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H o r n e s s i n g N a t u r e ' s P o w e r



**KLEANA  
POWER  
CORPORATION**

October 10, 2017

B.C. Utilities Commission

Sixth Floor, 900 Howe Street

Vancouver, B.C., V6Z2N3

**RE: KLEANA POWER CORPORATION'S RESPONSE TO BCUC ON SEPTEMBER 20, 2017 PRELIMINARY REPORT**

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Dear Mr. Wruck:

Attached to this letter is our response.

Regards

*for* Alexander N. Eunall

Per. Kleana Power Corporation

In the Site C Inquiry Preliminary Report, BCUC referred to Kleana Power Corporation's (Kleana) Klinaklini Project. BC Hydro and others were invited to provide further submissions. BC Hydro submitted a Round 2 Information Response on September 29<sup>th</sup> and referred to Kleana on pages 44 and 45. The following is Kleana's submission in response to the above.

## OUR CONCLUSION

After reviewing all of BC Hydro submissions about its Site C project as well as its approach to and representations about the Kleana Project and other competing alternatives, we were able to put in perspective their statements about Kleana and its project. Our conclusion is: Due to BC Hydro's overwhelming desire to develop Site C, BC Hydro has unfairly targeted Kleana and presented biased and incomplete information about our project. BC Hydro ignored Kleana's most recent offers to produce and sell power to BC Hydro based on a lower IRR and insisted on basing its analysis on Kleana's oldest and highest IRR offer bid in a past competition, which is no longer relevant.

Kleana today can deliver power at a cost lower than Site C *even after setting aside the sunk costs acknowledged by BC Hydro* and compared against BC Hydro's projected cost to completion for Site C. Furthermore, BC Hydro ignored their own existing publicly recorded risk analysis for the Kleana Project which it replaced in its submission with a conveniently new, generalized and ambiguous statement about Kleana's development risk unsupported by any data and without requesting any information from Kleana. In the submission below we will provide facts to support our conclusion that Kleana remains a strong competing alternative to Site C.

## FACTS ABOUT AND RESPONSES TO CLAIMS BY BC HYDRO REGARDING LEGAL MATTERS

**BC Hydro submits (page 44)** - On May 6, 2010, BC Hydro advised Kleana that BC Hydro had completed its evaluation of their proposal submitted under the 2008 Clean Power Call Request for Proposals, and that the proposal had not been successful and was no longer under consideration for an award of an electricity purchase agreement. The primary rationale was that the Project presented an unacceptably high level of development risk.

**Kleana Response** – During the 2008 Clean Call BC Hydro issued letters to every proponent. In these letters BC Hydro listed the development risks of concern in each project and required the proponent address the risks highlighted. The *sole* item of concern to BC Hydro about the Kleana Project, outlined in BC Hydro's letter, was the need to get a comfort letter from the relevant Minister that the Kleana conservancy boundary issue would be addressed. The Minister wrote back to BC Hydro stating unequivocally he would not do so. Only after receiving the Minister's letter did BC Hydro, in the final days of the two year Clean Call process, exclude the Kleana Project from consideration in the Call (BC Hydro letter dated May 6, 2010). Kleana commenced its first judicial review seeking a judgement that the action of the Minister was not legal and succeeded in Court. Following this decision, the government altered the conservancy boundary therefore eliminating the singular risk that BC Hydro identified to Kleana during the Clean Call process.

BC Hydro did not then, nor has it now, identified any other risk. Yet in its September 29<sup>th</sup> submission, BC Hydro implies that there were other ambiguous and undefined risks, which is false.

**BC Hydro submits (page 44)** - Subsequently Kleana brought forward a number of judicial reviews. In the appeal of the second judicial review application brought by Kleana in respect of its proposal, the BC Court of Appeal described Kleana's position as follows: In effect, they took the position that...BC Hydro was to negotiate a contract for the purchase of electricity at a price that would burden ratepayers with the cost of purchasing hydro-electric power from a project the development of which, at least in 2012, was not viable at what was then a reasonable commercial price.

**Kleana Response** – After the success of first judicial review and amendment of the conservancy boundary by the Government, Kleana asked the relevant Minister to direct BC Hydro to negotiate with Kleana as they had promised to do once the conservancy issue was resolved. The Minister refused and Kleana then commenced the second judicial review.

Immediately after commencement of the second judicial review, the Minister wrote to BC Hydro and directed it to negotiate with Kleana in good-faith. BC Hydro then told Kleana it was not valuing the electricity as it did before and furthermore, BC Hydro stated it had no need for it.

BC Hydro prepared and made presentations to Kleana about electricity demand projections, which BC Hydro suggested showed the lack of need for any new generation. But BC Hydro failed to inform Kleana that it was planning, at that very same time, to proceed with Site C. BC Hydro asked Kleana to wait until the BC Hydro projections indicated a change in their need for power. BC Hydro made no further complaint and raised no concern about any additional development risk – such an issue was never mentioned by BC Hydro.

Despite being directed by the Minister to negotiate with Kleana in good faith, at no time during the entire process did BC Hydro provide to Kleana a price or range of prices at which it would agree to buy Kleana's power. Therefore Kleana never had a chance to respond to any specific proposal by BC Hydro. The second judicial review was based on the promise of the Minister that Kleana would not be prejudiced by the delay of Government in amending the conservancy boundary and parameters of the 2008 Clean Call would be the basis for negotiations. Therefore, Kleana believed the terms and range of prices for electricity in BC Hydro issued contracts for the 2008 Clean Call would be applied in the framework for negotiations with BC Hydro. Moreover, Kleana believed it had a legal entitlement to those terms, which was the focus of the second judicial review. The Court disagreed and held that: "the Minister's promise did not clearly specify any particular range of prices and in that sense Minister's directive to BC Hydro was sufficient. However as a result the project remains prejudiced and Government still needs to address the loss incurred". This was upheld on appeal.

What the above summary shows is that the court process relating to the second judicial review was specific to Kleana's interpretation of the Minister's promise that the 2008 Clean Call price range should be the basis of negotiations. Kleana was seeking an order that the Minister make this entitlement clear in his direction to BC Hydro. Kleana was not seeking relief in terms of BC Hydro, or its failure to negotiate in good faith. Therefore, the second judicial review did not involve findings of facts as to what Kleana was proposing in negotiations with BC Hydro, the content of negotiations between BC Hydro and Kleana, or the commercial viability of the Kleana Project. The only fact found by the second judicial review judge in relation to this

matter was that it was clear that BC Hydro had not been willing to offer to Kleana the 2008 Clean Power Call terms, which is why the judicial review was necessary.

It is not clear to us why the Court of Appeal stated that in 2012 Kleana was not viable at a reasonable commercial price since there was absolutely no declaration at any point by BC Hydro as to what they consider a reasonable commercial price that Kleana can be tested against. Nor was there any evidence of what a “reasonable commercial price” could be. As noted, that was simply not the issue in the judicial review, which revolved around what commitment the Minister was required to give to BC Hydro. Possibly the lawyer who represented BC Hydro at Kleana litigation (who was the same lawyer who represented BC Hydro in other Site C litigations) made the so called statement and the Court of Appeal adapted it.

In any event, the Court of Appeal qualified its statement, noting that in its view, it applied “at least” to 2012, when BC Hydro told us they didn’t need any power and declined our \$102 offer. However within six months, in 2013 BC Hydro changed its position on the need therefore this particular finding of the Court of Appeal did not reflect the situation after that. Here are the facts:

- 1) The direction of Minister to negotiate with Kleana in good faith is outstanding and still applies;
- 2) The court case is not over; it was sent back to the judge of the second judicial review to reconsider another possible remedy; the hearing into that issue was held on September 29<sup>th</sup> (the same day of BC Hydro’s BCUC second submission); and a decision is pending;
- 3) Kleana never insisted on a set price in its discussions with BC Hydro, and in fact, Kleana made 3 specific proposals to BC Hydro which were as follows:
  - (a) the range of prices of the successful bidders in the 2008 Clean Call (and that was a wide range);
  - (b) the prices of the BC Hydro Standing Call at the time and
  - (c) to match BC Hydro’s projected price for power from Site C at the time.

All of these offers were rejected by BC Hydro and BC Hydro steadfastly refused to offer any terms in response, despite the fact that Kleana persistently asked for a commercial price that BC Hydro would consider. Appendix 1 to this submission contains the last communication from Kleana to BC Hydro which BC Hydro did not responde.

These facts are certainly a clear indication of BC Hydro’s unwillingness to consider other power projects as an alternative or supplement to the power from Site C. It appears obvious that when BC Hydro told Kleana in the fall of 2012 that it had no need for power, it was already seriously considering Site C and might have already made up its mind about Site C.

**BC Hydro submits (page 44)** - In dismissing Kleana’s appeal, the BC Court of Appeal also rejected the premise that BC Hydro should be required to enter into agreements to purchase energy based on set prices free of Commission approval.

**Kleana Response**– Kleana did not ask BC Hydro to enter into an agreement or to set prices free of Commission approval. Kleana took the position that Kleana must not be prejudiced due to the failure of

Ministers of the Crown to fulfil their promises. The Clean Call had a range of prices pursuant to which BC Hydro issued contracts and the Clean Call projects were approved as a package, which permitted them to proceed without each project individually going through BCUC process. Kleana asked for the same treatment, as we believe we are entitled to.

However Kleana also made alternative offers which as mentioned above, were rejected by BC Hydro, with no counter offers. Kleana fails to understand how BC Hydro's conduct can be considered to be negotiating in good-faith or how it can be taken to demonstrate BC Hydro's willingness to consider alternatives. The reality is that BC Hydro has been willing to build Site C in the absence of any set price and (until recently), to do so free of Commission approval. It was unwilling to do so with respect to the Kleana Project.

## **FACTS ABOUT AND RESPONSES TO CLAIMS BY BC HYDRO REGARDING TECHNICAL MATTERS**

**BC Hydro submits (page 45)** -As described in Appendix L, section 2.1, "BC Hydro prepares our inventory of resource options with advice from independent advisors and in consultation with industry experts and others with technical expertise. While we will consider specific projects in developing our resource options inventory, we are careful about doing so given the expected bias for project proponents to provide artificially low cost information to influence our planning analysis in situations such as this – where there is no formal requirement for proponents to commit to such prices – resulting in little risk to the seller."

**Kleana Response** - When BC Hydro conducts a Call proponents know that as part of the process they must provide BC Hydro with Bid Bonds that secure their prices, delivery profiles and schedules resulting with clear and substantial risks to seller and eliminates risk to the rate-payer. If BC Hydro were acting in the best interest of ratepayers and identified the need for power indeed in 2013, it should have established a formal process to invite offers to meet their demand profile under a price ceiling and define and secure those risks for their planning as an alternative to Site C.

It is ironic that BC Hydro is so sceptical about the prices of private power producers (notwithstanding price guarantees) assuming they must be providing artificially low cost information, with the result that BC Hydro makes adjustments at their own discretion. (Kleana has explained to BCUC, in our first submission dated August 29<sup>th</sup>, page 7, note 11 the strategy that BC Hydro employed to justify this unilateral action).

When the private sector develops a project based on a BC Hydro Call process, before financing they define the risk through design studies and often seek turnkey bids from contractors. That fixes the cost overrun risk to a great extent. Why is it that BCH exposes rate payers to significant cost increases by not demanding an overarching turnkey bid price from their Site C consortium? Part of the answer perhaps lays in the fact that such price may be much higher than BCH put forward as an estimate used to "self-justify" Site C without regulatory oversight. This approach invites a guessing game of competing opinions and by the time the actual costs start to rise and it becomes obvious the original estimates were little more than wishful thinking, it is too late to stop the project. Such is the case with the Muskrat Falls project, the Keeyask project and it is increasingly clear this is occurring with Site C. Any belief that the "worst is over" and the capital costs will miraculously come back on track is pure fantasy (as proven by the most recent announcement of cost overrun by BC Hydro).

**BC Hydro submits (page 44)** - BC Hydro provides the following background of our experience with Kleana and a unit energy cost analysis to reaffirm our conclusions that due to development risks and cost uncertainties the Kleana project is not economic when compared to other lower cost clean alternatives with or without Site C.

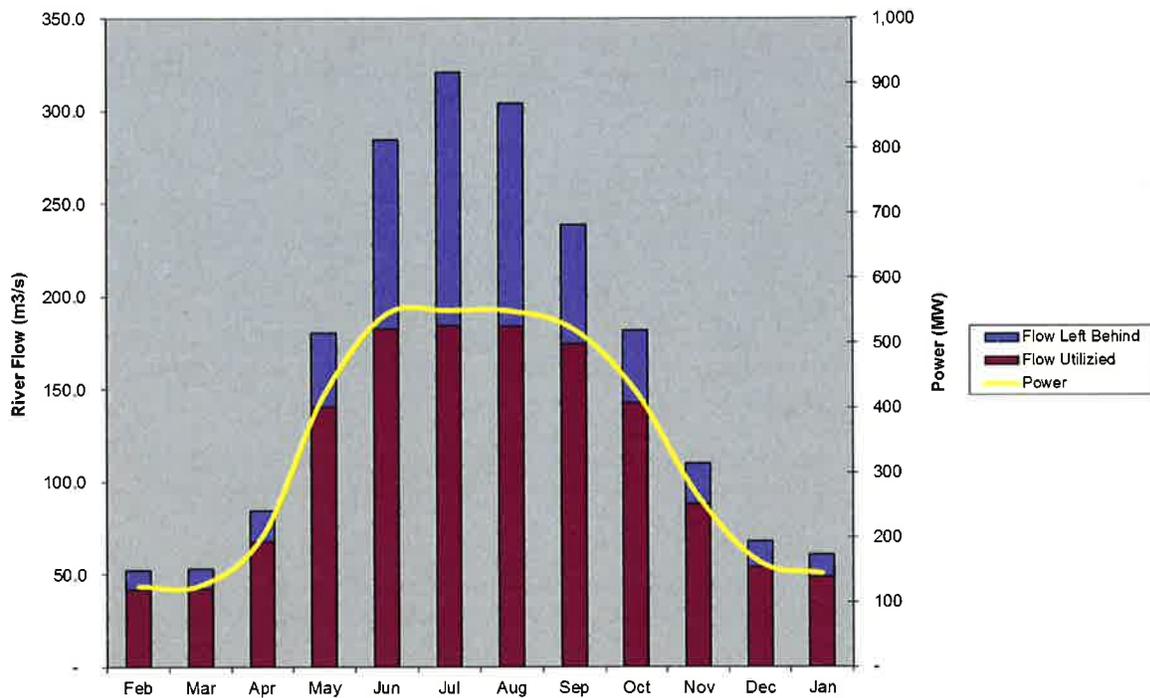
**Kleana Response** - Kleana operated a flow gauge at the intake area of Klinaklini Project for 5 years and collected valuable data. Together with the Water Survey Canada gauge operated at the mouth of the same river and other regionally operated Water Survey Canada gauges, our expert consultant Hatch Ltd arrived at a production profile for the Klinaklini Project. Kleana's run of the river profile is exceptional since it is not overwhelmingly fed by glaciers but more by a large catchment for direct precipitation and runoff. Kleana profile is a good compliment to wind project profiles in the province. Table 1 compares critical winter months to freshet production for the 565 Mw installation optimized for the terms of the 2008 Clean Call. As can be seen (Table 1') Kleana has a dependable capacity of about 150 MW based on the Clean Call configuration. Depending on the requirements (and incentives) for capacity vs energy, the turbine design and configurations can be optimized to reach a dependable capacity of over 180 MW by increasing total efficiency curve for lower level flows. This in return will also increase the amount of power produced for lower flow months. Table 1' shows the amount of water that Kleana spills due to restrictions of freshet flow utilization under the suggested installed capacity configured for the 2008 Clean Call terms. Kleana can easily reduce freshet production (and peak capacity) by a further 20% while still remaining profitable but yet cheaper than Site C as it will be obvious later in this document. This in return will increase plant factor further. The dependable capacity will also increase with lower capacity efficiency as spillage will be relevant to peak capacities. It is important to recognize that in a new Call process the entire Kleana project can be reconfigured and optimized to better suit a different demand profile than described in the 2008 Clean Call. The terms of a call (its incentives and penalties) determines the optimization and therefore the output profile of a project. BC Hydro compares apples with oranges when it compares projects optimized for different parameters than those BC Hydro says it now needs when justifying building Site C. The Call must be based on what Site C will deliver to BC Hydro. Only such a Call will produce a reliable comparison.

**Table 1 - Freshet months Production versus Critical Winter Months Production**

Freshet Months Mean (GWH).....	1,000
Winter Months Mean (GWH).....	300
Total Annual Mean (GWH).....	2,450

**Table 1 – Kleana Flow Potential**

**Klinaklini River excluding Dorothy**



The production table was the basis of Kleana’s submission as a bid to BC Hydro at the 2008 Clean Call and later modifications. While climate change is expected to improve Kleana’s winter production profile up to 18% this projection is not included in Table 1.

A detailed preliminary engineering package with a full set of preliminary design drawings has been completed for the project by Klohn Crippen Berger, the same consulting firm (experts) that BC Hydro retained for Site-C. Comprehensive geotechnical investigations including but not limited to multiple core samples were undertaken under their supervision. A geotechnical report was also issued. At the time, a comprehensive Capital cost estimate for the project was provided by a consortium led by Bilfinger SE.

BC Hydro did retain independent consultants to review the credibility of the technical data submitted by bidders in the Call and although some submissions were challenged, and required to submit further information to justify their submissions, Kleana was absolutely not challenged. Indeed BC Hydro kept the project in their favoured short list and waited for the conservancy issue to be resolved with the Minister in charge at the time. BC Hydro’s own letter to Kleana identified the conservancy issue as the sole risk and provided a deadline for it solution. Several months past the deadline imposed by BC Hydro, BC Hydro continued to communicate to Kleana that it was continuing to keep the project in their favoured short list and only abandoned it days before the Clean Call closed after the Minister’s letter declaring that he would not attend to the conservancy issue.

BC Hydro’s opposition to and concerns about Kleana emerged, it appears, only after BC Hydro’s internal decision to proceed with Site C. At that point it seems Kleana became a very inconvenient presence.

Perhaps the comparative data below may provide some insight to BC Hydro’s evolved opinions about Kleana after Site C became its chosen project (note the capacity factor).

Table 2 below is the technical data for the project extracted from the earlier submissions. The entire submission of Kleana to Site C Joint Review panel is provided to BCUC in our first submission to BCUC.

**Table 2: Kleana Power Project  
Technical Highlights in comparison to Site C**

	<b>Site C</b>	<b>Kleana</b>
Capacity (MW)	1100	565
Energy (GWh)	5100	2450
Capacity Factor	53%	49%
Capital Cost (\$/kWh installed)	\$7,200	\$4,250
Reservoir/Headpond Size	9,100 Hectares	40 Hectares
Reservoir/Headpond Length	83 Kilometers	0.8 Kilometer
Risk Allocation		
Capital Cost	Ratepayer	Kleana
Performance	Ratepayer	Kleana
<b>Kleana Technical Highlights</b>		
<ul style="list-style-type: none"> <li>&gt; 6x94 MW Pelton Turbines avoid fishery impact</li> <li>&gt; Dual circuit 230 kv transmission line to Campbell River</li> <li>&gt; Five Year Construction Timetable</li> <li>&gt; 9 meter diversion weir, no reservoir</li> <li>&gt; Entire diversion underground, no surface footprint</li> </ul>		

It is hard to comprehend admissions in BC Hydro's own submission that somehow it is basing its analysis of Kleana viability on the prices offered to BC Hydro in the 2008 Clean Call with no other consideration. The Clean Call is a competitive process. Kleana submits an initial bid (commercial price) based on how they see themselves in comparison to competition. BC Hydro then sends a letter to Kleana and suggests to them to bring their price to below a specific target price determined by BC Hydro. All proponents above that price (that are not eliminated by BC Hydro for their risk assessment) get the same letter. They state if Kleana insists on the initial price that does not mean that they are going to be eliminated but if they come below with an adjusted bid price their chances would greatly improve. It is a known process that BC Hydro has adopted in the past Calls to reduce bid prices. Kleana abides and becomes a bid at the lowest 10% of their rankings based on bid price. Kleana remains in the favoured short list for contracts to be offered. It is obvious that Kleana's purpose as a bidder would be to remain in the competitive process as a favoured project with their price while allowing highest possible profit for their shareholders. Nowhere in the bid process had BC Hydro demanded that Kleana must provide absolutely the lowest price they can afford nor Kleana made such a statement therefore it can't get any lower viably.

BC Hydro may claim that the 2008 Clean Call bid is the only price they have to assess Kleana with. If so this ignores facts which are on the record. As submitted earlier to joint review panel we stated:

"On September 18, 2012, the Minister of Energy, Mines and Natural Gas directed BC Hydro to enter into good faith negotiations with Kleana for an Electricity Purchase Agreement ("EPA") with respect to the project.

This was nearly 6 months prior to the filing of the Site C EIS Application on January 28, 2013.

Since then we received rejections and no counteroffers to any of our three offers to BC Hydro:

1. we offered in the fall of 2012 to negotiate on the terms of the 2008 Clean Power Call – our offer was priced within the lowest 10% of accepted bids;
2. we offered on December 18, 2012 to match the terms of BC Hydro's Standing Offer Program with a price of \$102/MWh – in their rejection on December 24, 2012 BC Hydro among other things mentioned substantial uncertainty about "Need". [BCH described the "Need" the following month in the Site C EIS Application on January 28, 2013.]
3. we offered on December 19, 2013 to match the price for power of Site C.

Furthermore, we do not understand how the modelling of BC Hydro can result in wind being the preferred resource when Kleana was offered to BC Hydro at \$102 on December 18, 2012. "

BC Hydro seems to be simply dismissing in their analysis the prices that we offered after the competitive Clean Call process as we followed up the Ministers' direction to negotiate. BC Hydro rejected all these. These offers were not made to confound BC Hydro's planning process; they were simply legitimate (with prejudice) offers. We made our \$102 offer at December of 2012 and they rejected it a week later. We made our offer in the middle of litigation, in good-faith, in writing, with prejudice, to avoid further litigation and sit at negotiating table instead. We were not informed at the time that BC Hydro was planning anything like Site C. BC Hydro's response to our offer was that they don't need the power.

At no point in time did BC Hydro ask Kleana to verify the validity or deliverability of its offers. They never asked for security. Arguing that Kleana's subsequent offers were not credible, without requesting any study or substantiating information whatsoever maligns the reputation of Kleana. Especially when out of nowhere BC Hydro states that: "due to development risks and cost uncertainties the Kleana project is not economic when compared to other lower cost clean alternatives with or without Site C." As stated above, development risks were never a concern other than the conservancy boundary issue, nor has BC Hydro identified to Kleana any other concern during the 2008 Clean Call. BC Hydro kept Kleana in their favoured short list until the very end of the Call hoping the conservancy issue is resolved. There has never been any communication from BC Hydro to Kleana about any other development risks or request to Kleana to respond if they identified any at a later date since the Call.

The cost uncertainties of Kleana were never a concern of BC Hydro at the Call and BC Hydro has never mentioned these to Kleana since. Given the opportunity, Kleana can answer any questions regarding costs, certainly more effectively than BC Hydro can do for Site C. This BCUC process after all is focusing on the cost uncertainties associated with BC Hydro's Site C project. BC Hydro has no basis or evidence to state that their unspecified uncertainties regarding Kleana make Kleana uneconomic when compared to other unspecified projects. We are not able to describe this statement as being other than unscientific, subjective and severely prejudicial to Kleana.

**BC Hydro submits (page 45)** - The Kleana submission (F53-1) provides a proposal for a large run of river project with an installed capacity of 565 MW and about 2,450 GWh/year of average energy with over 40 per cent of its deliveries estimated to be in the freshet period.

**Kleana Response** – As stated before in the competitive Clean Call environment Kleana submitted an energy profile that was accepted by BC Hydro for that process. Obviously it would have been Kleana's intention to deliver the most energy for sale based on the restrictions, limitations and penalties imposed by BC Hydro. If there were further restrictions Kleana could have altered the delivery portfolio further while still remaining more competitive than others. In fact Kleana's comparative competitiveness would have materially improved as a result of more restrictions in the Clean Call. If BC Hydro had engaged with Kleana after the Minister directed them to negotiate, these economies could have been realized. Regardless the biased price analysis that BC Hydro presented to BCUC and the price analysis that others have conducted more accurately on arriving at adjusted UEC (as discussed later in this document) takes into account the same delivery profile and therefore is valid. If BCH were to ask Kleana to arbitrarily reduce the freshet production by 10% Kleana could and still easily deliver cheaper than Site C. What is missing here is good faith in searching for a solution other than BC Hydro's own Site C. A proper optimization study for the solution to the provinces energy needs should occur with BC Hydro kept at arm's length.

**BC Hydro submits (page 45)** - However, using information provided in Kleana Power's submission (F53-1) and in its submission in the 2008 Clean Power Call would produce an adjusted unit energy cost of approximately \$112/MWh (\$2018). BC Hydro found that including Kleana at the proponent submitted costs in our Block UEC analysis results in a levelized unit energy cost of approximately \$154/MWh. This is not materially different from the \$153/MWh alternative block cost using pumped storage and wind described in

section 5.6.1 of our August 30 Filing. As a result, the inclusion of Kleana would not alter BC Hydro's conclusions reached in its August 30 Filing.

**Kleana Response** – At the first paragraph of their Kleana comment BCH states:” Kleana project is not economic when compared to other lower cost clean alternatives with or without Site C.” Then they go on to state they assigned \$112/MWh for Kleana (incorrectly) in their Block UEC analysis and they arrived at \$154/MWh for their Block UEC. Even with their assigned numbers it seems Kleana is there to lower their alternative block UEC not increase. How can Kleana be less competitive than other alternative projects as it is cheaper than their Block UEC? It appears that BC Hydro seems determined to avoid facts and figures about Kleana. They define a BC Hydro version of Kleana with numbers that they prefer and analyse them to come to their desired conclusion. It appears inclusion of Kleana with the numbers provided by Kleana (backed by with prejudice offers) in BC Hydro's analysis would result in the opposite conclusion desired by BC Hydro.

It is important to note that Kleana was recognized by others as a preferable alternative to site C. Barton et al have provided such a submission to Site C joint review panel.

Following Table 3 is the alternative portfolios that include Kleana created by Barton et al. Kleana's earlier submission to BCUC have the entire Barton et al document. Below are the excerpts from it:

“Feb 3, 2014 closing submission explains on page #21 that Kleana has a Unit Energy Cost at POI of \$80 per MWh and an Adjusted UEC at Lower Mainland of \$90 per MWh. The AUUC of \$90 is used in all the portfolios. UEC of \$80 and AUUC of \$90 were based on the Barton/Davis questions on January 21, 2014. (See page #7.)

Further, any alternative to 1100MW Site C must have 1100MW of dependable capacity. Therefore, Kleana is important. Back in January 2014, we calculated that 565MW of installed capacity will represent 135MW(lower than actual) of dependable capacity. (From page #22 of Closing Submission)

Lastly, this alternative to Site C provides 1117 MW of Dependable Capacity and never needs any natural gas (pg. #24 of Closing Submission)”

Table 3 - Excerpt 1 from Barton and Davis

**ALTERNATIVE #3 WITH 6 RESOURCE OPTIONS**

PROJECT:	DEPENDABLE CAPACITY (MW)	ANNUAL FIRM ENERGY (GWh)	ADJUSTED UEC (\$F2013/MWh)	TOTAL VARIABLE COST (\$F2013 million)
<b>Energy Costs</b>				
MSW2_LM	24	211	90	19
Wind_PC28		591	121	72
Wind_PC21		100	123	12
Wind_PC13		541	123	67
MSW1_VI	12	101	123	12
Wind_PC19		441	124	55
Wind_PC16		377	126	48
Wind_PC14		527	127	67
Wind_PC10		1023	129	132
Wind_PC15		382	130	50
Wind_PC20		609	131	80
Wind_VH12		151	131	20
Wind_VH14		113	132	15
250 MW Geothermal (LM)	250	1970	102	201
565 MW Kleana Run-of-River	135	1770	90	159
ROR_100-110_VI		450	143	64
REV6 Variable Costs		26	12	0
GMS Variable Costs		0	0	0
PS Variable Costs		-264	19	7
<b>SUBTOTAL</b>	<b>409</b>	<b>5118</b>		<b>528</b>
	<b>DEPENDABLE CAPACITY (MW)</b>	<b>ANNUAL FIRM ENERGY (GWh)</b>	<b>UNIT CAPACITY COST (\$F2013/kW-yr)</b>	<b>TOTAL FIXED COST (\$F2013 million)</b>
<b>Capacity Costs</b>				
REV6 Fixed Costs	488		50	24
GMS Fixed Costs	220		35	8
PS Fixed Costs	500		124	62
<b>SUBTOTAL</b>	<b>708</b>			<b>32</b>
<b>TOTAL</b>	<b>1117</b>	<b>5118</b>	<b>ADJUSTED UEC (\$F2013/MWh)</b> 109	<b>TOTAL COST (\$F2013 million)</b> 560

As explained in Chapter 1 and 2, the AUEC for Site C should be in the order of \$110 to \$159. Therefore, Site C is not cost effective when compared to this alternative. The significant adverse impacts are no longer justified.

**Table 3 - Excerpt 2 from Barton and Davis**

*Comparing Alternative Portfolios to Site C*

The following table compares 5 portfolios. The first two columns show Site C, before and after our suggested financial and capital cost adjustments. The last 3 columns show Alternative Portfolios we have assembled.

<i>Portfolio Name</i>	<i>Site C</i>	<i>Site C</i>	<i>Site C</i>	<i>Alternative Portfolio #1</i>	<i>Alternative Portfolio #2A</i>	<i>Alternative Portfolio #3</i>
Source of Data or Description of Portfolio or Scenario	BC Hydro June 4 Tech Memo	BC Hydro June 4 with Adjusted Financial Assumptions	Adjusted Capex and Financial Assumptions	Geothermal @ 320 MW	Kleana (Firm Energy)	Six Resources
Source of Capacity	Site C	Site C	Site C	Geothermal, GMS, Rev6, MSW	Kleana, GMS, Rev6, MSW	Kleana, Geothermal GMS, Rev6, MSW
Source of Energy	Site C	Site C	Site C	Geothermal, Rev6, Wind, MSW	Kleana, Rev6, Wind, MSW, SCGT	Kleana, Rev6, Geothermal, Run of River, Wind, MSW
WACC Evaluation Period	6%	7%	7%	7%	7%	7%
Capital Cost (billion)	70	40	40	40	40	40
Unit Energy Cost (2013 \$/MWh)	7.9	7.9	10.3	-	-	-
Adjusted Unit Energy Cost (2013 \$/MWh)	94	115	143	-	-	-
	<b>110</b>	<b>131</b>	<b>159</b>	<b>120</b>	<b>116</b>	<b>109</b>
MSW = Municipal Solid Waste. SCGT = Simple Cycle Gas Turbine Rev6 = Revelstoke Unit#6. GMS = Gordon M Shrum Units #1 - 5 - BC Hydro did not provide Capex or UECs for individual IPP projects						

Each of these solutions is preferable to Site C alone. Please note that the indicative portfolio tagged alternative #3 by Barton et al shows an adjusted UEC of \$109. BC Hydro claims their number for same type of analysis is \$154. Kleana understands Barton analysis. Barton numbers are actually conservative, dependable capacity for Kleana is higher than they assumed (see Table 1').

Barton et al used a WACC of 7.4% for Kleana which can be broken down into 20% equity at 13% return and 80% debt at 6% return.

A similar effort was undertaken by London Economics International with similar conclusions (September 16<sup>th</sup>, 2014). Below are relevant extracts from London study.

Extract 1 from London Economics International

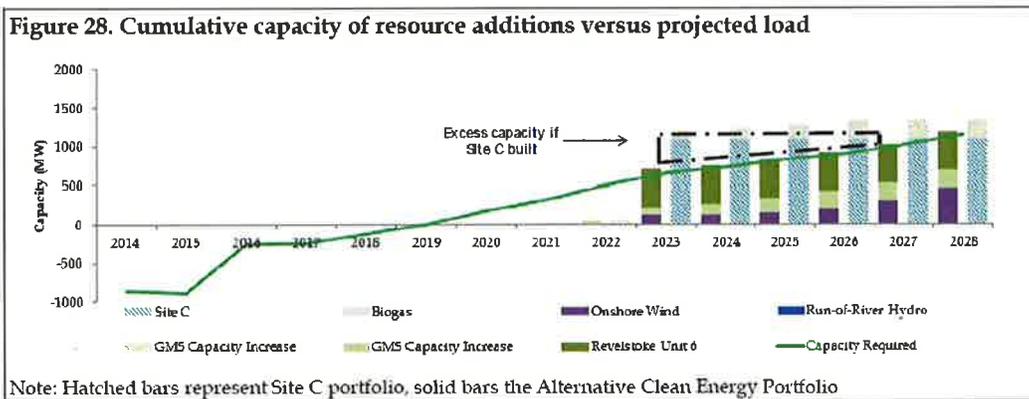
**7 Appendix A: List of projects incorporated in indicative Clean Energy Portfolio**

Project	Entry Year	Installed Capacity (MW)	Dependable Capacity (MW)	Average Annual Energy (MWh)	Resource Type
Bailey	2019	2	1.4	11.8	Biogas
Minnie's Pit	2019	1	0.9	7.1	Biogas
Comox Valley	2019	1	1.0	8.2	Biogas
Wind_PC28	2019	153	59.8	590.8	Onshore Wind
Foothills Blvd	2022	2	2.0	16.7	Biogas
Wind_PC19	2022	117	30.4	441.3	Onshore Wind
Wind_PC15	2023	135	33.1	541.0	Onshore Wind
ROR_90-100_KN	2024	72	2.2	220.1	Run-of-River Hydro
Cache Creek	2025	4	3.3	27.4	Biogas
Glenmore	2025	2	2.2	18.3	Biogas
Wind_PC16	2025	99	25.7	376.9	Onshore Wind
ROR_100-110_KN	2025	75	3.0	217.5	Run-of-River Hydro
Wind_PC10	2025	297	77.2	1022.7	Onshore Wind
Wind_PC20	2027	159	41.3	608.8	Onshore Wind
Wind_PC09	2027	207	53.8	713.4	Onshore Wind
Wind_PC18	2028	138	35.9	486.2	Onshore Wind
Wind_PC42	2028	63	16.4	219.4	Onshore Wind
Wind_PC11	2028	126	32.8	473.1	Onshore Wind
Kleana	2028	565	126.9	2450.0	Run-of-River Hydro
GMS Units 1-5 Capacity Increase	2022	220	220	0	Hydro
Revelstoke Unit 6	2020	500	488	26	Hydro
<b>Total</b>		<b>2,937</b>	<b>1,239</b>	<b>8,477</b>	

## 8 Appendix B: Alternate case under assumption of capacity bridging

The advantages of a Clean Energy Portfolio remain apparent even when no bridging capacity is used. LEI analyzed an alternative case in which clean energy resources are timed to come online consistent with the otherwise anticipated commercial operation date for Site C, but the amount procured is matched more finely with projected energy and capacity needs. An important advantage of IPP resources is that they are more granular than Site C, and provide more flexibility in synchronizing supply growth with demand. The smaller size of IPP projects allows for much reduced lead times, which means the costs of demand forecast errors are decreased because supply will naturally adjust as demand uncertainty decreases. More granular resources are also less prone to experience large cost overruns because of their size, and on a system level, because risk is diversified amongst many projects

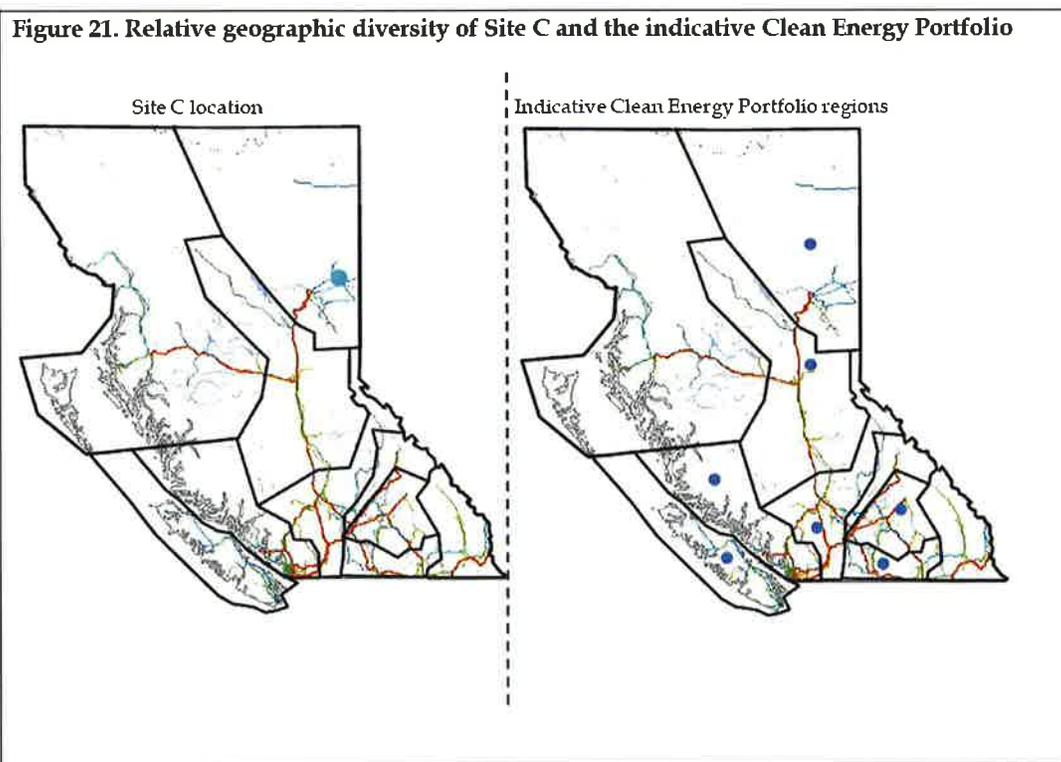
The aggregate nature of Site C means that a significant surplus of power will appear when it comes online in 2023, even if no new resources are brought online and the gap between demand and supply which will appear in the intervening time is filled by market energy. In Figure 28 and Figure 29, we compare a Site C portfolio to an Alternative Clean Energy Portfolio created under an assumption that shortfalls in supply will be covered by market purchases before 2023. Even assuming market purchases before Site C is built, the excess in capacity, Figure 28, and energy, Figure 29, of Site C is readily apparent compared to the Alternative Clean Portfolio. In this scenario, the Alternative Clean Energy Portfolio produces lifetime savings of \$1.4 billion under a social discount rate of 5% and \$756 million under a social discount rate of 8%.



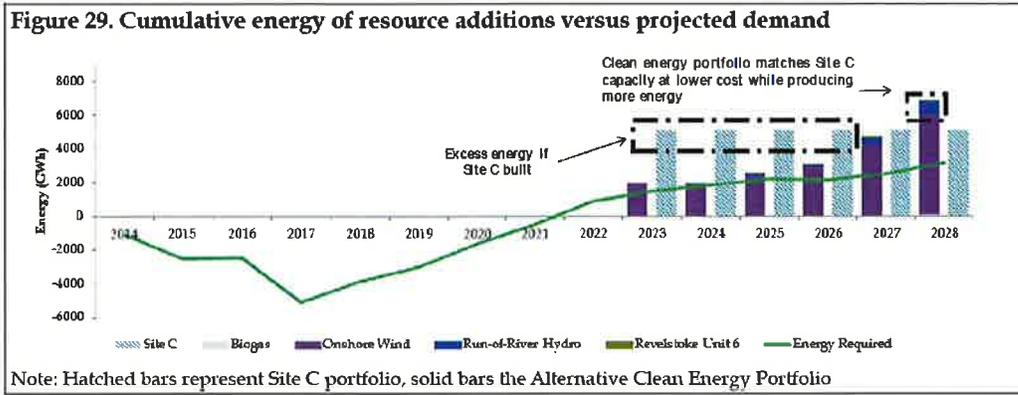
### Extract 3 from London Economics International

#### 5.1.1 Geographic diversity

The LEI indicative Clean Energy Portfolio is one of many potentially cost-effective portfolios that can be constructed which provide geographic diversity. Geographic diversity provides a range of benefits. As the JRP report points out, "geographic diversity raises reliability." (p.300) It reduces stress on transmission lines, and exposure to transmission outages on a critical line. It allows for less concentration of site impact. Less supporting infrastructure needs to be built, and what infrastructure is built need not be built to a scale which becomes excessive once construction is complete. Regional economies are not distorted and subjected to construction-driving boom-bust cycles. The graphic below provides an illustrative view of the difference in geographic concentration between Site C and the indicative Clean Energy Portfolio.



Extract 4 from London Economics International



## FINAL REMARKS

Kleana suggests that BC Hydro's analysis and numbers are convenient and consistent with its unjustified commitment to Site C at any cost. BCH insists on comparing apples with oranges. The UEC numbers that BC Hydro is arriving at for Kleana are based on what Kleana offered to BCH in a bid process (Clean Call 2008). They include Kleana's profit expectations for that Call. Barton Davis numbers are based on a lower profit expectation. For comparison reasons this demonstrates that Site C does not stand up as a cost effective project, in particular because BC Hydro contributes no equity, requires the ratepayer to bear all the development and production risk, and even then is not able to match Kleana.

Kleana requests that the BCUC disregard BC Hydro's statements about Kleana and rely on Kleana's and other parties' representations based on the above facts (and those included in Kleana's original submission). A true comparison of Kleana could only be done if BC Hydro identified a fair target price for Kleana, for example 5% lower than their Site C estimate, which then would have allowed Kleana to re-optimize the project accordingly. Kleana's 2012 offer of \$102 was such an attempt by Kleana which was, however, dismissed by BC Hydro arguing that they don't need the power less than 6 months before they applied for Site C declaring they needed the power after all.

We urge you to find that BC Hydro was pre-disposed to build the Site C project regardless of what other options might be available.

The best solution is likely a portfolio with complimenting and diverse profiles, similar to ones referenced above, coupled with some storage capacity dedicated to back this portfolio from BC Hydro (or through employment of other storage technologies and options). It is in the best interest of rate payers that BC Hydro stop competing with the private sector and work with them towards the optimum solution. This will also reduce risk and the ever increasing debt burden to rate payers. A study like this should be conducted.

The compelling economics of the Kleana project have been presented elsewhere in this submission. Please note that the additional benefits that are projected as a result of climate impact are not included in this response but must not be forgotten. In our first submission we cautioned BCUC about the need for a comprehensive Climate Change model to look into impacts of the same on BC Hydro's Site C production profile. The same is valid on demand side too. Climate change will likely reduce usage of winter power and increase usage of summer power. BC Hydro's arguments about freshet production must not be looked at based on the supply demand profile of today but must be based on careful scientific study and objective projections to the future. Not only climate change but other changes must also be considered. BC Hydro argues that Site C is needed because LNG plants are still on the provinces agenda. LNG plants produce year round. There is also a shift towards electrical transportation devices that are also more likely to increase consumption during summer months. The glaciers of BC have diminished in size by more than 60% over the past 30 years. Following this trend, the freshet runoffs supplied by glaciers will eventually dry up. The production profile (amount and shape) of a catchment will then be much more determined by its reaction to direct precipitation based on size, geographical position and relative elevation of the catchment. Kleana ranks very favourably when all these considerations are properly projected into the future. BC Hydro is wrong in dismissing Kleana in its future plans relying on generalized assumptions.

Also what must not be forgotten in BCUC analysis is our nearby Machmell project which is even more coastal in hydrology and can add an additional 50% production and capacity to the Kleana profile. If allowed to develop with a contract from BC Hydro Machmell can also allow Kleana to reduce the overall price of energy by a further 15% due to the synergies and scale of both projects together. While BC Hydro has spent substantial ratepayer resources bringing Site C to this juncture necessitating this review, with a fraction of these resources the private sector can define better options with no risk to rate payers.

The Commission may not be able to determine an optimal solution in the limited time provided in this hearing. But the information submitted to BCUC so far strongly suggests that BC Hydro's site C is not the optimum solution for rate payers. We would ask the Commission to recommend halting Site C construction and consider engagement with the private sector to provide for an independent and competitive review of alternatives to replace Site C. BC Hydro has proven again and again that such independence is sorely lacking.

All of the material statements and claims made by Kleana in this submission are based on documents. If Kleana's competing facts (to BC Hydro versions) become relevant and are needed by BCUC on any given point, Kleana will forthwith submit upon request by BCUC all documentation to substantiate (subject to a review for public dissemination or private review by BCUC).

## **APPENDIX 1**

From: Alexander Etnall  
To: [Redacted]  
Cc: [Redacted]  
Subject: RE: With Prejudice Discussions

WITH PREJUDICE

January 29, 2013

Dear

As you know and as I have stated in my previous emails and letters to you, Keena is ready and willing to enter good faith negotiations with BC Hydro regarding our project on the Klaban River. I am having difficulty to understand why you keep telling me that you understand otherwise.

So for your absolute clarity, notwithstanding our legal position that the negotiations should be benchmarked to the successful bids in the 2008 Clean Power Call, we have made it clear that we are willing to consider alternative proposals in accordance with BC Hydro's understanding of the Minister's direction of September 18, 2012 (the "Minister's Direction"). I or over a year, we have been asking BC Hydro to identify the specific commercial terms under which it would be willing to enter an Electricity Purchase Agreement (EPA) with Keena. To date, BC Hydro has refused to provide a substantive response.

- 1. our proposal in 2012 to negotiate on the terms of the 2008 Clean Power Call;
- 2. our offer on December 18, 2012, for Keena to match the terms of BC Hydro's Standing Offer Program, as adjusted to the year in which an EPA is signed; and
- 3. our offer on December 19, 2012 for Keena to match the price for power from the 1100 MW Site C Clean Energy Project.

You have failed to provide counteroffers to any of the above. While you advise that BC Hydro has been and remains willing to enter into good faith negotiations on the basis of the Minister's Direction, we fail to understand how BC Hydro is complying with such Minister's Direction.

You have advised that BC Hydro may not need the power from Keena's project because there is "uncertainty" about whether BC Hydro needs power from a project of this size. However, this contradicts the Environmental Impact Statement Application for the Site C project in which BC Hydro asserts the "Need" for Site C to the Joint Federal-Provincial Review Panel. In fact, BC Hydro is seeking to procure, through the Site C project, far more power than Keena. While Keena can deliver total energy of 2,450 GWh from a nameplate capacity of 565 MW, we understand from Site C's EIS Application that there must be a "Need" for Site C's total energy of 5,100 GWh from its nameplate capacity of 1100 MW.

Instead of simply telling us that BC Hydro is willing to enter into good faith negotiations on the basis of the Minister's Direction, why not commence such negotiations?

What we need is specifics about the contract BC Hydro would consider negotiating consistent with its understanding of the Minister's Direction. We have provided you with offers that have been simply rejected with no counter offers. There is no point in negotiating with ourselves. The only reasonable way to move this process forward is for BC Hydro to provide us with a commercially specific proposal for consideration. In our view, the Minister's Direction to negotiate in good faith requires it.

We look forward to hearing from you.

Regards

Alexander N. Etnall

----- Original Message -----

From: [Redacted]  
Sent: January 22, 2014 11:43 AM  
To: Alexander Etnall

Subject: With Prejudice Discussions

With Prejudice Discussions

January 22, 2014

With Prejudice

Dear Dr. Etnall,

I am writing in response to your 2:05 PM December 19, 2013 email in our With Prejudice discussions.

I disagree with many of the statements in your letter but will not respond to those at this time. From BC Hydro's perspective, the fundamental issue is that BC Hydro is prepared to engage in discussions on the basis of the Minister's September 18, 2012 Direction and Keena is not. We appreciate that you argue that the Minister's Direction is not consistent with the predecessor's earlier representations to you. As you know, we disagree with your position on this. However, regardless, we are only prepared to negotiate on the basis that we have been directed to do so. We confirm that we do not consider this to be any way not in good faith.

Sincerely,