HUDSON'S HOPE
PLAYGROUND OF THE PEACE

DISTRICT OF HUDSON'S HOPE
REGULAR COUNCIL MEETING AGENDA
Council Chambers
Tuesday, October 14, 2014 at 7:00 PM

1. **Call to Order:**

2. **Notice of New Business:**
   Mayor's List
   Councillors Additions
   CAO's Additions

3. **Adoption of Agenda by Consensus:**

4. **Declaration of Conflict of Interest:**

5. **Adoption of Minutes:**

M1	September 15, 2014 Regular Council Meeting Minutes	Page 1
M2	October 7, 2014 Committee of the Whole Minutes	Page 8

6. **Business Arising Out of the Minutes:**

7. **Delegations:**

D1	Yellowhead Road and Bridge	Page 10
D2	Hudson's Hope Health Care and Housing Society: Suzan Back & Sheila Martin	Page 12

8. **Staff Reports:**

SR1	Action and Other Updates by CAO	Page 14
SR2	5 Year Strategic Capital Planning Session Report	Page 18
SR3	Rogers Cell Tower Approval	Page 20
SR4	Fire Department Water Tanker Tender Award	Page 21
SR5	2014 UBCM Meeting with the Honorable Christy Clark	Page 23
SR6	2014 UBCM Meeting with the Honorable Steve Thomson	Page 158
SR7	2014 UBCM Meeting with the Honorable Terry Lake	Page 167

9. Bylaws:

10. Reports by Mayor & Council on Meetings and Liaison Responsibilities

11. Old Business:

12. New Business:

14. Public Inquiries:

15. Adjournment:

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

REGULAR COUNCIL MEETING
September 15, 2014
7:00 P.M.
MUNICIPAL HALL COUNCIL CHAMBERS

Present: **Council:** **Mayor Gwen Johansson**
Councillor Travous Quibell
Councillor Richard Brown
Councillor Daniel Bouillon
Councillor Nicole Gilliss
Councillor Travous Quibell
Councillor Kelly Miller

Staff: **CAO: Tom Matus**
Deputy Clerk: Laurel Grimm
Director of Protective Services: Robert Norton

Other: **5** in gallery

1. CALL TO ORDER:
The meeting was called to order at 7:00 p.m. with Mayor Gwen Johansson presiding.

2. NOTICE OF NEW BUSINESS:

Mayors List:
Mayor Johansson included a report on water testing at Lynx Creek and an update on the BC Ambulance under New Business.

Council Additions:
Councillor Kelly Miller added Telus/Seniors and a Rebranding Report under New Business.

Councillor Nicole Gilliss included a report on the flower pots under Old Business.

CAO Additions:
Agenda Additions SR4, SR5, SR6, SR7, SR8 and SR9 were included under Staff Reports. C8 was included under correspondence. An Addendum was also made to the CAO Action Items and other Updates.

3. ADOPTION OF AGENDA BY CONSENSUS:
The September 15, 2014 Regular Council meeting agenda was adopted by consensus.

4. DECLARATION OF CONFLICT OF INTEREST:
None

5. ADOPTION OF MINUTES: **0550-01**

M1 **August 11, 2014 Regular Council Meeting Minutes**
RESOLUTION NO. 212
M/S Councillors Bouillon/Quibell
THAT:

M1

"The minutes of the August 11, 2014 Regular Council Meeting be adopted as amended."
CARRIED

M2. **September 2, 2014 Regular Council Meeting Minutes**
RESOLUTION NO. 213
M/S Councillors Quibell/Heiberg
THAT:
"The minutes of the September 2, 2014 Regular Council Meeting be adopted as written."
CARRIED

6. BUSINESS ARISING OUT OF THE MINUTES:

BA1 **SR2: Extended Pool Opening**
Council inquired whether the attendance numbers were high the week that the pool remained open. The Director of Public Works was not present but the Pool Supervisor was in the gallery and gave a brief report:

- Most customers held family passes
- Weather was too cold
- Not very cost effective to remain open based on these numbers
- Total money in for the week was $411

BA2 **C2: NE BC Resource Municipal Coalition**
Mayor Johansson and Councillor Gilliss attended this event. It was a great networking opportunity. Diane Hunter, City Manager for Fort St. John, has agreed to come to Hudson's Hope and speak with Council about the Coalition. Council agrees that a united front is best.

BA3 **NB3: Site C Money Allocation**
Clarification that this was in regards to the Grant in Lieu funding.

BA4 **BA1: Meeting with BC Ambulance**
An investigation has been initiated as to why there was another 2.5 hour wait. A report will be submitted.

Six participants are registered in the EMR course on October 6, 2014. This course is being offered only to BC Ambulance employees. All participants have been hired by BC Ambulance. More people are invited to apply.

BA5 **NB2: Water Valve Installation Update by Mike Carter**
Clarification that they were speaking about the valves in the water treatment plant.

7. DELEGATIONS:

D1 **Elisha Siemens: Indoor Pool Proposal**

- Distributed a survey and received 93 completed;
- 83/93 were positive (in favor of building an indoor pool);
- use funding from the Site C recreation incentives to fund building a pool;
- great winter activity;
- attraction and retention incentive;
- great physio for seniors, babies, children;
- keep children busy over the long winter;
- Hudson's Hope is the only Northern community that does not have an indoor recreation facility;
- Combine the arena, gym and indoor pool;
- There is available room at the arena for growth;
- Important aspect of the community;

- Increase employment opportunities;
- Would like to still see the outdoor pool utilized. Could look at opening it up during the 6-8 week downtime for maintenance;
- Lifeguarding teaches responsibility and accountability; and
- Would like Council to consider this as a priority.

One of the questions on the survey was whether residents would allow an increase in their taxes to see an indoor facility built. Only three of the positive response survey participants said no.

This matter to be referred to Staff for a feasibility and operational cost report.

RESOLUTION NO. 214
Councillors Quibell/Miller
THAT:
"Refer the Indoor Pool Proposal to the Recreation Committee and that the Recreation Committee keep in contact with Elisha Siemens regarding any new information."
CARRIED

A planning meeting to be scheduled for October 7, 2014 at 5:00 p.m.

8. STAFF REPORTS:

SR1 **Intern Update**
Devon to look at other locations for the Community Garden and speak to more members of the public regarding their interest.

SR2 **Vacant Lots**
FOR INFORMATION

SR3 **Signage Update**
RESOLUTION NO. 215
Councillors Quibell/Gilliss
THAT:
"Council approves the design for the destination kiosks as amended."
CARRIED

All writing is to be in white except for on the yellow background.

SR4 **Action and Other Updates by CAO**
Staff to look at scheduling a meeting with Colin Griffiths, NE BC Resource Municipalities Coalition.

SR5 **LGM: Light Industrial Area Preliminary Survey Plan**
FOR INFORMATION

SR6 **Valve Insertion**
RESOLUTION NO. 216
Councillors Brown/Heiberg

THAT:

"Council approve the expenditure of $113, 500 plus taxes as per the Pacific Flow Control Ltd. Quote for the purchase of the 16 live insertion valves for insertion in the 2015 fiscal year."

CARRIED

This does not include the cost of concrete. Staff to submit a report to council on the expense of concrete.

SR7 **North Peace Airport Borrowing**

RESOLUTION NO. 217

Councillors Gilliss/Heiberg

THAT:

"Whereas the District of Hudson's Hope Municipal Corporation is a member of the North Peace Airport Society (S-0036167) (the "Society");

And Whereas the Society desires to borrow funds, in the form of a collateral mortgage, of up to $15,000,000.00, from the Canadian Imperial Bank of Commerce ("CIBC").

The Council of the District of Hudson's Hope hereby resolves that the Corporation of the District of Hudson's Hope approves and consents to the Society borrowing of up to $15,000,000.00 from CIBC, and the granting to the CIBC of a mortgage and general assignment of leases and rents as security for the funds."

CARRIED

SR8 **UBCM Premier/Minister's Briefings**

FOR INFORMATION

SR9 **Baseball Field Maintenance and Repair Plan**

RESOLUTION NO. 218

Councillors Quibell/Miller

THAT:

"The state of the ball field be referred to Staff. Staff is authorized to take action and complete any works necessary and allotted for in the 2014 budget this fall and to budget for the remaining costs in 2015."

CARRIED

A report to be submitted to Council outlining costs.

9. BYLAWS:

B1 **Sewer Service Regulations Bylaw No. 841, 2014**

RESOLUTION NO. 219

Councillors Gilliss/Brown

THAT:

"Council adopt the Sewer Service Regulations Bylaw No. 841, 2014 this fifteenth day of September, 2014."

CARRIED

B2 **Water Service Regulations Bylaw No. 842, 2014**

RESOLUTION NO. 220

Councillors Quibell/Heiberg

THAT:

"Council adopt the Water Service Regulations Bylaw No. 842, 2014 this fifteenth day of September 2014."

CARRIED

B3 **Fees and Charges Bylaw No. 843, 2014**

RESOLUTION NO. 221

Councillors Quibell/Brown

THAT:

"Council adopt the Fees and Charges Bylaw No. 843, 2014 this fifteenth day of September 2014."

CARRIED

B4 **Parks, Campgrounds and Facilities Regulations Bylaw Amendment No. 844, 2014**

RESOLUTION NO. 222

Councillors Quibell/Bouillon

THAT:

"Council give adopt the Parks, Campgrounds and Facilities Regulations Bylaw Amendment No. 844, 2014."

CARRIED

10. CORRESPONDENCE:

C1 **2014 Northeast British Columbia Community Coal & Energy Forum**

RESOLUTION NO. 223

Councillors Quibell/Gilliss

THAT:

"Council authorize travel and expenses for two members of Council to attend the 2014 Northeast BC Community Coal and Energy Forum."

CARRIED

C2 **PRRD: Board Meeting News Letter**
FOR INFORMATION

C3 **Canada's Economic Action Plan Notice**
FOR INFORMATION

C4 **Emergency Resolution: Community Library Training Program**
FOR INFORMATION

C5 **UNBC Commemorative Tree**
FOR INFORMATION

C6 **Hudson's Hope Historical Society " The Gething Exhibit" Opening**
FOR INFORMATION

C7 **Murry Krause for UBCM 3rd Vice President**
FOR INFORMATION

C8 **Alaska Highway Community Society Report**
FOR INFORAMTION

11. REPORTS BY MAYOR & COUNCIL ON MEETINGS AND LIAISONS RESPONSIBILITIES:

CR1 **Mayor Johansson – 2014 Fall Fair**
Mayor Johansson thanked Councillor Miller for his help with the Fall Fair. It was a great turnout.

CR2 **Vancouver Press Conference and Media Releases**
Good turnout in Vancouver for the Press Conference.

CR3 **David Marshall, Fraser Basin Council, Review of Ambulance Model**
Mr. Marshall is conducting a review of the Ambulance model to see if a better model exists. This includes looking into the Paramedicine Model.

CR4 **Kelly Miller – Seniors/Telus Issue**
A senior citizen was without TV and telephone last week and was informed that it would not be fixed for over 30 days. Thankfully the problem has been rectified. However, Hudson's Hope has not been receiving very good service and currently is without six channels that we are supposed to have.

CR5 **Rebranding – Logo Mesh for the Arena Ice**
RESOLUTION NO. 224
M/S Councillors Miller/Gilliss
THAT:
"Council authorize the expenditure of purchasing our logo for the Arena ice given that a) there is money available in the rebranding budget, and b) there is a place for it on the ice."
CARRIED

Staff to look into proper placement of logos prior to purchasing.

CR6 **North Peace Economic Development Commission Meeting**
Councillor Gilliss attended the regular meeting. The NPEDC has successfully launched the Business Expansion and Retention program and hired a contractor to come to Hudson's Hope from October 27-30 to do a "blitz" and contact local businesses regarding their needs.

CR7 **Ice at Arena**
Staff will not be putting ice in at the Arena until the dehumidifier is installed.

CR8 **Downtown Revitalization – Flower Pots**
Councillor Gilliss provided a recap of the flower pot project that was launched in 2014. The purpose of this project was to engage the community and to distribute the pots throughout the community in an effort to encourage "beautification". All the pots were auctioned off at the Fall Fair and the project was an overall success.

Council will probably not be looking at doing the painting program again next year.

12. OLD BUSINESS:
None

13. NEW BUSINESS:
None

14. PUBLIC INQUIRIES:

PI1 **Lenore Harwood – UNBC Scholarships**

By signing membership cards and paying a $5 membership fee to the IUS, the citizens and communities of the region led a movement that became UNBC and symbolized hope for the future of the North and generations to come. A scholarship is now available for the descendants of those people. A write up will be in the October bulletin.

Sewer Backup

The sewer back-up last week effected many homes who are now looking at going through insurance and going to determine whether the Municipality is responsible. Lenore Harwood is waiting on a report back from the drain surgeon.

Staff to handle the issue.

RESOLUTION NO.225
M/S Councillors Heiberg/Gilliss
THAT:
"Council recess this Regular Meeting of Council and move In-Camera pursuant to Section 90. 1 (c) of the Community Charter." (9:45 p.m.)
CARRIED

15. ADJOURNMENT:

RESOLUTION NO. 229
M/S Councillors Brown/Miller
THAT:
"The Regular Council Meeting for September 15, 2014 be adjourned" (10:00 p.m.)
CARRIED

		Diarized	*Last Review/Action*
	DIARY		
	Conventions/Conferences/Holidays		
DY1	PRRD: Solid Waste Disposal	05/12/14	
DY2	Airport Resurface and Redevelopment	05/12/14	
DY3	Grubjesic Driveway	05/12/14	
DY4	Co-Op Correspondence Re: Card Lock	11/12/13	
DY5	Communications Expenditure	08/11/14	
DY6	Premiers BC Natural Gas Forum	08/11/14	

Certified Correct:

Clerk / Minute Taker

Chair

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

COMMITTEE OF THE WHOLE MEETING
October 7, 2014
5:00 P.M.
MUNICIPAL HALL COUNCIL CHAMBERS

Present: **Council:** **Mayor Gwen Johansson**
Councillor Kelly Miller
Councillor Richard Brown
Councillor Daniel Bouillon
Councillor Nicole Gilliss
Councillor Dave Heiberg

Staff: **CAO: Tom Matus**
Deputy Clerk: Laurel Grimm
Director of Protective Services: Robert Norton
Intern: Devon Flynn
Lead Hand: Ed Reschke

Other: **0** in gallery

1. **CALL TO ORDER:**
The meeting was called to order at 5:07 p.m. with Mayor Gwen Johansson presiding.

2. **ADOPTION OF AGENDA BY CONSENSUS:**
The September 2, 2014 Regular Council meeting agenda was adopted by consensus.

3. **DECLARATION OF CONFLICT OF INTEREST:**
None

4. **STAFF REPORTS:**
Community Long Term Capital Planning Projects
Council discussed the long term capital projects for the District of Hudson's Hope. A report is to be submitted by the Administrator.

5. **PUBLIC INQUIRIES:**
None

6. **ADJOURNMENT:**
RESOLUTION NO. 211
M/S Councillors Brown/Heiberg
THAT:
"The Committee of the Whole Meeting for October 7, 2014 be adjourned" (8:45 p.m.)
CARRIED

M2

		Diarized	*Last Review/Action*
	DIARY		
	Conventions/Conferences/Holidays		
DY1	PRRD: Solid Waste Disposal	05/12/14	
DY2	Airport Resurface and Redevelopment	05/12/14	
DY3	Grubjesic Driveway	05/12/14	
DY4	Co-Op Correspondence Re: Card Lock	11/12/13	
DY5	Communications Expenditure	08/11/14	
DY6	Premiers BC Natural Gas Forum	08/11/14	

Certified Correct:

Clerk / Minute Taker

Chair

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

DISTRICT OF HUDSON'S HOPE

Delegation to Council Request Form

Name of person or group wishing to appear before Council: Yellowhead Road & Bridge (North Peace) Ltd., General Manager: Norm McNee
Operations Manager: Chris Charbonneau, Quality Manager: Rodney Hafner

Subject of presentation: Pre-Winter Annual Meeting. Covers winter specifications and operational procedures

Purpose of presentation:
- [x] information only
- [ ] requesting a letter of support
- [ ] requesting funding
- [ ] other (provide details)

Contact person (if different than above): Rodney Hafner

Telephone number: (250) 329 - 4214

Email address: rodney@yrb.ca

Will you be providing supporting documentation? [x] Yes [ ] No

If yes:
- [x] handouts at meeting
- [ ] publication in agenda (one original due by 4:30 the Wednesday prior to your appearance date)

Technical requirements:
- [ ] flip chart
- [x] multimedia projector
- [x] laptop
- [ ] other

D1

Rules for Delegations:

1. fifteen minute maximum
2. name of person and or group and subject will be published in agenda (available to public and on internet)
3. direct your presentation to Council
4. Council may have questions
5. be courteous and polite
6. be respectful
7. is not a debate
8. don't expect an immediate answer
9. may not be on date requested as limit of three delegations per meeting on a first come, first served basis
10. bring enough handouts if your material is not published in agenda (the District will not provide reproduction services)

Helpful Suggestions:

- have a purpose
- get right to your point and make it
- be concise
- be prepared
- don't waste time
- state your request if any
- multiple-person presentations are still ten minutes maximum
- may be people in gallery who support or oppose you
- the Recording Secretary may ask for any relevant notes from you if not handed out or published in the agenda

I understand and agree to these rules for delegations

Rodney Hafner
Name of Delegate or Representative of Group

Signature

October 8, 2014
Date

For Office Use

☐ Approved ☐ Rejected

By (signature): _____ ☐ Mayor ☐ CAO

Appearance date if applicable: _____

Applicant informed of approval/rejection on (date): _____

By (signature) _____ Date: _____

DISTRICT OF HUDSON'S HOPE

Delegation to Council Request Form

Name of person or group wishing to appear before Council: Hudson's Hope Health Care & Housing Society; Suzan Bach and Sheila Martin

Subject of presentation: repeated sewer backups into real property owned by the above-named delegation.

Purpose of presentation:

- ☐ information only
- ☐ requesting a letter of support
- ☐ requesting funding
- ☑ other (provide details)

Action requested to determine the cause of this ongoing nuisance.

Contact person (if different than above): Bill Lindsay

Telephone number: 250-783-5557

Email address: cygne@pris.ca

Will you be providing supporting documentation? ☑ Yes ☐ No

If yes:

- ☐ handouts at meeting
- ☑ publication in agenda (one original due by 4:30 the Wednesday prior to your appearance date)

Technical requirements:

- ☐ flip chart
- ☑ multimedia projector
- ☑ laptop
- ☐ other _____

D2

Rules for Delegations:

1. fifteen minute maximum
2. name of person and or group and subject will be published in agenda (available to public and on internet)
3. direct your presentation to Council
4. Council may have questions
5. be courteous and polite
6. be respectful
7. is not a debate
8. don't expect an immediate answer
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- state your request if any
- multiple-person presentations are still ten minutes maximum
- may be people in gallery who support or oppose you
- the Recording Secretary may ask for any relevant notes from you if not handed out or published in the agenda

I understand and agree to these rules for delegations

Bill Lindsay

Name of Delegate or Representative of Group

Signature

07 Oct. 2014

Date

For Office Use

☐ Approved ☐ Rejected

By (signature): _____ ☐ Mayor ☐ CAO

Appearance date if applicable: _____

Applicant informed of approval/rejection on (date): _____

By (signature) _____ Date: _____

Wednesday, October 8, 2014

To: Mayor and Council
District of Hudson's Hope

Subject: Repeated Property Damage from Municipal Sewer Backups

The undersigned are owners of property on Garbitt Crescent and Dudley Drive.

On Monday morning, September 8, 2014, ten (10) dwelling units along Dudley Drive and Garbitt Crescent experienced a backing up of sewage into their respective basements. If this occurred to one unit only, the first suspected cause is a blockage in the sewer lateral pipe. But this basement flooding happened at the same time and these residences are in proximity to each other.

This is not the first time that basements in this vicinity have been flooded.

10211 Garbitt Crescent:
Ms. Martin purchased this property on September 30, 2011. The previous owners had backup issues, but she was told that the problem had been fixed by them plugging the floor drain in the laundry room. Her first experience with a backup happened on June 20, 2012 when the sewage came up through the shower drain. The insurance deductible was $500 and the insurance company paid $24,147.86. The sewer line was thoroughly snaked and there should have been no more problems.
The second time was February 3, 2014. Again Ms. Martin paid the $500 deductible and the insurance company paid $15,757.77. The sewer lateral was snaked again; however there was a suspicion that the pipe may be broken. So she hired CL Video who put a camera down the pipe all the way to where it joins up with the municipal sewer pipe, which is about 32 metres. This company then power washed the pipe and it looked good as new - no cracks, no breaks.
The repair estimate for the recent occurrence is $13,321.40. In addition the water heater had to be replaced as the sewage had soaked into the insulation surrounding the water tank.
As a result of these claims, her insurance company dropped her effective September 30. She is now a "hard to place homeowner" (high risk). She has been able to get another insurance company to issue a homeowner's policy but her deductible is now $2,500 and there is no sewer/water damage coverage. Because she cannot afford to renovate/repair her basement the next time there is damage, she is now forced to sell her house and the purchase price could be substantially reduced because of this history.

10215 Garbitt Crescent:
This is the house provided to our community's physician and when Dr. McLean resided there a sewer backup occurred. The cause was determined to be a collapse of the sewer lateral; and because it was located within the municipal road allowance, the repairs were made by the District of Hudson's Hope. The Drain Surgeon (Dawson Creek) was engaged to clean up the recent flooding damage and that cost is $9,157.71. Jock's Restoration (Dawson Creek) has been hired to repair the damage and the estimate is $11,422.94.
There was a previous sewer backup on June 20, 2012.

10200 Dudley Drive:
These are the row of ten townhouses just before Holland Street. Eight basement units were flooded on September 8th. Ms. Bach recalls a sewer backup during the second week of June 2013. Sewer backups have occurred in previous years, but the cleanup was always performed by employees of the family business. The specific documentation will take time to locate.

After comparing these repeating experiences, our conclusion is the municipal sewer system is causing these incidents of flooded basements.

During her address to the Council on September 15th, Mrs. Harwood advised the Council of these flooding damages. She was told that the municipality was claiming immunity under section 288 of the *Local Government Act*. This statutory provision states:

> "A municipality, council, regional district, board or improvement district, or a greater board, is not liable in any action based on nuisance or on the rule in the Rylands v. Fletcher case[1] if the damages arise, directly or indirectly, out of the breakdown or malfunction of
>
> (a) a sewer system,
> (b) a water or drainage facility or system, or
> (c) a dike or a road."

In *Port Alberni (City) v. Moyer*[2], the plaintiff successfully sued the City after flooding from a sewer backup damaged his basement. The City had a program, accepted by City council, of video inspection and sewer flushing, for both preventative maintenance and for emergency response. The City's program was supposed to flush 10% of the lines each year; by the year of the incident, they should have inspected all lines, but had not done so. The plaintiff succeeded even though the *Municipal Act* (as it then was) gave municipalities statutory immunity in an action based on nuisance or the rule in Rylands v. Fletcher.

We are requesting the municipality to engage a qualified engineer to determine what is causing these problems. Some years ago a camera system was used to record the state of the municipal sewer lines. It was a televised recording that also noted the traveled distance from each manhole as the images were recorded. Since that time, there may be root intrusions, a cracked pipe or the settlement of a sewer line. The manhole on Garbitt Crescent in front of the physician's residence is where the force main connects with the gravity sewer. Perhaps when the pump(s) at the sewer lift station at the Dudley Drive and Holland Street intersection is activated, that, at times, the volume of sewage being pumped into the gravity main exceeds its capacity so much so that the sewage flows backwards into adjacent lateral

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1 ***Rylands v Fletcher*** was a decision by the House of Lords which established a new area of English tort law. Rylands employed contractors to build a reservoir, playing no active role in its construction. When the contractors discovered a series of old coal shafts improperly filled with debris, they chose to continue work rather than properly blocking them up. The result was that on 11 December 1860, shortly after being filled for the first time, Rylands's reservoir burst and flooded a neighbouring mine, run by Fletcher, causing £937 worth of damage. Fletcher brought a claim under negligence. Ultimately this case lead to the development of the "Rule in *Rylands v Fletcher*"; that "the person who for his own purpose brings on his lands and collects and keeps there anything likely to do mischief, if it escapes, must keep it in at his peril, and if he does not do so, is *prima facie* answerable for all the damage which is the natural consequence of its escape".

2 [1999]B.C.J. No. 423 (B.C. Supreme Court).

pipes and floods the basements. Among other factors, the capacity of a gravity sewer line depends on its diameter, its grade and the smoothness of the walls. Are the elevations of the adjacent basement floors and the sewer main comparable?

Where a municipality chooses to provide a water, sewer and drainage system, it owes a duty to take reasonable care in construction, maintenance and operation of the system. By breaching this duty of care, such as by failing to have a reasonable inspection, maintenance and monitoring program in place, a municipality is vulnerable to a claim in negligence.

Thank you for your consideration of the foregoing.

Hudson's Hope Health Care & Housing Society Box 342 Hudson's Hope, BC, V0C 1V0 Property: 10215 Garbitt Crescent	Wayne Hammack, represented by Suzan Bach Box 209 Hudson's Hope, BC, V0C 1V0 Property: 10200 Dudley Drive	Sheila Martin Box 246 Hudson's Hope, BC, V0C 1V0 Property: 10211 Garbitt Crescent

THE DISTRICT OF HUDSON'S HOPE

REPORT TO: **Mayor Johansson and Council**

SUBJECT: **ACTION and other UPDATES**

DATE: **October 14, 2014**

FROM: **Tom Matus, CAO**

UBCM Minister's Meetings
Reports of the meetings with the Ministers are included in this agenda package.

Water Main Valve Insertion Project
PFC has been secured for the valve insertion, we will send out a purchase order November 3rd, as per their request, and provide a 30% deposit. They will hold the valves at their location and truck them up at time of project. We will work over the winter to secure excavation work on this project.

L&T PLA
L&T has agreed to most of the conditions of the PLA, I will be speaking with them and our lawyer for the best direction to take on this matter.

Lynx Creek River and Watershed
It has been determined that there are heavy metals by the two separate tests that have been completed and the water advisory is still in effect.

Dudley St Sewer Back-up
This incident occurred sometime during September 7th - the day after BCH had done its Planned Electrical Outage, and September 8th.

We believe that due to the power outage (and the pumps being off-line) a blockage occurred in the sewage pipe at the east end of Garbitt Crescent as sewage only back flowed into the row house and some houses in Garbitt Crescent, not east of this point.

Initially when the pumps went back on-line after the planned power outage the lift station had accumulated a large amount of waste, for some reason a pump dislodged from the rails cutting the electrical feed in two places, this piece of wire then got sucked up into the 2nd pump and shut that pump down, completely shutting down the lift station – again, this allowed for more sewage to accumulate in the lift station well. The sewage overflow had not yet occurred. We note that there is low grade to the east on these lines.

I assume that the blockage occurred as per the following:

While the pumps were off-line "solid waste" from residents was still accumulating in the sewer main, while the lift station was down. Because there was no liquid flow from the lift station, (which would add fluid to assist in the movement of solids), the solids where not moving also due to the low grade of the sewer main. Eventually enough solids accumulated in the sewer main to cause a blockage. Build up into the main as people were still using their toilets while the lift station was down due to the power outage and pump breakdown. I suspect our pump breakdown happened shortly after the second power outage – hence the large amount of waste in the lift station well. Once the pump problem was corrected, sewage was pumped up into Garbitt Crescent line backing up into the Garbitt Crescent and row house residences. Once enough

head pressure built up at the block it removed the block in the pipe but not before sewage backed up into the residences. To note when the pumps stop at the lift station sewage flow is to the east.

The pool water was not the issue, the pool water was not drained into the sewage system – this issue had nothing to do with the emptying of the pool.

We have arranged to acquire an alarm plan/alert system: it is proposed that this system will connect to the Dudley Lift Station then to the arena by radio link and then into the arena telephone dialer. This will be the beginning of a community wide, (district owned property alarm system). The cost for the system to address our lift station issue will be in the cost range of $3K-$5K. Administration requests the Council approval for this Sewer O&M expenditure.

We are also going to refit our pumps with impellors that act more like grinders. Presently we are sending our spare pumps to Flygt to be refitted with these "grinder" type impellors so as to reduce the possibility of debris entering the pumps/line and the pumps coming off the rails. I suspect when debris enters into our current pumps it causes the pumps to rock and come off the rails.

Combo VAC/Flusher Truck

I have forwarded to Urban Systems a request to determine the optimal size truck for Hudson's Hope, as well to determine if a combo **Vacuum/Flusher/Steamer** truck is available. Discussion with the CAO in Chetwynd notes that the DPW considers it there most valuable piece of equipment due to versatility, low maintenance and frequency of use.

Arena Opening

Issues with the scheduling of the Refrigeration technician occurred whereby on two occasions the service man did not keep his appointments: Friday, September 26th and then Monday, September 29th. As well, the Arena Operator had to train the three personnel whom where to work with her, they having no previous experience or background on painting the ice, the new logo is becoming a challenge to place. We have hired a casual to assist her and I have approved 4 man-hours of overtime for the week-end of October 4th and 5th.

Arena will be open for the Thanksgiving week-end.

Emergency Medical Responder course

As per Jodie Marshall (truncated) email:

Unfortunately the Emergency Medical Responder course scheduled for October 06-24 in Hudson's Hope has been postponed due to low enrolments (2 students we registered). Students have been notified.

BC Ambulance Service staff discuss next steps.

Jodie Marshall
Manager, Medical Responder Programs
Paramedic Academy | School of Health, Community & Social Justice

Baseball Field

Speaking with Lanny it seems there is not much to do on the baseball field during the fall; but having said this I inspected the arena with Ed and we found that there is a 2" waterline that runs along the ceiling over the change rooms to the concession. I have found that this 2" pipe is adequate to feed the irrigation system.

Our initial plan was to try and have Jason Hopkins of Storm Irrigation Services Ltd, the fellow who provided us the $15K quote come in the latter part of October to install the system and seed to apply after the system installation then getting soil from Omar Kirkeeng, (application of soil to occur next year).
The expenses required to do work this fiscal year: approximately $20K:

Sweep out gravel: bobcat rental	$ 500
Irrigation System, installed):	$ 15,000
Soil - I estimate 15 loads @ $200/double tandem axle truck load (Omar):	$ 3,000
Seed and miscellaneous	$ 2,000

	$20,500
	======

I don't suspect it would be more than 15 truckloads.

I inspected the arena and found that there is a 2" waterline that runs along the ceiling over the change rooms to the concession. I have found that this 2" pipe is adequate to feed the irrigation system – as per Jason Hopkins. Then next spring we can extend/attach the waterline from the 2" pipe within the arena. We will extend it through the wall and bury it to the ball field – we will need approximately 60 feet of 2" piping.

After consultations with Councillor Dave Heiberg, and staff Lannie Rhymer we have determined there is not much to do on the baseball field during the fall so the above plan will be deferred to next year. This will cause the field to be closed for the year after the baseball tournament in June. Lannie is available to discuss any issues should you want any clarification, and will provide another report to be included in this agenda package.

NEBCRMC
Could not meet on October 14th; this item will be put on their meeting agenda of October 22nd to determine a date to meet.

On October 10th I received the following email from Colin Griffiths (with the attached agenda):

Mayor Johansson and Tom;

Please accept this as a formal invitation you and your Council, and staff, to attend the Mayor's Partnership meeting to be held in Fort St John, on October 22nd, 2014. The agenda is attached for your review.
Much appreciated!

Colin Griffith
Executive Director
Interim

MSWG - CKD
In regard to the contribution to the Dr.'s salary CKD had agreed to:

CKD's General Manager, Frank Wang, has asked that our company be removed from the Medical Services Group.

To date we have not moved any employees into Hudson's Hope and therefore have not required any services from Hudson's Hope. Our project was delayed by a costly 10 months due to the Judicial Review filed by the West Moberly First Nations and now we are waiting for 'Court of Appeal' which West Moberly First Nations filed for on June 25, 2014. The earliest this court hearing will be is sometime in Q2 of 2015. There

is now a possibility that the project could either be stopped or on hold for at least 2 years. The Board will make this decision hopefully by month's end.

Our Board has frozen all of our donations and we are on a very strict budget. We laid off over 1/2 of our staff and the staff remaining have been placed on 'part time'.

Frank Wang and the Board have told me we do not have the money in our budget to pay for past medical expenses.

If this project does move forward than we will participate actively with the community of Hudson's Hope and the Medical Services Group.

Judy Matkaluk

BCH - Access Notifications for Oct. 15-17, 2014

In regard to the drill holes lease agreement ($12K), BCH will be accessing the lands to affect geotechnical surveys on those lands we gave permission:

Further to our telephone conversation today I'm sending this email to confirm the engineering (geotech.) field crew have requested access to the drill-holes (piezometers) located on land owned by the District of Hudson's Hope or within road allowance to conduct visual inspections and readings of the piezometers. Access is requested to occur between Oct. 15th-17th, 2014 to the following properties:

1. The soil and freehold or right of possession of the non-arterial public highway or road described as that portion of Kyllo Street, Hudson's Hope, located South of Dudley Drive;
2. To the extent that the Licensor is vested with the soil and freehold or right of possession of the non-arterial public road known as D.A. Thomas Road, Hudson's Hope, which road is more particularly shown as "Road" on Highway Plan H-733;
3. PID 011-763-418 - Block A of the North East ¼ Section 19 Township 81 Range 25 West of the 6th Meridian Peace River District Except Plan H626;
4. PID 011-427-302 - Lot 1 Section 11 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 17478; and
5. To the extent that the Licensor is vested with the soil and freehold or right of possession of the following portion or area of non-arterial highway or road:

a. That portion or area immediately south and southeast of PID 013-886-029 Parcel B (Plan B6436) of Block 7 Section 19 Township 81 Range 25 West of the 6th Meridian Peace River District,

If you require any further information or would like to discuss further please send me an email or call me on my cell at 778-886-7566.

Tom Matus, CAO

THE DISTRICT OF HUDSON'S HOPE

REPORT TO: **Mayor Johansson and Council**

SUBJECT: **5 Year Strategic Capital Planning Session**

DATE: **5:00pm, Tuesday, October 7, 2014**

FROM: **Tom Matus, CAO**

District of Hudson's Hope Committee of the Whole met to strategize and prioritize Capital Planning for the 5 year fiscal periods of 2015-2019.

Council determined that Water, Sewer capital projects would take first priority; all general capital projects will be 2nd priority.

The priority listing is attached and will be tabled at the next budget meetings.

The following items were discussed:

1. the recent sewer back-up into homes;
2. placement of a DPW shop;
3. the hiring of a Project Engineer/Manager;
4. the purchase of a vacuum truck: staff is to provide financial and logistical info on the pros and cons of purchasing a combination vacuum truck;
5. staff is to research grant possibilities for sidewalks, (as well as for any other capital purchases);
6. check to see if the solar panels at the pool are working;
7. water testing invoice from G. Wendling;
8. The state of weeds at the proposed ATV campground.

Tom Matus, CAO

SR2

CAPITAL PROJECTS 5 YEAR

		Description	2015 Total Cost - 2015	Other Funding	Municipal Funding	2014	2015	2016	2017	2018	2019	2020
GC		Street Sweeper	$250,000		$250,000	$250,000						
GC		Combination Vacum/Jetrodder	$350,000		$350,000	$350,000						
WT		Replacement water Tanker	$300,000			$300,000						
GT		Thermal Imaging Camera	$8,500			$8,500						
WC	1	Valve Insertion (with cement box?)	$460,000		$460,000		$460,000					
WC	1	Valve excavation	$325,000				$325,000					
WC	1	Water Meters	$85,000		$85,000		$85,000					
WC	2	Backup Generator for WTP & river pumps	$100,000		$100,000		$100,000					
WC	3	Gate Valve at WTP	$10,000		$10,000		$10,000					
GC	4	Public Works Shop - Design/construction	$2,000,000		$2,000,000		$2,000,000					
SC	5	Wastewater Treatment Upgrade: Lagoon	$3,000,000		$3,000,000		$3,000,000					
GC	6	Back Up Generator District Office	$80,000		$80,000		$80,000					
GC	7	Landfill (recycling shed/oil contaiment)	$30,000		$30,000		$30,000					
GC	8	Ball Diamond Upgrade	$30,000		$30,000		$30,000					
GC	9	Light Industrial land Purchase	$285,000		$285,000		$285,000					
WC	10	Beryl Prairie Well Rehab	$50,000		$50,000		$50,000					
GC	11	Gravel Crushing	$150,000		$150,000			$150,000				
GC	12	Sidewalks	$1,000,000		$1,000,000				$1,000,000			
GC	15	Emergency Response Vehicle	$400,000		$400,000				$400,000			
GC	16	BP Firehall Extension	$160,000		$160,000			$160,000				
WC	17	Beryl Prairie Well Rehab	$50,000		$50,000			$50,000				
GC	18	ATV Campground	$100,000		$100,000			$100,000				
GC	19	Pool Enclosure	$2,274,000		$2,274,000							$2,274,000
WC	20	Water Main Replacement	$8,000,000	$4,000,000	$8,000,000							$12,000,000
GC	21	Roadway Surface Repairs	$2,000,000		$2,000,000							$2,000,000

REQUEST FOR DECISION

Date: September 14 2014
Originator: Robert Norton, Director of Protective Services
RFD TITLE: Rogers Cell Tower Approval

BACKGROUND:

Rogers is proposing to construct a 44.9 metre telecommunications tower in the District of Hudson's Hope, and is required by Industry Canada to follow the Industry Canada default community consultation process. As part of this process Rogers has completed a public consultation process which consisted of the following actions:

- On August 13th, 2014, 10 Notification packages were issued to property owners, occupants and other recipients that fall within three times the tower height (134.7m) of the proposed location.

- On August 19th and 26th notice of proposed tower proposal was placed in the Alaska Highway News.

The required 30 day consultation period concluded on September 21st, 2014, and no written comments were received by Rogers regarding the proposed tower.

Rogers is requesting that if Council concurs with the proposed tower construction that a letter or resolution of concurrence be issued.

RECOMMENDATION / RESOLUTION:

"Council approve the proposed Rogers telecommunications tower project".

Robert Norton, Director of Protective Services

Tom Matus, CAO

REQUEST FOR DECISION

Date: October 14, 2014
Originator: Robert Norton, Director of Protective Services
RFD TITLE: Fire Department Water Tanker Tender Award

Council approved $300,000.00 in the 2014 capital budget for the purchase of a replacement water tanker to be placed in service by Hudson's Hope Fire & Rescue Service. This apparatus would replace a 33 year old water tanker that has vastly exceeded its useful life cycle.

Tender DHH 2014-48 was posted on BC Bids for 30 days in August 2014 to identify a proponent to supply the apparatus and accessory equipment, which resulted in three (3) bids being received for the apparatus and accessory equipment, and one (1) bid from Guillivan Safety for the supply of the accessory equipment only.

The bids received were as follows:

Hub Fire Engines

Apparatus	$ 261,711.00
Accessory equipment	$ 8,210.00
Total	$ 269,921.00
GST	$ 13,496.05
PST	$ 18,894.47
Total Cost	$ 302,311.52

Rosenbauer/Rocky Mountain Phoenix

Apparatus	$ 287,820.00
Accessory equipment	$ 8,920.00
Total	$ 296,740.00
GST	$ 14,837.00
PST	$ 20,711.80
Total Cost	$ 332,348.80

Spartan ERV & Vimar Emergency Equipment

Apparatus	$ 300,339.00
Accessory equipment	$ 11,750.00
Total	$ 312,089.00
GST	$ 15,604.45
PST	$ 21,846.23
Total Cost	$ 349,539.68

Guillevin Safety

Apparatus	n/a
Accessory equipment	$ 10,082.76
Total 10082.76*0.07	$ 10,082.76
GST	$ 504.14
PST	$ 705.79
Total Cost	$ 11,292.69

The selection criteria utilized to evaluate the tenders submitted included the following:

- Total price for "Goods"
- Manufacturing and delivery schedule.
- Warrant and warrant details.
- Proponent's demonstrated capabilities and qualifications.
- Service Center location(s).

Based on an evaluation of each bid against this criteria it is recommended by Staff that the tender be awarded to Hub Fire Engines for the apparatus and accessory equipment.

Official Community Plan (OCP) Compliance

Council's goals within the Social Needs and Culture section of the OCP include the one listed below and this acquisition supports this goal.

Goal

- Continue to provide a high level of protective services (fire and police) in the community.

RECOMMENDATION / RESOLUTION:

"Council award Tender DHH 2014-48 for one (1) fire tanker apparatus and accessory equipment to Hub Fire Engines for the total price of $ 269,921.00 excluding GST and PST.

Robert Norton, Director of Protective Services

Tom Matus, CAO

THE DISTRICT OF HUDSON'S HOPE

REPORT TO: **Mayor Johansson and Council**

SUBJECT: **2014 UBCM Honourable Christy Clark, Premier of British Columbia Meeting**

DATE: **3:40-3:55, Tuesday, September 23rd,**

FROM: **Tom Matus, CAO**

Mayor Gwen Johansson, Councillors Dave Heiberg and Kelly Miller, and I met with Minister Steve Thomson and three of her aides; Energy and Mines Deputy Minister Dave Nikolejsin.

1. Site c was discussed and items broached are as follows:

District of Hudson's Hope:

1. The Urban systems Backgrounder document was presented to the Premier for her perusal;
2. District of Hudson's Hope was most impacted community;
3. Berm construction;
4. Reservoir from river: 18-20% within HH;
5. Inundation of lands;
6. Road relocation;
7. Statutory Right of Way on banks;
8. Impact lines - no permanent structures within;
    a. Prime /choicest lands taken out of circulation/market: 4500 acres;
9. Infrastructure losses;
10. Cost estimates: JRP no comment;
11. Alternative sources - independent power producers;
12. BCUC - independent regulators;
13. BCUC: formed to review Site C;
14. Request commitment to defer Site C to BCUC;

Premier:

1. BCUC may not have capacity to review Site C;
2. LNG fails then what?
3. JRP: Geothermal - not well informed;
4. LNG an alternative though impact on environment and ratepayers;
5. Government supports clean energy;

District of Hudson's Hope:

1. incentives for LNG;
2. LNG can burn but not others;

Premier:

1. Need to create a balance with power production;

325

2. 97% renewables in BC;

District of Hudson's Hope:
1. subsurface rights;
2. burning gas anywhere is the issue;

Premier:
1. Need to reduce environmental impact;
2. Produce clean LNG reduces overall impact - UBC to move technology forward in this field;

District of Hudson's Hope:
1. 2 dams: District of Hudson's Hope never benefitted;
2. Grants in Lieu?
3. Legacy Term Sheet?

We ended the meeting under the distinct impression that the Premier was firmly in favour of the Site C Clean Air Project.

Attached, please find the Brief I submitted to the Premier's Office.

Tom Matus, CAO

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Box 330
9904 Dudley Drive
Hudson's Hope BC V0C 1V0
Telephone 250-783-9901
Fax 250-783-5741

MEETING WITH:

THE HONOURABLE CHRISTY CLARK

PREMIER OF BRITISH COLUMBIA

UBCM – WHISLTER, BC,

SEPTEMBER 2014

District of Hudson's Hope Attendees:
Mayor Gwen Johansson
Councillor Dave Heiberg
Councillor Kelly D. Miller
CAO Tom Matus

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

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Fax 250-783-5741

The District of Hudson's Hope representatives: Mayor, Gwen Johansson; Councillor Dave Heiberg; Councillor Kelly Miller and CAO Tom Matus, would like this opportunity to discuss with the Honourable Christy Clark, the following aspects of the Site C Clean Energy Project:

Site C Clean Energy Project BCH Mitigation/Compensation Agreement:

As per our Mayor Gwen Johansson's Open Letter to the Honourable Premier Christy Clark we would like to reiterate the contents of this letter which asks for a BC Utilities Commission Review; and

To make aware of the severe and lasting negative impacts, (more than any other community will bear), that Site C will have on the District of Hudson's Hope. Namely, that residential properties of which most are situated along the Peace River bank, (choice property), including those properties behind the berm will change from Residential zoning to Farmland zone status and of course other Residential properties that will be flooded and taken from the assessment roll, specifically those properties located in the Lynx Creek sub-division; and last but not least Class A Agricultural property that will be taken out of use due to flooding. The District of Hudson's Hope will lose property tax revenues over the 100 year life of the project: and compensation BC Hydro is offering for this, $160,000.00?

This compensation does not include past transgressions against the District of Hudson's Hope such as: the Site C Regional Legacy Fund which was to address the historical and future industrial development needs associated with the construction of a new hydro facility, which the District of Hudson's Hope did not sign for the following reasons:

1. The Regional model is based 60% on population and 40% on impact which is inconsistent with a legacy fund created to address impact. The fund must be weighted more toward impact than to population.
2. The Legacy Fund was intended to be for the benefit of impacted communities but the fund is not available during the decade of construction and highest impact.
3. The identified financial benefits will not be paid until the facility begins operation more than a decade from now but the funding is fixed in 2012 dollars resulting in a significant erosion of funds depending on future inflation levels. The fund needs to be indexed yearly.
4. The District of Hudson's Hope requested that approval of a Regional Legacy Fund require unanimous consent of all municipalities and that principle was not adopted.
5. The term of the agreement must be for as long as the facility operates and not set at 70 years. Allocation (10.99% of the total legacy funding) to the District of Hudson's Hope that we feel was and still is unfair.
6. Whereas the District of Hudson's Hope is the municipality the most impacted should Site C be constructed an allocation of the Site C Regional Legacy Fund should be distributed on a 60% Impact and 40% population with the impact weighting remaining unchanged.

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Box 330
9904 Dudley Drive
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7. Also specific legislation (Order in Council) was enacted for BC Hydro Grant in Lieu to the District of Hudson's Hope for the two constructed dams and reservoir (includes Site C), currently in the amount of $1,225,000 – grants for power generating facilities; should this have been treated as the Columbian Basin Trust Agreement we would have been receiving considerably more. To note the District of Hudson's Hope produces 30% of the Province's electricity;

Other facts to consider:

1. Taxes and Grants in Lieu for Hydro Electric Facilities in BC: there was massive infrastructure investments in the town site when Williston Reservoir/ W.A.C. Bennett Dam was established as water/ sewer/ roads/ rec/ swimming pool but very little contribution since;
2. BC Hydro employee (and their families) numbers resident in the community has dropped steadily over the last 30 years;
3. cumulative impacts upon the community's natural beauty and built assets;
4. The sterilization of lands within the community for future development (as noted above).
5. Agricultural land losses and impacts to traditional community economic activities.

Following attachments are provided:

1) Open letter to BC Premier Christy Clark
2) Backgrounder
3) Purchased Properties for Site C
4) Term Sheet for Site C Regional legacy Benefits Agreement
5) Review of the Proposed Site C Clean Energy Project: Exploring the Alternatives
6) Taxes and Grants in Lieu for Hydroelectric Facilities

We thank you for taking the time to meet with us and we look forward to further dialogue in the near future with you and your Ministry on this matter.

Mayor, Gwen Johansson
Councillor Dave Heiberg
Councillor Kelly D. Miller
CAO, Tom Matus

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Open Letter to BC Premier Christy Clark

July 15th, 2014

The Honourable Christy Clark
Premier of British Columbia
P.O. Box 9041 Stn. Prov. Govt.
Victoria, B.C. V8W 9E1

Dear Premier Clark,

Re: British Columbia Utilities Commission Review of Proposed Site C Dam Project

I am writing to urgently request that you refer the proposed Site C Dam Project to the British Columbia Utilities Commission (BCUC) for further review of project costs, alternatives to Site C, and related issues prior to making a decision on this project.

Prudent Fiscal Management Requires Further Review of Site C

The District of Hudson's Hope, a community of 1,100 people in the heart of the Peace River Valley, will be more adversely impacted than any other municipality by the proposed Site C dam.

Understandably, we wish to ensure that these adverse community and environmental impacts and the $7.9 billion cost of the proposed Site C project are justified and necessary for meeting British Columbia's future electricity needs.

The proposed $7.9 billion Site C project may also be the largest provincial public expenditure of the next 20 years, adding over 10% to our growing $62 billion provincial debt. BC taxpayers, whether they live in Hudson's Hope, Penticton, Surrey, Comox, Coquitlam, Prince George, Vancouver, Delta, Victoria or any other BC community, reasonably expect the government to subject Site C project costs and alternatives to open, rigorous and independent review with full procedural safeguards before committing to such a large capital expenditure.

Rating agencies such as Moody's call this prudent fiscal management. When Moody's reaffirmed B.C.'s triple-A credit rating in May of this year, it was accompanied by a negative outlook due to accumulation of provincial debt. Moody's said,

> "The negative outlook reflects the risks to the province's ability to reverse the recent accumulation in debt given a softened economic outlook, weaker commodity prices and continued expense pressures."

What better way to demonstrate prudent fiscal management than to subject Site C project costs and alternatives to open, rigorous and independent scrutiny by the BCUC?

Yet this is not what has happened - at least to date. The Site C Joint Review Panel (JRP) was prevented by a combination of BC law, public policy, terms of reference, and a lack of information from fully scrutinizing key project elements including project costs and alternatives to Site C[1]. However, this did not prevent the JRP from flagging its concerns about project costs:

> "The Panel cannot conclude on the likely accuracy of Project cost estimates [by BC Hydro] because it does not have the information, time or resources. This affects all further calculations of unit costs, revenue requirements and rates."

Or asking questions about alternatives such as natural gas:

> "Finally, if it is acceptable to burn natural gas to provide power to compress, cool, and transport B.C. natural gas for Asian markets, where its fate is combustion anyway, why not save transport and environmental costs and take care of domestic needs?"

To ensure proper scrutiny, the JRP recommended on May 1st, 2014 in its 457 page final report that a number of matters be referred to the BCUC for further review[2]. The JRP noted, "...available resources could provide adequate energy and capacity until at least 2028" and accordingly there is time available for the BCUC to do this work.

However, Minister of Energy and Mines, Bill Bennett was quick to dismiss further scrutiny. On May 8th, 2014, the same day as the report's public release, Minister Bennett said:

> "...I think that the work has been done and I think subjecting it to another review after all the years the project has been studied is not a good use of public money..."

Madame Premier, this defies prudent fiscal management. BC needs to complete its homework on Site C.

Hudson's Hope, BC taxpayers and rating agencies such as Moody's need to be fully satisfied that this $7.9 billion project will not be characterized as a white elephant that transformed the beautiful Peace River Valley into a dam reservoir, increased the provincial debt by over 10%, and put BC's strong fiscal management record at risk.

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[1] JRP findings:

- The Panel concludes that, basing a $7.9 billion Project on a 20-year demand forecast without an explicit 20-year scenario of prices [by BC Hydro] is not good practice. Electricity prices will strongly affect demand, including Liquefied Natural Gas facility demand.
- The Panel concludes that demand management does not appear to command the same degree of analytic effort [by BC Hydro] as does new supply.
- The Panel concludes that a failure [of BC Hydro] to pursue research of the last 30 years into B.C.'s geothermal resources has left BC Hydro without information about a resource that BC Hydro thinks may offer up to 700 megawatts of firm, economic power with low environmental costs.

[2] Please refer to JRP recommendations 46,47,48 and 49.

Urban Systems Report Supports Need for BCUC Review

Recognizing these major uncertainties, the District of Hudson's Hope retained Urban Systems Ltd. to review the findings of the JRP Report, and compile information from the proposed project's Environmental Impact Statement, BC Hydro's Integrated Resource Plan, and other relevant resources and data to examine the following key question:

> Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

We are attaching a copy of the Urban Systems report entitled, "*A Review of the Proposed Site C Clean Energy Project: Exploring the Alternatives*" for your consideration.

The JRP concluded that BC Hydro has not fully demonstrated the need for this project on the timetable set forth and Urban Systems has also concluded that a commitment to the proposed Site C is project is likely premature:

> "The material cited within this document suggests that a commitment to the proposed Site C project is likely premature before the British Columbia Utilities Commission undertakes a review of the proposed project costs and long-term energy needs, including the comparative costs and benefits of potential alternatives. And as the JRP notes there is time to do this work. "

Urban Systems reviewed 5 alternative scenarios to Site C including retrofits and upgrades, geothermal, other renewables and enhanced demand side management, natural gas/cogeneration, and emerging technologies. Urban Systems concludes:

> "...there are likely alternatives which could be cost-competitive and viable to meet future electricity needs."

A preliminary comparison of selected alternatives to Site C suggests that BC could pursue these alternatives and potentially save over $ 5 billion in project costs. The "accumulation of debt" by the province would be significantly reduced. Please refer to Table A.

Finally, Urban Systems cautions that emerging trends could result in a risk to ratepayers:

> "Three trends are occurring simultaneously that could substantially reduce the need for the proposed Site C project and affect BC Hydro's forecasted revenues, thus limiting its ability to pay for such an asset over its 70 year amortization period. These three trends include: increases in BC Hydro electrical rates, the decreasing cost of solar photovoltaic (PV) modules, and the commercialization of micro grid enabling technologies."

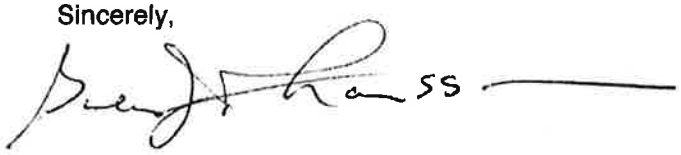
Conclusion

With the benefit of the information contained in this letter, I urge you to do what is fiscally prudent and makes common sense - refer the proposed Site C project to the BCUC for open, rigorous and independent review of project costs, forecasted revenues and less costly alternatives to Site C prior to making a decision on this project.

To do anything less for the largest and most expensive public project in BC in the next 20 years is imprudent, especially for a government that prides itself on its triple-A credit rating.

I would appreciate a written response from you by July 31st, 2014.

Sincerely,



Mayor Gwen Johansson

Table A
Comparison of Capacity & Cost of Selected Potential Alternatives to Site C[1]

	Proposed Site C Project	Mica Dam 2 New Turbines	Natural Gas Fired Generation[2]	Burrard Thermal Upgrade	Solar	Geothermal
Capacity						
Megawatts(MW)	1,100	1,000	1,100	875	1,100	1,100
Terawatt hours per Year	5.1			6.1		
Capital Cost						
Estimated Total Capital Cost	$7.9 billion to $10.3 billion	$800 million	$1.9 billion	$1.0 billion	$2.50 billion	$2.75 billion
Potential Savings	-	$7.1 billion to $9.5 billion	$6.0 billion to $8.4 billion	$6.9 billion to $9.3 billion	$5.4 billion to $7.8 billion	$5.15 billion to $7.55 billion
Provincial Debt						
Estimated Cost as % of Provincial Debt ($62 billion)	12.7% to 16.6%	1.3%	3.1%	1.6%	4.0%	4.4%
Unit Cost of Electricity						
Target Cost per Megawatt Hour (MWh)	$110 per MWh	To be determined	$30 per MWh	To be determined	$60 per MWh	$ 88-92 MWh
Potential Savings[3]		-	73%	-	45%	16-20%

[1] This Table was prepared by Hudson's Hope to illustrate the potential cost and provincial debt implications for a sample of alternatives to Site C.
[2] This estimate is based on the Shepard Energy Facility near Calgary, Alberta. The potential savings under this scenario are significant and thereby leave room for investment in emission reduction technologies and carbon offsets, as well as mitigation strategies to address potential natural gas price fluctuations.

BACKGROUNDER

B.C. UTILITIES COMMISSION REVIEW OF PROPOSED SITE C DAM PROJECT

BACKGROUND

The BC government is considering committing British Columbia taxpayers and ratepayers to what could well be the largest public infrastructure expenditure in a generation: the estimated $7.9 billion Site C dam project.

However, despite repeated requests, the government is refusing to allow the B.C. Utilities Commission to conduct an independent and expert review of whether we need the Site C project, or what this project might actually cost British Columbians.

The only independent review to date, which was conducted by the federal/provincial Joint Review Panel, found that:

1) The need for Site C has not been established
2) The cost estimates and rate impacts for Site C could not be verified and need further scrutiny
3) Site C should not proceed without expert and independent review of the Project by the B.C. Utilities Commission

"The Panel concludes that the Proponent has not fully demonstrated the need for the Project on the timetable set forth."

"The Panel cannot conclude on the likely accuracy of Project cost estimates because it does not have the information, time, or resources. This affects all further calculations of unit costs, revenue requirements, and rates."

"The Panel concludes that, basing a $7.9 billion Project on a 20-year demand forecast without an explicit 20-year scenario of prices is not good practice. Electricity prices will strongly affect demand, including Liquefied Natural Gas facility demand."

(Joint Review Panel Report, pp. 280, 287, 306)

B.C. UTILITIES COMMISSION—EXPERT AND INDEPENDENT REVIEW OF SITE C PROPOSAL

The Joint Review Panel was stark in its determinations about the unreliability of proceeding with Site C without proper and thorough regulatory oversight. British Columbians risk embarking upon a massive expenditure which is based on unreliable estimates, and may not even be necessary.

When the government exempted Site C from B.C. Utilities Commission Review in 2010, it told us that it was doing so to ensure that this "critical project" would not be subject to an "unnecessary" process before the B.C. Utilities Commission, and that the public interest would be protected by a robust and independent environmental review process.

(Hon. B. Lekstrom, May 26, 2010, V. 18 N. 8, Second Reading Bill 17 *Clean Energy Act* http://www.leg.bc.ca/hansard/39th2nd/h00526p.htm#5787)

We have now had that independent environmental assessment process, and it has clearly determined that Site C is not a "critical" project at this time, and that review by the B.C. Utilities Commission is not "unnecessary"—quite the opposite.

RECOMMENDATION 46

If it is decided that the Project should proceed, **a first step should be the referral of Project costs** and hence unit energy costs and revenue requirements **to the BC Utilities Commission for detailed examination.**

RECOMMENDATION 47

The Panel recommends that BC Hydro **construct a reasonable long-term pricing scenario for electricity and its substitutes and update the associated load forecast**, including Liquefied Natural Gas demand, and that this be **exposed for public and Commission comment in a BC Utilities Commission hearing, before construction begins.**

RECOMMENDATION 49

The Panel recommends that, if Ministers are inclined to proceed, they may wish to consider referring the **load forecast and demand side management plan details to the BC Utilities Commission**.

Joint Review Panel Recommendations

The onus is now on the BC government to follow the recommendations of the Joint Review Panel, and allow the B.C. Utilities Commission to do its job: to make an expert and independent determination of whether we need the project and what it will cost us. Review by the B.C. Utilities Commission is in the public interest: it allows for independent review, informed by experts who are tested by cross-examination. And very importantly, it is in a public forum.

This is one of the most important energy policy choices to be made in a generation in British Columbia, and should not be made behind closed Cabinet doors. There is no sound basis for the exceptional exemption of the Site C Dam from B.C. Utilities Commission review.

1) We have time for BCUC review. If we rush into building Site C now, we will be faced with an energy surplus under which we will be forced to sell power at a significant loss to export markets like California for several years: "BC Hydro projects losing $800 million in the first 4 years of operation." (Joint Review Panel (JRP) Report p. 298 and p. 273).
2) Cost of review is minor compared to an estimated $7.9 billion (potentially unnecessary) expenditure.

Parameters for the BCUC review should ensure:

1) Timely review and determination, within one year of referral to the Commission.
2) Sufficient yet cost-effective funding for the review process, the budget for the review not to exceed 1/3rd of 1% of Site C project cost.
3) Consideration of all options, including allowing the BCUC to consider options the Joint Review Panel was prevented from reviewing because of government policy constraints.
4) An open and transparent BCUC review process, with full procedural safeguards, reasonable intervenor funding and allowance for public hearings.

NEED FOR THE PROJECT AND ALTERNATIVES

The Panel has emphasized that **we have time** to properly examine the potential project costs, and the need for and alternatives to the Project. The Panel's concluding remarks state:

1) **The significant costs of the Project can only be justified by "an unambiguous need for the power"**
2) **That need has not been established on the timeline presented**
3) **We will need the power someday, but the unanswered questions are:**

    a. **When?**

    And,

    b. **What alternatives might be available when that day comes?**

The Panel outlined several potential alternatives to Site C that have been insufficiently explored to truly measure whether we need Site C, and how best to develop and integrate BC's energy system:

- "One major alternative should have been fully characterized many years ago. In 1983, the B.C. Utilities Commission advised BC Hydro to explore the promising geothermal resources in the Coast Range, near the load center. Little has been done. Since then, new geothermal resources have been discovered in the sedimentary rocks of northeast BC. BC Hydro now says 700 MW of firm power via geothermal resources may be available at competitive prices. They are, however, forbidden by policy to develop it." (JRP Report p. 308)

- "There are a number of other renewable alternatives available at costs comparable to Site C, but these have been only roughly costed in the Environmental Impact Statement. As a matter of public policy, BC Hydro is not allowed to develop them and so has not invested much in exploration, research, and engineering." (JRP Report p. 308)

- "As it stands, the government of B.C. does not call on [its Columbia River Treaty] entitlement but usually takes a cash payment. It would probably be financially attractive to BC Hydro, and therefore the Province, to take power rather than cash and retail it to its domestic customers rather than wholesaling it to U.S. utilities. This would also put off the need to borrow more money for new supply for a period of time, reducing the pressure on rates." (JRP Report p. 305)

- "Finally, if it is acceptable to burn natural gas to provide power to compress, cool, and transport B.C. natural gas for Asian markets, where its fate is combustion anyway, why not save transport and environmental costs and take care of domestic needs?" (JRP Report p. 305)

The Panel recommended that BC Hydro develop, and take before the B.C. Utilities Commission for review and approval, a research and development budget to properly examine alternative resources and conservation techniques, and an optimal integration of such resources into the BC energy system. (JRP Recommendation 48)

September 9, 2014

NOTE: Property information is a combination of BC Hydro's current ownership records, BC Assessment data and BC Land Title & Assessment Authority data. The information is accurate as of August 19th, 2014 and is subject to change.

Count	PID	Legal Description	Notes
1	003-715-701	Lot 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 31413	
2	003-716-562	Lot 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 22664 Except Plans 28222 and 31413.	
3	004-583-353	Parcel B (39747M) of the South East 1/4 of Section 10 Township 82 Range 25 West of the 6th Meridian Peace River District	
4	004-858-191	Lot 2 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
5	006-075-665	Lot B Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 28222	
6	006-075-673	Lot A Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 28222	
7	006-353-681	Lot 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 20042	
8	006-814-000	That Part of Parcel A (Plan 22969) of the North West 1/4 of Section 34 Township 81 Range 25 West of the 6th Meridian Peace River District as shown on Statutory Right of Way Plan 26870 to be known hereafter as Pcl. 1 (R40280) of the North West 1/4 of Section 34 Township 81 Range 25 West of the 6th Meridian Peace	
9	007-281-609	Lot 21 Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 26211	
10	008-513-767	Lot 1 Section 10 Township 82 Range 25 West of the 6th Meridian Peace River District Plan 23479	
11	010-952-331	Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Except Plans 16985 17081 and 22664	
12	011-013-851	Lot 7 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
13	011-203-650	Lot 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 18052	
14	011-203-676	Lot 2 Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 18052	
15	011-357-339	That Part of Lot 15 Section 18 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 1979 As Shown on Plan 17674	Not included in list provided by District of Hudson's Hope
16	011-642-661	Lot 8 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
17	011-647-451	Lot 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
18	011-647-515	Lot 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
19	011-647-558	Lot 3 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
20	011-647-591	Lot 4 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
21	011-647-604	Lot 5 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
22	011-673-346	Lot 4 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16562	
23	011-746-955	Lot 10 Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 16562	
24	011-746-971	Lot 5 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16562	
25	011-746-980	Lot 9 Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 16562	
26	011-747-005	Lot 6 Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 16562	
27	011-747-013	Lot 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16562	
28	011-747-021	Lot 11 Section 33 Township 81 Range 25 West of The 6th Meridian Peace River District Plan 16562	
29	011-747-030	Lot 3 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16562	
30	011-934-841	Lot 2 Block 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
31	011-934-859	Lot 5 Block 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
32	011-934-867	Lot 3 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	

33	011-934-891	Lot 8 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
34	011-934-905	Lot 6 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
35	011-934-913	Lot 5 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
36	011-934-921	Lot 1 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
37	011-961-031	Lot 4 Block 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
38	011-961-066	Lot 3 Block 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
39	011-961-091	Lot 4 Block 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
40	012-014-591	Lot 1 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15379	
41	012-172-642	Lot A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 14321	
42	012-274-470	Lot 1 Section 19 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 13525 Except Plans 17881 and PGP38305	
43	012-325-678	Lot 6 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
44	012-346-624	Lot 13 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
45	012-346-632	Lot 11 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597 Except Plan 15880	
46	012-346-659	Lot 10 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
47	012-346-667	Lot 9 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
48	012-346-683	Lot 7 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
49	012-346-691	Lot 5 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
50	012-346-705	Block B Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
51	012-346-713	Block C Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597 Except Plan 15379	
52	012-429-775	Lot 1 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
53	012-429-783	Lot 2 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
54	012-429-805	Lot 3 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
55	012-429-813	Lot 4 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
56	012-507-849	Lot 6 Block 1 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 12086	
57	012-508-004	Lot 4 Block 1 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 12086	
58	012-875-368	Lot 1 Block 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
59	013-040-138	Lot 6 Block 2 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 15880	
60	013-335-553	Parcel A (T41614) of District Lot 1200 Peace River District	
61	013-741-811	Lot A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16866	
62	013-742-027	Lot 11 Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 16985	
63	013-750-909	Lot 2 Section 18 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 2839	
64	013-890-123	Lot 14 Section 18 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 1979	
65	013-988-859	Lot 3 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 2123	Not included in list provided by District of Hudson's Hope
66	014-044-901	Lot 8 Block A Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 12597	
67	014-673-011	Parcel A (M19805) of Legal Subdivision 2 Section 10 Township 82 Range 25 West of the 6th Meridian Peace River District	
68	014-673-410	That Part of Legal Subdivision 8 of the South East 1/4 of Section 19 Township 81 Range 25 West of the 6th Meridian Peace River District Lying North and West of	

69	014-741-644	That Part of the South East 1/4 of Section 15 Township 82 Range 25 West of the 6th Meridian Peace River District as shown on Plan 23984 Except Plan 21821	
70	014-789-736	District Lot 1211 Peace River District, Except the West 80 Feet	
71	014-801-922	The South West 1/4 of Section 24 Township 82 Range 25 West of the 6th Meridian Peace River District Except Plan 30367 and 21821	Not included in list provided by District of Hudson's Hope
72	014-805-821	Legal Subdivision 14 of Section 33 Township 81 Range 25 West of the 6th Meridian Peace River District Except Plans 16562 16922 and 18052	
73	014-806-614	The Fractional North West 1/4 of Section 34 Township 81 Range 25 West of the 6th Meridian Peace River District lying North West of the Peace River Except Parcel A (Plan 22969) and Except Plan 21821	
74	014-900-831	That Part of the North East 1/4 of Section 13 Township 82 Range 25 West of the 6th Meridian Peace River District Which Lies to the North of the Left Bank of the Peace River Except Plan 21821	Not included in list provided by District of Hudson's Hope
75	014-900-840	The South East 1/4 of Section 24 Township 82 Range 25 West of the 6th Meridian Peace River District Except Plans 21821	Not included in list provided by District of Hudson's Hope
76	016-051-688	Lot 6 Section 18 Township 81 Range 25 West of the 6th Meridian Peace River District Plan 34594	
77	016-365-194	Lot 3 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
78	016-365-208	Lot 4 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	Not included in list provided by District of Hudson's Hope
79	016-365-216	Lot 5 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
80	016-365-232	Lot 7 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
81	016-365-267	Lot 10 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
82	016-365-275	Lot 11 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
83	016-365-291	Lot 13 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
84	016-365-615	Lot 44 Section 13 Township 81 Range 26 West of the 6th Meridian Peace River District Plan 34820	
85	024-828-203	Block A District Lot 1210 Peace River District	
86	027-092-224	Lot 1 Section 23 Township 82 Range 25 West of the 6th Meridian Peace River District Plan BCP29761	

TERM SHEET

REGARDING A SITE C REGIONAL LEGACY BENEFITS AGREEMENT

BETWEEN

BC HYDRO AND POWER AUTHORITY
("BC Hydro")

AND
PEACE RIVER REGIONAL DISTRICT
AND
District of Chetwynd
AND
City of Dawson Creek
AND
City of Fort St. John
AND
District of Hudson's Hope
AND
Village of Pouce Coupe
AND
District of Taylor
AND
District of Tumbler Ridge

(the "Region")

Background

BC Hydro is proposing to develop and construct the Site C Clean Energy Project (the "Project"). The Project is currently undergoing a federal and provincial environmental assessment process, including a review by an independent Joint Review Panel. The project has the opportunity to provide benefits to local communities, the Peace Region and the Province as a whole.

BC Hydro has committed to meaningful engagement of communities in addition to consultation throughout the environmental assessment process. In addition, BC Hydro is committed to constructing the project to meet international and Canadian industry standards for quality and safety.

BC Hydro is engaged in discussions regarding individual agreements with communities for the identification and mitigation of potential effects of the Project. While these mitigation initiatives and other related commitments may proceed immediately and/or through the construction period, BC Hydro and the Region (the "Parties") have agreed to take a regional perspective regarding additional ongoing legacy benefits once the Project is in operation. These discussions have been informed by a Peace River Energy Benefit Position Paper, developed by the Region and presented to BC Hydro on October 17, 2012 in addition to a request by the Region for BC Hydro to negotiate legacy benefits collectively through the PRRD.

A Site C Regional Legacy Benefits Agreement is intended to recognize the Region's contribution to hosting the Project, contribute to the longer-term self-sufficiency of the communities and the region, and to provide stable, predictable long-term benefits to the region and to leave the region better-off after construction.

Objective

The objective of this Term Sheet is to set out the substantive terms developed through discussions between representatives of the Parties regarding a Regional Site C Legacy Benefits Agreement.

It is agreed that these terms will be presented for review and approval by the Board of BC Hydro and the Board of the Peace River Regional District.

Legacy Benefits

BC Hydro will pay $2,400,000 by April 15 of each year once the Project is operational. This amount will be adjusted annually, averaged for the preceding 12 months by the BC Consumer Price Index as published by Stats Can, effective beginning in the second year of payment.

The first payment will be calculated from the first month of power generation and prorated to the end of the calendar year, with the full CPI indexing to apply for the second year of the benefit and funded as per this agreement.

All payments will be made by BC Hydro to the PRRD.

Payments will be made annually over 70 years once the Project is operational (anticipated to be 2022 to 2092).

These benefits are in addition to any taxes and payments-in-lieu of taxes that may be paid by BC Hydro in relation to the Project. These benefits are also in addition to community specific agreements that may be entered into related to mitigation measures for specific effects of the project as determined by the Environmental Assessment Process.

Regional Allocation of Benefits

Benefits will be administered by the PRRD. The benefits will be allocated to the member jurisdictions, according to a formula established by the PRRD and its member communities, and to be set out in an Appendix to the Agreement. The funds allocated to each jurisdiction may be utilized for purposes determined by each jurisdiction at its sole discretion.

Certainty of Agreement

Both parties recognize that, through the proposed Site C Regional Legacy Benefits Agreement, BC Hydro and the Province of BC can be assured that the regional shared benefit issues of the Region are resolved.

Dated this day of March, 2013.

PEACE RIVER REGIONAL DISTRICT

BC HYDRO AND POWER AUTHORITY
Susan Yurkovich
Executive Vice-President, Site C Clean Energy Project

District of Chetwynd

Village of Pouce Coupe

City of Dawson Creek

District of Taylor

City of Fort St. John

District of Tumbler Ridge

District of Hudson's Hope

APPENDIX A

Regional Allocation Formula

Site C Benefit Agreement Legacy Allocation Model

BC Hydro Legacy Benefit Allocation 60% population - 40% impact	100	to be adjusted annually		
	Population	**Population Legacy**	**Services Impact Legacy**	**Total Legacy %**
Colum 1	Column 2	Column 3	Column 4	Column 5
District of Chetwynd	2,635	$ 2.69	$ 2.80	5.49
City of Dawson Creek	11,583	$ 11.82	$ 1.20	13.02
City of Fort St. John	18,609	$ 18.99	$ 15.60	34.59
District of Hudson's Hope	970	$ 0.99	$ 10.00	10.99
Village of Pouce Coupe	738	$ 0.75	$ 1.20	1.95
Peace River Regional District – Regional Services Impact	20,193		$ 12.36	12.36
Peace River Regional District – Rural Population	20,193	$ 8.24		8.24
District of Taylor	1,373	$ 1.40	$ 8.00	9.40
District of Tumbler Ridge	2,710	$ 2.76	$ 1.20	3.96
TOTALS	58,811	$ 47.64	$ 52.36	100.00

Column 1 = Peace Region Legacy Benefit Agreement partners.

Column 2 = Population stats adjusted annually using BC Stats annual projections for current year of allocation.

Column 3 = The regional percentage of the local government's population weighted at 60% of the benefit allocation.

Column 4 = Projected service impact associated with long-term effect of the Site C project. Impact associated to servicing is calculated at 40% of the benefit allocation. Impact weighting is calculated and based upon the following impact table:

Service providers impacted:	
Chetwynd	7
Dawson Creek	3
Fort St. John	39
Hudson's Hope	25
Pouce Coupe	3
Taylor	20
Tumbler Ridge	3
	100

Column 5 = The total Legacy Benefit calculation resulting from the combined 60% population weighting and 40% services impact weighting.

NOTE 1 - The Peace River Regional District only participates in population legacy benefit of which 60% is allocated for impacted regional servicing and 40% for unincorporated population allocation.

Note 2 - This funding allocation model is an example of the calculations considering annually the BC Hydro legacy benefit allocation dollar value and the current year's local government population. As these two variables change yearly, so too will the local government share of legacy funding.

Note 3 - Annual funds received through the legacy benefit agreement shall be allocated and spent at the sole discretion of each municipal council. Annual funds received by the Regional District allocated to regional servicing shall be proportionally applied to all religion wide service functions, those funds allocated to rural population allocation shall spent through Rural Budgets Administration Committee allocation policy.

Note 4 - Regional District population does not include on reserve statistics

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

A Review of the Proposed Site C Clean Energy Project:

Exploring the Alternatives

July, 2014

URBAN systems

Executive Summary

The District of Hudson's Hope has clearly shared its concerns about the proposed Site C project's potential impacts to the community's natural environment, infrastructure and well-being. The Site C Joint Review Panel (JRP) was also clear in stating that the proposed project will have very significant, largely irreversible adverse impacts upon the Peace River Valley. In fact, Hudson's Hope will be one of the most impacted by the proposed Site C project. Additionally, the JRP report raises several uncertainties about the proposed Site C project. These uncertainties have brought into question the need for the proposed project and whether or not there are viable and cost-effective alternatives to a high-impact and capital intensive large-scale project. Some major uncertainties surrounding the project include:

- Whether the estimated future demand for electricity projected by BC Hydro is accurate;
- Whether the significant capital costs[1] of the project are justified given the availability of alternative and cost-effective energy options; and
- Whether the significant impacts to communities and the environment in the region are justified given the potential availability of affordable lower impact options.

Recognizing these major uncertainties, the District of Hudson's Hope retained Urban Systems Ltd. to review the findings of the JRP Report, and compile information from the proposed project's Environmental Impact Statement, BC Hydro's Integrated Resource Plan, and other relevant resources and data to examine the following key question:

Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

To explore this question, this report reviews BC Hydro's anticipated long-term forecasted electricity needs as it relates to the proposed Site C project. Based on this review, it is evident that there is risk of overbuilding the province's generation capacity too far in advance of forecasted energy demands. This risk adds uncertainty to the need for the proposed Site C project. The premature development of Site C could place BC Hydro and rate payers in financial risk resulting from a lack of revenue generation required to support the upfront development costs of generating capacity without the actual demand to support it. Furthermore, this financial risk could be potentially exacerbated if there are cost overruns associated with the development of a $7.9 billion facility.

Nevertheless, it is evident that British Columbia will require more electricity in the future. Yet, the District, and evidently the JRP and other stakeholders remain unconvinced that the proposed Site C project is the *right* project to meet the province's future energy demands due to the risk of overbuilding capacity, the project's required financial costs and significant and likely irreversible community and environmental impacts.

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[1] It is important to note that the JRP found that it could not confirm the accuracy of project cost estimates because it did not have the information, time or resources. Assuming the project cost estimates are accurate, the JRP found that the proposed Site C project would have a capacity to supply firm power over a long term at an ultimate cost (in dollars and greenhouse gas emissions) that would be the least expensive of the limited alternatives that the Government of British Columbia permitted the JRP to investigate.

Therefore, this report explores five Project Alternatives which investigate potential options for pursuing an incremental approach to adding new energy generation capacity to the provincial electricity system.

The five Project Alternatives and associated findings are summarized herein:

Project Alternative 1: Retrofits and Upgrades

Overall, retrofitting existing hydroelectric infrastructure could potentially displace the need for a large amount of power that would be generated by Site C. This option has been supported by the JRP, which suggested that retrofitting and upgrading the G.M. Shrum facility and adding a sixth turbine to Revelstoke Dam would potentially address power supply deficits projected by BC Hydro and would increase capacity by over 700 megawatts (MW). These retrofits alone would evidently delay the requirement for new capacity to 2028; deferring the immediate need for the development of the proposed Site C project. It is also important to note, that other heritage hydro infrastructure upgrades are available to BC Hydro that could provide up to an additional 1,465 MW of dependable capacity. It is evident that the unit capacity costs of most of the upgrades identified are more cost-competitive than the $7.18 million per MW projected cost for Site C. Given that these opportunities exist, it is likely that a significant portion of the province's future power needs could be met more cost effectively through retrofits and upgrades of heritage assets.

In addition to the potential upgrades to existing hydroelectric assets, the Burrard Thermal Generating Station, which has a similar capacity and could be operated to have a similar production profile as Site C, would provide further support for an incremental approach to developing energy infrastructure and would reduce the need for the Site C project. The anticipated cost of upgrading this facility to be in compliance with the *Clean Energy Act* and to allow for the facility to be used more regularly would be approximately $1 billion. However, this facility is set to prematurely close in 2016.

Project Alternative 2: Geothermal

Geothermal energy represents a potentially substantial energy resource in British Columbia. Currently, BC Hydro has identified 16 prospective geothermal sites in the province, with six of these sites having an estimated collective capacity of over 1,000 MW. This abundant energy resource remains untapped.

It is also evident that geothermal energy could be developed for similar costs as proposed for Site C. This has been supported by the JRP. BC Hydro also estimates in Chapter 3 of its current Integrated Resource Plan that 4 terawatt hours (TWh) of geothermal power and about 700 MW of capacity could be available within the range of $91 to $105 per MWh. This represents a cost similar to the $110 per MWh estimated for the proposed Site C project.

Project Alternative 3: Other Renewables and Enhanced Demand Side Management

In the process of reviewing the proposed Site C project, the JRP concluded that there are numerous renewable alternative energy resources available at costs comparable to Site C. However, since BC Hydro, as matter of public policy, is not mandated to develop such resources there has been a lack of analysis and consideration for their potential. Further, it appears that the analysis that was conducted failed to evaluate Site C and renewable energy options in an equitable manner due to the financial assumptions used to evaluate private sector investments into renewable energy projects relative to the

proposed Site C. The JRP also highlighted the limited consideration for Demand Side Management (DSM) initiatives as another analytical oversight by BC Hydro, citing a miscalculation of the potential opportunities for energy efficiency and conservation.

A review of BC Hydro's Integrated Resource Plan and an associated analysis of several renewable technologies and DSM measures revealed that they could be capable of providing sufficient amounts of energy at similar or lower costs than Site C. Consequently, it is evident that further investment is required to investigate the potential of these options and their respective roles in fulfilling future energy needs.

Project Alternative 4: Natural Gas / Cogeneration

Gas-fired generation or cogeneration plants fuelled by the abundant and domestic natural gas resources of Northeastern British Columbia could reduce or eliminate the need for the proposed Site C project.

The JRP report and interveners in the review process recognized BC Hydro's analysis did not justify the true potential of natural gas as an energy resource. This was largely due to the fact that BC Hydro's assessment considered that it would run the gas turbines at an 18 per cent capacity factor; although such facilities can operate with a capacity factor of 90 per cent or higher and therefore produce much more energy.

The JRP report also highlighted evidence submitted on the Shepherd Energy Facility in Calgary, a cogeneration facility, whose electrical energy output and capacity would be comparable to Site C. This facility is expected to have a unit energy cost of approximately $30 per MWh versus the expected energy cost of $110 per MWh for Site C.

Project Alternative 5: Emerging Technologies

Three trends are occurring simultaneously that could substantially reduce the need for the proposed Site C project and affect BC Hydro's forecasted revenues, thus limiting its ability to pay for such an asset over its 70 year amortization period. These three trends include: increases in BC Hydro electrical rates, the decreasing cost of solar photovoltaic (PV) modules, and the commercialization of micro grid enabling technologies.

To illustrate what these trends could mean in British Columbia one only needs to acknowledge the following:

1. BC Hydro rates in the next 5 years are approved to increase by 28%. For residential customers, by 2019 Tier 1 rates will increase to $88 per MWh and Tier 2 rates will increase to $132 per MWh. In parts of British Columbia, Tier 2 rates upwards of $132 per MWh already exist. Solar PV can already be developed for rates less than these.
2. Globally solar PV has emerged as a significant, reliable and affordable electricity source, and forecasts indicate the recent trends (i.e. increased efficiency and plummeting equipment costs) of this technology will continue over the planning horizon of BC Hydro's 2013 Integrated Resource Plan. Consider that the US Department of Energy has established a goal to achieve a solar PV unit energy cost of $60 per MWh by 2020, which would result in a significantly lower cost of power for consumers when compared to Site C at $110 per MWh.

3. There are also a host of new technologies that will enhance the capacity of micro grids that could operate more efficiently and cost-effectively, thereby reducing the need to maintain a large transmission infrastructure across the province. These technologies are also overcoming the challenges of energy storage.

While some may doubt the potential influence of these trends, one only needs to consider the current dynamics of the electricity market in many American states. For example, in California electricity rates are already higher than the cost of solar PV. As a result, large publically traded companies such as Solar City are aggressively providing full service solar installations and supplying electricity to customers at competitive rates when compared to traditional service providers.

In light of these trends, an investment in a large scale project like the proposed Site C project could result in a risk to ratepayers. Site C would provide approximately 7.5% of provincial electricity demand by 2028. At the same time, the US Department of Energy has a target of solar energy meeting 14% of national energy needs in the United States. This juxtaposition illustrates that the potential for solar and other emerging technologies to provide a more affordable and environmentally responsible electricity source to meet future electricity needs should not be dismissed.

Based on the research summarized and compiled information in this report, it is evident that the stated question presented by the District of Hudson's Hope is a difficult one to answer. There is uncertainty regarding the imminent need for the power that would be generated by the proposed Site C project, and there are likely alternatives which could be cost-competitive and viable to meet future electricity needs. More research is therefore needed on the relative costs and benefits of those alternatives, and how those alternatives could be further integrated into the existing power generation fleet within British Columbia to ensure electricity needs are met without the proposed Site C project.

The material cited within this document suggests that a commitment to the proposed Site C project is likely premature before the British Columbia Utilities Commission undertakes a review of the proposed project costs and long-term energy needs, including the comparative costs and benefits of potential alternatives. And as the JRP notes there is time to do this work.

The information and material in this report supports the request by the District of Hudson's Hope that the proposed project be referred to the British Columbia Utilities Commission for a thorough review. Such a review would be consistent with the requirements outlined within the 2014/2015 "Government's Letter of Expectations" between the Government of British Columbia and BC Hydro. Such a review also would provide an opportunity for this regulatory agency to consider potential alternatives, their benefits and costs relative to the proposed Site C project.

HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Table of Contents

1.0 Preamble

The British Columbia Hydro and Power Authority, better known as BC Hydro, is pursuing the development of the proposed Site C Clean Energy Project. The proposed hydroelectric dam project is intended to meet British Columbia's future electricity demand as projected in its 2013 Integrated Resource Plan (IRP). The proposed Site C project could provide 1,100 megawatts (MW) of new capacity and 5,100 gigawatt hours (GWh) of electricity annually. The project is estimated to cost $7.9 billion dollars.

In response to this project proposal, the District retained Urban Systems Ltd. to review the Site C Joint Review Panel Report, and compile information from the Site C Environmental Impact Statement, the Site C Business Case Summary and BC Hydro's Integrated Resource Plan to explore the need for the proposed project and potential alternatives.

In preparing this document, neither the District nor Urban Systems take issue with the Joint Review Panel's expertise which is considerable and should be recognized.

2.0 Introduction

The District of Hudson's Hope has clearly shared its concerns about the proposed Site C project's potential impacts to the community's natural environment, infrastructure and overall well-being.[2] The Site C Joint Review Panel (JRP) was also clear in stating that the proposed project will have very significant, largely irreversible adverse impacts upon the Peace River Valley. In fact, Hudson's Hope will be one of the most impacted by the proposed Site C project. Additionally, the JRP report raises several uncertainties about the proposed Site C project. These uncertainties have brought into question the need for Site C and whether or not there are viable and cost-effective alternatives to this high-impact and capital intensive large project.[3] Some major uncertainties surrounding the project include:

- Whether the estimated future demand for electricity projected by BC Hydro is accurate;
- Whether the significant capital costs[4] of the project are justified given the availability of alternative and cost-effective energy options; and
- Whether the significant impacts to communities and the environment in the region are justified given the potential availability of affordable lower impact options.

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[2] See Appendix 1. Submission to Site C Environmental Assessment Joint Review Panel. District of Hudson's Hope. November 25, 2013.

[3] Report of the Joint Review Panel with Errata – Site C Clean Energy Project. Review Panel Established by the Federal Minister of Environment and the British Columbia Minster of Environment (2014). Available at: http://www.ceaa-acee.gc.ca/050/documents/p63919/99173E.pdf

[4] It is important to note that the JRP found that it could not confirm the accuracy of project cost estimates because it did not have the information, time or resources. Assuming the project cost estimates are accurate, the JRP found that the proposed Site C project would have a capacity to supply firm power over a long term at an ultimate cost (in dollars and greenhouse gas emissions) that would be the least expensive of the limited alternatives that the Government of British Columbia permitted the JRP to investigate.

Recognizing these major uncertainties, the District of Hudson's Hope retained Urban Systems to examine the following key question:

Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

To explore this question, a review was completed of BC Hydro's anticipated long-term forecasted electricity needs as it relates to the proposed Site C project. Based on this review, it is evident that there is risk in overbuilding the province's generation capacity too far in advance of forecasted energy demands. This risk adds uncertainty to the need for the proposed Site C project. The premature development of Site C could place BC Hydro and rate payers in financial risk resulting from a lack of revenue generation required to support the upfront development costs of generating capacity without the actual demand to support it. Furthermore, this financial risk could be potentially exacerbated if there are cost overruns associated with the development of a $7.9 billion facility.

Nevertheless, it is evident that the Province of British Columbia will require more electricity in the future. Yet, the District, the JRP and other stakeholders remain unconvinced that the proposed project is the *right* project to meet the province's future energy demands due to the risk of overbuilding capacity, the project's proposed costs and significant and irreversible community and environmental impacts.

Therefore, this report explores 5 Alternative Scenarios[5], which investigate potential options for pursuing an incremental approach to adding new energy generation capacity to the provincial electricity system.

The five Project Alterative scenarios include:

- Project Alternative Scenario 1: Retrofits and Upgrades
- Project Alternative Scenario 2: Geothermal
- Project Alternative Scenario 3: Other Renewables and Enhanced Demand Side Management
- Project Alternative Scenario 4: Natural Gas / Cogeneration
- Project Alternative Scenario 5: Emerging Technologies

[5] It is important to note that there are a diversity of project alternatives and energy futures that British Columbia could pursue. However, for the purpose of this review the five Project Alternatives selected were based on those that were deemed most relevant and applicable to the current policy and energy landscape of British Columbia.

3.0 British Columbia's Need for More Electricity

The projected energy demand estimate utilized by BC Hydro is a "medium growth" forecast scenario. This forecast shows that demand in the province is expected to increase by approximately 40 per cent over the next 20 years. This demand growth is likely to be driven by a projected population increase of more than one million residents, and the continued expansion of the Provincial economy.[6]

The application of demand side management (DSM) practices is another important consideration in BC Hydro's future energy demand estimates. According to the *Clean Energy Act*, BC Hydro is mandated to reduce expected electricity demand by the year 2020 by at least 66 per cent.[7] The business case for the proposed Site C project incorporates DSM in all scenarios with a reduction in load growth by 78 per cent by 2021 through conservation and efficiency relative to status quo growth forecasts.[8,9]

The electricity demand estimates and projected DSM reductions provided by BC Hydro in justifying the need for the project were received as highly conservative and likely over-estimate provincial electricity demand. As a result, it is probable that the proposed Site C project may be built many years before the energy it produces is actually required. The JRP noted that the uncertainties associated with the energy demand forecasts mean that the proposed Site C project may not be needed until the 2030s, and in consideration of these estimates concluded that BC Hydro had not fully demonstrated the need for the project on the timetable currently proposed.[10]

The risk of overbuilding capacity too far in advance of forecasted energy demand adds uncertainty to the proposed Site C project. In general, the premature development of Site C could place BC Hydro and rate payers at unneeded financial risk due to a lack of revenue generation required to support the upfront development of an enormous amount of energy generating capacity without the demand (and revenues) to support it. Further, the potential for increased costs resulting from overruns and other risks associated with the development of the proposed project create even more uncertainty.[11]

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[6] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html
[7] Government of British Columbia. (2010). *Clean Energy Act*. Available At: http://www.leg.bc.ca/39th2nd/1st_read/gov17-1.htm
[8] Site C Clean Energy Project: Business Case Summary, (Updated May, 2014). Available at: https://www.sitecproject.com/sites/default/files/site-c-business-case-2014.pdf
[9] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 283.
[10] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 303.
[11] The actual development cost of most large hydroelectric facilities are much greater than their pre-development cost estimates. See for example: A. Ansar, et. al (2014). *Should we build more large dams? The actual costs of hydropower megaproject development*, in Energy Policy. Volume 69. Available at: http://www.sciencedirect.com/science/article/pii/S0301421513010926

4.0 If not Site C, What Alternatives are Available to British Columbia?

It is evident that the Province of British Columbia will require more electricity in the future. The District, and evidently the JRP and others stakeholders remain unconvinced that the proposed Site C project is the *right* project to meet the province's future energy demands due to the risk of overbuilding capacity, the project's required financial costs, significant and likely irreversible community and environmental impacts and the availability of viable alternatives.

In response, and as mentioned above, this report has explored Five Project Alternatives which investigate potential options for pursuing an incremental approach to adding new energy generation capacity to the provincial electricity system. The remaining sections of this report explores each of the Five Project Alternatives.[12]

5.0 Exploring the Alternatives

5.1 Project Alternative Scenario 1: Retrofits and Upgrades

Overview: In their evaluation of the proposed Site C project, the JRP has questioned whether retrofitting and upgrading existing BC Hydro energy infrastructure has the potential to fulfill BC's long-term energy needs and eliminate or defer the need for the proposed Site C project. Additionally in its 2013 Integrated Resource Plan, BC Hydro recommended that it continue to advance retrofitting and upgrading existing facilities through identification and early definition phase activities, but avoid committing significant capital before a need is confirmed.[13] In other words, if the motivation to develop Site C is focused on meeting future energy demand, then cost effective options for retrofitting and upgrading existing facilities should be assessed with a comparable level of detail prior to the development of new infrastructure.

Scenario Analysis: BC Hydro is already moving forward with upgrades to existing hydro facilities. Furthermore, BC Hydro is currently investing close to $800 million to install two additional turbines in the Mica Generating Station that will add 1,000 MW; the generating station was originally designed to hold 6 generating units with only 4 originally installed.[14] The upgrades currently being undertaken at the Mica dam facility demonstrate the need for BC Hydro to investigate further opportunities to upgrade existing hydro infrastructure.

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[12] It is important to note that each project alternative explored within this report, on its own, may not in itself meet future electricity needs given the dynamics and challenges of meeting power reliability requirements and short-term and seasonal load demands. There is no "silver bullet". Rather, it is likely that a mix of project alternatives would be required to adequately balance reliability, price and environmental sustainability objectives and goals.

[13] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html

[14] BC Hydro. (October 2013). Project Update - Mica Projects. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/mica-5-6/mica-projects-october-2013-project-update.pdf

Based on available literature other upgrades are evidently available to BC Hydro. These include the replacement of five turbines at the GM Shrum generating station at a cost of approximately $600 million and adding a sixth generating unit at a cost of approximately $420 million to the Revelstoke Generating Station.[15] These replacements and upgrades could provide 220 MW and 488 MW, respectively, of additional energy generation capacity. It is also possible to upgrade some existing hydro facilities, such as the Mica dam, to include pump storage schemes. Doing so could further enable the integration of intermittent renewable energy into the BC Hydro system and therefore use existing electricity generating infrastructure more efficiently.

As summarized in Table 1 below, BC Hydro has identified a number of facilities that could be retrofitted to increase capacity and efficiency of the province's electricity system. Such investments would allow for a phased approach to the development of the province's electricity infrastructure, relative to the proposed Site C project.

Table 1: Dependable Capacity at Heritage Hydro Facilities Available via Upgrades

Option	Dependable Capacity (MW)
5 new turbines at G.M. Shrum	220 MW
Revelstoke Unit 6	488 MW
Pumped storage at Mica	465 MW
Pumped storage at other locations	1,000 MW
Total	*2,173 MW*
Site C	1,100 MW

Source: BC Hydro, Integrated Resource Plan, November 2013, Table 2-3.

In addition to potential upgrades to hydroelectric generation systems, the Burrard Thermal Generating Station could provide similar capacity and output as Site C. The Burrard Thermal Generating Station having a capacity of 875 MW could produce 6.1 TWh/yr if operated as a base load facility, which is similar to the proposed to 5.1 TWh/yr and 1,100 MW for Site C. This could provide further support for the incremental approach of developing energy infrastructure. The cost of upgrading this facility to be in compliance with the *Clean Energy Act* and to allow for the facility to be used more than occasionally would cost approximately $1 billion.[16] Even if BC Hydro budgeted an additional $1.1 billion for carbon credits to offset projected greenhouse gas emissions for the next 20 years, this project option would still cost $5.8 billion less than Site C.[17] However, this facility is set to prematurely close in 2016.

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[15] BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf

[16] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 303.

[17] Such a facility would likely produce 2.14 megatons of CO2e (based on the 5.1 TWh/y, and an assumed emissions intensity of 420 g of CO2e /KWh. At $25/tonne that equals approximately $54 million per year to offset 100 per cent of the facility's assumed emissions.

Overall, retrofitting existing infrastructure would potentially displace the need for power from the proposed Site C project. This has been supported by the JRP, which stated that adding the G.M. Shrum turbines and the sixth turbine at Revelstoke to the power supply deficits projected by BC Hydro would increase capacity to over 700 MW and move the requirement for new greenfield capacity such as that provided by Site C to 2028; potentially eliminating the immediate need for the development of Site C.[18]

Costs: Upgrading existing generation facilities combined with DSM could evidently be completed at lower costs than the development of the proposed Site C project. Such upgrades would likely reduce the risks associated with developing a large-scale project and allow the addition of new generation capacity to better follow forecasted demand. Such an incremental approach would also likely reduce financing costs (relative to the proposed Site C project) and allow for the greater adoption of alternative energy sources.

As shown in Table 2 below the unit capacity costs of most upgrades are competitive with the $7.18 million per MW projected cost for Site C. Given that these opportunities exist and have been considered by BC Hydro, it is apparent that a significant portion of British Columbia's future power needs could likely be met more cost effectively, in comparison to the projected costs of Site C.

Table 2: Dollars per Megawatt (MW) of Dependable Capacity[19][20][21]

Option	Dependable Capacity (MW)	Dollars/MW capacity
5 new turbines at G.M. Shrum	220 MW	$2.73 million per MW
Revelstoke Unit 6	488 MW	$0.86 million per MW
2 new turbines at Mica	1,000 MW	$0.80 million per MW
Site C	1,100 MW	$7.18 million per MW

Environmental Impacts: The environmental impacts of upgrading existing hydro facilities would be limited. Upgrades to facilities such as the Revelstoke Unit 6 or G.M. Shrum would not involve any significant change to the facility and construction activities would be within the existing facility's footprint. The primary environmental impacts would be related to the manufacturing and transportation of the equipment itself.

Upgrading and relying more on Burrard Thermal Generating Station would result in the utilization of natural gas, which would result in the release of greenhouse gas emissions and some air pollutants.

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[18] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 304.
[19] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 297.
[20] BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available At: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf
[21] BC Hydro. (October 2013). Project Update - Mica Projects. Available At: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/mica-5-6/mica-projects-october-2013-project-update.pdf

Relative to other large emitters in British Columbia and Canada, the Burrard facility would have nominal greenhouse gas footprint, which is estimated to be approximately 2.14 mega tonnes (MT) annually.[22]

Community Benefits: Retrofitting and upgrading existing energy infrastructure would also create many new employment opportunities. Unlike the proposed Site C project, these employment benefits would be well distributed throughout the province, versus being concentrated in the Peace Region. For example, if pursued the Revelstoke Unit 6 upgrade would create about 390 person years of temporary employment.[23] Similar employment benefits would arise from other facility upgrades. In the past projects such as the Revelstoke Unit 5 Project resulted in the hiring of over 380 person years of trades work. Of these, 33% (125 person-years) were local hires and about 6% (22.8 person years) were First Nation hires.[24] This scenario may also temper the existing labour shortage concerns in Northeast BC by distributing labour demand throughout the province.

Project Alternative Scenario Summary:

Table 3: Summary of Benefits and Limitations of Project Alternative Scenario 1: Retrofits and Upgrades

Benefits	Limitations
• Utilizes existing infrastructure more effectively and maximizes efficiency of existing assets. • Likely more cost effective relative to Site C. • Employment benefits distributed throughout the province. • Allows for an incremental/phased approach to developing energy infrastructure to match load demands. • Further enables the integration of renewable energy technologies. • Provides greater incentive and opportunity to focus on DSM opportunities. • Lower environmental impacts for hydro upgrades.	• The continued or enhanced utilization of Burrard Thermal Generating Station would have a higher carbon emission footprint relative to Site C. This would require investment into appropriate emission reduction technologies and/or carbon offsets. • Upgrading opportunities are bound to existing facilities and therefore limited. • The actual power output of such upgrades requires further analysis.

[22] Based on 5.1 TWh/y, and an assumed emissions intensity of 420 g of CO2e /KWh.
[23] BC Hydro. (October 2013). Factsheet - Revelstoke Generating Station Unit 6 Project. Available at: https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/revelstoke-unit-6/revelstoke-generating-station-unit-6-project-factsheet-oct-2013.pdf
[24] Ibid.

5.2 Project Alternative Scenario 2: Geothermal

Overview: Geothermal energy represents a potentially substantial energy resource in British Columbia. Currently, BC Hydro has identified 16 prospective geothermal sites in the province, with six sites having an estimated cumulative geothermal potential of over 1,000 megawatts. In addition to the six most promising sites, the province's overall potential capacity is estimated to be 3000 MW.[25] This abundant energy resource remains untapped with no major geothermal plants producing electricity in British Columbia.

In their evaluation of the proposed Site C project, the JRP spoke to the lack of investment from BC Hydro in the research and development of geothermal sites. In fact, BC Hydro has characterized its present level of investment into understanding this energy resource as being under $100,000 per year.[26] The JRP saw this as a major oversight in BC Hydro's decision to pursue the Site C project, as geothermal could potentially provide a competitive, stable and cost effective energy source in the long-term. Further, it is also evident that geothermal resources could be developed incrementally at a similar or lower cost ($95 to $105 per MWh) relative to the proposed Site C project.[27] The JRP has stated that, a failure to pursue research into the province's geothermal resources over the past 30 years has left the province and its agencies without information about an important resource, essentially limiting their decision making abilities.[28]

In spite of BC Hydro's low investment in assessing geothermal resources, in its Integrated Resource Plan BC Hydro states that "*geothermal appears to be a low-cost resource option*," and that from a cost perspective "*BC's geothermal resource is estimated to total more than 700 MW* (at similar costs per MWh to Site C) *of renewable power*".[29] In other words, even with limited research, it has been estimated that geothermal energy could displace two-thirds of Site C's proposed capacity and potentially more cost-effectively.

Given the potential for geothermal energy resources to provide a viable alternative investment to Site C, the following section further outlines what is known about the scale and viability of the resource.

Scenario Analysis: It is evident that geothermal energy could be developed for similar a cost to the proposed Site C project. Consider that BC Hydro estimates in Chapter 3 of its current Integrated Resource Plan that 4 terawatt hours (TWh) of geothermal power and about 700 MW of capacity could be available within a range of $91 to $105 per MWh.[30] This represents a cost similar to the $110 per MWh recently estimated for the proposed Site C project.

The opportunities to develop geothermal resources, which would be individually smaller than Site C on a project basis, would allow new supply to progressively follow power demand forecasts. This could also obviate most of the early-year financial losses that are expected from the proposed Site C project should

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[25] Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available at: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
[26] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 299.
[27] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 303.
[28] Ibid.
[29] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 299.
[30] Ibid.

it be built. Furthermore, with increased experience in the development of geothermal energy projects it may be possible to develop subsequent projects more cost-effectively.

It is evident that the best prospect for immediate geothermal development in British Columbia is the South Meager Geothermal Project located 55 kilometers north of Pemberton. At this location the average temperature of 260 degrees Celsius could support a facility with a generating capacity of up to 100 MW and meet future provincial energy demands for several years. Other geothermal prospects include Pebble Creek at North Meager (est. 300–700 MW); Canoe Hot Springs near Valemount (est. 50 MW); Mount Cayley near Squamish (est. 20–100 MW); Lakelse Hot Spring in northwest British Columbia (est. 10–50 MW); and Mount Edziza in northwest British Columbia (est. 200–800 MW).[31] Combined these geothermal energy sources could offset the power production proposed to come from Site C and potentially provide a sustainable, more cost-efficient incremental approach to energy development.

Costs: Like hydropower projects, the cost of geothermal energy projects are heavily weighted toward development costs, rather than operating costs. Based on available data, the development cost of a geothermal field and power plant is approximately $2500 per installed kilowatt (kW), with operating and maintenance costs ranging from $0.01 to $0.03 per kilowatt hour (kWh).[32] If similar expenditures for geothermal energy could be realized in British Columbia it would cost approximately $2.75 billion to develop the same capacity as Site C (1100 MW).

In most circumstances, geothermal projects provide a reliable and stable energy source. Most geothermal power plants can operate for more than 90 per cent of the time.[33] With such performance the Geothermal Energy Association (2007) estimates the levelized generation costs for a 50 MW geothermal to be between $88 and $92 per MWh. Based on these economics, over the lifetime of a plant, geothermal can be competitive with a variety of technologies, including hydropower and natural gas.

Environmental Impacts: The overall environmental impacts of geothermal energy development are limited. The following summarizes the most notable impacts:

- Emissions are low and only excess steam is emitted by geothermal flash plants. No air emissions or liquids are discharged by binary geothermal plants, which are projected to become the dominant geothermal technology in the near future.[34]
- Salts and dissolved minerals contained in geothermal fluids are usually re-injected with excess water back into the reservoir at a depth well below groundwater aquifers. This recycles the geothermal water and replenishes the reservoir as it recycles the treated wastewater.[35]
- Some geothermal plants do produce solid materials, or sludges, that require disposal in approved sites. In some instances these solids are now being mined for their as zinc, silica, and sulfur content.[36]

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[31] Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available at: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
[32] United States Department of Energy (2014). Geothermal FAQs. Available at: http://energy.gov/eere/geothermal/geothermal-faqs
[33] Ibid.
[34] Ibid.
[35] Ibid.
[36] Ibid.

- Pollutants such as nitrous oxide, hydrogen sulfide, sulfur dioxide, carbon dioxide and particulates may be present in the source "fuel" – but in extremely low amounts that can be controlled by an abatement system.[37]
- Land impacts also are minimal as geothermal power plants typically are constructed at or near the geothermal reservoir – there is no need to transport 'fuel' to the plant – and most facilities require a few acres for the plant buildings.[38]
- Geothermal wells and pipelines cover a considerable area but do not prohibit other uses such as farming, livestock or wildlife grazing and recreational activities.[39]
- Hydraulic fracturing technologies can stimulate geothermal production and potentially reduce construction costs. This would also leverage capacity and technologies from British Columbia's growing natural gas sector.[40]
- Waste heat from geothermal facilities could be used for other industrial purposes and/or district heating systems.

Community Benefits: Geothermal energy can evidently lead to numerous community and economic benefits. The following benefits have been identified as they relate to the construction and operation of a generating plant and associated transmission infrastructure:

- The construction of a 100 MW generating plant (for example), and associated infrastructure would employ some 250–350 personnel over a two-year construction period.[41]
- Once in operation such a facility would employ some 30–40 persons full-time.[42]
- The investment in establishing a similar geothermal capacity to the proposed Site C project would result in projects being dispersed throughout British Columbia – spreading the potential economic development benefits to a greater number of communities – in regions of the province not experiencing hyper-economic growth and the challenges that accompanies such growth.

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[37] Clean Energy Association of British Columbia. (2011). Geothermal Fact Sheet. Available at: https://www.cleanenergybc.org/facts_&_resources/fact_sheets/
[38] Ibid.
[39] Ibid.
[40] See Bullis, Kevin (2013). Fracking for Geothermal Heat Instead of Gas. Available at: http://www.technologyreview.com/news/520361/fracking-for-geothermal-heat-instead-of-gas/
[41] Ibid.
[42] Ibid.

Project Alternative Scenario Summary:

Table 4: Summary of Benefits and Limitations of Project Alternative Scenario 2: Geothermal

Benefits	Limitations
• Allow BC Hydro to develop energy infrastructure in a phased approach. • Offer a lower risk of cost overrun exposure to ratepayers. • Employment opportunities would be spread throughout British Columbia. • Complimentary with the province's growing capacity to cost-effectively develop natural gas. • Reduced system-wide transmission upgrade requirements (cost savings). • Fewer environmental impacts relative to most conventional energy supplies, including large hydro development projects. • Fewer to no emissions of greenhouse gases. • Provides the possibility using by-product heat for other industrial purposes (i.e. co-generation). • Typically have a capacity factor, with plants having average availabilities of 90% or higher. • Minimal impacts on land and land use, so it can be developed to coexist with agricultural and other productive uses.	• Similar to Site C, the development costs associated with developing geothermal resources would be significant. • Environmental disturbance in the development of geothermal plant sites and would require mitigation.

5.3 Project Alternative Scenario 3: Other Renewables and Enhanced Demand Side Management

Overview: Investigations by BC Hydro into the viability and applicability of renewable energy technologies, such as wind, solar, and biomass, have evidently underestimated their potential to fulfill future electricity needs. In the process of reviewing the proposed Site C project, the JRP concluded that there are numerous renewable alternatives available at costs comparable to Site C. However, since BC Hydro, as matter of public policy, is not mandated to develop such resources, consideration for their potential has been limited.[43]

[43] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 308.

Furthermore, the process in which BC Hydro has undertaken its assessment of renewable energy resources appears to be a flawed; notably in its exclusion of exploring off-shore wind resources and using 70 years as the selected amortization period for Site C while limiting Independent Power Producers (IPPs) to 30 years.[44] By excluding off-shore wind and limiting the amortization period for IPPs to 30 years - even though many clean energy projects could last longer (i.e. run of the river hydro) - BC Hydro has likely underestimated the potential of these resources and their cost-effectiveness relative to Site C. It is also evident that BC Hydro has not clearly defined the cost saving benefits of an incremental approach to energy infrastructure development.

In response to BC Hydro's approach to considering the potential of renewable energy options the Clean Energy Association of BC (Clean Energy BC) made a submission to the JRP reiterating the financial soundness of IPP power portfolios and questioning BC Hydro's projected weighted average cost of capital (WACC) of 5% for Site C and 7% for IPPs. It was suggested by Clean Energy BC that both be set at 6%. In this submission, Clean Energy BC made it very clear that BC Hydro's use of a WACC of 5% and a 70 year debt amortization period (which is double that provided for in the Federal Government guarantee of the Muskrat Falls project) is inappropriate given the uncertainty inherent in such a long time period.[45]

The JRP also identified that the exclusion of DSM capacity initiatives and the potential high effectiveness of DSM, from their analysis as another major analytical oversight by BC Hydro.[46] By ignoring the potential of renewable resources and developing excess capacity, the Site C project could discourage DSM and limit the potential of IPPs for decades to come.

Since the commentary provided by the JRP and participants involved in the review of the proposed project have clearly suggested that the power from the proposed Site C may not be required until the 2030s, there is opportunity to further characterize renewable energy resources and their potential role in meeting future needs.[47]

Scenario Analysis: BC Hydro's analysis of renewable resources and DSM options involved a review of several renewable energy technologies, as well as the development of five DSM scenarios to determine their ability to satisfy the future energy needs of British Columbia. This summary provides a review of both.

Renewable Energy Technologies: The applicability and viability of renewable energy resources in British Columbia is becoming increasingly relevant. In response to the development of the proposed Site C project there has been an enormous focus on the key options to provide the most stable, sustainable and secure energy future for the province. The review of the proposed Site C project conducted by the JRP revealed that renewable energy options are likely a viable solution to future energy needs, especially when combined with greater investment in DSM.[48]

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[44] Such an amortization schedule skews the unitized energy cost ($/MWh) in favour of the proposed Site C project (JRP, 2014).
[45] Clean Energy Association of British Columbia aka Clean Energy BC. (February, 2014). Final Submission to the Site C Joint Review Panel. http://www.ceaa-acee.gc.ca/050/documents/p63919/98322E.pdf
[46] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 295.
[47] Ibid.
[48] Ibid.

Although the Clean Generation portfolios considered by BC Hydro in their Integrated Resource Plan showed that a combination of wind, run-of-river and biomass resources could fulfill future needs, Site C was selected as the preferred development path. It was deemed preferable by BC Hydro as the proposed project could evidently provide power to ratepayers at lower costs, spawn more construction jobs and deliver dependable capacity to the electricity system.[49] However, as noted above, the methodology deployed by BC Hydro too has been heavily questioned by the JRP. In contemplating the potential of renewable energy resources the JRP highlighted that British Columbia is uniquely positioned to further increase the presence of renewables given that the province has:

- A storage-dominated hydraulic power system. This system is excellent for renewable energy integration as it can function as a significant "battery", so power can be dispatched in a manner that follows load demand on an hourly to annual basis; and,
- British Columbia's geography and vast distances may make power transmission expensive and inefficient, with the risk of failure. The cost of this infrastructure, inefficiency of the transmission (i.e. transmission losses), and associated risk of failure could be mitigated with the greater uptake of renewable and distributed power resources.[50]

It was also pointed out by the JRP that a broad portfolio of dispersed intermittent clean or renewable resources throughout British Columbia would be much more reliable than a few concentrated sites.[51]

Review of a recent analysis completed by BC Hydro revealed that renewables are capable of providing sufficient amounts of energy at similar or lower costs than Site C (see Table 5 below).

Table 5: Renewable Energy Opportunities in British Columbia

Option	Energy, GWh/yr	Capacity, MW	Unitized Energy Cost at Point of Interconnection $2013/MWh
Wood-based biomass	9,772	1,226	122-276
Biogas from biomass	134	16	59-154
Municipal solid waste	425	50	85-184
Wind, onshore	46,165	4,271	90-309
Run-of-river	24,543	1,149	97-493
Site C	**5,100**	**1,100**	**110**

Source: Adapted from Tables 2-2, Integrated Resource Plan, November 2013.

The conclusions of the JRP and associated interveners in the review process have demonstrated that BC Hydro has likely omitted the potential and cost-effectiveness of renewables as an alternative to the proposed Site C project. Further, the JRP and others have noted that renewable energy resources

[49] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html
[50] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 295.
[51] Ibid.

represent an opportunity to develop cost-effective, sustainable, stable and secure sources of energy that can be developed incrementally and well-distributed across the province.

DSM Scenarios: The business case for DSM programs are rooted in their potential to displace capital expenditures and the long term operations and maintenance costs of new facilities. Methods of DSM currently employed by BC Hydro include but are not necessarily limited to: codes and standards; rate structures aimed at promoting conservation and energy efficiency; education and outreach; and rebate programs.

The *Clean Energy Act* (CEA) provides BC Hydro with a mandate to achieve 66 per cent energy savings through DSM by 2021.[52] Five progressively more aggressive DSM Options were presented in Chapter 3 of the Integrated Resource Plan to meet future energy demands in British Columbia. These DSM options are summarized below:

- Option 1: This scenario would meet the minimum savings requirement under the *Clean Energy Act*.
- Option 2: This scenario would be higher than the minimum DSM target required by *the Clean Energy Act*, resulting in 7,800 GWh/year energy savings and 1,400 MW of capacity savings through DSM in 2021, or 78 per cent of load growth. This scenario is projected to require capacity and generation from Site C by 2028. It was also chosen by BC Hydro for the basis of the Site C economic analysis.
- Option 3: This scenario was identified as a partial alternative to the Site C project, deferring the need for Site C's energy output by up to two years. This scenario could result in 9,200 GWh/year of energy savings and 1,500 MW of dependable capacity savings by 2021.
- Options 4 and 5: These scenarios were screened out due the untested nature and uncertainty of customer acceptance of the proposed DSM initiatives. Option 5 however, has the potential to achieve a savings of 9,600 GWh and displace 1,600 MW of capacity and be a potential alternative to the Project; reversing load growth for a 20 year period.

The key conclusions from BC Hydro were that DSM Option 3 would defer the energy gap by up to two years; however it would not defer the capacity gap. Therefore, DSM Option 3 on its own is not an alternative to Site C. However, there is an evident aversion to pursue more aggressive scenarios which would require greater government regulation and rate structure adjustments to change market parameters and societal norms.[53] Yet DSM measures can be actively managed to increase or decrease incentives to achieve certain objectives and therefore offer greater flexibility and less risk than developing a large-scale project.

In reviewing BC Hydro's DSM analysis, the JRP concluded that the DSM yield ought to at least keep up with the growth in gross demand for electricity, and therefore the potential savings from 2026 to 2033 may be understated. This is supported by the point that as electricity rates increase, conservation programs will become more cost effective and significantly influence consumer and industrial customer behavior.

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[52] Government of British Columbia. (2010). *Clean Energy Act*.
[53] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 289.

For these reasons the JRP concluded that DSM options did not receive the same degree of analytic effort as did new supply.[54]

Costs: As shown in Table 5 (above) several renewable energy options exist and could potentially meet the energy demand for a similar or lower price relative to the proposed Site C project. The JRP testimonies suggest that the comparison of Site C with DSM and renewable energy options may be skewed due to the WACCs ascribed by BC Hydro to IPPs and itself, as well as the use of a 70 year amortization period proposed for Site C. These weighted factors have a major effect on the analysis of long-term project costs and the numbers provided by BC Hydro likely provide a distorted comparison. The DSM scenarios are also evidently undervalued as their potential to reduce the demand for electricity could have significant benefits, and reduce the amount of energy infrastructure required overall.

Consequently, further investment in investigating the role DSM and renewable energy could play in fulfilling the power need requirements is warranted. Combined with more aggressive DSM measures and with the right mix and phasing of renewable energy sources, it is evident that there are cost-effective and reliable options to meet future power needs and thus potentially displace the need for Site C.

Environmental Impacts: The environmental impacts of renewable or clean energy projects are not benign. A high-level review of the environmental impacts of renewable energy sources suggest that many projects can be developed with minimal adverse effects to agriculture, forestry, harvest of fish and wildlife resources, outdoor recreation and tourism, navigation, visual resources, and human health. This is supported by the JRP, which suggested that renewable energy resources would likely have a smaller impact on the environment, relative to the proposed Site C project.[55]

The DSM component in its essence is promoting conservation and the need for the development of energy infrastructure. The environmental benefits of DSM are well documented.

Community Benefits: There is an enormous potential for renewable energy projects to generate significant community benefit. Given the number of renewable energy projects likely required to offset the potential output of Site C, it is likely that there would be many opportunities for employment creation and skill development throughout the entire province. As shown in Table 6 below, the Clean Alternatives portfolio explored within the Integrated Resource Plan indicates that approximately 17 times more long-term jobs could be created relative to Site C. Most of these jobs would be distributed throughout the entire province versus being concentrated in the northeast region of the province which is already facing labour shortage challenges. Since these projects would likely be developed incrementally, the employment benefits to the province would likely be distributed over a longer period of time using local capacity, rather than being concentrated within estimated construction period of the proposed Site C project.

[54] Ibid.
[55] Ibid.

Table 6: Potential Employment Benefits[56]

Economic Development Attributes	Site C Portfolios	Clean Alternatives Portfolio
Construction Jobs (total jobs)	44,250	33,230
Construction GDP (millions)	$3,530	$2,610
Operations Jobs (jobs per year)	70	1,180

It is also important to acknowledge the potential diverse and significant benefits to First Nation communities associated with the development of British Columbia's renewable energy resources. As recently stated by Minister Bill Bennett "*British Columbia's clean-energy sector has a strong track record of working collaboratively with First Nations to promote economic development. Working with First Nations is a key part of doing business in British Columbia ....*"[57] This contrasts to the challenges faced by BC Hydro to satisfy the concerns and perspectives of many, if not all, Treaty 8 First Nation communities which would be impacted by the proposed project.

Project Alternative Scenario Summary:

Table 7: Summary of Benefits and Limitations of Project Alternative Scenario 3: Other Renewables and Enhanced Demand Side Management

Benefits	Limitations
• Renewable energy projects would likely create more long-term jobs. • Renewables would allow for an incremental approach to energy resource development making it potentially more cost effective. • The economic and community benefits of project development would be better distributed throughout the province; often in areas seeking economic stimulus. • Renewable energy projects would likely impact smaller land areas and have a smaller environmental footprint on a project by project basis. • Encouraging DSM will reduce overall costs and environmental impacts of energy infrastructure development.	• Renewables would likely create less jobs during construction. • Renewables could create challenges associated with their dependability; resulting from their intermittency. • Greater consideration to understand potential cumulative environmental effects on certain environmental landscape should be given. Any environmental impacts associated with such projects would require mitigation.

[56] BC Hydro. (January 2013). Site C Clean Energy Project: Business Case Summary. Page 21. Available At: http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/site-c/site-c-business-case-summary.pdf
[57] Clean Energy BC. (2014). Clean Energy Fuels First Nation Development. Available at: https://www.cleanenergybc.org/whats_new/News_releases/clean-energy-fuels-first-nations-development?News

5.4 Project Alternative Scenario 4: Natural Gas / Cogeneration

Overview: Gas-fired generation plants use natural gas to generate electricity. These plants are often established as cogeneration or Combined Heat and Power (CHP) facilities to simultaneously generate both electricity and heat from the same fuel.

Gas-fired generation or cogeneration plants could be fuelled by abundant natural gas resources in northeastern British Columbia. Such facilities could reduce or potentially eliminate the need for the proposed Site C project and provide a transition energy source toward the adoption of alternative technologies (such as geothermal, wind, and other renewables). Although there remains a degree of uncertainty as to how the natural gas industry will evolve in British Columbia, it is evident that there is more than a sufficient supply of natural gas from domestic basins including the Montney, Horn River and Liard.[58] These basins could supply the needed gas to fuel electricity production in British Columbia well into the future. In fact, many other North American jurisdictions are increasing the utilization of natural gas as a key fuel for producing electricity due to its abundance, and ability to provide a cost-effective source of electricity.[59]

Scenario Analysis: BC Hydro has undertaken an analysis that would see the utilization of natural gas as an alternative to the proposed Site C project; referred to as *Clean + Thermal Generation Portfolio*. In this analysis the energy that is proposed to come from Site C would be replaced by clean or renewable resources, while the system capacity that would be provided by Site C is displaced by thermal generation from simple-cycle gas turbines (SCGTs) and clean capacity resources.[60]

The JRP report and participants in the review process recognized BC Hydro's analysis overlooked the true potential of natural gas as an energy resource. This was largely due to the fact that BC Hydro's assessment considered that it would run the gas turbines at an 18 per cent capacity factor. However, such facilities can operate with a capacity factor of 90 per cent or higher and therefore produce much more energy.[61] It was also stated by participants that "*since BC Hydro's analysis did not recognize the backup capability that would also allow increased reliance on non-firm resources, BC Hydro would be buying high-cost energy in these blocks*" resulting in exaggerated costs of the *Clean + Thermal Generation Portfolio*.[62] It is evident that BC Hydro also overlooked the potential of using cogeneration

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[58] See National Energy Board. (2013). An assessment of the unconventional petroleum resources in the Montney Formation, West-Central Alberta and East-Central British Columbia. Available at: http://www.neb-one.gc.ca/clf-nsi/rthnb/nws/nwsrls/2013/nwsrls30-eng.html, and, National Energy Board, BC Ministry of Energy and Mines. (2011). Ultimate Potential for Unconventional Natural Gas in Northeastern British Columbia's Horn River Basin. http://www.empr.gov.bc.ca/OG/Documents/HornRiverEMA_2.pdf and BC Oil and Gas Commission (2012). Hydrocarbon and By-Product Reserves Report. https://www.bcogc.ca/node/11111/download

[59] Potts, Dan. (2014). Site C Dam Unlikely to Ever Be Cost Competitive. Available at: http://blogs.theprovince.com/2014/07/06/dan-potts-site-c-dam-unlikely-ever-to-be-cost-competitive/

[60] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html

[61] Report of the Joint Review Panel– Site C Clean Energy Project (2014). Page 293.

[62] Ibid.

facilities that could be more cost effective and environmentally friendly than traditional simple-cycle gas turbines.[63]

It is also important to acknowledge the current discourse surrounding meeting the energy demand for liquefied natural gas (LNG) projects. This discourse suggests that their energy demand will largely be supplied by natural gas. Given the projected export rates of LNG and the fact that this industry will seek the lowest cost generation option to minimize capital and operating costs, it is likely that natural gas generation is the lower cost option for providing power to the proposed LNG facilities.

Costs: The majority of the proposed Site C project's costs will be associated with its upfront capital costs, which are likely to be followed by low, predictable operating costs over its project life. As a result, the project would likely offer a cost predictable supply of electricity for many years to come. This attribute differs from other power generation facilities that rely on fossil fuels, such as natural gas-fired facilities. Natural gas-fired facilities tend to have lower up front capital costs, but tend have higher operating costs due to the cost of fuel required for their operation. Further, the operation and maintenance costs of natural gas facilities are subject to fluctuations in commodity prices which are contingent on continental and global markets conditions. It is important to note that it is possible to hedge natural gas prices to help smooth major price fluctuations in the cost of a facility's fuel.

With access to an ample and domestic source of natural gas and likely a lower cost of development and/or refurbishment cost, natural gas-fired generation opportunities may still provide a cost-effective alternative. For example, the JRP report highlighted evidence submitted on the Shepard Energy Facility in Calgary, a cogeneration facility, which will have an electrical energy output and capacity comparable to the proposed Site C project. This section of the JRP report highlighted differences between the anticipated unit energy costs of Site C ($110 per MWh) and the Shepard Energy Facility at $30 per MWh, including the cost of gas. This indicates that this type of facility could potentially offer significant economic benefits over Site C.[64] Furthermore, and as discussed earlier, the refurbishment and altered operations of the Burrard Generating Station could also provide cost competitive electricity and potentially circumvent the need for the proposed Site C project.

Environmental Impacts: The environmental impacts of a gas-fired generation or cogeneration energy facility would be far less from a land disturbance perspective. However, land, water and habitat disturbance from the development and transport of natural gas resources (i.e. the fuel) would further contribute to environmental impacts in the upstream supply region of northeast British Columbia.

Natural gas-fired generation would also result in air and greenhouse gas emissions – potentially generating substantially more emissions than the proposed Site C project, (and potentially much higher emissions depending on natural extraction and fuel processing methods used).

However, gas-fired power plants can be paired well with renewable energy resources, make beneficial use of the waste heat generation in a district heating system or industrial processes, and provide a transition fuel to a low-carbon future. As mentioned earlier in BC Hydro's *Clean + Thermal Generation*

[63] Ibid.
[64] Ibid.

Portfolio analysis, the development of gas-fired generation energy projects would likely coincide with further renewable energy resource development.[65]

***Community Benefits**:* The development or refurbishment of gas-fired generation or cogeneration energy projects could create significant community benefits. Such projects would provide many opportunities for long-term employment and skill development across the province. BC Hydro in its analysis of direct employment benefits showed Site C generating more short-term construction jobs, mostly in the Peace Region. However, as shown in Table 7, the *Clean + Thermal Portfolio* was shown to create approximately 14.5 times more long-term jobs, which would be better distributed throughout the province.

Table 8: Community Benefits Comparison[66]

Economic Development Attributes	Site C Portfolios	Clean + Thermal Portfolios
Construction Jobs (total jobs)	44,250	28,520
Construction GDP (millions)	$3,530	$2,230
Operations Jobs (jobs per year)	70	1,020

[65] BC Hydro. (November 2013). Final Integrated Resource Plan. Available at: https://www.bchydro.com/energy-in-bc/meeting_demand_growth/irp/document_centre/reports/november-2013-irp.html
[66] BC Hydro. (January 2013). Site C Clean Energy Project: Business Case Summary. Page 21. Available At: http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/projects/site-c/site-c-business-case-summary.pdf

Project Alternative Scenario Summary:

Table 9: Summary of Benefits and Limitations of Project Alternative Scenario 4: Natural Gas / Cogeneration

Benefits	Limitations
• Gas-fired generation or cogeneration plants could provide significant capital cost savings; which could be passed on to power users. • These facilities can reduce the need for transmission and distribution networks; thus improving the efficiency of the provincial electricity system. • These facilities can support the progressive integration of renewable technologies and thus act as a transition fuel. • Natural gas facilities would have fewer impacts on local terrestrial and aquatic ecosystems relative to the proposed Site C project. • Natural gas is available in abundance in northeastern BC and North American markets indicate commodity prices will remain suppressed for many years to come (i.e. the incentive for investing in LNG facilities), which could limit future fuel costs.	• Gas-fired generation or cogeneration plants produce more greenhouse gas emissions relative to hydroelectric facilities. This would require investment into appropriate emission reduction technologies and/or carbon offsets. • Natural gas prices are more volatile and vulnerable to price fluctuations; therefore dependence on natural gas would likely create more long-term uncertainty in regard to energy input and delivery costs. • Price fluctuation mitigation strategies may be required. • The extraction of natural gas has negative environmental impacts, thus requiring mitigation as per provincial and federal regulations.

5.5 Project Alternative Scenario 5: Emerging Technologies

Overview: BC Hydro's limited investment in the research and exploration of innovative energy technologies is a major challenge in fostering an environment that enhances their uptake. Yet, the objective for developing electricity resources, as stated in the *Clean Energy Act,* is "*to use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency of clean or renewable resources*".[67]

Even with such a policy statement, BC Hydro remains restricted in its ability to expand its mandate and satisfy this objective. As a result, there has been a lack of consideration for the potential role of emerging energy technologies within long term energy plans. The omission of these technologies has resulted in BC Hydro having a preference for proven large scale hydropower resources such as the proposed Site C

[67] Government of British Columbia. (2010). *Clean Energy Act.*

project. While these proven resources may meet future needs, neglecting emerging alternatives could have a disruptive[68] effect on potential future electricity demand and supply

It is probable that a disruptive effect could be realized in British Columbia, as electricity prices continue to rise and solar photovoltaic (PV) equipment costs continue to decline. If these trends continue it is likely that customers will opt to generate their own electricity from solar PV either displacing required grid capacity, or disconnecting from the grid altogether. This trend could significantly reduce the need to develop large scale capacity projects such as the proposed Site C project.

There are many examples of markets where the price of electricity has significantly affected the adoption of certain technologies over others, including British Columbia. For example, British Columbia is home to some of the lowest electricity prices in North America. As a result of low power prices the province saw a high adoption of baseboard heating and high adoption of heat pump technologies in the mid-2000s. However, with recent electricity rate increases and reductions in the price of natural gas the business case for such technologies has eroded.

The influence of the private sector could also drive significant disruption. Evidence of such a disruption is occurring throughout many North American jurisdictions where electricity rates are already higher than the cost of solar PV. Companies such as Solar City are aggressively providing full service solar installations. Solar City's recent purchase of a large module manufacturer demonstrates the private sector's motivation to be a catalyst to reduce the cost of solar installations and expand into markets offering lower utility electricity rates.

It is also important to acknowledge that the proposed Site C project could provide approximately 7.5 per cent of the province's electricity needs by 2028. Within the same time frame the US Department of Energy has established a target of solar energy meeting 14 per cent of national electrical energy needs.[69] This juxtaposition illustrates that the potential for solar to provide an affordable and environmentally responsible electricity source to meet provincial electricity needs in the future should not be dismissed. In light of these trends, an investment in a large-scale project like the proposed Site C project could result in a financial risk to ratepayers and the province.

Scenario Analysis: Three disruptive trends are occurring simultaneously that could substantially reduce the need for the proposed Site C project, affect BC Hydro's future revenues from the project, and potentially limit BC Hydro's ability to pay for such an asset over its 70 year amortization period. These three trends are summarized in the following paragraphs:

- BC Hydro rates in the next 5 years are approved to increase by 28%. For residential customers, by 2019 Tier 1 rates will increase to $88 per MWh and Tier 2 rates will increase to $132 per MWh. In parts of British Columbia, Tier 2 rates upwards of $132 per MWh already exist. Solar PV can already be developed for below those rates.

[68] Disruptive technology is a term coined by Harvard Business School professor Clayton M. Christensen to describe a new technology that unexpectedly displaces an established technology.
[69] Total project demand in 2028 without LNG and DSM is 75,500 GWh. 7,800 GWh are estimated to be displaced by DSM, Site C supply is 5,100 GWh. Assuming Site C is required in 2028, Site C would provide 7.5% of total demand in BC.

- At a global scale solar PV has emerged as a significant, reliable and affordable electricity source. Forecasts indicate the recent trends (i.e. increased efficiency and plummeting equipment costs – as illustrated in Table 8 below) of this technology will continue over the planning horizon of BC Hydro's 2013 Integrated Resource Plan. Consider that data from the US Department of Energy illustrates that the price of utility scale solar PV are approximately $112 / MWh, or $1.96 per Watt.[70] The International Energy Association (IEA) predicts that solar PV will achieve grid parity by 2020 in many regions the world.[71] However, the SunShot Initiative goes further with a mission to reduce utility scale solar PV prices to $60 / MWh or $1 per Watt by 2020.[72] These reductions in the cost of utility scale projects will result in further cost reductions in residential systems, conceivably making solar PV far more economical at both large and small scales than Site C whose unit energy cost is $110 / MWh.
- There are also a host of new technologies that will enhance the capacity of micro grids that could operate more efficiently and cost-effectively, thereby reducing the need to maintain a large transmission infrastructure across the province.[73]. These technologies are overcoming the challenges of energy storage and are currently tied to significant advancements in lithium ion battery technologies used for electric vehicles. Micro grid technologies could enable more local-based power production and help energy consumers overcome the reliability and availability limitations for intermittent energy sources such as solar PV. These extraordinary technological advances are predicted to enable customers to meet their energy needs independently and also provide centralized electricity grids an alternative for energy storage. This could allow for greater grid penetration of intermittent electricity sources.[74] Additionally a Navigant Research report projects that by 2018, total global capacity using micro grid technology would grow from 764 MW in 2012 to 4,000 MW by 2018.[75] Projecting continued significant growth on this front suggests that it is conceivable that by 2028 micro grid technologies could be sufficiently advanced as to displace a large capacity load.

The catalyst for the increased market penetration of solar energy will likely come from the private sector. Companies (such as Solar City) as well as from customers in all sectors – residential, commercial, and industrial – seeking lower costs and more certainty in the price of electricity. Greater involvement of the private sector in supplying electricity would result in lower demand for the energy produced by BC Hydro, ultimately reducing the overall need for BC Hydro to supply power through large scale centralized sources such as Site C.

Costs: As shown in Table 8 (below) solar PV is emerging as a significant, reliable and affordable electricity source within the timeframe of BC Hydro's 2013 Integrated Resource Plan. The goal set by the US Department of Energy to achieve a unit energy cost of $60 per MWh by 2020 would result in

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[70] International Energy Agency. (2010). *Techonlogy Roadmap.* Available at: http://www.iea.org/publications/freepublications/publication/pv_roadmap.pdf
[71] Ibid.
[72] Renewable Energy World. (2014, 03 5). *US Solar Celebrates Records in 2013, Big Trends Coming in 2014.* Retrieved from Renewable Energy World: http://www.renewableenergyworld.com/rea/news/article/2014/03/us-solar-celebrates-records-in-2013-big-trends-coming-in-2014?page=2
[73] Navigant. (2012). *Micro Grid Enabling Technologies.* Retrieved from Nigant Research: http://www.navigantresearch.com/research/microgrid-enabling-technologies and Filice, L. (2014, 06 04). *Solar PV Micro Grid Market Moving into Commercialization.* Retrieved from Seeking Alpha: http://seekingalpha.com/article/2252413-solar-pv-micro-grid-market-moving-into-commercialization and
[74] Lovins, Amory (2011). Reinventing Fire: Bold Business Solutions for the New Energy Era. Chelsea Green Publishing.
[75] Navigant. (2012). *Micro Grid Enabling Technologies.* Retrieved from Nigant Research: http://www.navigantresearch.com/research/microgrid-enabling-technologies

significantly lower costs of power relative to the proposed Site C project at $110 per MWh. As a result, the potential disruptive effect of solar PV and other relevant trends (as described above) on future energy supply and demand dynamics in British Columbia should be considered in the case of the proposed Site C project. However, since BC Hydro, as matter of public policy, is not mandated to develop such resources, consideration for their potential has been limited.

Table 10: Total Installed PV System Prices and Costs of Electricity (Global Average)[76]

Year	System Price ($/w)	Levelized Cost of Energy Range* (cents/kWh)
2007	$ 7.20	22 to 42
2008	$ 7.00	23 to 41
2009	$ 5.12	17 to 31
2010	$ 4.55	15 to 28
2011	$ 3.47	12 to 23
2012	$ 2.58	9 to 18
2013	$ 2.33	8 to 17
2014	$ 2.10	7 to 15
2015	$ 1.89	6 to 14
2016	$ 1.75	6 to 14
2017	$ 1.61	6 to 13
2018	$ 1.49	5 to 12
2019	$ 1.38	5 to 12
2020	$ 1.27	4 to 11
2021	$ 1.17	4 to 11
2022	$ 1.07	4 to 10

*LCOE: Levelized Cost of Energy is a calculation of the cost of generating electricity at the point of connection to a load or electricity grid. It includes the initial capital, discount rate, as well as the costs of continuous operation, fuel, and maintenance. *Forecasted values are in italics.*

Environmental Impacts: The environmental impacts of solar PV are largely related to the transportation of equipment, land use, and the use of hazardous materials and global warming emissions created during the manufacturing of the panels. An Environment Canada study of the environmental impacts of solar PV indicated that solar PV's do not emit greenhouse gas emissions or air pollutants during operation, and that the largest manufacturing concern is associated with use of fluorinate gases (which is declining with more efficient manufacturing processes and the use of alternative substances). A small amount of

[76] Clean Edge (2013). Clean Energy Trends: 2013. Available at: https://cleanedge.com/reports/Clean-Energy-Trends-2013. Note: 2007 through 2012 are actual figures and 2013 through 2022 are estimates. Figures calculated using Clean Edge cost projects and the NREL Levelized Cost of Energy (LCOE) Calculator. Assumptions: Discount rate: 4%; Capacity Factor 16-26%; O&ML $6-$60/kW.

cadmium telluride is also used in PV cells. This form of cadmium is a natural byproduct of zinc mining and it could be an environmentally friendly means to sequester cadmium that can also be recycled from used modules.[77] Finally, large scale ground-mounted systems can consume a significant amount of land affecting wildlife habitat and terrestrial resources. However, such facilities can make use of existing disturbed areas such reclaimed mine sites (i.e. the SunMine Project located in Kimberly British Columbia) landfills, as well as rooftops.[78]

In comparison with the proposed Site C project, solar PV provides more flexibility in terms of where and how electricity is generated. This offers an alternative to avoid the concentrated land use, environmental and community impacts of the proposed Site C project.

Community Benefits: Solar PV has the potential to provide more widespread community benefits throughout British Columbia by distributing generation capacity and jobs in many locales. Additionally, the adoption of solar PV and micro grid technologies could enable communities to have greater control over their energy supply and costs. Such a model would enable communities to retain more energy dollars within their communities[79]. This will provide residents and businesses with the option of paying escalating electricity rates or having stable self-generation. Greater control over energy generation might also reduce total electricity demand as residents with solar PV systems will be more conscious of their consumption. Additionally, the potential employment benefits are substantial as the job market for solar PV is experiencing 10 times the US national average job growth rate.[80]

From an employment generation perspective, the Skypower solar project in Thunder Bay, Ontario recently provided the equivalent of 11.7 direct Jobs per MW installed plus many more indirect jobs.[81] Extrapolating from this example, it is estimated that the development of a solar capacity equivalent to the proposed Site C project could generate approximately 13,000 jobs. This would be fewer than the 44,250 jobs projected for the proposed Site C project. However, the jobs would likely be distributed throughout the entire province, often in communities where job opportunities are limited, versus a region currently facing labour shortage challenges.

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[77] Environment Canada. (2010). *Assessment of the Environmental Perofrmance of Solar Photovolatic Technologies.* Available at: http://www.ec.gc.ca/scitech/B53B14DE-034C-457B-8B2B-39AFCFED04E6/ForContractor_721_Solar_Photovoltaic_Technology_e_09%20FINAL-update%202-s.pdf

[78] For more information on the SunMine project, please review: http://www.sunmine.ca/

[79] The Canadian Federation of Municipalities has suggested that most Canadian communities see at least 75 cents of every dollar spent on energy leave the local economy. Retaining these dollars within a community could support local economic benefits.

[80] United States Department of Energy. (2014, 02 12). *Progress Report: Advancing Solar Energy Across America.* Available At: http://energy.gov/articles/progress-report-advancing-solar-energy-across-america

[81] Based on recent 8.5 MW solar park in Thunder Bay 100 direct jobs http://skypower.com/skypower-news-dec13-2-2010.php

Project Alternative Scenario Summary:

Table 11: Summary of Benefits and Limitations of Project Alternative Scenario 5: Emerging Technologies

Benefits	Limitations
• By 2020, solar PV could provide more affordable electricity relative to the proposed Site C project and the BC Hydro electricity grid. • Solar PV can meet local energy needs and retain energy dollars within communities. • Solar PV has significantly lower environmental impact when compared to Site C. • As a product of local generation, solar PV can encourage more aggressive demand side management further reducing the need for additional large scale capacity infrastructure such as the proposed Site C project. • Solar PV is a more scalable investment than Site C since its modularity allows it to be developed incrementally thus reducing development risk. • Solar PV jobs would be well distributed. • There is a significant push by industry and other governments to rapidly improve the viability of micro grids and solar PV.	• There are future cost uncertainties with respect to solar PV and micro grid technologies. This could result in higher or lower costs. • Such a scenario would likely create fewer jobs. • The economic development benefits associated may be lesser than the proposed Site C project; however they would likely be better distributed.

6.0 Conclusion

Given the magnitude of the likely impact of the proposed Site C project upon the District of Hudson's Hope, the District decided to explore the following question:

Are the anticipated community and environmental impacts, and high-costs of the proposed Site C project justified and necessary for meeting British Columbia's future electricity needs?

Based on the research summarized and compiled information in this report, it is evident that the stated question is a difficult one to answer. There is uncertainty regarding the imminent need for the power that would be generated by the proposed Site C project, and there are likely alternatives which could be cost-competitive and viable to meet future electricity needs. More research is therefore needed on the relative costs and benefits of those alternatives, and how those alternatives could be further integrated into the existing power generation fleet within British Columbia to ensure electricity needs are met without the proposed Site C project.

The material cited within this document suggests that a commitment to this investment is likely premature before the British Columbia Utilities Commission undertakes a review of the proposed Site C project costs and long-term energy pricing, including the comparative costs and benefits of potential alternatives. And as the JRP notes there is time to do this work.

The information and material in this report supports the request by the District of Hudson's Hope that the proposed project be referred to the British Columbia Utilities Commission for a thorough review. Such a review would be consistent with the requirements outlined within the 2014/2015 "Government's Letter of Expectations" between the Government of British Columbia and BC Hydro. Such a review also would provide an opportunity for this regulatory agency to consider potential alternatives, their benefits and costs relative to the proposed Site C project.

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HUDSON'S HOPE
PLAYGROUND OF THE PEACE

Appendix 1

Submission to Site C Environmental Assessment Joint Review Panel: District of Hudson's Hope