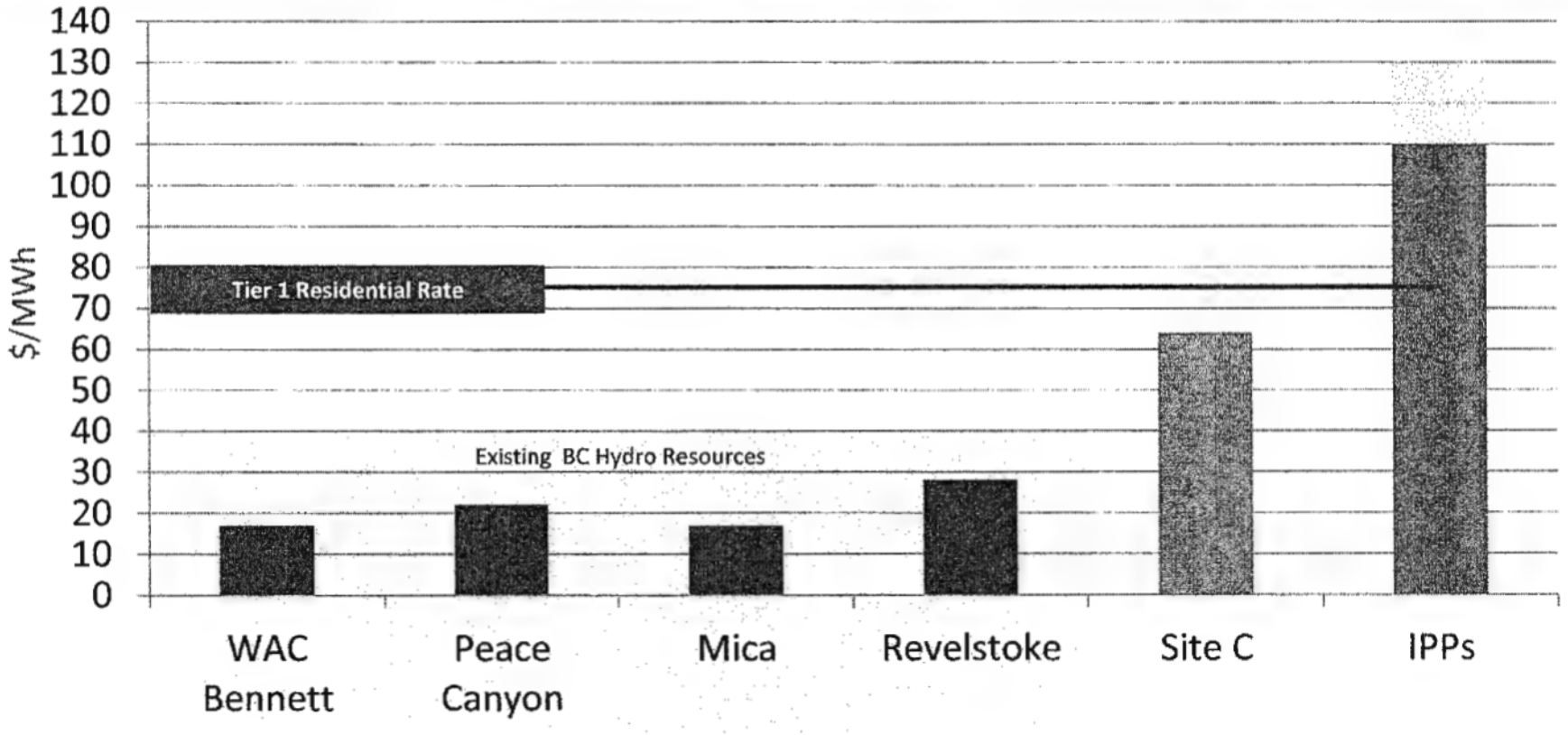
- Following these consultations, government adopted a cost of **$85 / MWh** for IPPs in its analysis.

Impact on Ratepayers

- Must account for additional factors such as:
  - Costs of delivering the electricity to customers.
  - Costs of backing up intermittent power with firm energy.
  - Lost trade revenues due to inability of IPPs to store power to take advantage of high prices on the export market.

	Site C (2014)	IPPs (Industry Consultations)	IPPs (IRP)
Starting Cost	$58 - $61 / MWh	$85 / MWh	$96 / MWh
Additional Factors	Adds $6	Adds $25	Adds $34
Final Cost	**$64 - $67 / MWh**	**$110 / MWh - $130 / MWh**	

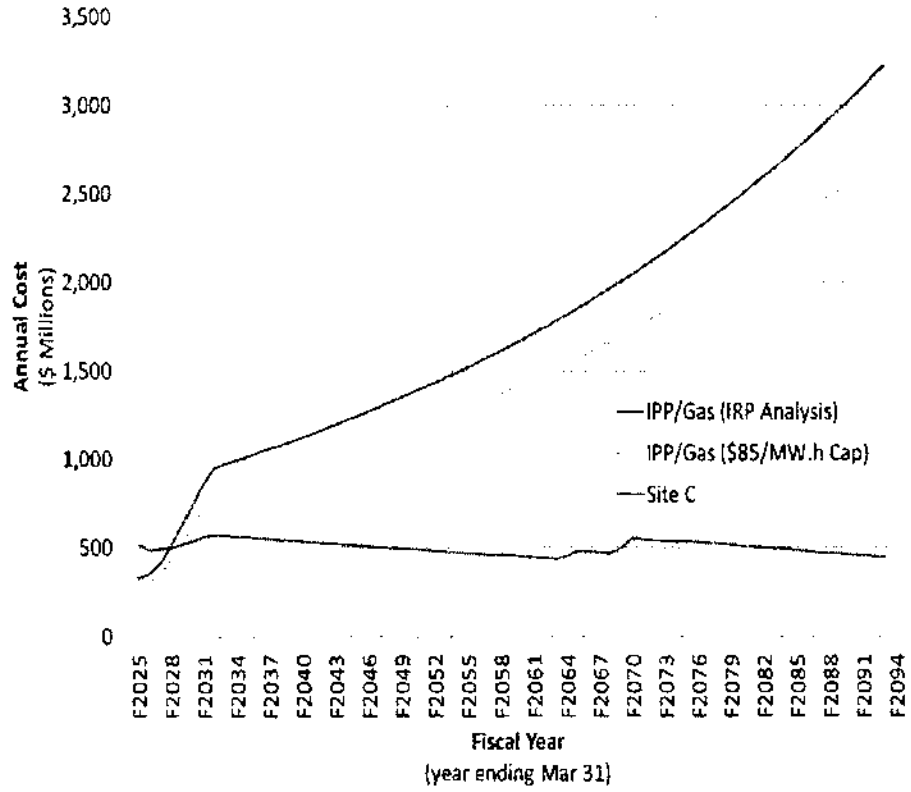
Cost Advantages of Hydroelectric Dams



Site C – Significant Ratepayer Benefits

- Over the first 50 years, ratepayers will pay an average of **$650 – $900 million** less each year, compared to an IPP/Gas portfolio.

- This amounts to annual average savings of **~6% to 8%** for the typical household, compared to alternatives.



Aboriginal Engagement

- Consulting and engaging with Aboriginal groups since 2007; focusing on those most affected by project.
- Conclusion of federal/provincial Consultation and Accommodation Report:

  "There has been meaningful consultation with the potentially affected Aboriginal groups..." and *"... consultation has been carried out in good faith and that the process was appropriate and reasonable in the circumstances."*

- Offers of accommodation have been made to all First Nations the Joint Review Panel deemed most affected by Site C.
- Significant procurement opportunities being negotiated.
- Will continue working with First Nations to address concerns, identify opportunities for benefits and enhance relationships.

Questions

Pages 808 through 855 redacted for the following reasons:
- -
s12, s13
s12, s13, s16