

Energy Supply Costs

BCUC Workshop

15 January 2004

Outline

- ◆ Electricity Planning/Supply Requirements Context
 - Approach to Planning for New Supply
 - Cost Versus Risk Management
 - Projected Electricity Demand/Supply Balance

- ◆ Major Energy Supply Cost Components
 - Power Smart
 - Energy Purchase Agreements
 - Heritage Payment Obligation
 - Market Purchases

Key Points

- ◆ BC Hydro has a legal obligation to meet the electricity demands of its customers - secure, reliable supply when needed
- ◆ BC Hydro plans to meet projected demand
 - At least-cost on a risk-adjusted basis;
 - that meets industry standards and policy objectives (eg., Energy Plan)
- ◆ Energy supply costs are a function of the operating plan to cost-effectively match supply to demand
 - Largely driven by Heritage Resources and IPPs contracted before F2001
- ◆ Increased energy supply costs to meet new demand growth contribute to increased revenue requirements
 - Marginal cost of supplying new demand is higher than existing supply

Approach to Planning for New Supply

- ◆ Primary objective
 - Reliably meet load requirements under various scenarios/uncertainties
- ◆ Plan for uncertainties through contingencies with respect to:
 - Electricity demand
 - Water inflows
 - Unit availability
 - Future electricity and nature gas prices and price volatility
 - Availability and timing of new resources
- ◆ Applies integrated risk perspective
 - Bridges planning for uncertainties to managing current conditions in shorter term operating plans

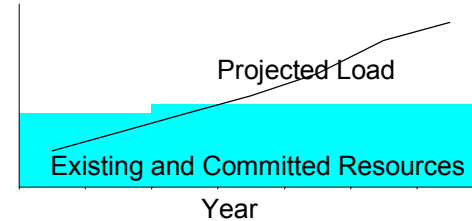
Approach to Planning for New Supply

◆ BC Hydro's planning approach

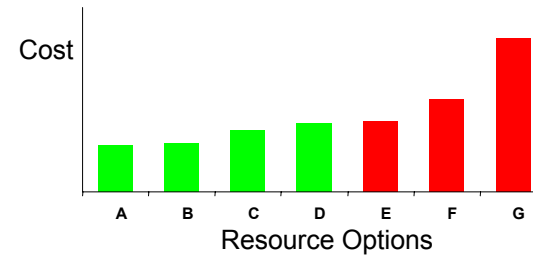
- Industry standards/practices
- Least cost planning
 - ❖ long term perspective that plans for uncertainties; and
 - ❖ bridges to shorter-term operational planning horizons that manages current risks and conditions
- Manage acquisitions on basis of securing medium to long term needs
- Significantly influenced by predominately hydro base supply and associated volatility
- Secure reliable supply preference drives electricity plans to ensure domestic loads served even under low water conditions
- Results in potential surplus in average water conditions

Simplified Planning Process

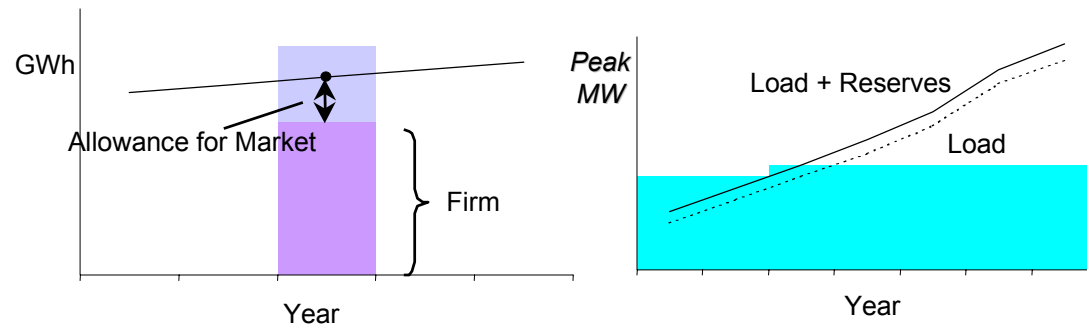
1. Assess Need for New Resources



2. Rank Resource Inventory



3. Plan Resources to Meet Load



4. Address Key Uncertainties

Cost Versus Risk

◆ Cost effective

- Least cost on a risk-adjusted basis
- Planning must balance trade-offs between minimizing cost and managing risks (reliability and financial).

◆ Examples

- Costs to ensure sufficient resources are available to meet higher than expected load
- Cost to ensure sufficient resources are available to meet load under lower than expected hydro conditions
- Costs to ensure sufficient resources are available to meet load under system disturbances (eg., single contingency criterion)
- Costs to ensure relative cost certainty/mitigate risks versus exposure to price volatility/cost uncertainty (eg., long-term fixed price contracts versus short-term floating price contracts)

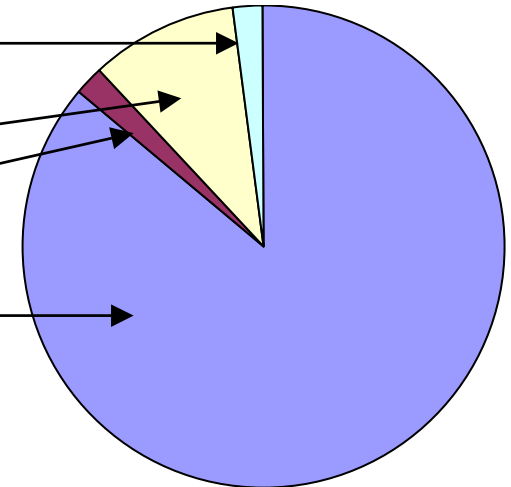
Projected Electricity Demand/Supply Balance

◆ 2003 Reference Load Forecast (20 year)

- Prepared annually to forecast short (5) , medium(10) and long term (20) energy and peak demand;
- Forecasts before and after demand reductions arising from Power Smart
- Provides high/low uncertainty bands around Reference Forecast
- Total system requirements = integrated (domestic and treaty obligations) + non integrated areas

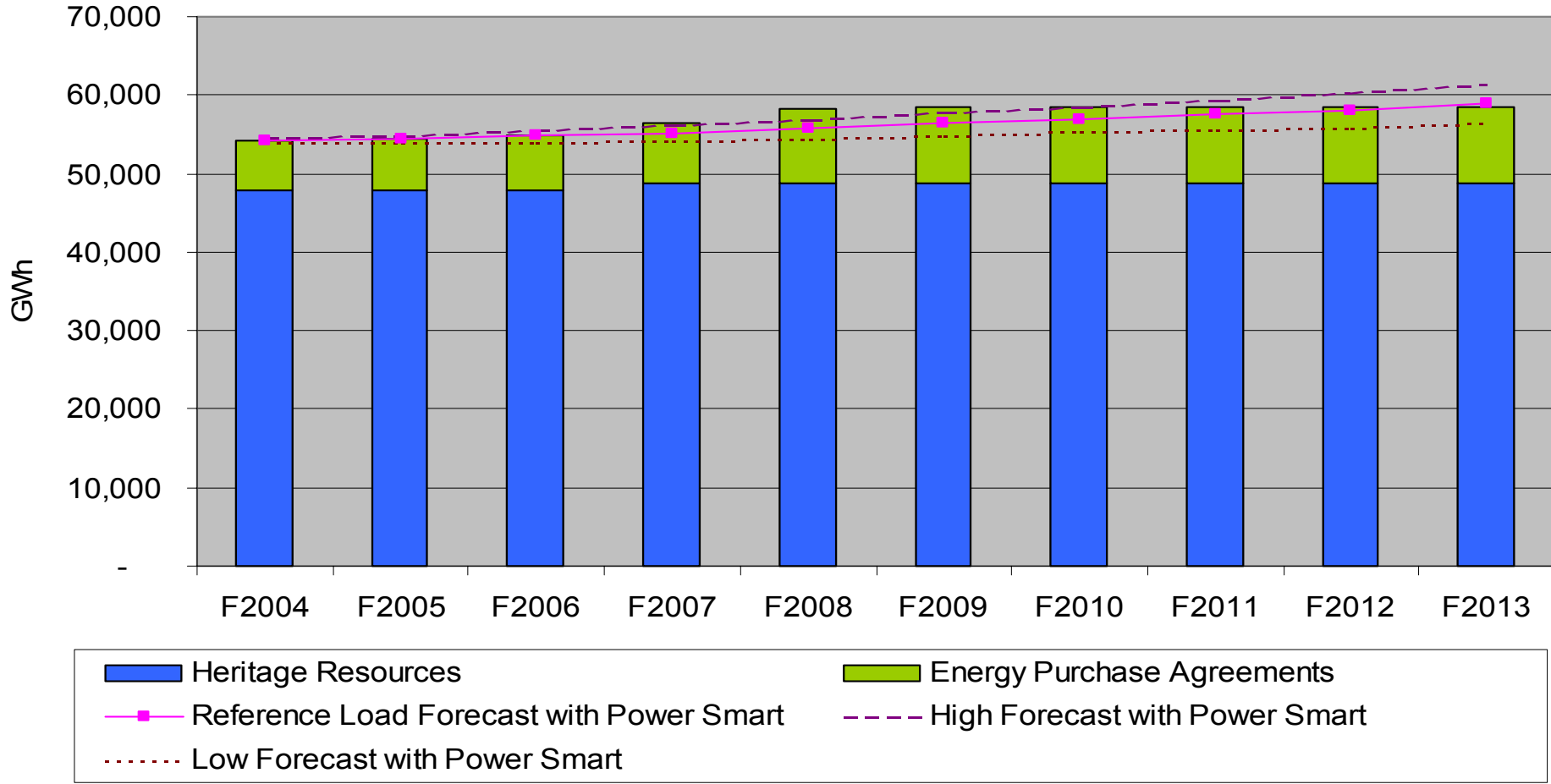
◆ Supply Resources (for integrated system over test years)

- Power Smart - 2%
- Energy Purchase Agreements
 - ❖ Pre- F2001 contracts -10%
 - ❖ F2001 - F2003 contracts - 2%
- Heritage Resources - 86%
 - ❖ Predominantly hydroelectric - 82%
 - ❖ Thermal resources and/or market purchases - 4%



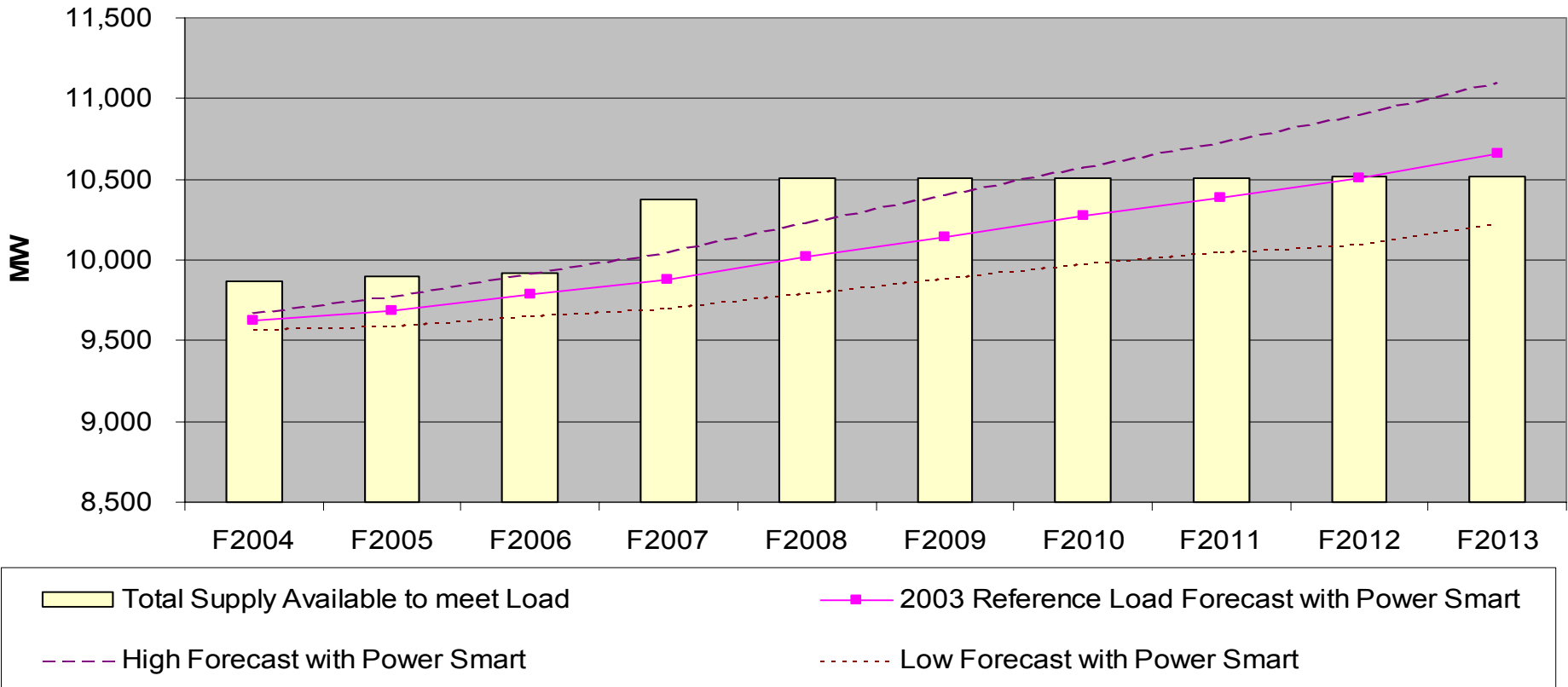
Projected Energy Demand/Supply Balance

Integrated System Energy Balance 10-Year Outlook - With PowerSmart



Projected Peak Load Demand/Supply Balance

Integrated System Peak Load Balance 10-Year Outlook - With PowerSmart



Energy Supply Costs

◆ Major Cost Components:

- Power Smart
- Energy Purchase Agreements
- Heritage Payment Obligation

◆ Other Energy Supply Costs

- Non-Integrated Areas
- Purchase Areas
- Gas Transportation and (non-BCTC) Domestic Transmission
- Vancouver Island Call-for-Tenders
- Resource Planning and Acquisition OMA

Power Smart

◆ Energy contribution

- historical achievements embedded in actual load
- expected cumulative savings of 928 GWh/yr in F2005; 1,375 GWh/yr in F2006; 3618 GWh/yr by F2012

◆ Three major cost components

- Operating, maintenance and administration costs
- Amortization of Power Smart programs initiated prior to F2002
- Amortization of Power Smart programs initiated from F2002
- 10% of amortized costs are allocated to Transmission

(\$ millions)	F2003	F2004	F2005	F2006
OMA	\$12.8	\$19.1	\$22.6	\$22.4
Amortization of Power Smart before F2002	23.4	18.0	13.3	8.4
Amortization of Power Smart from F2002	<u>1.5</u>	<u>6.3</u>	<u>17.7</u>	<u>28.1</u>
Amortization subtotal	\$24.9	\$24.3	\$31.0	\$36.5
Finance charges	5.0	4.3	4.6	6.0
Allowed ROE	4.0	3.8	4.3	4.7
Total	\$46.7	\$51.5	\$62.5	\$69.6

Energy Purchase Agreements

◆ Purchase Agreements Pre-F2001

- Pre-1994 Purchase Agreements
- 1994-2000 Purchase Agreements

◆ Purchase Agreements Since F2001

- 2000 Request For Expressions of Interest for Green Energy
- 2001 Green Energy Call
- 2002 Customer Based Generation
- 2002 Green Power Generation Call

Energy Purchase Agreements (continued)

◆ Energy Contributions

- Pre-F2201 Purchases: 5,631 GWh in F2005; 5,914 GWh in F2006
- Since F2001 Purchases: 937 GWh in F2005; 1,056 GWh in F2006

◆ Summary Costs

(\$ millions)	F2004 Forecast	F2005 Plan	F2006 Plan
Energy Purchases Agreements contracted before F2001	\$353.8	\$325.4	\$336.5
Energy Purchases Agreements contracted since F2001			
2000 Expressions of Interest for Green Energy	2.4	10.4	10.1
2001 Green Energy Call	9.9	26.2	31.4
2002 Customer Based Generation Call	11.6	15.8	16.1
2002 Green Power Generation Call	<u>0.0</u>	<u>0.8</u>	<u>2.9</u>
Subtotal	23.9	53.2	60.5
Total Energy Purchase Agreement Costs	\$377.7	\$378.6	\$397.0

Heritage Payment Obligation

◆ Cost Summary

- Aggregate reliable energy capability approximately 49,000 GWh/year
- Costs large driven by hydroelectric resources
- Relative contribution from Burrard and market purchase depends on hydro conditions and relative economic dispatch costs between Burrard and spot market purchases

(\$ millions)	F2005 Plan	F2006 Plan
Cost of Energy	\$411.3	\$379.9
Operating Costs	168.3	169.8
Asset Related Expenses	366.8	375.3
Generation Related Transmission Asset Expenses	43.3	43.3
Less Other Revenues	(27.4)	(29.1)
Return on Equity	196.0	199.0
Forecast Heritage Payment Obligation	\$1,158.3	\$1,138.2

Energy Supply Cost Summary

(\$ millions)	F2005 Forecast	F2006 Forecast
Power Smart	\$59.4	\$66.0
Energy Purchase Agreements contracted before F2001	325.4	336.5
Energy Purchase Agreements contracted from F2001		
2000 Expressions of Interest for Green Energy	10.4	10.1
2001 Green Energy Call	26.2	31.4
2002 Customer Based Generation Call	15.8	16.1
2002 Green Power Generation Call	<u>0.8</u>	<u>2.9</u>
Subtotal	53.2	60.5
Gas transportation and domestic transmission	13.0	13.0
Energy Management OMA	12.8	11.1
Subtotal of Non-Heritage Electricity Supply Cost	\$463.8	\$487.1
Heritage Payment Obligation	1,158.3	1,138.2
Total Energy Supply Costs including Fort Nelson	\$1,622.1	\$1,625.3

Does not include 10% of Power Smart amortized costs allocated to Transmission

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