

SITE C CANCELLATION

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FIVE QUESTIONS AND SOLUTIONS

1. Low Load Forecast: Does Electrification Affect It? (No)
2. What alternative portfolio do you recommend? (Wind, DSM, Mica)
3. What is the cost and practicality of wind and solar in BC? (Good)
4. Can we find capacity other than Site C? (Yes)
5. What about rates and ratings if Site C cancels? (Rates lower/Ratings higher)

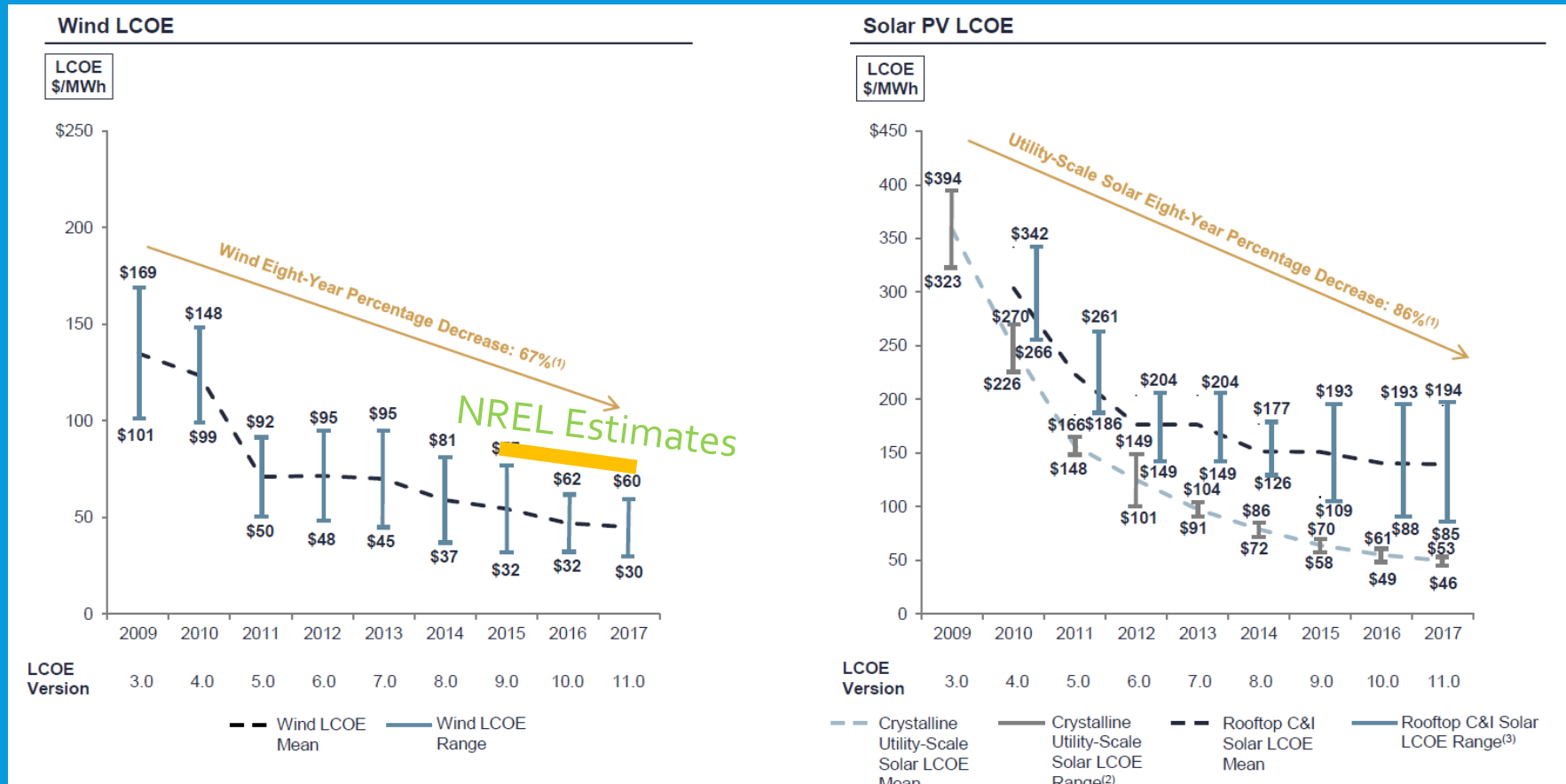
SOLUTIONS . . .



QUESTION #1: SITE C IS NOT NEEDED FOR DECARBONIZATION/ELECTRIFICATIONS

- Our best answer is to use resources that are deployable on demand
- We are currently paying customers to take power off-peak
- One important example, electric vehicles – according to research from California and New York – indicate major impact is off-peak
- The low load forecast is sound given flat loads elsewhere in North America

QUESTION #2: LOW CARBON ALTERNATIVES





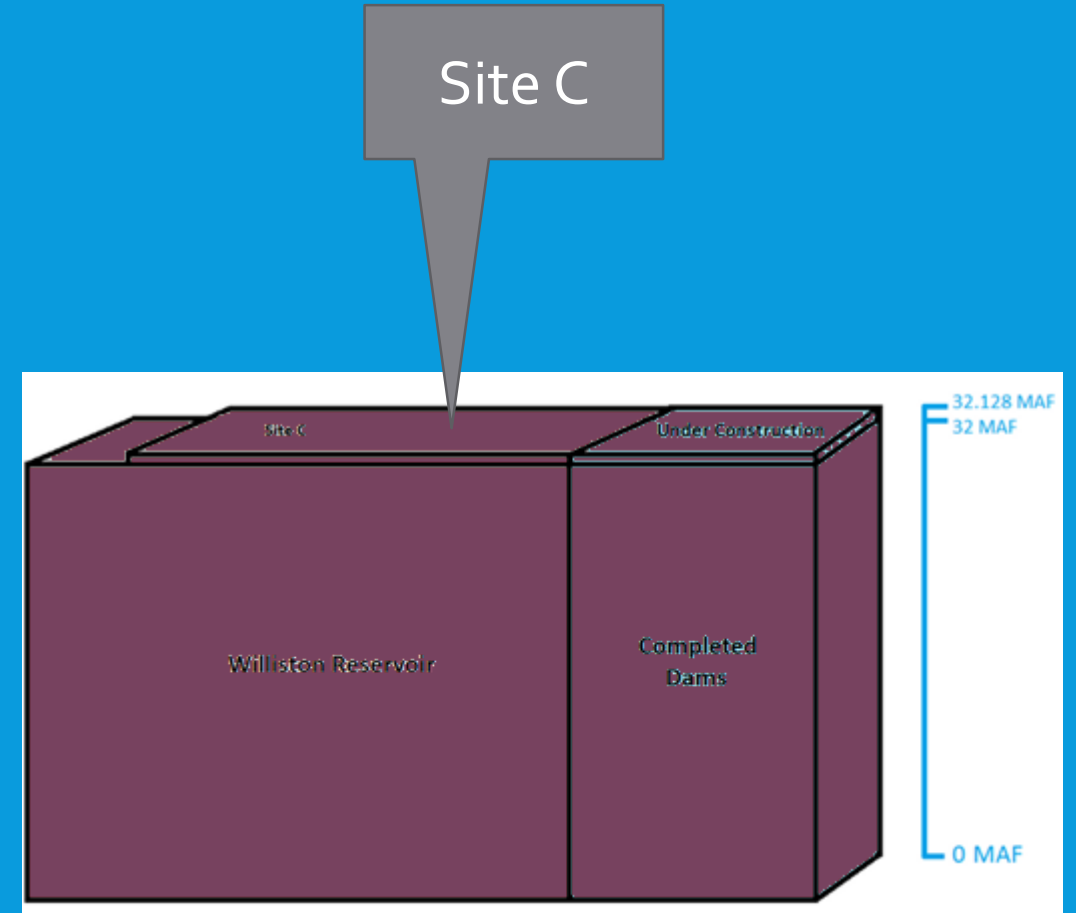
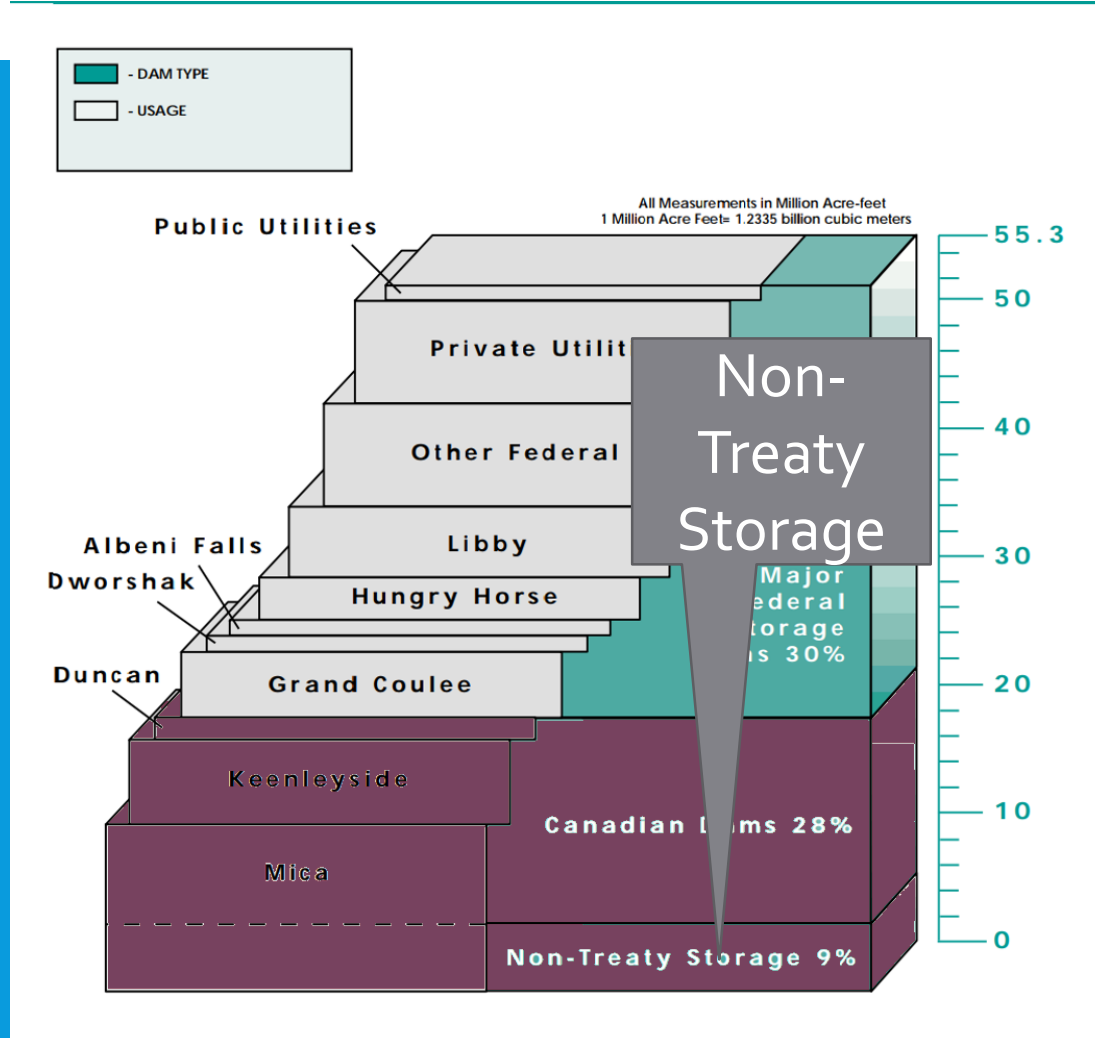
UNIVERSITY OF BC WATER GOVERNANCE FINDINGS

- Site C more expensive than export markets and BCUC alternative portfolio (before sunk and termination costs)
- Site C risks are asymmetric – negative risks exceed positive risks
 - Significant rate impacts
 - Declining alternative costs
- BCUC alternative provides 22% more jobs
- Site C has higher green house gases than alternative
- Site C has unprecedented negative environmental impacts, including on agricultural land
- Site C is the subject of First Nations litigation with significant risk
- <http://watergovernance.sites.olt.ubc.ca/files/2017/11/UBC-Report-Site-C-Key-Issues-Full-Report-1.pdf>

QUESTION #3: STORAGE IS SUBSTANTIAL

- Storage on the Columbia is a partnership between BC Hydro and the Bonneville Power Administration
- The Bonneville Power Administration's control area has roughly ten times the current level of wind turbines as British Columbia. It uses approximately 1 Million Acre Feet to firm wind
- Site C is approximately an eighth of that – its requirement is approximately .12 MAF
- The Columbia River currently has 55.3 MAF: water behind dams
 - 15.5 MAF in Canadian Treaty storage
 - 5 MAF in non-treaty storage

STORED BEHIND THE DAMS?



QUESTION 4: WHAT ABOUT CAPACITY TO MEET PEAK LOADS?

- We have extensive capacity other than Site C – Mica's capability for example.
- Our region is so surplus in capacity, we tend to value it at very low levels
- Hydro-Quebec (Canada's leading utility in wind energy) treats 30% of nameplate wind capacity as usable capacity to meet loads

QUESTION 5: RATES AND RATINGS

- Regulatory treatment of terminated projects that had been previously judged “used and useful” is generally lenient – rate payers are not punished due to an act of god
- In the case of Site C, continuing the regulatory treatment of existing expenditures is not a reach – the costs have been financed and recovery need not be changed.
- Reclamation costs appear exaggerated. Reclamation costs are usually accumulated over the life of the project. In this case, reclamation is underfunded, but would have enjoyed a 70 year amortization as well.
- Utilities facing similar issues – Hydro-Quebec with the Gentilly-2 and Omaha Public Power District and Calhoun – do not indicate rate increases or bond downratings
- Provinces proceeding with troubled projects – Manitoba and Newfoundland have been downgraded and are facing significant rate increases

RATES AND RATINGS: 2024 COST IMPACT (PER YEAR)

	Site C		Wind Farm
Cost:	\$10.0 billion (Best Case)	Termination:	\$1.8 billion (Worst Case)
Spent:	\$ -2.1 billion	Wind farm:	\$0.1 billion
Net	\$ 7.9 billion	Net	\$1.9 billion
Allowed Return	x 6.22%		x 6.22%
Cost of Capital	\$491 million		\$113 million
Return of Capital	\$263 million		\$ 60 million
Total Cost	\$755 million		\$173 million

BOND RATINGS

- Bond rating agencies like certainty, not risk
- Utilities facing similar issues – Hydro-Quebec with the Gentilly-2 and Omaha Public Power District and Calhoun – do not indicate rate increases or bond downratings
- Provinces proceeding with troubled projects – Manitoba and Newfoundland have been downgraded and are facing significant rate increases

SITE C OVERVIEW: THIS IS A TROUBLED PROJECT

- Expensive relative to well managed projects like Hydro-Quebec's La Romaine (Site C is 40% higher on a per MWh basis)
- First major hydro project in thirty years (Revelstoke)
- Poorly bid and poorly managed – one of the main civil works bidders immediately went bankrupt
- Unfortunate start with tension cracks and delays
- Cost overruns are just starting with contractor claims steadily arriving
- BC Hydro omitted 1,600 MW of resources in their Site C Inquiry submission

SUMMARY OF FINANCIAL IMPACTS

▪ Site C	10.0 billion (Best Case)
▪ Less Sunk Costs	-2.1 billion
▪ Less Reclamation	-1.8 billion (Worst Case)
▪ Net	=6.1 billion
▪ Less Alternatives	-3.4 billion
▪ Termination Dividend	=2.7 billion (Worst Case)

SOLUTIONS

- There are options where everyone wins
- They are not limited to the Order in Council of August 2, 2017
- BC Hydro had 1,600 megawatts that were not considered in the Inquiry, but were recommended in the Final Report
- This is not a zero sum game



EASIEST SOLUTIONS:

- Terminate Site C and rely on a renewable portfolio firmed by the five maf at Mica deploying new renewables as needed
- Monetize the Canadian Entitlement

RESOURCES NOT CONSIDERED IN THE INQUIRY

- Non-Treaty Storage:
 - In addition to the storage included in the Treaty, British Columbia owns five million acre feet at Mica
 - This is currently provided to BPA on an agreement terminating in 2024
- Canadian Entitlement:
 - In 1948, the Columbia River destroyed Oregon's second largest city
 - In 1964, the U.S. and Canada agreed on a cooperative management of the Columbia River and added reservoirs at Duncan, Arrow, and Mica
 - British Columbia energy was sold for the first thirty years
- Revelstock Upgrade

ACTION PLAN

1. Terminate Site C construction and commence reclamation
2. Adopt prudent long term financial plan on sunk and reclamation costs
3. Direct BC Hydro to adopt resource plan around renewables
4. Use the Non-Treaty Storage for firming
5. Proceed with Revelstoke Six if needed
6. Make a long term transaction to maximize revenue from the Canadian Entitlement