Financial Viability of switching propane heat to Combined Heat and Power (CHP) in rural northern communities.

By

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Project Submitted In Partial Fulfillment Of
The Requirements For The Degree Of
Master Of Business Administration

University of Northern British Columbia
April 2012

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Abstract

Community energy production will serve as an avenue for self-sufficiency and energy independence from utilization of biomass in local forests. The most opportune way of achieving this is to maximize the full utilization of the forest resource. As in the rural northern communities, the forests are available for Combined Heat and Power (CHP) projects. The CHP technology is well established in Europe, and it would be beneficial for Canada to become business partners with the CHP manufacturers to ensure the knowledge and expertise is established in British Columbia (BC). Based on this project, the CHP system is most appropriate when the unit is producing enough heat and power for the facility rather than to establish a large CHP for selling the surplus power to BC Hydro. The BC Hydro bioenergy rates are not high enough for building a strong business case for CHP at a smaller scale. The rates for BC Hydro are a driver for CHP, if the project is built based on present energy prices; the renewable energy based projects are more costly than fossil fuel burning energy systems. As shown in the capital budgeting calculations, the smaller BG25 has a greater chance of success due to the lower costs for the initial investment and the lower operating costs. When the purchase price of renewable energy increases and given priority with premium prices then CHP will be financially viable.
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Chapter 1 – Introduction

This MBA project will research and examine the viability of the Combined Heat and Power (CHP) plants in rural northern communities in particular First Nations communities for a single or group of buildings in an area. CHP is commonly utilized in European countries due to advancement in technology and carbon markets. In Canada, the CHP is not widely used as a result of limited knowledge and CHP technology availability; however, there is an abundance of fiber supply. There are many CHP technology providers who would not consider the northern rural communities as an ideal project due to less densely populated communities where energy use is minimal. The hypothetical question to consider for this Master of Business Administration (MBA) project is as follows: Is bioheat from wood biomass financially viable in northern communities, by switching heat sources such as fossil fuels (propane and oil) heat sources to CHP.

This paper will focus on analyzing the financial viability of switching the heat source of fossil fuels such as propane and oil to combined heat and power (CHP). CHP is a common method in Europe due to proven technology. In the European countries they have communities that are in close proximity, which provides for economic viability (Axelsson et al. 2003). There are other cities and towns in British Columbia, which would be suitable for CHP; however, the purpose of this paper is to research and examine the financial economics of the CHP in rural or small communities of less than 10,000 population. As stated by Stenne and McBeath (2006), in Canada the costs for bioenergy is significantly higher than energy production using fossil fuel, this will be a contributing factor for CHP project development. However, the fossil fuel burning power generation plants are inefficient due to the wasted energy whereas with the CHP the heat is utilized as well as the electricity (Basu, 2010).
CHP is well advanced in the European countries including the Scandinavian countries for heating and power generation. The CHP process involves using biomass as a fuel source, where the biomass is combusted at high temperatures to produce high-pressure steam for electricity production and low-pressure steam for district heating (Lucian et al. 2008). District heating is most common in Sweden and CHP is more common in Finland, this is as a result of the energy policy of both countries (Ericsson et al. 2004). The creation and development of two energy sources from one fiber source such as biomass is efficient, for environmental benefits and low costs if conducted correctly (Kleiber-Viglione, 2011).

Many of the rural communities have woodstove, propane and oil as the primary source of heat. The primary heat sources are considered polluting due to the release of greenhouse gas emissions into the atmosphere. The current CHP or bioenergy technology is considered cleaner burning and environmentally friendly. Bio-energy is considered a significant method of reducing the greenhouse gas emissions using modern technology and biomass as the fuel source. CHP will reduce our dependency on fossil fuels and provide for a future of efficiency and innovation (Faaij, 2006). The energy generated from bio-energy is diverse and opportunistic in nature due the use of waste and residue. This project will examine the financial viability, social, and environmental values of CHP in rural communities.

**Background (Literature Review)**

The initial research does show the CHP in Scandinavian countries such as Finland and Sweden is quite common and advanced and not so prominent in the United Kingdom (UK) circulation. This advancement can serve as a baseline of information for this MBA project to assess whether the project is economically viable and suitable for the community. The literature review will provide a better insight of the tools and resources required to make a bioenergy project
successful including the CHP. Due to a history of experience in Europe, we can determine what factors would hinder CHP projects in rural communities.

The waste management systems, local utilization, regional biomass market, national markets, increasing markets and transportation distances, and biomass production are influencing factors for bioenergy (Faaij, 2006). The net availability and prices of biomass residues and wastes is a limiting factor for bioenergy initiatives; furthermore, the local market demand and international markets will influence the available sources of fiber supply (Faaij, 2006).

Kleiber-Viglione (2011) expresses the benefits of CHP as the following:

a. Increased energy efficiency when using less input of fiber supply,
b. Reduced demand charge from the local utility,
c. Reduced peak electric energy costs,
d. Lower greenhouse gas emissions, and
e. Having a secondary or back-up supply of energy when necessary in some cases.

There is an eminent requirement in BC to identify reasonable bioenergy projects that utilize the abundant mountain pine beetle-logging residue and waste. As stated in the BC Bioenergy Strategy (2008), the Province would like to reduce the greenhouse gas emissions by 33% in 2020 as compared to 2007 levels and an avenue of achieving this reduction is to use renewable resources such as biomass, solar, wind, and water for energy production. Kolar (2000) expressed that bioenergy is an emerging mechanism to reduce the Greenhouse Gas (GHG) from atmosphere; bioenergy is using resources such as wind, solar, and biomass. Biomass is defined as being any organic material from plants (Kolar, 2000). Kolar (2000) identified disadvantages for bioenergy, they are costs, soil erosion and degradation, and air emissions. Kolar (2000) also
identified advantages for bioenergy such as uses in developing countries; carbon offset potential, and abundance of fiber supply.

The advantage of rural communities is the close proximity to the fiber source and colder winters in the north. As noted by Hall (2002), the biomass is economically converted into other energy when situated close to the source. The rural areas of the Province have the abundant supply of fiber, as witnessed with the Mountain Pine Beetle (MPB) infestation causing large forest stock of pine to prematurely die. There is biomass, which is available for innovative and creative business opportunities. The smaller communities would like to be self-sufficient and produce power for community uses for eventual energy independence.

In Sweden and Finland, 40% of all timber is used for energy productions, which is derived from logging waste and residue along roadsides (Ericsson et al. 2004). Small scale energy units such as CHP are common in less densely populated areas in Sweden and Finland; further these units have known to be efficient and self sustaining to meet the needs of the small communities (Ericsson et al. 2004). Based on over 20 years of biomass utilization for CHP-District Heating in small communities, the same knowledge and experience can be implemented in the rural communities in northern British Columbia.

The versatility of CHP is that in summer months the operations can continue since the business will not rely solely on producing heat but can operate by producing electricity during summer warm months. As stated by Lockwood and Renda-Tanali (2010), the operability of the cogeneration plant is not utilized all year round, which makes the plant not financially viable. Consequently, there is thermal heat generated and if not utilized then it will be wasted. The CHP system can be used all year round and alternative uses of the heat in the summer months can be
for greenhouses to cultivate food crops and tree seedlings. Another benefit is from the ash, which is produced from CHP operations, the ash can be used as a fertilizer for growing plants.

Kelly and Pollitt (2010) state the Combined Heat Power (CHP)-District Heating (DH) plants primarily operate intermittently during the summer months and operate progressively in winter months for efficient utilization of the heat from CHP's. Furthermore, heat accumulators can be used during peak winter months, where heat is stored for future use (Kelly and Pollitt, 2010). The heat accumulators are an innovative tool to use heat energy for future uses. Another key feature for making the CHP a valuable tool for efficiency and effectiveness is the use of heat accumulators.

The financial viability can be achieved by undersizing the CHP to match the peak flow energy demands for maximizing the cash inflows for capital investment purposes (Lockwood and Renda-Tanali, 2010). Controlling the CHP operations is a requirement to limit the hourly host facility energy demand to maximize the heat and power outputs while minimizing fuel costs (Lockwood and Renda-Tanali, 2010). The CHP development requires time and capital investment to establish a customer base for the available thermal heat network; the time and money requirements will not provide an adequate dividend return for the immediate term (Kelly and Pollitt, 2010). CHP's are best located where there is a high demand for the heat supply which is in high population densities (Kelly and Pollitt, 2010).

There are many items to consider when designing a CHP system and they are realistic goals and expectations, knowing the demands for thermal heat and electricity, adequate back-up systems, and facility layout (Kleiber-Viglione 2011). This study area of CHP will incorporate the items noted above and thus serve as the basis for viability in the rural communities.
The community of Quesnel, in the heart of the MPB infestation, prepared a feasibility study: Resource Recovery Options for the Sustainable Community of Quesnel (Salter, 2008) to explore options for the use of the MPB for sustainability purposes. This report will serve as a baseline of information, where Salter recommends the CHP and Biomethane and Compost as the most feasible option as compared to District Heating (DH), Western Energy Loop, Eastern Energy Loop, and Cogeneration.

The projects are financed as assets, which are profitable as an independent venture relying on cash inflows from cogeneration plants rather than receiving subsidies or grants from governments (Lockwood and Renda-Tanali, 2010). As stated by Lockwood and Renda-Tanali (2010), the availability and capacity factor (CF) are two generally accounted as aggregate annual ratios contributing to operating success or failure of a power plant. Availability is the percentage of time a power plant is available for operation during one year. Capacity factor is important in determining the cash inflows for CHP project finance and can be defined by the ratio of the net electricity generated in a particular time frame, at continuous full-power operation during the same period (Lockwood and Renda-Tanali, 2010).

The profitability of a CHP is determined by the engineering design and optimization of the resources. The four step process for determining if the CHP is financially viable is prefeasibility, feasibility, engineering and design, and construction and commission. In general practice, the engineer will design the CHP plant based on the the present demand of electrical and heat wheather in the summer or winter, night or day time requirements (Kelly and Pollitt, 2010). This study is the pre-feasibility stage component.
CHP-DH face considerable risk due to significant upfront infrastructure costs, volatility of fuel prices and ambiguity over future government policy. Government policy will encompass an open market for heat, adequate support for dispersed energy and the appropriate pricing of negative peripherals (Kelly and Pollitt, 2010). The communities in the north are less likely to develop and construct a CHP facility due to factors such as high capital costs, low populations, and existing low fuel costs such as propane and natural gas.

Objectives:

a. To learn more about the financial variables associated with Community Heat and Power plants.

b. To promote smaller scale bioenergy by utilization of biomass as a fiber source.

c. To examine barriers associated with CHP in rural northern communities by completing a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis of biomass.

d. To research the CHP technology.

e. Conduct a capital budgeting assessment of CHP using Internal Rate of Return (IRR), Net Present Value (NPV), Modified Internal Rate of Return (MIRR), Payback and Discounted Payback and Profitability Index (PI) from net cost savings.

f. To review and conduct a literature review for CHP’s.

Chapter 2 - Background of CHP Technology

The CHP technology available in North America is relatively new as compared to the Scandinavian countries; they have proven systems that are in operations and self-sustaining. In the eastern United States (US), there CHP systems are becoming more common, the capital costs are varied between US $10 to 15 Million for less than a 5 megawatt (MW) plant. The economic
feasibility is based on greater power generation as compared to heat produced, as a result the biomass required will be reduced due to the power to heat ratio and the CHP system is operated in accordance with heat demand (Dong, Liu, and Riffat, 2009).

The CHP technology available in Europe is well established due in large part to the energy policies that are in place for environmental tax and government grants. Environmental taxes are issued to companies that use fossil fuel sources and nuclear energy plants. The Scandinavian countries are rich with forest stands, which makes the use of biomass a priority.

The CHP technology is valuable to the northern communities as it provides options to utilize the biomass accumulated following harvesting operations. The CHP technology is rare in British Columbia and even more so in rural northern communities. The technology presently is available in other countries as mentioned where the biomass as renewable resources is used extensively, as such the CHP technology is inimitable by others once it is proven to be economically viable. The technology is substitutable as there are other low cost energy sources such as hydroelectric projects and natural gas or propane heat sources. The CHP is very exploitable in terms of the two energy sources generated from the technology.

There are many small CHP manufacturers in United States and Europe as shown in Table 1.

Table 1: Small scale (≤2 MWe) biomass CHP systems (Hogan, 2009)

<table>
<thead>
<tr>
<th>Company</th>
<th>Website</th>
<th>Technology</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adorotec GmbH</td>
<td><a href="http://www.adoratec.com">www.adoratec.com</a></td>
<td>ORC system 315 to 1,600 kW</td>
<td>Germany</td>
</tr>
<tr>
<td>Alternative Energy</td>
<td><a href="http://www.aesenergy.net">www.aesenergy.net</a></td>
<td>Steam boilers 400 kW to 8 MW</td>
<td>US</td>
</tr>
<tr>
<td>Bioenergy Technology Ltd.</td>
<td><a href="http://www.bioenergy.org">www.bioenergy.org</a></td>
<td>Steam boiler 50 kW</td>
<td></td>
</tr>
<tr>
<td>Bioflame Ltd</td>
<td><a href="http://www.bioflame.co.uk">www.bioflame.co.uk</a></td>
<td>Steam boiler plus steam turbine 1 MW+</td>
<td>UK</td>
</tr>
<tr>
<td>Biomass CHP Ltd.</td>
<td><a href="http://www.biomaschp.co.uk">www.biomaschp.co.uk</a></td>
<td>Downdraft gasifier plus IC</td>
<td>UK</td>
</tr>
<tr>
<td>Company</td>
<td>Website</td>
<td>System Description</td>
<td>Country</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Biomass Engineering Ltd</td>
<td><a href="http://www.biomass-uk.com">www.biomass-uk.com</a></td>
<td>Downdraft gasifier coupled with gas engine 250 kW e</td>
<td>UK</td>
</tr>
<tr>
<td>Del-Tech Industries</td>
<td><a href="http://www.deltech.ca/">www.deltech.ca/</a></td>
<td>Biomass Energy systems from 0.5MW to 25MW capacity</td>
<td>BC</td>
</tr>
<tr>
<td>Energy North</td>
<td><a href="http://www.energynorth.ca">www.energynorth.ca</a></td>
<td>Biomass energy systems for heat and electricity</td>
<td>Canada</td>
</tr>
<tr>
<td>Entimos Oy</td>
<td><a href="http://www.entinos.fi">www.entinos.fi</a></td>
<td>Gasifier plus gas or diesel engine, from 460 kW upwards</td>
<td>Finland</td>
</tr>
<tr>
<td>Innovation Technologies (Ireland) Ltd.</td>
<td><a href="http://www.innovation-tech.co.uk">www.innovation-tech.co.uk</a></td>
<td>Fluidyne downdraft gasifier plus gas/IC engine, 35 kW e+</td>
<td>Ireland</td>
</tr>
<tr>
<td>KARA Energy Systems B.V.</td>
<td><a href="http://www.kara.nl">www.kara.nl</a></td>
<td>Gasifier plus gas engine 4 – 500 kW e or steam turbine above</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Kohlbach</td>
<td><a href="http://www.kohlbach.at">www.kohlbach.at</a></td>
<td>ORC based systems 200 – 1,600 kW or steam turbine</td>
<td>Austria</td>
</tr>
<tr>
<td>Nexterra</td>
<td><a href="http://www.nexterra.ca">www.nexterra.ca</a></td>
<td>Gasification and syngas systems. 2 to 10 MW electricity</td>
<td>Canada</td>
</tr>
<tr>
<td>Sunmachine GmbH</td>
<td><a href="http://www.sunmachine.com">www.sunmachine.com</a></td>
<td>1.5-3 kW Stirling engine running on wood pellets; 4.5- to 10.5 kWth</td>
<td>Germany</td>
</tr>
<tr>
<td>Stirling Denmark ApS</td>
<td><a href="http://www.stirling.dk">www.stirling.dk</a></td>
<td>Updraft gasifier plus Stirling engine 35 and 75 kW e</td>
<td>Denmark</td>
</tr>
<tr>
<td>Talbott's</td>
<td><a href="http://www.talbotts.co.uk">www.talbotts.co.uk</a></td>
<td>Stepped grate combustion; plus indirect micro-turbine 100 kW e</td>
<td>UK</td>
</tr>
<tr>
<td>Turboden</td>
<td><a href="http://www.turboden.it">www.turboden.it</a></td>
<td>(ORC) turbines 200 to 2,000 kW e</td>
<td>Italy</td>
</tr>
<tr>
<td>Wartsila Biopower Oy</td>
<td><a href="http://www.wartsila.com">www.wartsila.com</a></td>
<td>Rotating grate boiler plus steam turbine 1.1 MWe+</td>
<td>Finland</td>
</tr>
<tr>
<td>Waste to Energy Ltd.</td>
<td><a href="http://www.wastetoenergy.co.uk">www.wastetoenergy.co.uk</a></td>
<td>Gasifier technology 10 kW e to 1 MWe or multiple units</td>
<td>UK</td>
</tr>
<tr>
<td>Puhdas Energia Oy</td>
<td></td>
<td>Retrofit wood gasifier for oil boilers, available in units of 1MWth</td>
<td>Finland</td>
</tr>
<tr>
<td>Mawera UK Ltd.</td>
<td><a href="http://www.mawera.co.uk">www.mawera.co.uk</a></td>
<td>Biomass boilers plus Stirling (35 or 70 kW), ORC (300 to 1,500 kW), or steam turbine (100 to 2,500 kW)</td>
<td>UK</td>
</tr>
</tbody>
</table>

kWe – kilowatt of electrical energy  
MWe – megawatt of electrical energy  
MWth – megawatt of thermal energy
The associated costs for the CHP technology determined by the overall end use for heat and electricity; this would need to be assessed prior to deciding a CHP system. In previous studies, the parameters to be considered in a CHP system are as following:

a.) An environmental permitting system that is complex, costly, time consuming, and uncertain,

b.) Existing regulatory policies do not fully recognize the overall energy efficiency of CHP and carbon credits are not factored into the evaluation,

c.) Prohibitive interconnection arrangements and erroneous rates, which deter CHP development,

d.) Inadequate depreciation schedules for CHP investments fluctuate depending on ownership structures and

e.) The marketability of CHP technology and associated developments (Elliott and Spurr, 1999).

In order for the CHP to be feasible, the above parameters will need to be addressed by the proponent. However, there are many organizations and initiatives which are advocating the use of bioenergy and ultimately the development of CHP systems in a rural setting. The organizations which can assist with promoting CHP are outlined in Table 2, the entities are familiar with what would be required for a successfully operated CHP.
Table 2: Organizations specializing in CHP systems (Hogan, 2009).

<table>
<thead>
<tr>
<th>Organization</th>
<th>Website</th>
<th>Purpose</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Heat and Power Association</td>
<td><a href="http://www.chpa.co.uk">www.chpa.co.uk</a></td>
<td>Promotes use of CHP and community heating</td>
<td>UK</td>
</tr>
<tr>
<td>European Bio-CHP</td>
<td><a href="http://www.dk-teknik.dk/cms/site.asp?p=1042">www.dk-teknik.dk/cms/site.asp?p=1042</a></td>
<td>Examples of CHP plants in Europe</td>
<td>Europe</td>
</tr>
<tr>
<td>Irish CHP Association</td>
<td><a href="http://www.ichpa.com/index.php">www.ichpa.com/index.php</a></td>
<td>Representative body for CHP in Ireland, North and Republic</td>
<td>Ireland</td>
</tr>
<tr>
<td>DECC</td>
<td><a href="http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/emerging_tech/chp/chp.aspx">www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/emerging_tech/chp/chp.aspx</a></td>
<td>Department for Energy and Climate Change</td>
<td>UK</td>
</tr>
<tr>
<td>Cogenc Europe</td>
<td><a href="http://www.cogeneurope.eu/">www.cogeneurope.eu/</a></td>
<td>The European Association for the Promotion of CHP</td>
<td>Europe</td>
</tr>
<tr>
<td>Renewable Energy Association</td>
<td><a href="http://www.r-e-a.net/">www.r-e-a.net/</a></td>
<td>General information on renewable energy</td>
<td>UK</td>
</tr>
<tr>
<td>Green Heat Initiative</td>
<td><a href="http://www.greenheatinitiative.com">www.greenheatinitiative.com</a></td>
<td>Promotion of DH, CHP, and cogeneration in municipalities and small communities</td>
<td>BC</td>
</tr>
</tbody>
</table>

Technology

The three CHP technologies to be reviewed in this paper are the Stirling engine, ORC technology and gasification as they are small units suitable for the building identified in this study and they are presently utilized around the world.

Stirling Engine – Uses external combustion to produce heat and electricity, the system is capable of utilizing all types of fuels sources that combust in the combustion chambers (Pourmovahed et al. 2011) and a reciprocating system where external combustion engine continuously burns the fuels outside of the Stirling engine cylinders (Energy and Environmental Analysis Inc., 2007). The heat exchanger provides the ability to transfer heat from combustion to engine (Alakangas and Flyktman, 2001). The benefits of the Stirling engine is it combusts the fuel source at very low working conditions, thus is not prone to exploding and much safer for the workers; further
the benefits are fuel flexibility, low emissions, CHP abilities, smooth and quiet, renewable fuels, and low maintenance (Pourmovahed et al. 2011). Although, the Stirling Engines are not so well advanced for commercial use, there is the possibility to advance the technology for low emissions and efficiency. Reverend Robert Stirling invented the technology in 1816, the technology did not advance due to more favoured internal combustion methods (Pourmovahed et al. 2011). Stirling engines are available commercially with electrical output from 1 kW to about 75 kW and a higher heat to electricity output ratio of 4:1 or greater. The Stirling technology is well used in Denmark and Austria; the typical output of electricity is 30-60 kW (Alakangas and Flyktman, 2001).

![Figure 1: Stirling Engine process for CHP (Alakangas and Flyktman, 2001).](image)

**Figure 1:** Stirling Engine process for CHP (Alakangas and Flyktman, 2001).

**ORC (Organic Rankine Cycle)** – The ORC technology is more complex system than the Stirling Engine; the ORC relies on a heat source that vaporizes the organic fluid in the vaporizer, the
fluid then expands in the turbine of a high speed turbo alternator. The expanded vapor is condensed in the condenser, and then a reliable coolant like water is added to cool and pumped back into the pressurized vaporizer and the condenser and the by-product hot water is then used (Alakangas and Flyktman, 2001). In ORC, the organic fluids are preferred due to the fluid mechanics leading to higher turbine efficiency in both full and partial load (Dong, Liu, and Riffat, 2009). Electrical outputs are typically in the range 350 kWe to 3500 kWe with thermal to electrical output typically around 5:1 (Alakangas and Flyktman, 2001). The overall costs of ORC technology is considerably lower than the Stirling Engine at 60% less, where ORC is similar to gasification technology and steam turbine engines (Dong, Liu, and Riffat, 2009).

Figure 2: ORC Process (Alakangas and Flyktman, 2001)

Gasification – the gasification process is known as pyrolysis, high pressurized heat is used to heat biomass for optimized gas production; when pyrolysis is complete the fuel becomes a volatile constituents and solid carbon residual (Alakangus and Flyktman, 2001). Biomass gasification technology is a thermal conversion method, to convert solid fuel into a combustible
gas (Dong, Liu, and Riffat, 2009). The char is combined with water or other liquid which can be converted into gas, the gas is burnt to produce heat and steam which is used in gas turbines for electricity generation. The gasification process depends on how the fuel and heat are fed into the updraft or downdraft gasifiers (Alakangas and Flyktman, 2001). The gasification technology varies in energy output of 5 kW to 50 kW and the variability in important parameters determines a low quality of product gases thus creating severe engine wear as a result of tar contamination and unstable operation (Dong, Liu, and Riffat, 2009).

Figure 3: Gasification systems based on steam turbine and gas engines (Alakangas and Flyktman, 2001).

**Market Opportunities**

The market opportunities for CHP fall into three main categories: industrial plants, district energy systems, and small-scale commercial and residential building systems (Elliott and Spurr, 1999). There are four major categories of players:

a.) Project developers, b.) Equipment manufacturers, c.) Engineering and construction firms, and d.) Energy supply companies (Elliott and Spurr, 1999). The CHP is still evolving in Canada,
there is a vast array of opportunities for the small scale systems. Further, the majority of the existing players are not established in Canada.

**Current Uses**

The Nexterra gasification system is currently used at Dockside in Victoria, BC. This was a project to use the gasification for heat and hot water. Another project is at the University of Northern British Columbia; Nexterra gasification is used to produce heat for the facility, from Biomass that is supplied locally from sawmills. At the University of British Columbia, they have a CHP gasification and syngas system to produce electricity and heat from local biomass sources (Nexterra System Corp., 2011).

**Environmental Benefits**

The associated environmental benefit is the biomass that is utilized by modern technology; which is considered renewable green energy and the pollutants emitted into the atmosphere are reduced. As in the Hazelton area, the biomass from logging residue is not utilized due to the lack of facilities for bioenergy. This type of utilization would decrease the dependence of fossil burning fuels for power and heat. Sustainable forest management also comes into the arrangement, the forests will be managed sustainably and the biomass will also be considered for ecological considerations. As stated by Stinson and Rochefort (2011), the biomass benefits are renewable resource, environmentally sustainable, reduction of waste, availability, and improved forest management.

The environmental benefits will be reaped from the use of biomass in place of fossil fuels. Further, the forests are a basis of renewable energy through the modification of forest biomass into useable solid, liquid or gaseous fuels for industrial, commercial or domestic use (Hall,
2002). This will be a reduction of greenhouse gas emissions into the atmosphere. The biomass utilized is the unmerchantable timber and the common forest practice is to burn the logging debris and residue. The open burning of the biomass has a negative impact on the air quality and rapid release of carbon into the atmosphere. However, if the biomass is used in a bioenergy project such as CHP then there is no net release of carbon due to the balance of growth of trees with harvesting (Hall, 2002). Sustainability of the resources includes the economic, environmental and social values, which are balanced for the long-term benefit of society as such the biomass is a sustainable source of energy (Hall, 2002).

Chapter 3 Government Policies

Policies will be required to stimulate the growth of biomass utilization for renewable energy; for example, in the UK the target is to reach 10% of electricity generation to be from renewable resources and in Sweden, 25% of district heating is to be from biofuels by 1996 (Hall, 2002). The federal government and provincial government will be required to provide policies and enabling tools to move the use of bioenergy and in particular CHP in rural communities. The low price of fossil fuels such as natural gas and propane will restrict the possibility of advancing the CHP. The low cost for electricity from BC Hydro will also restrict the advancement of CHP's; BC Hydro will need to provide an incentive for CHP by buying the CHP power at a premium price and sell back to proponents at the present low price. As witnessed in the US and Europe, the governments have policies in place to increase the use of renewable green energy by subsidies and or renewable energy credits.

There are other federal government grants such as ecoEnergy and First Nations Regenerations Fund for promoting the use of renewable energy in First Nations or northern communities. The
province also has grant opportunities such as the First Nations Clean Energy Business Fund (FNCEBF) and Innovative Clean Energy (ICE) fund.

**Government Grants**

The ecoENERGY program is to promote and encourage the use of renewable energy such as wind, low-impact hydro, biomass, photovoltaic and geothermal power. In this program there are Aboriginal and Northern Communities, to promote the same and provide funding support to the communities. The purpose of the *ecoENERGY for Aboriginal and Northern Communities Program* is to reduce or displace coal and diesel generation of electricity for the reduction of greenhouse gas emissions. The *ecoENERGY for Aboriginal and Northern Communities Program* provides funding to aboriginal and northern communities for:

- **a.)** Renewable Energy Projects must implement renewable energy technologies for local energy generation and/or energy efficiency technologies for energy savings; and
- **b.)** Energy Projects Integrated with Community Buildings where an energy efficiency/renewable energy component is added to a new or existing (through a retrofit) community building. (Government of Canada, 2011).

This program would fit with the CHP since the facility we are examining is in an aboriginal community that is on Indian Reserve lands. The facility is currently using propane as a heat source thus within the category of reducing the greenhouse gas emissions in the community. There are two streams of funding available: renewable energy projects and energy projects integrated with community buildings are $250,000 and $100,000 respectively.

The new program First Nations Clean Energy Business Fund (FNCEBF) is a BC initiative for providing the First Nations grants for capacity and equity funding to be actively involved in renewable energy projects. The primary obstacle with First nations in rural communities is there is the lack of expertise and limited financial support to proceed with a project. The FNCEBF
enables the First Nations to conduct the necessary pre-feasibilities and to have equity available for a project as this funding entices the energy companies to partner with the aboriginals. Another aspect to the FNCEBF is there will be a requirement to have a revenue sharing mechanism with the impacted First Nations community.

The Province of BC provided 25 Million dollar grant to promote bioenergy technologies and build on the capacity of bioenergy in BC. The BC Bioenergy Network supports the demonstration and deployment of products and systems that:

1. Produce heat, power or combined heat and power;
2. Process biomass into solid fuel;
3. Refine biomass into liquid fuel; or
4. Collect or concentrate biogas to be used as fuel (Bioenergy Network, 2012).

**First Nations**

The forest tenure system has gained with the creation of the First Nations Woodlands Tenure and the biomass tenures such as the “Stand as a Whole” pricing. The last issue is with aboriginal rights and title in the province, adequate consultation and accommodation is needed prior to any development activity can take place. The solution to this matter is to involve and provide early engagement with the First Nations group where the project will occur, the First Nations can be equal partners in the project and benefit from the cost savings and environmental friendly CHP technology.

**Chapter 4 Biomass Supply**

In reviewing what the primary issues with biomass as a heat source, the issues are as follows: sustainability, high costs, environmental issues, government policy, infrastructure, capital
investments, tenure system and First Nations. Sustainability will involve what the land will be
able to provide on a long-term basis, the question is how much volume is available on a 25 year
cycle, which provides for fiber supply certainty. As a stand-alone use of the biomass for CHP,
the costs are too high and not viable. The key piece for viability in terms of fiber is with
maintaining minimum fiber costs. The sawlog component will be required to cover the majority
of the costs for logging and trucking, where the revenue generated from biomass will be an
additional revenue stream.

The environmental issues are tied to the sustainability and the removal of biomass; this biomass
extraction will not negatively impact the wildlife, soils, diversity, visual quality, water quality,
fish values, and cultural heritage resources. Hall (2002) consid

ers the site productivity, biodiversity, and greenhouse gas reductions as key ingredients for
sustainability of the timber resources. Site productivity is the ability of the soils having adequate
soil nutrients, organic matter and moisture for optimal growth rates. Biomass utilization will
entail harvesting intensity and shorter rotation forests, this will limit the amount of nutrients
cycled back into the soils. The biodiversity of the land, is the mixture of plant and tree species in
area. The area will have biodiversity at genetic, species and landscape levels. Greenhouse gas
emissions will be reduced based on switching from fossil fuel use to biomass use for the purpose
of renewable green energy.

Government policy is progressing to a point where bioenergy projects are becoming feasible; the
province has a bioenergy strategy, tenure reform, and carbon offsets. The infrastructure for
bioenergy is not well advanced for biomass delivery from forest setting to destination point. Both
the logging activity and end user need to be aware of the most efficient and effective use of the
timber, they will need to sort the biomass roadside and maintain enough volume in the openings to ensure biodiversity and coarse woody debris (CWD). The logging residue constitutes approximately 25 to 45% of the harvested volume of timber; the implementations of biomass utilization will be a significant aspect of forest management decisions (Hall, 2002).

**SWOT Analysis**

In reviewing the fiber supply, or biomass, an analysis will be provided of the feedstock for the CHP plant. The feedstock or biomass is the logging debris and residue left behind after the completion of the logging operations. The basis of this SWOT analysis is to get a full understanding of the biomass to be used in the local area and to strategically plan for the renewable green energy. As shown in Appendix E, a few impediments are identified for the fiber supply, and listed as weaknesses and threats. With any obstacle, there are obvious opportunities and associated strengths to be reviewed. The most noted weaknesses are that the logging residue and debris is considered to be costly and underutilized, due to the transportation costs of transporting material from the logging setting to the facility. The other weakness are the biomass is relatively high in moisture and costly for drying prior to usage and there is no biomass utilization infrastructure in place. The strengths are an abundance of biomass available and this supply would provide an added revenue stream to the integrated business approach as well as there is a tenure system to support such biomass utilization.

The external threats for the biomass are the competition with other biomass user groups such as pulp and paper industries and wood pellet industries. As a result of the competition, the price for the biomass will increase due to supply and demand, in addition there is the rising fuel costs for the logging operators. The logging operators may want additional funds for the road side preparation of the biomass as well as for the high petroleum fuel costs. Another threat is the
biomass may be extracted at an unsustainable level which would adversely impact the nutrient cycling, soil productivity, wildlife, hydrology, and public use of the forests. The opportunities for the biomass are endless, the biomass would now have a destination for usage and provide for additional revenue to the rural communities through gathering and collecting biomass and transportation of feedstock. The communities will also reduce the dependence of fossil fuel burning furnaces for reduction of greenhouse gas emissions and have better air quality from CHP use as well as elimination of open burning of the logging waste.

This SWOT analysis has provided valuable insight into the strategic approach for the over abundant logging residue and waste. The primary strategic areas identified are to build a First Nations brand for renewable clean energy using biomass for the communities. The main desires are to be an independent self-sustaining community. There is also an educational element, where the school would use the project as a tangible asset for showing students a better understanding of the full spectrum of the project with associated long term benefits for the environment. The other stakeholders will be involved such as the local governments, licensees, provincial and federal government to provide support and cooperation in the establishment of a renewable energy project, which will provide for a revenue stream for offsetting the overall logging costs.

Chapter 5 – Methodology

The study area is the Kispiox Elementary School located in Kispiox, British Columbia. The Kispiox Elementary School was recent constructed in 1998 as the old school was outdated and lacked energy efficiency. The new constructed building is made out of timber beams and timbered accents. The location of the school is situated in close proximity to the new subdivision where there are recently built homes and in addition there is an adjacent subdivision available for
new home construction. This newly built school is an ideal location as it has all the new features conducive to a CHP where the electricity and heat generation can be used by the facility and possibly by the nearby residential homes. The complex is located close to the residential homes that can be considered for phase 2 of the CHP system. Information is gathered for the electrical usage and propane usage for the 2010/2011 fiscal years to use for calculating the net cost savings.

In 2010, the school installed two new furnaces – MACH 300, which is gas-fired boiler with a 300,000 Btu/hour (70 mm2/kW) input x 2, which equates to 600,000 Btu/hour. Btu is the British thermal unit, this is approximately the amount of energy needed to heat 1 pound (0.454 kg) of water, which is exactly one tenth of a UK gallon or about 0.1198 US gallons. From a conversion perspective, the 600,000 Btu/hour is equivalent to 175 kilowatts. This furnace system can serve as a back-up plan in case the CHP system is not operational due to maintenance and repair.

**Framework of Financial Viability Calculations**

The framework to be used for testing the financial viability of switching propane/oil to CHP are Net Present Value (NPV), Internal Rate of Return (IRR), Payback, Discounted Payback, Profitability Index, and Modified Internal Rate of Return (MIRR). The capital budgeting methods used were derived from the net cost savings of switching from propane to CHP, and the overall saving of producing the electricity for use in the building. The discount rate used is 2.60%, which is the from long-term Government of Canada Treasury bonds that presently yield 2.60%. The reason for using this discount rate is the Kispiox Elementary School is situated on Indian Reserve (IR) Lands, where there are no taxes paid to government and no tax incentives for the CHP project. The inflation rate used is 2.5%, to account for rising costs year after year.
The capital budgeting methods used were based on the initial investment and operating cash flows, the data was gathered from the CHP manufacturer/provider for the purchase price of the CHP unit, freight charges, Harmonized Sales Tax (HST), installation costs, and shelter for system. The incremental cash flows is derived from comparing the change between the propane and electricity with biomass CHP for the generated thermal heat and internal power generation. The change was summed to capture the net cost savings associated with the installation of the CHP, known as the BG25 and ORC system.

The BG25 system is able to produce enough heat and power for internal use and the overall initial investment costs is consider low as compared to the ORC system. The ORC system is 10 times more costly than the BG25 system. The variables that were used in the calculations were biomass costs per Bone Dry Tonnes (BDT), kW/hour that BC Hydro will pay for excess power from CHP, and the Carbon Offsets. The variables used were based on Average case, Worst case and Best case scenario for both CHP units.

For BG25 the variables are as following:

Worst case – biomass used was $90/BDT, no grant allowance, and CO2 offset at $20/ton.

Average case – biomass used was $70/BDT, grant allowance of $100,000, and CO2 offset at $25/ton.

Best Case – biomass used was $60/BDT, grant allowance of $200,000, and CO2 offset at $30/ton.

For ORC system the variables are as following:

Worst case – biomass used was $90/ton, grant allowance of $2.5 Million, $0.096/kW and CO2 offset at $20/ton.
Average case – biomass used was $70/ton grant allowance of $1.5 Million, $0.10/kW and CO2 offset at $25/ton.

Best Case – biomass used was $60/ton, grant allowance of $1.5 Million, $0.105/kW and CO2 offset at $30/ton.

The sensitivity analysis has shown that the biomass price is the driving force behind whether a project is viable. In addition, the BC Hydro bioenergy rates are also a contributing factor, the project will commence based on having a minimum amount of $0.10/kW hr in order for the project to be successful. The surplus power will be sold on the grid through the Standing Offer Program. The average bioenergy prices are $0.105/kW hr. For the BG25 unit, the grant amount will be required and this study shows a grant amount of $200,000 to make the project viable.

Chapter 6 – Financial Viability of Switching from propane/oil to CHP

Capital costs for rural CHP unit

Capital investment will involve building a business case for bioenergy or CHP, where the information and knowledge gained will serve as a starting point for securing financing from investors and bank financing or both. There are two entities that have provided the initial capital costs for the CHP and the range is from $300,000 to $3 Million depending on the technology.

Table 3: Initial Investment for the BG25 CHP system.

<table>
<thead>
<tr>
<th>Items</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase price of BG25</td>
<td>$266,921.00</td>
</tr>
<tr>
<td>HST</td>
<td>$32,030.52</td>
</tr>
<tr>
<td>Freight charges</td>
<td>$15,000.00</td>
</tr>
<tr>
<td>Installation</td>
<td>$15,000.00</td>
</tr>
<tr>
<td>Shelter</td>
<td>$25,000.00</td>
</tr>
<tr>
<td>Initial Investment</td>
<td>$353,951.52</td>
</tr>
</tbody>
</table>
For the purposes of this project, the overall initial investment is $353951.52 for BG25 as shown in Table 3, this includes the CHP unit, freight charges, HST, installation costs, and shelter for system. The initial investment estimates were obtained from Energy North, Gary Spence.

Table 4: Showing the Scenario analysis for the average, worst and best case of the BG25 CHP system.

<table>
<thead>
<tr>
<th>BG25 CHP System</th>
<th>Average</th>
<th>Worst Case</th>
<th>Best Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV</td>
<td>$273,925</td>
<td>$160,921</td>
<td>$386,928</td>
</tr>
<tr>
<td>Discounted Payback</td>
<td>9.95 years</td>
<td>12.93 years</td>
<td>6.97 years</td>
</tr>
<tr>
<td>Payback</td>
<td>8.95 years</td>
<td>12.0 years</td>
<td>5.88 years</td>
</tr>
<tr>
<td>IRR</td>
<td>10.82%</td>
<td>6.58%</td>
<td>17.93%</td>
</tr>
<tr>
<td>PI</td>
<td>1.77</td>
<td>1.45</td>
<td>2.09</td>
</tr>
<tr>
<td>MIRR</td>
<td>7%</td>
<td>5%</td>
<td>10%</td>
</tr>
</tbody>
</table>

The results of the capital budgeting for the BG25 are showing a positive NPV for all scenarios. The internal rate of return (IRR) is greater than 2.6% discount rate for all scenarios; therefore, the investment is considered good. For example, in the average case, the IRR is 10.82%, which is greater than the discount rate used. The simple payback is 8.95 years for the average case. The discounted payback is 9.95 years. The profitability index is 1.77, which is acceptable since it is greater than 1. The financial calculations are shown in Appendix H, I and J. The grant amount used for this project is $100,000.00 for the average case and $200,000 for the best case. Without the grant allowance the numbers do show favorable results including the PI of 1.45 for worst case scenario.

The sensitivity analysis for the CHP system in a rural community is for the biomass availability and costs. The other variables are the inflation rate to be used for the numbers, and the variables for choosing the appropriate discount rate.
Table 5: Showing the Initial Investment for ORC system.

<table>
<thead>
<tr>
<th>Items</th>
<th>Cost</th>
<th>Items</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase price of thermal generation</td>
<td>$1,000,000.00</td>
<td>Purchase price of electrical generation</td>
<td>$660,000.00</td>
</tr>
<tr>
<td>HST</td>
<td>$120,000.00</td>
<td>HST</td>
<td>$79,200.00</td>
</tr>
<tr>
<td>Freight charges</td>
<td>$87,500.00</td>
<td>Installation</td>
<td>$40,000.00</td>
</tr>
<tr>
<td>Installation</td>
<td>$750,000.00</td>
<td>Interconnection study</td>
<td>$85,000.00</td>
</tr>
<tr>
<td>Shelter</td>
<td>$25,000.00</td>
<td>Interconnection line</td>
<td>$200,000.00</td>
</tr>
<tr>
<td></td>
<td>$1,982,500.00</td>
<td></td>
<td>$1,064,200.00</td>
</tr>
</tbody>
</table>

The initial investment for the ORC system is $3,046,700.00, this is 10 times more costly as compared to BG25. The additional cost will allow the proponent to sell the surplus power to BC Hydro; however, due to the additional capital costs the duration of the project is double as compared to the BG25.

Table 6: Showing the capital budgeting for ORC system in terms of Average, Worst and Best case scenarios.

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Worst Case</th>
<th>Best Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPV</td>
<td>$739,389.33</td>
<td>-$98,223.46</td>
<td>$1,882,946.56</td>
</tr>
<tr>
<td>Discounted Payback</td>
<td>20.9 years</td>
<td>&gt;25 years</td>
<td>12.92 years</td>
</tr>
<tr>
<td>Payback</td>
<td>16.97 years</td>
<td>&gt;25 years</td>
<td>11.99 years</td>
</tr>
<tr>
<td>IRR</td>
<td>5%</td>
<td>2%</td>
<td>9%</td>
</tr>
<tr>
<td>PI</td>
<td>1.24</td>
<td>0.97</td>
<td>1.60</td>
</tr>
<tr>
<td>MIRR</td>
<td>4%</td>
<td>2%</td>
<td>6%</td>
</tr>
</tbody>
</table>

The results of the capital budgeting for the ORC system are showing a positive NPV for average and best case scenarios. The internal rate of return (IRR) is greater than 2.6% discount rate for the best scenarios and IRR is showing 5% for average case, and 9% for the best case. For example, in the best case, the IRR is 9%, which is greater than discount rate used. The simple payback is 11.9 years for the best case. The discounted payback is 12.9 years. The profitability index is 1.60 for best case and 1.24 for average case, which is acceptable since it is greater than
1. The Financial calculations are shown in Appendix G and H. The grant amount used for this project is $1.5 Million for average and best scenarios, and $2.5 Million for Worst scenario. Without the grant allowance the project will not be viable.

Chapter 7 – Conclusions
A part of this project is to research the CHP technology and to gain a better understanding of what CHP is all about for bioenergy purposes in small rural communities. Based on my experience, the most popular response to bioenergy in small rural communities is the financial viability of a CHP system is not viable due to the small energy requirements as compared to larger centers. However, the larger centers maybe more suitable for CHP, the down side of such a project is the lack of available biomass. Contrary to rural communities there is an abundance of readily available biomass. This research has identified the CHP technology advancement in Europe, in particular the Sweden and Finland. The reasons for the advanced development of CHP's is the contribution by governments in these countries as having strong policies, which provide avenues for project development from strict environmental regulations and incentives for bioenergy projects. In Canada, and BC, the lack of CHP technology is a limiting factor in terms of available expertise in CHP and the high costs for transporting CHP systems in from other countries. In addition, the CHP's will require parts and supplies and trained expertise to repair the CHP units. It would be wise to ensure there is a local presence of the CHP manufacturers in Canada to build an infrastructure conducive to CHP systems. This local presence will provide for the advancement of CHP and a decrease in the overall initial investments required for the system.

Financial Viability
The net present value of the BG25 investment is positive for all scenarios, and the BG25 system
has the highest net present value as compared to the ORC system. The ORC system is greater in price and provides for the ability to sell excess power to BC Hydro. However, the duration of the project is longer due to the higher initial investment costs. The BC Hydro rates will need to increase to at least $0.11/kW hr and have incremental increases to remain in line with inflationary costs for biomass and labour. These results are broadly in line with the hypothesis of not having a financially viable project due to the smaller CHP units; the units will need to match the demand peak levels for heat and power.

Technology
The technical potential for CHP is enormous as the push for renewable green energy is a priority for the general public, to reduce our environmental footprint. By using the CHP technology, we are able to offset the burning of fossil fuel for heat and energy and to full utilization of the forests for energy production. There are many CHP technologies available to rural communities; it’s a matter of locating the right equipment for the desired purpose. This project did not provide a full financial analysis of all available technology, however, this project does provide a basis of knowing what is involved with pursuing a CHP system by identifying the variables, which drives the success or failure of a project.
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Stewart, K. (2007). Recycle heat into electricity: combined heat and power plants are the 'blue box' for energy. Corporate Knights, 64.

Appendix A: Propane usage for the Kispiox Elementary School for 2010/2011 Fiscal Year

<table>
<thead>
<tr>
<th>Date</th>
<th>Quantity (L)</th>
<th>Unit Price</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/04/09</td>
<td>2644.9</td>
<td>0.609</td>
<td>1610.7441</td>
</tr>
<tr>
<td>10/08/12</td>
<td>6138.7</td>
<td>0.609</td>
<td>3738.4683</td>
</tr>
<tr>
<td>10/11/08</td>
<td>484.4</td>
<td>0.609</td>
<td>294.9996</td>
</tr>
<tr>
<td>10/10/27</td>
<td>9002.5</td>
<td>0.609</td>
<td>5482.5225</td>
</tr>
<tr>
<td>10/11/04</td>
<td>3989.5</td>
<td>0.609</td>
<td>2429.6055</td>
</tr>
<tr>
<td>10/11/09</td>
<td>8233.2</td>
<td>0.609</td>
<td>5014.0188</td>
</tr>
<tr>
<td>10/11/25</td>
<td>973.5</td>
<td>0.609</td>
<td>592.8615</td>
</tr>
<tr>
<td>10/11/29</td>
<td>10595.3</td>
<td>0.609</td>
<td>6452.5377</td>
</tr>
<tr>
<td>10/12/12</td>
<td>6377.5</td>
<td>0.609</td>
<td>3883.8975</td>
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<tr>
<td>11/01/27</td>
<td>3154.7</td>
<td>0.609</td>
<td>1921.2123</td>
</tr>
<tr>
<td>11/01/10</td>
<td>2641.4</td>
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<tr>
<td>11/02/05</td>
<td>13552.4</td>
<td>0.609</td>
<td>8253.4116</td>
</tr>
<tr>
<td>11/02/09</td>
<td>7007.6</td>
<td>0.609</td>
<td>4267.6284</td>
</tr>
<tr>
<td>11/02/24</td>
<td>7737</td>
<td>0.609</td>
<td>4711.833</td>
</tr>
<tr>
<td>11/03/15</td>
<td>4554.1</td>
<td>0.609</td>
<td>2773.4469</td>
</tr>
<tr>
<td></td>
<td>82532.6</td>
<td></td>
<td>50262.3534</td>
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</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Energy Use (kW h)</th>
<th>Energy Charge Rate ($/kW h)</th>
<th>Energy Charge Costs</th>
<th>Demand Charge (kW)</th>
<th>Rate Rider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apr 01 to Apr 12</td>
<td>5550</td>
<td>0.081</td>
<td>449.35</td>
<td>0</td>
<td>18.81</td>
</tr>
<tr>
<td>Mar 12 to Mar 31</td>
<td>9250</td>
<td>0.041</td>
<td>749.75</td>
<td>0</td>
<td>31.35</td>
</tr>
<tr>
<td>Feb 11 to Mar 11</td>
<td>14800</td>
<td>0.081</td>
<td>1198.8</td>
<td>0</td>
<td>58.52</td>
</tr>
<tr>
<td>Jan 14 to Feb 10</td>
<td>24800</td>
<td>0.081</td>
<td>1198.8</td>
<td>0</td>
<td>71.06</td>
</tr>
<tr>
<td>Jan 01 to Jan 13</td>
<td>6325</td>
<td>0.081</td>
<td>512.325</td>
<td>0</td>
<td>25.01</td>
</tr>
<tr>
<td>Dec 14 to Dec 31</td>
<td>6325</td>
<td>0.081</td>
<td>512.325</td>
<td>0</td>
<td>34.63</td>
</tr>
<tr>
<td>Nov 11 to Dec 13</td>
<td>4560</td>
<td>0.081</td>
<td>1198.8</td>
<td>0</td>
<td>54.34</td>
</tr>
<tr>
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Total: 218595

BC Hydro Usage
Kispiox Elementary School
April 2010 to March 31, 2011

## Monthly Data Report for 2009

### Notes on Data Quality

**SMITHERS A**

**BRITISH COLUMBIA**

| Latitude: | 54°49'29.000" N |
| Longitude: | 127°10'58.000" W |
| Climate ID: | 1077500 |
| WMO ID: | |
| TC ID: | YYD |

### Previous Year

### Next Year

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<th>Mean Min °C</th>
<th>Mean Max °C</th>
<th>Extr Min °C</th>
<th>Extr Max °C</th>
<th>Total Rain mm</th>
<th>Total Snow cm</th>
<th>Total Precip mm</th>
<th>Snow Grnd Day cm</th>
<th>Last Gust km/h</th>
<th>Dir of Spd of Gust deg</th>
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### Summary, average and extreme values are based on the data above.

Monthly Data Report for 2010

Notes on Data Quality.

SMITHERS A
BRITISH COLUMBIA
Latitude: 54°49'29.000" N
Longitude: 127°10'58.000" W
Elevation: 521.80 m
Climate ID: 1077500
WMO ID:
TC ID: YYD

Previous Year

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<thead>
<tr>
<th>Month</th>
<th>Mean Max Temp °C</th>
<th>Mean Temp °C</th>
<th>Mean Min Temp °C</th>
<th>Extr Max Temp °C</th>
<th>Extr Min Temp °C</th>
<th>Total Rain mm</th>
<th>Total Snow cm</th>
<th>Total Precip mm</th>
<th>Snow Gnd cm</th>
<th>Last Day Deg</th>
<th>Dir of Max Gust</th>
<th>Spd of Max Gust km/h</th>
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</thead>
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<td>Feb</td>
<td>3.1</td>
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<td>-11.1</td>
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<td>8.2</td>
<td>6.6</td>
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</tr>
<tr>
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<td>7.6</td>
<td>2.8</td>
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<td>18E</td>
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<tr>
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<td>3.2*</td>
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<td>11.7*</td>
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<td>M</td>
<td>3.0*</td>
<td>19*</td>
<td>57*</td>
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</table>

Summary, average and extreme values are based on the data above.
Appendix E: SWOT Analysis of the biomass in CHP/Bioenergy systems.

<table>
<thead>
<tr>
<th>Internal</th>
<th>Weakness</th>
<th>Strengths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. High costs for logging and transportation.</td>
<td>1. Economy of scale for the biomass and merchantable timber.</td>
</tr>
<tr>
<td></td>
<td>2. Underutilization of logging residue and waste.</td>
<td>2. Abundance of biomass for full utilization.</td>
</tr>
<tr>
<td></td>
<td>3. Lack of infrastructure for biomass utilization.</td>
<td>3. Integrated approach.</td>
</tr>
<tr>
<td></td>
<td>4. High moisture content of logging residue and waste.</td>
<td>4. Proven technology in Europe.</td>
</tr>
<tr>
<td></td>
<td>5. Long-term debt vs. short-term debt.</td>
<td>5. Tenure system support biomass utilization.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>External</th>
<th>Threats</th>
<th>Possible Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Competition with other industry user groups such as pellets, pulp &amp; paper, bio-coal.</td>
<td>1. The other industry users can assist with covering the operational cost by purchasing the biomass at cost.</td>
</tr>
<tr>
<td></td>
<td>2. Rising costs due to rising fuel costs and inflation.</td>
<td>2. Aboriginal groups can become leaders in energy production for self-reliance.</td>
</tr>
<tr>
<td></td>
<td>3. Unsustainable use of biomass, negatively impacting the environment.</td>
<td>3. Incorporate the other users in the integrated approach for sustainability and diversification.</td>
</tr>
<tr>
<td></td>
<td>4. Aboriginal Rights &amp; Title.</td>
<td>4. Off set costs by full utilization.</td>
</tr>
<tr>
<td></td>
<td>5. High cost of drying biomass.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Possible Strategies</th>
<th>Possible Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reduction of greenhouse gas emissions due to switching fuel source.</td>
<td>1. Renewable clean energy brand that is financially viable.</td>
<td>1. Better uses of biomass that benefit the rural communities.</td>
</tr>
<tr>
<td>2. Renewable green energy production from waste and residue.</td>
<td>2. Smaller rural communities will benefit from the environmental, social, and economic values of CHP.</td>
<td>2. Educate the public about the opportunities and benefits.</td>
</tr>
<tr>
<td>3. Zero waste as a result of CHP project.</td>
<td>3. Short-term debt is desired, full support from government with grants.</td>
<td>3. Training and capacity building for the CHP.</td>
</tr>
<tr>
<td>4. First mover approach.</td>
<td></td>
<td>4. Distributor rights for the</td>
</tr>
</tbody>
</table>
Appendix F: Green Heat Initiative – Biomass Calculator to show approximate net cost savings for chips and pellets for project facility.

**Calculator for Biomass Heating Systems between 50 kW and 1.5 MW**

The calculator below is designed as a snap assessment tool to determine the costs and savings of switching to a biomass heating system. Using your estimated annual heating cost, fuel type and heat output of your current system (this is usually located on the serial number tag of your current heating system), the calculator will help determine how a Green Heat system would work for you.

For questions or interpretation of your results, please contact our project coordinator David Dubois via email at David@greenheatinitiative.com or call 250-457-7319. This is intended as a pre-assessment educational tool.

If you have any technical difficulties with the calculator please contact info@greenheatinitiative.com.

What is your current annual heating cost?  
What are you currently using for heat?

<table>
<thead>
<tr>
<th>What is your current annual heating cost?</th>
<th>$50252.35/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are you currently using for heat?</td>
<td>Propane</td>
</tr>
<tr>
<td>How much energy/fuel are you currently using per year?</td>
<td>Use this amount -&gt;</td>
</tr>
<tr>
<td>What is the size of your current heating system?</td>
<td>600000 BTU/hr</td>
</tr>
</tbody>
</table>

Results

Your current energy usage equates to **105.5 Bone Dry tonnes of Biomass per year**.  
A biomass based heating system would reduce Green House Gas emissions by **126.3 tonnes of CO2e per year**.

<table>
<thead>
<tr>
<th>Pellets</th>
<th>Chips</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Fuel Savings:</td>
<td>$26,116</td>
</tr>
<tr>
<td>Simple Payback:</td>
<td>4.4 years</td>
</tr>
</tbody>
</table>

More Results...

The estimated size of your biomass based heating system would be **166 kW or 563,900 BTU/hr**.

<table>
<thead>
<tr>
<th>Pellets</th>
<th>Chips</th>
</tr>
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<tbody>
<tr>
<td>The yearly operating costs would be:</td>
<td>$24,146</td>
</tr>
<tr>
<td>Estimated Biomass Heating System Capital Cost:</td>
<td>$114,254</td>
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<tr>
<td>Yearly Biomass Fuel Consumption:</td>
<td>108.8 tonnes</td>
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</table>

If you’d like to have a more detailed analysis suited to your specific needs, please submit your email address and we will be happy to help.
Appendix G: Operating Cash Flows for ORC system to show capital budgeting from net cost savings (Best Case Scenario).

<table>
<thead>
<tr>
<th>Year</th>
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<th>Grant</th>
<th>Depreciation</th>
<th>Life</th>
<th>Savings</th>
<th>Tax Rate</th>
<th>Annual</th>
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<td>20%</td>
<td>0</td>
<td>0</td>
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<td>20%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>20%</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
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<td>20%</td>
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<td>0</td>
<td>0</td>
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<tr>
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</tr>
</tbody>
</table>

Discount rate: Add to NWC: SL,781,550.00 5%
Appendix H: Operating Cash Flows for ORC system to show capital budgeting from net cost savings (Average Case Scenario).

### Table: Operating Cash Flows

<table>
<thead>
<tr>
<th>Description</th>
<th>Method</th>
<th>Cash Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>$3,132,000.00</td>
<td>$1,000,000.00</td>
</tr>
<tr>
<td>$1,500,000.00</td>
<td>25%</td>
<td>$783,550.00</td>
</tr>
<tr>
<td>$1,400,000.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
<tr>
<td>$900,000.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
<tr>
<td>$0.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
<tr>
<td>$900,000.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
<tr>
<td>$0.00</td>
<td>25%</td>
<td>$111,565.48</td>
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<tr>
<td>$900,000.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
<tr>
<td>$0.00</td>
<td>25%</td>
<td>$111,565.48</td>
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<tr>
<td>$900,000.00</td>
<td>25%</td>
<td>$111,565.48</td>
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<tr>
<td>$0.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
<tr>
<td>$900,000.00</td>
<td>25%</td>
<td>$111,565.48</td>
</tr>
</tbody>
</table>

### Notes:
- Sample: ORC system to show capital budgeting from net cost savings (Average Case Scenario).
- Active years: 15 years.
- Cost: $3,132,000.00.
- Discounted Payback Period: 5.4 years.
Appendix I: Operating Cash Flows for BG 25 system to show capital budgeting from net cost savings (Best Case Scenario).

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost Savings</th>
<th>Depreciation</th>
<th>Tax Shield</th>
<th>Cumulative Cashflow</th>
<th>Discounted Cashflow (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$19,237.65</td>
<td>-</td>
<td>-</td>
<td>$19,237.65</td>
<td>$19,237.65</td>
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<td>$34,237.65</td>
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<tr>
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<td>-55,353</td>
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</tr>
<tr>
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<td>-55,353</td>
<td>$34,237.65</td>
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</tr>
<tr>
<td>4</td>
<td>$4,237.65</td>
<td>-34,237.65</td>
<td>-55,353</td>
<td>$34,237.65</td>
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<tr>
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<td>-55,353</td>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
<tr>
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<td>-34,237.65</td>
<td>-55,353</td>
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<td>$88,487.88</td>
</tr>
<tr>
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<td>-34,237.65</td>
<td>-55,353</td>
<td>$34,237.65</td>
<td>$88,487.88</td>
</tr>
<tr>
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</tr>
<tr>
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<td>-55,353</td>
<td>$34,237.65</td>
<td>$88,487.88</td>
</tr>
</tbody>
</table>

Discounted cashflow (%):
- IRR = 20.9% (IRR > Discount, Good)
- NPV = $386,928.00
- MIRR = 10% (MIRR > Discount, Good)
- Simple PB = 5.58 (Good)
- Discounted PB = 0.97 (Good)
- PI = 2.98 (Greater than 1, good)
- PB = 18.9% (Discount, Good)

I: Initial Investment
TCS: Total Cost of System
Appendix J: Operating Cash Flows for BG 25 system to show capital budgeting from net cost savings (Average Case Scenario).

<table>
<thead>
<tr>
<th>Case</th>
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<tr>
<td>Grant</td>
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<tr>
<td>Depreciation</td>
<td>0</td>
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<tr>
<td>Life</td>
<td>15 years</td>
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<tr>
<td>Salvage</td>
<td>$50,487.88</td>
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<tr>
<td>Life</td>
<td>$2,237.65/year</td>
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<tr>
<td>Tax rate</td>
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<td>Add. To NWC</td>
<td>$36,353</td>
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| 1. Cost saving | 24,237.65 |
| 2. Depreciation | 0 |
| Year | 0 |

| AT savings | $34,237.65 |
| Tax shield | $34,237.65 |
| 10% | 0%
| NWC Sp. | ($353,951.52) |
| Capital Spending | ($253,951.52) |
| Total Project CF | ($253,951.52) |
| Cumulative cash flow | $309,304.52 |

Discounted cash flow (%)

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<th>2</th>
<th>3</th>
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<th>15</th>
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<tr>
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<tr>
<td>Simple PB</td>
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<td>IRR</td>
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<tr>
<td>PI</td>
<td>1.77 Greater than 1, good</td>
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</tr>
<tr>
<td>MIRR</td>
<td>7% MIRR=Discount, Good</td>
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<table>
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<tr>
<td>Freight charge</td>
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<tr>
<td>Installation</td>
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<tr>
<td>Shelter</td>
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<tr>
<td>Total Capital Spending</td>
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Biomass CHP

net investment two
BG25 TCS Biomass to Power System
Appendix K: Operating Cash Flows for BG 25 system to show capital budgeting from net cost savings (Worse Case Scenario).

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<tr>
<td>Depreciation</td>
<td>0</td>
</tr>
<tr>
<td>Life</td>
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</tr>
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<td>Salvage</td>
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<td>Depreciation</td>
<td>$423,776.25/year</td>
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<td>1. cost saving:</td>
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<td>2. Depreciation:</td>
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</tr>
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<td>3. Tax Shield</td>
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<td>4. OCF</td>
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<td>5. Add. To NWC</td>
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<td>6. Total Project CF</td>
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<td>7. Cumulative cash flow</td>
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<td>8. Discounted cash flow (5%)</td>
<td>($376,124.87)</td>
</tr>
<tr>
<td>9. Acc. Discounted cash flow</td>
<td>($409,304.52)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>NPV</td>
<td>10.93</td>
</tr>
<tr>
<td>Discounted PB</td>
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<tr>
<td>PI</td>
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<tr>
<td>MIRR</td>
<td>5%</td>
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</table>

<table>
<thead>
<tr>
<th>Biomass CHP Initial Investment =0</th>
<th>BG 25 TCS Biomass To-Power System</th>
</tr>
</thead>
<tbody>
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<td>Item</td>
<td>Cost</td>
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<td>Purchase price</td>
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<td>Freight charge</td>
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<tr>
<td>Installation</td>
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</tr>
<tr>
<td>Shutter</td>
<td>$225,000.00</td>
</tr>
<tr>
<td>Total investment</td>
<td>$353,951.52</td>
</tr>
</tbody>
</table>

| Discounted cash flow (5%) | $376,124.87 |
| Acc. Discounted cash flow  | ($409,304.52) |
| IRR                          | 5.88% |
| PI                            | 1.45 |
| MIRR                          | 5% |

| NPV                          | 10.93 |
| Discounted PB                | 12.93 |
| Simple PB                    | 12.90 |
| RRR                          | 5.88 |
| PI                           | 1.45 |
| MIRR                         | 5% |
Appendix L: BC Hydro Standing Offer EPA document.

BC HYDRO

STANDARD FORM ELECTRICITY PURCHASE AGREEMENT

STANDING OFFER PROGRAM

Revised: January 2011

[Note to Developers: The following is a summary only of certain key terms and conditions of the Standard Form EPA. Developers are encouraged to carefully review the Standard Form EPA prior to submitting an Application. If there is any conflict between this summary and the Standard Form EPA, the Standard Form EPA governs.

Capitalized terms used in the following summary that are not defined in Appendix 1 to the Standard Form EPA having the meaning given to those terms in the Glossary to the Standing Offer Program Rules.

1. The Developer is required to sell all energy from the Project to BC Hydro during the EPA Term.

2. The Developer can select an EPA Term of twenty (20) to forty (40) years from COD (in whole years only).

3. The Target COD specified in the Developer’s Application to the SOP must be within three (3) years after signing the EPA. The Target COD will be adjusted to reflect the interconnection schedule as indicated in the interconnection studies, including any studies completed after the EPA is signed.

4. The Developer is required to deliver the energy from the Project to the POI. For Projects with an Indirect Interconnection, the Developer will be required to deliver the energy to a specified point of interconnection on the Transmission System or Distribution System.

5. BC Hydro pays for the quantity of energy delivered to the POI after COD that qualifies as Clean Energy. Fifty (50) percent of the price is adjusted for escalation effective as of January 1 in each year of the EPA Term. The price is also adjusted based on the time of delivery of the energy.

6. The Developer is required to transfer title to BC Hydro to all Environmental Attributes associated with the energy sold to BC Hydro under the Project EPA. The payment for the Environmental Attributes is included in the price payable by BC Hydro for the energy delivered under the Project EPA.

7. There is no requirement to deliver a specified quantity of energy to BC Hydro at specified times. BC Hydro accepts energy if and when it is delivered to the POI. However, the Project EPA provides BC Hydro with the right to terminate the Project EPA in certain circumstances, including, among others, a failure to achieve COD within two (2) years after the Target COD, or a failure to deliver any energy for a continuous period of two (2) years.
8. There are no liquidated damages payable under the Project EPA and the Developer is not required to provide performance security. However, the Developer is required to provide BC Hydro with Network Upgrade Security at the time specified in Appendix 3 to the Standard Form EPA.

9. The Standard Form EPA has been drafted based on a Seller's Plant that consists of a new electricity generation facility that is interconnected directly to the Distribution System. The Project EPA for a particular Project will be based on the information in the Application for that Project. Some of the revisions applicable to certain types of Projects are described in Appendix 11.
THIS ELECTRICITY PURCHASE AGREEMENT ("EPA") is made as of *, 20__ (the "Effective Date")

BETWEEN:

___ a corporation incorporated under the laws of ___ with its head office at ____________________________

("

S

eller")

AND:

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY, a corporation continued under the Hydro and Power Authority Act R.S.B.C. 1996, c. 212, with its head office at 333 Dunsmuir Street, Vancouver, BC V6B 5R3

("Buyer").

The Parties agree as follows:

(a) INTERPRETATION

The definitions and certain principles of interpretation that apply to this EPA are set out in Appendix 1.

[Note to Developers: Any terms used in the Notes to Developers in this EPA that are not defined in Appendix 1 to this EPA have the meaning given to those terms in the Standing Offer Program Rules - Glossary.]

(b) TERM

The term ("Term") of this EPA commences on the Effective Date and continues until the _________ anniversary of COD, unless it is terminated earlier as authorized under this EPA.

[Note to Developers: The blank in this section will be completed based on the term selected by the Developer in the Application.]

(c) CONSTRUCTION AND OPERATION

a. Construction and Operation Costs and Liabilities - Except as set out in
Appendix 3, the Seller shall be responsible for all costs, expenses, liabilities and other obligations associated with the design, engineering, construction, Interconnection, commissioning, operation, maintenance and decommissioning of the Seller's Plant.

b. **Standard of Construction and Operation** - The Seller shall own the Seller's Plant and shall ensure that the Seller's Plant is operated by qualified and experienced individuals. The Seller represents, warrants and covenants that the location, design, engineering, construction, Interconnection, commissioning, operation and maintenance of the Seller's Plant, are and, except as otherwise consented to by the Buyer, shall be carried out at all times during the Term in compliance with: (a) the information in the Application in all material respects; and (b) the Project Standards, provided that if the requirements for Clean Energy are amended or replaced after the Effective Date, the Seller shall make commercially reasonable efforts to operate the Seller's Plant in a manner that allows the Delivered Energy to continue to qualify as Clean Energy under the new requirements.

c. **Project Changes** - Without limiting any other section of this EPA under which the Buyer's consent is required, the Seller shall not make any change to:

   (a) those aspects of the Seller's Plant described in sections 1-3 of Appendix 2; or

   (b) any other aspects of the Seller's Plant or the information in any interconnection study completed for the Seller's Plant prior to the Effective Date where such change would increase the Buyer's liability for Network Upgrade Costs or any other costs with respect to the Seller's Plant or any other project,

in either case without the Buyer's prior consent, such consent not to be unreasonably withheld, conditioned or delayed. The Seller shall not make any change to the Plant Capacity without the Buyer's prior consent. The Seller acknowledges that the Buyer may require as a condition of its consent to any change described in this section, or any other change to the Seller's Plant for which the Buyer's consent is required under any other section of this EPA, that the Seller agree in writing to reimburse the Buyer for any incremental liability for Network Upgrade Costs with respect to the Seller's Plant or any other project, and any other losses, costs and damages incurred by the Buyer as a result of any change described in this section. The Buyer may also require the Seller to provide security to the Buyer to secure such reimbursement obligation.

d. **Development Reports** - The Seller shall deliver a Development Report to the Buyer on each January 1, April 1, July 1 and October 1 after the Effective Date until COD.

e. **Network Upgrades** - The Parties' obligations with respect to Network Upgrade Costs and Network Upgrade Security are set out in Appendix 3.

f. **Revenue Metering Equipment** - The Seller shall ensure that a Revenue Meter is installed, operated and maintained at a location approved by the Buyer, acting reasonably. The Revenue Meter must be tested and sealed according to Measurement Canada standards by a facility that is accredited by Measurement Canada. The Revenue Meter must be capable of accurately measuring the quantity of Energy generated by the Seller's Plant and delivered to the POI independent of all other generation equipment or facilities. If there is any dispute regarding the accuracy of the Revenue Meter, either Party may give notice to the other Party of the dispute. In that case the Parties will resolve the matter in accordance with the *Electricity and Gas Inspection Act* (Canada). The Buyer may, at its cost, install a duplicate revenue meter at the Seller's Plant at a location agreed to by the Seller, acting reasonably. The Seller shall allow the Buyer to access the Seller's Plant to install, inspect and maintain any such duplicate meter. The Seller shall make equipment and telephone access available to the Buyer as
required for the duplicate revenue meter. If the Seller’s Plant is rated 1.00 MVA or higher, the Seller shall ensure that the Seller’s Plant is equipped with SCADA capability.

g. **Insurance** - The Seller shall at its cost obtain and thereafter maintain during the Term insurance covering such risks and in such amounts as would a prudent owner of a facility the same as or similar to the Seller’s Plant. Such insurance shall include commercial general liability insurance with a per occurrence limit of liability not less than $2,000,000 applicable to the Seller’s Plant separate from all other projects and operations of the Seller. All commercial general liability policies must include the Buyer, its directors, officers, employees and agents as additional insureds and must include a cross liability and severability of interest clause. The Seller shall provide evidence of such insurance to the Buyer on request.

h. **Early COD** - Except with the Buyer’s prior consent, COD may not occur earlier than 90 days prior to Target COD. The Buyer shall not be required to incur any incremental expense or other liability of any kind to enable COD to occur prior to Target COD.

i. **Change in Target COD** - If the Estimated Interconnection Facilities Completion Date is later than 90 days prior to the Target COD, and unless otherwise agreed by the Parties in writing, the Target COD shall be postponed to the Estimated Interconnection Facilities Completion Date plus 90 days.

j. **No Liability For Delay** - The Buyer shall have no liability under this EPA for delays in completion of (i) any Network Upgrades, or (ii) other work undertaken by the Distribution Authority or the Transmission Authority on the Seller’s Plant side of the POI, in each case howsoever arising.

k. **First Nations Consultation**

3.11.1 For the purposes of this EPA, the following terms shall have the following meanings, respectively:

(a) “First Nations” means:

(i) for the purposes of this EPA (other than subsection 3.11.3), any band, band council, tribal council, aboriginal treaty nation and/or other aboriginal group or aboriginal governing body, however organized and established by aboriginal people within their traditional territory in British Columbia, that is identified by the Crown, before or after the Effective Date, as a band, band council, aboriginal treaty nation and/or other aboriginal group or aboriginal governing body with which consultation regarding any of the Potential Impacts is required in accordance with applicable Laws as a result of an application or request by the Seller or any Affiliate of the Seller for any Permit or tenure related directly to the Seller’s Plant or any amendment, renewal, replacement, assignment or any other decision whatsoever by the Crown with respect to any Permit or tenure related directly to the Seller’s Plant, and

(ii) for the purposes of subsection 3.12.3, any band, band council, tribal council, aboriginal treaty nation and/or other aboriginal group or
aboriginal governing body, however organized and established by aboriginal people within their traditional territory in British Columbia, whether or not identified by the Crown pursuant to the foregoing subsection (i) of this subsection 3.11.1(a),

(b) "Order or Decision" means:

(i) any order or decision of any court of competent jurisdiction or any regulatory authority, including the BCUC; and

(ii) a writ or any other document commencing legal proceedings with respect to the Buyer or any written communication threatening to issue a writ or otherwise commence legal proceedings with respect to the Buyer, alleging that there has been a failure to consult with First Nations in relation to Potential Impacts, and which has received a Verification;

(c) "Potential Impacts" means any adverse impact or potential adverse impact on the established or potential aboriginal rights (including title) of a First Nation as a result of the following matters (and which, for greater certainty, does not in any circumstance include any matters arising on the Buyer's side of the Point of Interconnection or on the Transmission System):

(i) this EPA;

(ii) the Project;

(iii) the interconnection of the Seller's Plant to the Transmission System;

or

(iv) any activities carried out by the Seller, any Affiliate, consultant or contractor of the Seller, or any other Person for whom the Seller is responsible at law directly related to the Seller's Plant to enable the Seller to comply with its obligations under the EPA; and

(d) "Verification" means that a lawyer, qualified to practice in British Columbia and acceptable to both the Buyer and Seller, has reviewed the writ or other document commencing legal proceedings or the written communication threatening to issue a writ or otherwise commencing legal proceedings, and verified in writing to both parties that there is a reasonable prospect of an order or decision of a court of competent jurisdiction or regulatory authority, including the BCUC, in favour of the party who has commenced or threatened the writ or other legal proceedings. The Buyer and the Seller shall each provide to the lawyer conducting such review such information and other assistance as may be requested by that lawyer to assist them in completing the review. If the Buyer and the Seller are unable to agree on an acceptable lawyer to provide the Verification within 15 days after the Buyer
has provided the name of a proposed lawyer to the Seller, either Party may refer the matter to arbitration under section 7.5 and each of the Buyer and the Seller shall, within 7 days after the dispute is referred by either Party to arbitration, submit a list of lawyers that would be acceptable to that Party and the Parties shall ask the arbitrator to select the lawyer from the proposed lists that is, in the arbitrator’s opinion, after receiving any submissions from the Parties the arbitrator may request, the most qualified lawyer to provide the Verification. The Buyer and the Seller shall each pay 50% of the costs of obtaining the Verification. Each Party acknowledges and agrees that any lawyer providing a Verification is jointly retained by the Parties and any communications between the Parties and the lawyer and any work product of the lawyer in subject to solicitor client privilege.

3.11.2 If, prior to the second anniversary of COD, the Buyer is or may be required by an Order or Decision to consult with and/or accommodate any First Nations in relation to Potential Impacts, then the Seller, if requested to do so by the Buyer, by notice sent to the Seller as soon as practicable after the Buyer receives notice of the Order or Decision, shall:

(a) carry out that consultation to the extent the Seller is legally capable of doing so and in accordance with applicable Laws, or assist the Buyer if and to the extent requested by the Buyer in the consultation process;

(b) take measures, to the extent (if any) required under the Order or Decision, or under applicable Laws, to address, prevent, mitigate, compensate or otherwise accommodate any Potential Impacts; and

(c) provide regular written reports to the Buyer concerning the Seller's compliance with this subsection, or such other information and communications as may be reasonably requested by the Buyer.

3.11.3 Notwithstanding subsection 3.11.2, the Buyer hereby confirms that the responsibilities of the Seller in subsection 3.11.2 do not in any way whatsoever encompass or apply to the following matters, whether arising prior to or after the second anniversary of COD:

(a) any duty to consult or accommodate applicable to any Crown decision-maker or regulatory authority, which for greater certainty does not include the Buyer, that is considering or dealing with the Project in any way, including in connection with the consideration of the issuance of any of the Permits;

(b) any measure of reconciliation or accommodation that the Buyer may offer or be required to provide to a First Nation related to land or resource use that is not associated with the Potential Impacts, including resource revenue sharing, or that is related to electricity policy, planning, regulation or export; and
3.11.4 The Buyer will as soon as practicable notify the Seller of any written communication received by the Buyer that commences a legal proceeding with respect to the Buyer or that threatens to issue a writ or any other document commencing a legal proceeding with respect to the Buyer, with respect to which the Buyer intends to request the Seller to carry out its obligations under subsection 3.11.2. Any failure by the Buyer to notify the Seller as required under subsection 3.11.2 or subsection 3.11.4 shall not limit or otherwise affect the Seller's obligations under subsection 3.11.2 except to the extent the Buyer's failure to notify the Seller has a materially adverse effect on the Seller. For greater certainty, the covenant of the Buyer in section 10.9 applies to the obligations of the Seller in subsections 3.11.2 and 3.12, and the Seller shall reimburse the Buyer for all costs reasonably incurred by the Buyer in providing assistance to the Seller at the request of the Seller as contemplated under that section to assist the Buyer to perform its obligations under subsections 3.11.2 and 3.12. Without limiting the generality of but subject to the foregoing (including the obligation to reimburse the Buyer for all costs reasonably incurred by the Buyer), for greater certainty, the Buyer will at the request of the Seller provide reasonable assistance to the Seller in the performance by the Seller of its obligations under subsections 3.11.2 and 3.12; including agreeing to reasonable amendments of the EPA as contemplated by section 3.12; provided however, that any proposed amendment of the EPA must be in the public interest.

3.11.5 At any time prior to the second anniversary of COD, the Buyer will not have any discussions with any First Nation with respect to the consultation or accommodation regarding the Project without first notifying the Seller of its intention to have such discussions and seeking the consent of the relevant First Nation for the Seller to participate in such discussions. The foregoing obligation does not extend to any properties or infrastructure owned by the Buyer.

I. Right to Terminate - If a measure or measures required to be undertaken by the Seller in order to comply with its obligations under section 3.11 of this EPA would impose a commercially unreasonable cost or other obligation on the Seller, or would require the consent of the Buyer under any provision of this EPA or would require agreement by the Buyer to an amendment of the EPA in order to address any such adverse impacts on established and potentially existing aboriginal rights (including title) and if such consent or agreement to amend is not provided within 60 days after the Seller's request to the Buyer, then the Seller may terminate this EPA on notice to the Buyer, and such termination will be effective on the date that is 60 days after the date of delivery of such notice of termination unless, prior to that date, the Seller, by notice from the Buyer or otherwise, has been relieved of its obligation to take the measure or measures that would impose the unreasonable cost or obligation on the Seller or the consent or agreement to an amendment of the EPA has been provided, as applicable. A termination by the Seller under this section shall, for all purposes of this EPA, be treated in the same manner as a
termination by the Seller under subsection 8.3(d) of this EPA. If the Seller terminates the EPA pursuant to this section, the Seller shall not be, or be deemed to be or have been, in breach of section 3.11 of this EPA for failure to implement the measure or measures that gave rise to the Seller's right to terminate the EPA under this section. For purposes of this section 3.12, "a commercially unreasonable cost or other obligation on the Seller" means a cost or obligation (i) to be borne by the Seller, (ii) that results, or can reasonably be expected to result, from the implementation of a measure or measures required under section 3.11, and (iii) that would impose upon the Seller a commercially unreasonable burden, having regard to all other financial benefits and burdens of the EPA to the Seller over the entire Term.

m. Planned Outages – The Seller shall:

give the Buyer not less than 90 days' prior notice of any Planned Outage, or such shorter period to which the Buyer may consent, such consent not to be unreasonably withheld, delayed or conditioned, and such notice shall state the start date and hour and the end date and hour for the Planned Outage. Notwithstanding the foregoing, at any time prior to 48 hours before the start of a Planned Outage that will be more than 7 days long, the Seller may change the proposed start time for the Planned Outage by not more than 24 hours and at any time prior to 48 hours before the end of the Planned Outage, the Seller may change the proposed end time of the Planned Outage on notice to, and without the consent of, the Buyer, provided that if as a result of such notice from the Seller the Planned Outage starts later or ends earlier than originally scheduled, there will be no deemed Delivered Energy under section 4.7 during the period between the originally scheduled start time and the revised start time and/or between the originally scheduled end time and the revised end time of the Planned Outage;

in accordance with the Buyer’s written instructions, use the Buyer’s web-based application or other system for communicating Planned Outages to the Buyer;

make commercially reasonable efforts to coordinate all Planned Outages with the Buyer’s requirements as notified to the Seller; and

make commercially reasonable efforts to coordinate all Planned Outages with the Transmission Authority’s maintenance schedule where such schedule is publicly available or otherwise notified to the Seller.

Not less than 30 days before a Planned Outage is scheduled to commence, the Buyer may request the Seller to reschedule that Planned Outage. Within 14 days after receipt of such a request, the Seller shall provide the Buyer with an estimate, together with reasonable supporting detail, including a reasonable contingency allowance, of the costs, if any, the Seller expects to incur, acting reasonably, as a result of rescheduling the Planned Outage in accordance with the Buyer’s request. Within 7 days after receipt of such cost estimate, the Buyer shall notify the Seller if the Buyer requires the Seller to reschedule the Planned Outage, and upon receipt of such notice from the Buyer, the Seller shall adjust the schedule for the Planned Outage as required by the Buyer, provided that the rescheduling is consistent with Good Utility Practice and does not have a materially adverse effect on the operation of the Seller’s Plant or on any facility that is a thermal host for the Seller’s Plant. The Buyer shall reimburse the Seller for all costs reasonably incurred by the Seller as a result of such rescheduling, but not exceeding the estimate delivered by the Seller to the Buyer under this section 3.13.
n. Notice of Outages – Other than for a Planned Outage for which notice has been given pursuant to section 3.13, the Seller shall promptly notify the Buyer of any outage, or any anticipated outage of the Seller’s Plant.

(d) PURCHASE AND SALE OBLIGATIONS

a. Pre-COD Energy - The Buyer shall make commercially reasonable efforts to accept delivery of Energy at the POI prior to COD, provided that the Buyer shall not be required to take any steps or to incur any incremental expense or other liability of any kind to enable delivery of Energy to the POI prior to 90 days before the Target COD.

b. Post-COD Sale and Purchase of Energy - From and after COD for the remainder of the Term, the Seller shall sell and deliver all Energy to the Buyer at the POI and the Buyer shall purchase and accept delivery of all Delivered Energy. The Buyer shall pay for all Delivered Energy after COD in accordance with section 5.2. Notwithstanding the foregoing, the Buyer shall have no obligation to take or pay for any Energy that is generated as a result of an increase in the Plant Capacity made without the consent of the Buyer in accordance with section 3.3. When the Seller is delivering Energy to the Buyer, the Seller shall make commercially reasonable efforts to operate the Seller’s Plant in a manner that ensures delivery of Energy at the POI at a uniform rate within each hour during which Energy is delivered.

c. Transmission Outages - The Buyer will not be in breach or default of its obligations under section 4.1, section 4.2 or section 5.2 if the Buyer is not able to accept delivery of Energy at the POI as a result of a Distribution/Transmission Constraint or Disconnection. The Buyer shall have no liability with respect to a Distribution/Transmission Constraint or Disconnection, except as set out in section 4.7, if applicable.

d. Environmental Attributes - The Seller hereby transfers, assigns and sets over to the Buyer all right, title and interest in and to the Environmental Attributes.

e. Exclusivity - The Seller shall not at any time during the Term commit, sell or deliver any Energy or any Environmental Attributes to any Person, other than the Buyer under this EPA. The Seller shall not use or apply any Energy or Environmental Attributes for any purpose whatsoever except for sale to the Buyer under this EPA. These prohibitions do not apply when the Buyer is in breach of its obligations under section 4.2. The Seller acknowledges and agrees that the exclusive rights conferred by this section are of fundamental importance, and that, without prejudice to any right to claim damages, compensation or an accounting of profits, the granting of an interim, interlocutory and permanent injunction is an appropriate remedy to restrain any breach or threatened breach by the Seller of the obligation set out in this section.

f. Custody, Control, Risk of and Title To Energy - Custody, control, risk of, and title to, all Energy passes from the Seller to the Buyer at the POI. The Seller shall ensure that all Energy delivered to the Buyer under this EPA and all Environmental Attributes transferred to the Buyer under this EPA are free and clear of all liens, claims, charges and encumbrances. The Seller is responsible for all transmission losses and costs relating to the transmission of Energy from the Seller’s Plant to the POI.

g. Distribution/Transmission System Constraint or Disconnection - If in any month after COD the Seller is unable to deliver Energy at the POI solely as a result of a Distribution/Transmission Constraint or Disconnection that exceeds 30 continuous minutes in duration and such Distribution/Transmission Constraint or Disconnection:
is not caused by an event beyond the control of the Buyer or the Transmission Authority;

(b) is not caused by the Seller or the Seller’s Plant; and

(c) occurs after Distribution/Transmission Constraints or Disconnections have been in effect for more than 24 hours in the aggregate, whether or not continuous, in that month;

then, notwithstanding that the Buyer is excused under section 4.3 from its obligations under section 4.2, the Buyer shall pay to the Seller an amount equal to the price payable for post-COD Delivered Energy under section 5.2 multiplied by the amount of Energy, not exceeding \[ \text{MWh} \], that could have been generated and delivered at the POI in each hour after the 24 hours has elapsed but for the occurrence of the Distribution/Transmission Constraint or Disconnection less any costs the Seller avoided or, acting reasonably, could have avoided during the Distribution/Transmission Constraint or Disconnection. The Seller shall maintain accurate and complete records of all avoided or avoidable costs and shall report all such costs to the Buyer and provide the Buyer with all information required to calculate such costs. The Buyer or its designated representative may audit such costs and in that event the provisions of section 7.2 apply. The Buyer will not be required to pay for any Energy under this section during any period specified as a maintenance period in an Energy schedule delivered pursuant to section 7.7 or during any other period where the Seller’s Plant would otherwise not have been operating. For greater certainty, the provisions of this section will not apply during any period when the Buyer is or would be excused, in accordance with section 7.9, from its obligation to accept delivery of Energy as a result of Force Majeure.

(Note to Developers: The blank in this section will be completed with the Plant Capacity multiplied by 1 hour.)

h. Buyer Dispatch/Turn-Down Right -

The Buyer may at any time during the Term deliver notice to the Seller requiring the Seller to turn down or shut off the Seller’s Plant (a “Dispatch/Turn-Down”) and the Seller shall forthwith comply with any such direction except to the extent that any operational, technical, regulatory or fuel storage constraint prevents or limits the Seller’s ability to comply with such direction.

Energy, not exceeding \[ \text{MWh} \], that could have been generated and delivered to the POI in each hour as Delivered Energy but for a direction from the Buyer pursuant to subsection 4.8(a) shall be deemed to be Delivered Energy and the Buyer shall pay to the Seller an amount equal to the price payable for post-COD Delivered Energy under section 5.2 multiplied by that amount of Energy less any costs the Seller avoided or, acting reasonably, could have avoided during the period of the Dispatch/Turn-Down.

There shall be no deemed Delivered Energy pursuant to this section in any hour specified as a maintenance period in an Energy schedule delivered pursuant to section 7.7 or during any other hour when the Seller’s Plant would otherwise not have been operating if there had been no Dispatch/Turn-Down notice or in any period when the Buyer is excused under section 7.9 from its obligations under section 4.2 and 5.2.

(Note to Developers: The blank in this section will be completed with the Plant Capacity multiplied by 1 hour.)
(e) **PRICE AND PAYMENT TERMS**

a. **Pre-COD Energy** - No price is payable by the Buyer for Energy delivered to the POI prior to COD.

b. **Post-COD Energy Price** - Subject to section 4.2, the price payable by the Buyer for each MWh of Delivered Energy after COD and prior to expiry of the Term is $_____/MWh, adjusted as follows:

[Note to Developers: The blank above will be completed with the escalated Base Price as set out in Section 3 of the Standing Offer Program Rules.]

(a) effective as of January 1 in each year after the Effective Date in accordance with the following formula:

\[
\text{Payment Price}_n = \left( 0.5 \times \frac{\text{___$/MWh}}{\text{CPI}_{\text{January } n}} \right) \times \frac{\text{CPI}_{\text{January } 1}}{\text{CPI}_{\text{January } 1}}
\]

[Note to Developers: The first and third blanks above will be completed with the escalated Base Price as described above. The blank in the subscript will be completed with the year in which the EPA is signed.]

Where:

\( n \) = the year for which the relevant calculation is being conducted

\( \text{CPI}_{\text{January } 1, n} \) = the CPI for December in the year immediately prior to the year for which the relevant calculation is being conducted, and

(b) for each hour, the price determined pursuant to subsection (a) for Delivered Energy during that hour will be adjusted to an amount (expressed in $/MWh) equal to the percentage of that price applicable for that hour as set out in the table in Appendix 4.

c. **No Further Payment** - The amount payable by the Buyer as specified in section 5.2 is the full and complete payment and consideration payable by the Buyer for Energy delivered by the Seller to the Buyer under this EPA and for the Environmental Attributes transferred by the Seller to the Buyer under this EPA.

d. **Statements and Payment** -

**Statements:**

The Seller shall, by the 15th day of each month after COD, deliver to the Buyer a statement for the preceding month. The statement must indicate, among other things, the amount of Delivered Energy for that month (including any deemed Delivered Energy and any associated avoided or avoidable costs pursuant to section 4.7), the price payable for the Delivered Energy, and any Final Amounts owing by either Party to the other Party. The statement must set out in reasonable detail the manner by which the statement and the amounts shown thereon were computed and be accompanied by sufficient data to enable the Buyer, acting reasonably, to satisfy itself as to the accuracy of the statement.
Either Party may give notice to the other Party of an error, omission or disputed amount on a statement within 36 months after the statement was first issued together with reasonable detail to support its claim. After expiry of that 36 month period, except in the case of willful misstatement, fraud or concealment, amounts on a previously issued statement will be considered accurate and amounts which were omitted will be considered to be nil, other than amounts disputed in accordance with this subsection within the 36 month period, which will be resolved in accordance with this EPA.

Payment:

Within 30 days after receipt of a statement delivered under subsection 5.4(a), and subject to section 5.6, the Buyer shall pay to the Seller the amount set out in the statement, except to the extent the Buyer in good faith disputes all or part of the statement by notice to the Seller in compliance with subsection 5.4(a)(ii). If the Buyer disputes any portion of a statement, the Buyer must nevertheless pay the undisputed net amount payable by the Buyer pursuant to the statement.

Any amount required to be paid in accordance with this EPA, but not paid by either Party when due, will accrue interest at an annual rate equal to the Prime Rate plus 2%, compounded monthly. Any disputed amount that is found to be payable will be deemed to have been due within 30 days after the date of receipt of the statement which included or should have included the disputed amount.

e. **Taxes** - All dollar amounts in this EPA do not include any value added, consumption, commodity or similar taxes applicable to the purchase by the Buyer of Delivered Energy and Environmental Attributes, including HST and any successor thereto, which, if applicable, will be added to each statement and paid by the Buyer.

f. **Set-off** - If the Buyer and the Seller each owe the other an amount under this EPA in the same month, then such amounts with respect to each Party shall be aggregated and the Parties may discharge their obligations to pay through netting, in which case the Party, if any, owing the greater aggregate amount shall pay to the other Party the difference between the amounts owed, provided that:

  this section applies only to any purchase price for Delivered Energy owing by the Buyer to the Seller, any Final Amount owing by either Party to the other Party, and any amount owing by the Seller to the Buyer under Appendix 3 of this EPA; and

  no Final Amount or amount owing by the Seller to the Buyer under Appendix 3 of this EPA shall be added to or deducted from the price owing by the Buyer to the Seller for Delivered Energy unless that amount remains unpaid 30 days after the Buyer gives notice to the Seller of the amount owing.

Except as otherwise expressly provided herein, each Party reserves all rights, counterclaims and other remedies and defences which such Party has, or may be entitled to, arising from or related to this EPA.

(f) **ENVIRONMENTAL ATTRIBUTES - CERTIFICATION AND ADMINISTRATION**

a. **EcoLogo™ Certification** - Without limiting the Seller’s obligation to comply with subparagraph (e) of the definition of Project Standards, if required by the Buyer, the Seller shall use
commercially reasonable efforts to obtain EcoLogoM Certification for the Seller's Plant and all the Delivered Energy and shall use commercially reasonable efforts to maintain EcoLogoM Certification for such period during the remainder of the Term as the Buyer may specify. The Seller shall notify the Buyer forthwith if the Seller fails to obtain EcoLogoM Certification as required hereunder or if, at any time during the period of the Term specified by the Buyer, the Seller does not have EcoLogoM Certification. If the Buyer requires the Seller to obtain EcoLogoM Certification, the Buyer shall be responsible for all certification, audit and licensing fees required to obtain EcoLogoM Certification, unless the Seller requires EcoLogoM Certification to comply with subparagraph (e) of the definition of the Project Standards or the Seller fails to obtain or maintain EcoLogoM Certification, in either of which cases the Seller shall be responsible for all such fees.

b. **Alternate Certification** - The Seller shall, at the Buyer's request and at the Buyer's cost, use commercially reasonable efforts to apply for, and diligently pursue and maintain, any certification, licensing or approval offered by any Governmental Authority or independent certification agency evidencing that the Seller's Plant and the Delivered Energy has Environmental Attributes as an addition or an alternative to the EcoLogoM Certification. Any failure by the Seller to use commercially reasonable efforts pursuant to this section 6.2 is a "material default" for the purposes of this EPA, and the Buyer may terminate this EPA under subsection 8.1(i).

(g) **EPA ADMINISTRATION**

a. **Records** - The Seller shall prepare and maintain all Records, or duplicates of such Records, at the Seller's Plant or following the expiry of the Term or the earlier termination of this EPA, at such other location as may be agreed in writing between the Parties, for a period of not less than 7 years from the date on which each such Record is created. The Audit Parties may take copies of such records for the purposes of an inspection or audit under section 7.2.

b. **Inspection and Audit Rights** - For the sole purpose of verifying: (a) compliance with this EPA; (b) the accuracy of invoices and other statements or calculations delivered by the Seller to the Buyer under this EPA; (c) the qualification of the Energy as Clean Energy; (d) the qualification of the Seller's Plant and the Energy for the Environmental Certification; or (e) the liability of each of the Parties for Network Upgrade Costs, the Seller shall, on reasonable prior notice from the Buyer, provide the Buyer and its Affiliates, representatives, consultants, advisors and any third party with whom the Buyer or any of its Affiliates has entered into a contract for the sale and purchase of Environmental Attributes and their Affiliates, representatives, consultants and advisors (the "Audit Parties") with prompt access during normal business hours to the Seller's Plant and all records relating to the Seller's Plant, including any Seller Confidential Information, to enable the Audit Parties to conduct an inspection or audit thereof. The Audit Parties shall exercise any access and audit rights under this section in a manner that minimizes disruption to the operation of the Seller's Plant. Any review, inspection or audit by any of the Audit Parties may not be relied upon by the Seller, or others, as confirming or approving those matters. Where the Buyer requires the Seller to provide access to the Seller's Plant and/or records relating to the Seller's Plant to a third Person with whom the Buyer or any of its Affiliates has entered into a contract for the sale and purchase of Environmental Attributes or any Affiliate, representative, consultant or advisor to any such third Person, the Buyer shall first obtain from the third Person an agreement to maintain the confidentiality of any Seller Confidential Information to which such Person may have access and to limit the use of such Seller Confidential Information as required to verify the Environmental Attributes.

c. **Seller Consents** - The Seller shall promptly provide any consents required to enable any of the Audit Parties to make enquiries with any Governmental Authority or any Person administering the Environmental Certification concerning any or all of the following: (a) the qualification of the Energy as
Clean Energy; (b) the qualification of the Seller’s Plant and the Energy for Environmental Certification, 
the status of the Environmental Certification and copies of any audits, inspections or reports prepared in 
connection with the Environmental Certification; and (c) compliance by the Seller with Laws and 
Permits applicable to the Seller’s Plant.

d. **Assignment -**

**Requirement for Consent:** The Seller may not Assign this EPA except with the prior consent 
of the Buyer, which consent may not be unreasonably withheld, conditioned or delayed. 
Any Assignment (other than an Assignment to a Facility Lender) is subject to the 
assignee entering into and becoming bound by this EPA, assuming all the obligations 
and liabilities of the Seller under the EPA arising both before and after the Assignment, 
providing any Network Upgrade Security as applicable at the time of Assignment, and 
providing the representations and warranties set out in the Application and in section 9.1 
effective as at the time of Assignment, subject in the case of the representation and 
waiver in subsection 9.1(c) to such exceptions as the Buyer consents to acting 
reasonably.

**Time for Request:** Any request by the Seller for the Buyer’s consent under subsection 7.4(a) 
must be delivered to the Buyer not less than 30 days before the date of the proposed 
Assignment. A request under this section must be accompanied by such information as 
reasonably required by the Buyer to assess the request for consent including the name, 
address and ownership structure of the assignee, a list of the directors and officers of the 
assignee and information concerning the assignee’s operations, experience and financial 
status.

**Assignment to Facility Lender:** If the Seller seeks consent to Assign this EPA to a Facility 
Lender, the Buyer may require, as a condition of its consent to the Assignment, that the 
Seller and the Facility Lender enter into a Lender Consent Agreement with the Buyer.

(d) **Costs:** The Seller shall reimburse the Buyer for all costs reasonably incurred by the 
Buyer in connection with any request by the Seller for the Buyer’s consent pursuant to 
subsection 7.4(a).

e. **Dispute Resolution -**

**Arbitration:** Any dispute under or in relation to this EPA will be referred to and finally 
resolved by arbitration conducted by a single arbitrator in Vancouver, British Columbia 
and administered by the British Columbia International Commercial Arbitration Centre 
(“BCICAC”) pursuant to its rules. Except as otherwise expressly provided in this EPA, 
the arbitrator shall have the jurisdiction to grant equitable remedies, including interim or 
permanent injunctive relief. It shall not be incompatible with this agreement to arbitrate 
for a party to seek from the Supreme Court of British Columbia, or for that court to 
grant, interim measures of protection pending the outcome of arbitral proceedings. The 
decision of the arbitrator will be final and binding on the Parties.

**Effect of Arbitration:** All performance and payments required under this EPA will continue 
during any dispute under this EPA, provided that the Parties may, notwithstanding the 
foregoing, exercise any right to terminate this EPA in accordance with the terms of this 
EPA. Any payments or reimbursements required by an arbitration award will be due as 
of the date determined under subsection 5.4(b)(ii) or, where that subsection does not
apply, as of the date determined in the award. Without duplication with subsection 5.4(b)(ii), any payments or reimbursements required by an arbitration award will bear interest at an annual rate equal to the Prime Rate plus 2% compounded monthly from the date such payment was due until the amount is paid.

Confidentiality: The Parties shall maintain in confidence the fact that an arbitration has been commenced, all documents and information exchanged during the course of the arbitration proceeding, and the arbitrator’s award, provided that each of the Parties shall be entitled to disclose such matters: (i) as required by applicable Law or for regulatory purposes (including pursuant to the rules of any stock exchange on which the shares of the Seller or its Affiliates are traded); (ii) as required to enforce any arbitration award; (iii) to that Party’s consultants and professional advisors who have a need to know such information; and (iv) in the case of the Buyer, to representatives of the Government of British Columbia.

f. Notices - Any notice, consent, waiver, declaration, request for approval or other request, statement or bill that either Party may be required or may desire to give to the other Party under this EPA must be in writing addressed to the other Party at the address for that Party stated in Appendix 1 and:

notices under section 7.9, section 8.1, section 8.3 and section 4 of Appendix 3 must be delivered by hand or by a courier service during normal business hours on a Business Day and a notice so delivered will be deemed to have been delivered on that Business Day;

all notices other than notices described in subsection 7.6(a) may be delivered by email during normal business hours on a Business Day and a notice so delivered will be deemed to have been delivered on that Business Day; and

either Party may change its address for notices under this EPA by notice to the other Party.

g. Energy Schedules - By September 15 of each year, the Seller shall deliver to the Buyer a schedule of the expected total deliveries of Energy to the POI in each month during the 12 month period commencing on October 1 of the year in which the schedule is delivered and a schedule of the maintenance outages expected for the Seller’s Plant during that period. The Energy schedules are provided for planning purposes only and do not constitute a guarantee by the Seller that Energy will be delivered in accordance with the schedules and do not limit the amount of Energy the Seller may deliver during the periods covered by the schedules. The Seller shall deliver a revised schedule to the Buyer promptly upon becoming aware of any expected material change in a delivered Energy schedule.

h. Confidentiality

7.8.1 Confidentiality and Compliance Agreement - The Standing Offer Confidentiality and Compliance Agreement continues in full force and effect in accordance with its terms.

7.8.2 Additional Confidentiality Obligation - Without limiting the effect of the Standing Offer Confidentiality Agreement, during the Term and for two years thereafter (i) the Buyer shall treat as confidential, and shall not disclose to any third Person, Seller Confidential Information, and (ii) the Seller shall treat as confidential, and shall not disclose to any third Person, Buyer Confidential Information, provided however that nothing in the foregoing obligations, and nothing in this EPA, prevents or restricts:
disclosures that are expressly authorized under any section of this EPA, or as otherwise set out in this EPA;

disclosures that are necessary to enable either Party to fulfill its obligations under this EPA;

in the case of the Buyer, disclosure of Seller Confidential Information:

to any ministers, deputy ministers, servants or employees of the Province of British Columbia; and

to its directors, officers, employees and Affiliates, consultants and advisors;

provided that each of the foregoing to whom Seller Confidential Information is disclosed is advised of the confidential nature thereof;

in the case of the Buyer, disclosure of Seller Confidential Information in any regulatory proceeding, whether in respect of this EPA or in respect of other matters, to the extent that the Buyer considers disclosure necessary or desirable to support its position in any such proceeding, provided that, to the extent reasonably practicable, the Buyer gives reasonable notice to the Seller before making the disclosure, and, to the extent requested by the Seller, requests the relevant tribunal to treat all or any part of the disclosure as confidential or to limit its further disclosure;

in the case of the Buyer, disclosure to any Person or any Governmental Authority of any Seller Confidential Information with respect to:

the Seller's Plant that the Buyer is required to disclose to verify qualification of the output of the Seller's Plant as Clean Energy or to provide confirmation to any such Person or Governmental Authority that the output from the Seller's Plant qualifies as Clean Energy; or

the Energy and/or the Seller's Plant that the Buyer is required to disclose to enable the Buyer to obtain or realize the full benefit to the Buyer of the Environmental Attributes, including sales of Environmental Attributes to third Persons;

in the case of the Buyer, disclosures to a third Person of any Seller Confidential Information that was known by that third Person before disclosure thereof by the Buyer, including information that originated from that third Person or that the Seller or any other Person has given the third Person, in either case as indicated on the face of any document or as acknowledged by the Seller in any discussions with the Buyer;

in the case of the Seller, disclosure of the Buyer Confidential Information to its directors, officers, employees, consultants and advisors, provided that each of the foregoing to whom Buyer Confidential Information is disclosed is advised of the confidential nature thereof and undertakes in writing to respect such confidentiality on the terms of the EPA, provided that the Seller shall give to the Buyer, at its request, a copy of each undertaking;

without limiting the Buyer's disclosure rights under subsection 7.8.2(d) above, disclosures required to be made by a Party by an order of a court or tribunal or under any law, regulatory requirement or requirement of any stock exchange that is binding upon it,
provided that (i) to the extent reasonably practicable, the Party making such disclosure gives reasonable notice to the other Party before making the disclosure, and (ii) limits the disclosure to that required by the applicable order, law, or regulatory or stock exchange requirement;

disclosures in any legal proceedings for the enforcement of this EPA; or

disclosures of the Seller Confidential Information or the Buyer Confidential Information, as the case may be, by written agreement or consent of both Parties.

7.8.3 Freedom of Information and Protection of Privacy Act - The Seller acknowledges that the Buyer is subject to the Freedom of Information and Protection of Privacy Act (British Columbia) and agrees that the Buyer’s non-disclosure obligations under this EPA are subject to the provisions of that legislation, as amended from time to time.

7.8.4 Exemption from Disclosure - The Parties confirm that Seller Confidential Information constitutes commercial and financial information of the Seller, which has been supplied, or may be supplied, in confidence and the disclosure of which could reasonably be expected to harm significantly the competitive position and/or interfere significantly with the negotiating position of the Seller. Accordingly, the Parties confirm their intention that, subject to section 7.8.3, all Seller Confidential Information disclosed by the Seller to the Buyer shall be deemed to be confidential and exempt from disclosure to third Persons in accordance with section 21 of the Freedom of Information and Protection of Privacy Act (British Columbia), as amended from time to time.

i. Force Majeure -

Neither Party will be in breach or default as to any obligation under this EPA if that Party is unable to perform that obligation due to an event or circumstance of Force Majeure, of which notice is given promptly to the other Party identifying the nature of the Force Majeure, its expected duration and the particular obligations affected by the Force Majeure. Subject to any limitations expressly set out in this EPA, the time for performance of such obligation will be extended by the number of days that Party is unable to perform such obligation as a result of the event or circumstance of Force Majeure. The Party invoking Force Majeure shall promptly respond to any inquiry from the other Party regarding the efforts being undertaken to remove the Force Majeure and shall give prompt notice of the end of the Force Majeure.

Notwithstanding the definition of Force Majeure in Appendix 1, and without limiting the application of the definition of Force Majeure to any circumstance that is not specifically described in this section 7.9, any order or decision of any court of competent jurisdiction or any regulatory authority, including the BCUC, that is binding on the Buyer and/or the Seller, the compliance with which would prevent the Buyer and/or the Seller from performing all or any of its obligations under this EPA, which is based in whole or in part on any failure or alleged failure of the Buyer to adequately consult with, and/or accommodate, any First Nation, in relation to this EPA, the Project, the Seller’s Plant or the interconnection of the Seller’s Plant to the Distribution System or the Transmission System, as applicable (which, for greater certainty, does not include any failure to consult with, and/or accommodate any First Nation, with respect to activities occurring after COD on the Buyer’s side of the Point of Interconnection or on the Transmission System), shall be an event of Force Majeure that may be invoked by the Party or Parties so prevented, provided that the Party or Parties so prevented shall
use commercially reasonable efforts to remedy the situation and remove, so far as possible and with reasonable dispatch, the Force Majeure to the extent that it is within the control of that Party to do so, provided that in the case of the Buyer, this obligation is subject to the Seller complying with, or having complied with, its obligation under section 3.11.2.

A Party may not invoke Force Majeure as a result of such binding order or decision referenced at subsection 7.9(b) if such order or decision results from a wilful act or omission of a Party, provided that the failure or alleged failure of the Buyer to have adequately consulted with, and/or accommodated, any First Nation may only be considered a wilful act or omission where the underlying event or circumstance giving rise to the duty to consult or accommodate was or is fully within the control of the Buyer and provided further that, for greater certainty, any activities of the Seller will not be considered to be within the control of the Buyer regardless of any consent, waiver, declaration or approval under the EPA, including any further amendment of the EPA that the Buyer may provide in respect of the Seller’s activity.

The Seller may not invoke Force Majeure as a result of such binding order or decision referenced at subsection 7.9(b) if such order or decision results from a failure by the Seller to comply with its obligations under section 3.11 of this EPA.

The Buyer may not invoke Force Majeure as a result of such order or decision referenced at subsection 7.9(b) if:

- the Buyer has received notice in writing from the Seller that the Seller is attempting to resolve, cure, fulfill or remedy, as the case may be, at its own initiative and at its own expense, the issues, orders or obligations raised or required by the order or decision;

- the Buyer is not incurring additional expense, risk or liability as a result of the Seller taking the steps described in paragraph (a) and the Buyer has received written confirmation from the Seller that the Buyer will not be subject to any liability to the Seller for breach of this EPA as a result of the Buyer’s compliance with that portion of the order or decision that prohibits the Buyer from performing its obligations under this EPA while at the same time not being able to invoke Force Majeure as a result of this provision;

- the Seller is at all times moving expeditiously and in good faith to resolve, cure, fulfill or remedy the issues, orders or obligations raised in the order or decision; and

- the Buyer would not be in breach of the order or decision as a result of the Seller taking the steps described in subsection 7.9(e)(i).

(h) TERMINATION

a. Termination by Buyer - In addition to any other right to terminate this EPA expressly set out in any other provision of this EPA and in addition to all other rights and remedies the Buyer may have under this EPA or at law or in equity in respect of any of the following events, the Buyer may terminate this EPA by notice to the Seller if:

COD does not occur by the second anniversary of Target COD for any reason whatsoever.
(including Force Majeure), provided that the Buyer may terminate the EPA under this provision only if the Buyer delivers a termination notice prior to COD; or

at any time after COD, the Seller does not deliver any Energy to the Buyer for a period of 730 continuous days for any reason whatsoever (including Force Majeure or a Distribution/Transmission Constraint or Disconnection), but excluding a Distribution/Transmission Constraint or Disconnection for which the Seller is entitled to receive payment under section 4.7; or

at any time after COD, the Buyer is unable to accept delivery of Energy at the POI for a period of 730 continuous days due to Force Majeure invoked by the Buyer in accordance with section 7.9 or a Distribution/Transmission Constraint or Disconnection other than a Distribution/Transmission Constraint or Disconnection for which the Seller is entitled to receive payment under section 4.7; or

the Seller breaches section 4.5; or

the Seller fails to complete any application, payment, filing, study, document or other step in the process for interconnecting the Seller’s Plant to the Transmission System or the Distribution System in accordance with the requirements of, and within the time limits, including any cure periods, specified by the Transmission Authority or Distribution Authority, as applicable, and such failure results in a loss of the interconnection queue position for the Seller’s Plant or otherwise could reasonably be expected to have an adverse impact on the Buyer; or

the Seller is Bankrupt or Insolvent; or

the Seller, as a result of an act or omission of the Seller, ceases to be exempt from regulation as a “public utility” as defined in the UCA with respect to the Seller’s Plant and the sale of Energy to the Buyer under this EPA, and the loss of such exemption could reasonably be expected to have an adverse effect on the benefit to the Buyer of this EPA; or

an amount due and payable by the Seller to the Buyer under this EPA remains unpaid for 15 days after its due date and such default has not been cured within 15 days after the Buyer has given notice of the default to the Seller; or

the Seller is in material default of any of its covenants, representations and warranties or other obligations under this EPA (other than as set out above), unless within 30 days after the date of notice by the Buyer to the Seller of the default the Seller has cured the default or, if the default cannot be cured within that 30 day period, the Seller demonstrates to the reasonable satisfaction of the Buyer that the Seller is working diligently and expeditiously to cure the default and the default is cured within a further reasonable period of time. A “material default” includes any purported Assignment of this EPA without the consent of the Buyer and any failure by the Seller to comply with section 3.2 in respect of subsection (e) of the “Project Standards” definition, section 4.5, section 6.1 or section 6.2.

Any termination pursuant to this section shall be effective immediately upon delivery of the notice of termination to the Seller.

b. Notice of Termination Event - The Seller shall notify the Buyer promptly if the Seller is
Bankrupt or Insolvent or if there is a material risk that the Seller will become Bankrupt or Insolvent or if the Seller has defaulted under any agreement with a Facility Lender or if any Permit or land tenure agreement for the Seller’s Plant is terminated or expires.

c. **Termination by the Seller** - In addition to any other right to terminate this EPA expressly set out in any other provision of this EPA and in addition to all other rights and remedies the Seller may have under this EPA or at law or in equity in respect of any of the following events, the Seller may terminate this EPA by notice to the Buyer if:

- the Seller has not been able to achieve COD for a period of 180 days after Target COD solely as a result of a delay in completion of Interconnection Network Upgrades where such delay is not attributable directly or indirectly in whole or in part to the Seller or the Seller’s Plant; or

- after COD, the Buyer has not accepted delivery of Energy for a period of 180 continuous days due to an event described in section 4.3 or any event of Force Majeure and the Seller is not entitled to receive any payment pursuant to section 4.7 in respect of that period; or

- the Seller’s Plant has suffered Major Damage;

- the Seller has been unable to achieve COD for a period of 730 days after Target COD or has been unable to deliver Energy to the POI for a period of 730 continuous days after COD in either case solely as a result of Force Majeure invoked by the Seller in accordance with section 7.9 or a Distribution/Transmission Constraint or Disconnection other than a Distribution/Transmission Constraint or Disconnection for which the Seller is entitled to receive payment under section 4.7; or

- the Buyer is Bankrupt or Insolvent; or

- except where an amount has been disputed in the manner specified in subsection 5.4(a)(ii), an amount due and payable by the Buyer to the Seller under this EPA remains unpaid for 15 days after its due date and such default has not been cured within 15 days after the Seller has given notice of the default to the Buyer; or

- the Buyer is in material default of any of its covenants, representations and warranties or other obligations under this EPA (other than as set out above), and such default has not been cured within 30 days after the Seller has given notice of the default to the Buyer or, if the default cannot be cured within that 30 day period, the Buyer fails to demonstrate to the reasonable satisfaction of the Seller that the Buyer is working diligently and expeditiously to cure the default or the default is not cured within a further reasonable period of time.

Any termination pursuant to this section shall be effective immediately upon delivery of the notice of termination to the Buyer.

d. **Effect of Termination** - Upon expiry of the Term or earlier termination of this EPA in accordance with its terms:

- the Parties may pursue and enforce any rights and remedies permitted by law or equity in respect of any prior breach or breaches of the EPA, and may enforce any liabilities and obligations that have accrued under this EPA prior to the expiry of the Term or the date
of termination or that are stated to arise on termination of this EPA (including any claims by the Buyer for amounts payable by the Seller under Appendix 3), subject to any express restrictions on remedies and limitations or exclusions of liability set out in this EPA; and

both Parties will remain bound by Article 5 and Appendix 3 with respect to the satisfaction of residual obligations for the period prior to termination or that are specified to arise on termination, and sections 7.5 and 7.8 and all provisions of the EPA with respect to Environmental Attributes but only with respect to Environmental Attributes associated with Delivered Energy prior to termination of this EPA; and

the Seller will remain bound by sections 7.1 and 7.2 for a period of 36 months following expiry or termination of this EPA

and, in all such cases, both Parties will remain bound by any other provisions necessary for the interpretation and enforcement of the foregoing provisions.

e. **Buyer Payment on Seller Termination** - If the Seller terminates this EPA under any of subsections 8.3(e), (f) or (g), the Buyer shall pay to the Seller an amount equal to the positive amount if any by which the Seller’s Losses and Costs exceed its aggregate Gains. The Seller’s Gains, Losses and Costs shall be determined by comparing the reasonably estimated quantities of Delivered Energy for the remaining Term and the price payable for those quantities under this EPA had it not been terminated to the relevant market prices for equivalent quantities of electricity for the remaining Term either quoted by a bona fide arm’s length third party or which are reasonably expected to be available in the market under a replacement contract for this EPA. Market prices will be adjusted for differences between the product subject to the market prices and a product, inclusive of Environmental Attributes, equivalent to that specified under this EPA available from a generator meeting the eligibility requirements for the Buyer’s Standing Offer Program in effect at the Effective Date, including with respect to quantity, place of delivery, length of term and each element of the eligibility requirements. The Seller shall not be required to enter into a replacement transaction in order to determine the amount payable by the Buyer under this section. The Seller’s Gains, Losses and Costs will be discounted to the present value of those Gains, Losses and Costs at the effective date of termination of the EPA (to take into account the time value of money for the period between the effective date of termination of the EPA and the date the Gains, Losses and Costs would have occurred but for the termination of the EPA) using the Present Value Rate. If the Seller’s aggregate Gains exceed its aggregate Losses and Costs, if any, resulting from the termination of this EPA, the amount of the payment by the Buyer to the Seller under this section shall be zero. If the termination of this EPA by the Seller occurs prior to COD, the Buyer’s liability for any payment under this section will be 115% of the Development Costs less the net realizable value of the assets forming part of the Seller’s Plant at the date of termination.

f. **Calculation and Payment** - The Seller shall calculate the amount of any payment owed by the Buyer under section 8.5 and shall notify the Buyer of such amount and provide reasonable particulars with respect to its calculation within 120 days after the effective date of termination of this EPA, failing which the Seller will not be entitled to any payment under section 8.5. The Buyer shall pay any amount owing by the Buyer under section 8.5 within 30 Business Days after the date of delivery of an invoice by the Seller to the Buyer. Any amounts owing by the Seller to the Buyer under this EPA will be netted against any amount owing by the Buyer to the Seller under section 8.5.

g. **Exclusive Remedies** - Subject to section 8.4, payment by the Buyer of the amount determined under section 8.5 is the exclusive remedy to which the Seller is entitled, and the Buyer’s limit of liability, for termination of this EPA by the Seller pursuant to any of subsections 8.3(e), (f) or
(g). Subject to section 8.4, termination of this EPA is the exclusive remedy to which the Buyer or the Seller as the case may be is entitled if the Buyer or the Seller elects to exercise its right to terminate this EPA under any of section 8.1, subsection 8.3(a), (b), (c), or (d) or section 4 of Appendix 3 as applicable. For greater certainty, subject to section 8.4, the Seller shall not be required to pay any termination payment on termination by the Buyer of this EPA. Neither Party will have any right to terminate this EPA except as expressly set out herein.

(i) REPRESENTATIONS AND WARRANTIES AND LIABILITY LIMITATIONS

a. Seller’s Representations - The Seller represents and warrants to the Buyer, and acknowledges that the Buyer is relying on those representations and warranties in entering into this EPA, as follows:

   Binding Obligation - this EPA constitutes a valid and binding obligation of the Seller enforceable against the Seller in accordance with its terms;

   Authorization, Execution and Delivery - this EPA has been duly authorized, executed and delivered by the Seller; and

   Application - all information in the Application is true and correct in all material respects and there is no material information omitted from the Application that makes the information in the Application misleading or inaccurate in any material respect. The representations and warranties by the Seller in the Application are true and correct.

b. Buyer’s Representations - The Buyer represents and warrants to the Seller, and acknowledges that the Seller is relying on those representations and warranties in entering into this EPA, as follows:

   Corporate Status - The Buyer is a corporation continued under the Hydro and Power Authority Act, R.S.B.C. 1996, c.212, is validly existing and is in good standing under the laws of British Columbia, is lawfully authorized to carry on business in British Columbia, and has full corporate power, capacity and authority to enter into and to perform its obligations under this EPA;

   Binding Obligation - this EPA constitutes a valid and binding obligation of the Buyer enforceable against the Buyer in accordance with its terms; and

   Authorization, Execution and Delivery - this EPA has been duly authorized, executed and delivered by the Buyer.

c. Limit of Liability - The Buyer’s liability for damages for any failure to take or pay for Delivered Energy under this EPA is limited to the price payable by the Buyer for that Delivered Energy under Article 5 and any interest thereon calculated under this EPA less the amount of any revenue received by the Seller from any third Person for that Delivered Energy.

d. Consequential Damages - Neither Party shall be liable to the other Party for any special, incidental, exemplary, punitive or consequential damages with respect to, arising out of, relating to or in any way connected with a Party’s performance or non-performance under this EPA.
(j) **GENERAL PROVISIONS**

a. **Electric Service to the Seller** - If at any time the Buyer makes electric service available to the Seller's Plant, then that service will be provided under and in accordance with the Buyer's electric tariff applicable at the relevant time, and not under this EPA.

b. **Independence** - The Parties are independent contractors, and nothing in this EPA or its performance creates a partnership, joint venture or agency relationship between the Parties.

c. **Enurement** - This EPA enures to the benefit of the Parties, their successors and their permitted assigns.

d. **Entire Agreement** - This EPA contains the entire agreement between the Parties with respect to the purchase and sale of Energy and Environmental Attributes and supersedes all previous communications, understandings and agreements between the Parties with respect to the subject matter hereof including, without limitation, the documents related to the Standing Offer Program and all questions and answers and any other communications of any kind whatsoever by the Buyer in connection therewith or relating thereto, except only those representations, warranties and covenants contained in the Application which shall remain in effect notwithstanding this EPA. There are no representations, warranties, terms, conditions, undertakings or collateral agreements express, implied or statutory between the Parties other than as expressly set out in this EPA, except only those representations, warranties and covenants contained in the Application which shall remain in effect notwithstanding this EPA.

e. **Amendment** - This EPA may not be amended except by an agreement in writing signed by both Parties.

f. **No Waiver** - Other than in respect of the specific matter or circumstance for which a waiver is given, and except as otherwise specified in this EPA, no failure by a Party to enforce, or require a strict observance and performance of, any of the terms of this EPA will constitute a waiver of those terms or affect or impair those terms or the right of a Party at any time to enforce those terms or to take advantage of any remedy that Party may have in respect of any other matter or circumstance.

g. **Interconnection Agreements and Distribution and Transmission Authorities** - Nothing in the Facilities Agreement or the Interconnection Agreement and no exercise of any right thereunder, restricts or otherwise affects any right, obligation or liability of either Party under this EPA, except to the extent set out expressly herein, and no notice, consent, approval or other communication or decision under or in relation to the Facilities Agreement or the Interconnection Agreement shall constitute or be relied upon as a notice, consent, approval or communication or decision under this EPA. For the purposes of the interpretation and application of this EPA, the Distribution Authority and the Transmission Authority shall be treated in all instances as though they are entirely separate legal entities from the Buyer.

h. **Commodity Contract/Forward Contract** - The Parties agree and intend that this EPA constitutes an "eligible financial contract" under the Bankruptcy and Insolvency Act (Canada) and Companies' Creditors Arrangement Act (Canada) and that this EPA and the transactions contemplated under this EPA constitute a "forward contract" within the meaning of section 556 of the United States Bankruptcy Code and that the Parties are "forward contract merchants" within the meaning of the United States Bankruptcy Code.

i. **Further Assurances** - Each Party shall, upon the reasonable request of the other Party, do,
sign or cause to be done or signed all further acts, deeds, things, documents and assurances required for the performance of this EPA including, in the case of the Seller, completing any registration process required in respect of Environmental Attributes as requested by the Buyer.

j. **Severability** - Any provision of this EPA which is illegal or unenforceable will be ineffective to the extent of the illegality or unenforceability without invalidating the remaining provisions of this EPA.

k. **Counterparts** - This EPA may be executed in counterparts, each of which is deemed to be an original document and all of which are deemed one and the same document.

IN WITNESS WHEREOF each Party by its duly authorized representative(s) has signed this EPA effective as of the date set out on page one of this EPA.

For

Authorized Representative

Print Name and Office

Date

For **BRITISH COLUMBIA HYDRO AND POWER AUTHORITY**:  

Authorized Representative

Print Name and Office

Date
APPENDIX 1

DEFINITIONS AND INTERPRETATION

1. DEFINITIONS

References in an Appendix to a section or subsection mean a section or subsection of the EPA, and not an Appendix, unless otherwise stated. The following words and expressions wherever used in this EPA have the following meaning:

1.1 “Affiliate” means, with respect to the Seller or any third party, any Person directly or indirectly Controlled by, Controlling, or under common Control with, the Seller or the third party, and with respect to the Buyer, any Person directly or indirectly Controlled by the Buyer and, if at any time the Buyer is not Controlled, directly or indirectly, by the Province of British Columbia, shall include any Person directly or indirectly Controlling, or under common Control, with the Buyer.

1.2 “Application” means the application and all supporting documents and information with respect to the Seller’s Plant filed by the Seller with the Buyer in the Standing Offer Program.

1.3 “Assign” or “Assignment” means to assign or dispose of this EPA or any direct or indirect interest in this EPA, in whole or in part, for all or part of the Term and, without limiting the foregoing, each of the following is deemed to be an Assignment of this EPA by the Seller:

(a) any sale or other disposition of all or a substantial part of the Seller’s ownership interest in the Seller’s Plant, or of all or any interest of the Seller in this EPA or revenue derived from this EPA;

(b) any mortgage, pledge, charge or grant of a security interest in all or any part of the Seller’s Plant or the Seller’s ownership interest therein; and

(c) any change of Control, merger, amalgamation or reorganization of the Seller.

1.4 “Audit Parties” has the meaning given in section 7.2.

1.5 “Bankrupt or Insolvent” means, with respect to a Person:

(a) the Person has started proceedings to be adjudicated a voluntary bankrupt or consented to the filing of a bankruptcy proceeding against it; or

(b) the Person has filed a petition or similar proceeding seeking reorganization, arrangement or similar relief under any bankruptcy or insolvency law; or

(c) a receiver, liquidator, trustee or assignee in bankruptcy has been appointed for the Person or the Person has consented to the appointment of a receiver, liquidator, trustee or assignee in bankruptcy; or

(d) the Person has voluntarily suspended the transaction of its usual business; or

(e) a court of competent jurisdiction has issued an order declaring the Person bankrupt or insolvent.

1.6 “BCUC” means the British Columbia Utilities Commission or any successor thereto.
1.7 “Business Day” means any calendar day which is not a Saturday, Sunday or British Columbia statutory holiday.

1.8 “Buyer” means British Columbia Hydro and Power Authority and its successors and permitted assigns, but for the purposes of the interpretation and application of this EPA it excludes the Distribution Authority and the Transmission Authority.

1.9 “Buyer Confidential Information” means technical or commercial information disclosed by the Buyer to the Seller that the Buyer directs, and clearly marks, as confidential, including this EPA whether or not so directed and marked, and any communications by the Buyer with any lawyer providing a Verification and all work product of the lawyer providing a Verification, but excluding information that (i) is or becomes in the public domain, other than as a result of a breach of this EPA by the Seller, or (ii) is known to the Seller before disclosure to it by the Buyer, or becomes known to the Seller thereafter by way of disclosure to the Seller by any other person who is not under an obligation of confidentiality with respect thereto.

1.10 “Clean Energy” means Energy that qualifies as energy generated by a clean or renewable resource under British Columbia’s Clean Energy Act, SBC 2010, c.22, as amended from time to time.

1.11 “COD” or “Commercial Operation Date” means the date that is the later of:

(a) 90 days prior to Target COD, unless the Buyer has consented to an earlier date pursuant to section 3.8; and

(b) the date on which all of the following conditions have been satisfied in respect of the Seller’s Plant:

(i) the Seller has obtained all Permits required for the construction, commissioning, and operation of the Seller’s Plant and all such Permits are in full force and effect;

(ii) the Seller is not: (A) Bankrupt or Insolvent; (B) in default of any payment obligation or requirement to post security under this EPA; (C) in material default of any of its other covenants, representations, warranties or obligations under this EPA; or (D) in material default under any Permit or Law applicable to the construction, commissioning or operation of the Seller’s Plant or under any land tenure agreement for the site on which the Seller’s Plant is located or under the Facilities Agreement or the Interconnection Agreement;

(iii) a Revenue Meter has been installed in accordance with section 3.6;

(iv) the Seller has delivered to the Buyer:

(A) a Declaration of Compatibility-Generator (Operating), or such other document(s) of similar effect as may be substituted therefor, in respect of the Plant Capacity issued by the Distribution Authority/Transmission Authority to the Seller under the Interconnection Agreement,

(B) proof of registration by the Seller with Measurements Canada as an energy seller with respect to the Seller’s Plant, and
a COD Certificate;

and for purposes of this EPA, COD will be deemed to have occurred at 24:00 PPT on the later of the dates set out above.

1.12 "COD Certificate" means a certificate in the form attached as Appendix 5.

1.13 "Control" of any Person means:

with respect to any corporation or other Person having voting shares or the equivalent, the ownership or power to vote, directly or indirectly, shares, or the equivalent, representing 50% or more of the power to vote in the election of directors, managers or persons performing similar functions;

ownership of 50% or more of the equity or beneficial interest in that Person; or

c) the ability to direct the business and affairs of any Person by acting as a general partner, manager or otherwise.

1.14 "Costs" means brokerage fees, commissions and other similar transaction costs and expenses reasonably incurred or that would reasonably be expected to be incurred by the Seller in entering into new arrangements which replace this EPA and legal fees, if any, incurred in connection with enforcing the Seller’s rights under this EPA.

1.15 "CPI" means the British Columbia Consumer Price Index, All Items (Not Seasonally Adjusted) as published by Statistics Canada or any successor agency thereto, adjusted or replaced in accordance with subsection 2.9(c) of this Appendix.

1.16 "Crown" means Her Majesty in the Right of the Province of British Columbia or Her Majesty in Right of the Government of Canada.

1.17 "Delivered Energy" means in each month after COD the amount of Energy delivered by the Seller at the POI in that month as recorded by the Seller’s metering equipment described in section 3.6, or where that equipment is not functioning correctly, the duplicate revenue meter installed by the Buyer under section 3.6, if any.

1.18 "Development Costs" means all costs reasonably incurred or committed by the Seller after the Effective Date for the development of the Seller’s Plant and all costs reasonably incurred, or that are reasonably likely to be incurred by the Seller, after taking reasonable mitigation measures, to terminate all contractual commitments with respect to the development of the Seller’s Plant and to otherwise cease development of the Seller’s Plant, but excluding any lost profits, loss of opportunity costs or damages and all other special, incidental, indirect or consequential losses.

1.19 "Development Report" means a report in the form attached as Appendix 8, describing the progress of the financing, design, engineering, construction, Interconnection, and commissioning of the Seller’s Plant.

1.20 "Dispatch/Turn-Down" has the meaning given in subsection 4.8(a).
1.21 “Distribution Authority” means the Person or Persons who is or are responsible for the planning, asset management and operation of the Distribution System, in whole or in part, including an independent system operator.

1.22 “Distribution System” means the distribution, protection, control and communication facilities in British Columbia that are or may be used in connection with, or that otherwise relate to, the transmission of electrical energy at 35 kilovolts or less, and includes all additions and modifications thereto and repairs or replacements thereof.

1.23 “Distribution/Transmission Constraint or Disconnection” means any disconnection of the Seller’s Plant from the Distribution System or the Transmission System, as applicable, or any outage, suspension, constraint or curtailment in the operation of the Distribution System or the Transmission System preventing or limiting deliveries of Energy at the POI or any direction from the Distribution Authority or the Transmission Authority to reduce generation of the Seller’s Plant as a result of any outage, suspension, constraint or curtailment in the operation of the Transmission System or Distribution System.

1.24 “EcoLogoM Certification” means certification pursuant to Environment Canada’s Environmental ChoiceM program confirming that the Seller’s Plant and all or part of the Energy complies with the “Guideline on Renewable Low-Impact Electricity” as amended from time to time and is therefore entitled to the EcoLogoM designation.

1.25 “Effective Date” means the date set out on page one hereof.

1.26 “Energy” means all electric energy expressed in MWh generated by the Seller’s Plant, excluding electricity required to service the Seller’s Plant.

1.27 “Environmental Attributes” means:

(a) all attributes associated with, or that may be derived from, the Energy and/or the Seller’s Plant having decreased environmental impacts relative to certain other generation facilities or technologies including any existing or future credit, allowance, “green” tag, ticket, certificate or other “green” marketing attribute or proprietary or contractual right, whether or not tradeable;

(b) any credit, reduction right, offset, allowance, allocated pollution right, certificate or other unit of any kind whatsoever, whether or not tradeable and any other proprietary or contractual right, whether or not tradeable, resulting from, or otherwise related to the actual or assumed reduction, displacement or offset of emissions at any location other than the Seller’s Plant as a result of the generation, purchase or sale of the Energy;

(c) On-Site Emission Reduction Rights; and

(d) all revenues, entitlements, benefits and other proceeds arising from or related to the foregoing, but for certainty not including:

(i) benefits or proceeds from environmental incentive programs offered by Governmental Authorities that do not require a transfer of the attributes in (a) to (c) above; or
(ii) benefits or proceeds from social programs, including programs relating to northern or rural development, employment or skills training, or First Nations, that do not require a transfer of the attributes in subsections (a) to (c) above.

1.28 "Environmental Certification" means either or both of the following:

(a) EcoLogo® Certification; or

(b) any alternate certification the Buyer requires the Seller to obtain under section 6.2.

1.29 "Estimated Interconnection Facilities Completion Date" means the most recent estimated date for completing the Interconnection Network Upgrades, as set forth in the Final Interconnection Study Report.

1.30 "Facilities Agreement" means the agreement between the Seller and the Distribution Authority which provides for the design and construction of the facilities that enable the flow of electric power from the Seller’s Plant to the Distribution System and the payments associated with the design and construction of such facilities, as amended or replaced from time to time.

1.31 "Facility Lender" means any lender(s) providing any debt financing or debt hedging facilities for the design, engineering, construction and/or operation of the Seller’s Plant and any successors or assigns thereto and any Person taking any mortgage, pledge, charge or grant of a security interest in all or any part of the Seller’s Plant.

1.32 "Final Amount" means an amount owing by either Party to the other Party under this EPA, including as a result of a breach of this EPA, where such amount is: (a) undisputed by the Party owing such amount; or (b) has been finally determined by an arbitration award under section 7.5 or by a court order and all rights of appeal in respect of such award or order have been exhausted or have expired.

1.33 "Final Interconnection Study Report" means the final report issued to the Seller by the Distribution Authority or the Transmission Authority, as applicable, in respect of the interconnection of the Seller’s Plant, consisting, in the case of a Project interconnected to the Transmission System of a system impact study report and a facilities study report or, in the case of a Project interconnected to the Distribution System of a combined impact study and facilities study report.

1.34 "First Nations" has the meaning given in subsection 3.11.1.

1.35 "Force Majeure" means any event or circumstance not within the control of the Party, or any of its Affiliates, claiming Force Majeure, but does not include:

(a) any economic hardship or lack of money, credit or markets;

(b) an event or circumstance that is the result of a breach by the Party seeking to invoke Force Majeure of a Permit or of any applicable Laws;

(c) a mechanical breakdown or control system hardware or software failure, unless the Party seeking to invoke Force Majeure can demonstrate by clear and convincing evidence that the breakdown or failure was caused by a latent defect in the design or manufacture of
the equipment, hardware or software, which could not reasonably have been identified by normal inspection or testing of the equipment, hardware or software;

(d) an event or circumstance caused by a breach of, or default under, this EPA or a wilful or negligent act or omission by the Party seeking to invoke Force Majeure;

(e) any Distribution/Transmission Constraint or Disconnection; or

(f) any acts or omissions of: (i) any Affiliate, employee, director, officer, agent or other representative of the Party invoking Force Majeure; (ii) any vendor, supplier, contractor, subcontractor, consultant or customer of or to the Party invoking Force Majeure; or (iii) any other Person for whom the Party invoking Force Majeure is responsible at law, unless the act or omission is caused by an event or circumstance that would constitute Force Majeure if the person described above was a party to this EPA in place of a Party invoking Force Majeure.

1.36 “Gains” means an amount equal to the present value of the economic benefit (exclusive of Costs), if any, to the Seller resulting from the termination of this EPA, determined in a commercially reasonable manner and in the manner set out in section 8.5.

1.37 “Good Utility Practice” means any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry during the relevant time period, or any of the practices, methods and acts which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method or act to the exclusion of all others, but rather to be acceptable practices, methods or acts generally accepted in the Western Electricity Coordinating Council region.

1.38 “Governmental Authority” means any federal, provincial, local or foreign government or any of their boards or agencies, or any regulatory authority other than the Buyer and the Seller and entities controlled by the Buyer or the Seller.

1.39 “HST” means harmonized sales tax payable pursuant to Part IX of the Excise Tax Act (Canada) as that Act may be amended or replaced from time to time.

1.40 “Interconnection” means the facilities and procedures that enable the flow of electric power from the Seller’s Plant to the Transmission System or the Distribution System and vice versa.

1.41 “Interconnection Agreement” means the agreement between the Seller and the Distribution Authority or the Transmission Authority, as applicable, which enables the flow of electric power from the Seller’s Plant to the Distribution System or the Transmission System, as applicable, and vice versa, as amended or replaced from time to time.

1.42 “Interconnection Network Upgrades” has the meaning given in Appendix 3.

1.43 “Laws” means any and all statutes, laws (including common law), ordinances, rules, regulations, codes, orders, bylaws, policies, directions, standards, guidelines, protocols and other lawful requirements of any Governmental Authority in effect from time to time.
1.44 "Lender Consent Agreement" means a lender consent agreement in the form attached as Appendix 7.

1.45 "Losses" means an amount equal to the present value of the economic loss (exclusive of Costs), if any, to the Seller resulting from the termination of this EPA, determined in a commercially reasonable manner and in the manner set out in section 8.5.

1.46 "Major Damage" means damage to the Seller’s Plant caused by Force Majeure where the cost to repair the damage exceeds the net present value (using the Present Value Rate) of the expected revenues under the EPA for the remainder of the Term less the net present value (using the Present Value Rate) of the estimated operating and maintenance costs for the Seller’s Plant for the remainder of the Term.

1.47 "MW" means megawatt.

1.48 "MWh" means megawatt-hour.

1.49 "Network Upgrades" has the meaning given in Appendix 3.

1.50 "Network Upgrade Costs" has the meaning given in Appendix 3.

1.51 "Network Upgrade Security" has the meaning given in Appendix 3.

1.52 "On-Site Emission Reduction Rights" means any credit, reduction right, off-set, allowance, allocated pollution right, certificate or other unit of any kind whatsoever whether or not tradeable resulting from or otherwise related to the reduction, removal, or sequestration of emissions at or from the Seller’s Plant.

1.53 "Order or Decision" has the meaning given in subsection 3.11.1.

1.54 "Party" means: (a) the Buyer and its successors and permitted assigns; or (b) the Seller and its successors and permitted assigns, and “Parties” means both the Buyer and the Seller and their respective successors and permitted assigns, provided that the Distribution Authority and the Transmission Authority shall be deemed not to be a “Party”, whether or not owned or operated by the Buyer.

1.55 "Permits" means permits, certificates, licences, and other approvals required for the design, construction, ownership, operation, maintenance and decommissioning of the Seller’s Plant and the delivery of Energy to the POI.

1.56 "Person" means an individual, body corporate, firm, partnership, joint venture, trust, legal representative or other legal entity.

1.57 "Planned Outage" means an outage for purposes of scheduled inspections, repair and/or maintenance in the Seller’s Plant.

1.58 "Plant Capacity" means the electrical capacity of the Seller’s Plant as set out in Appendix 2.

1.59 "POI" or "Point of Interconnection" means the point at which the Seller’s Plant interconnects with the Distribution System or the Transmission System, as applicable, as described in Appendix 2.
1.60 "PPT" means Pacific Prevailing Time, which means Pacific Daylight Time or Pacific Standard Time as applicable.

1.61 "Present Value Rate" means the annual yield on a Government of Canada bond having a term and maturity date that most closely matches the remaining Term (as at the date of the applicable calculation) and expiry date of the EPA, plus 3%.

1.62 "Prime Rate" means the floating prime interest rate announced from time to time by the main branch of Bank of Montreal in Vancouver, or any successor thereto, expressed as an annual rate, as the reference rate it will use to determine rates of interest payable on Canadian dollar commercial loans made in Canada.

1.63 "Project" means the financing, design, engineering, procurement, construction, commissioning, operation and maintenance of the Seller's Plant.

1.64 "Project Standards" means:

(a) all applicable Laws;

(b) the terms and conditions of all Permits, including land tenure agreements, issued in connection with the Seller's Plant;

(c) Good Utility Practice;

(d) the description of the Seller's Plant in Appendix 2;

(e) the requirement that Energy must qualify as Clean Energy;

(f) the terms and conditions of this EPA, the Facilities Agreement and the Interconnection Agreement; and

(g) the Code of Conduct Guidelines Applicable to the Buyer Contracts attached as Appendix 10.

1.65 "Records" means all records and logs required to properly administer this EPA, including:

(a) Energy generation records and operating logs;

(b) a log of all outages of the Seller's Plant and other reductions in Energy output (specifying the date, time, duration and reasons for each such outage and each reduction in Energy output);

(c) meter readings,

(d) maintenance reports;

(e) invoice support records;

(f) documents concerning compliance with Permits and applicable Laws, but excluding any such documents that are protected by solicitor-client privilege;

(g) records related to Development Costs;
(h) all information the Buyer requires to verify qualification of the output from the Seller’s Plant as Clean Energy; and

(i) information relating to the Environmental Certification, information relating to the existence, nature and quality of Environmental Attributes, information required for the purposes of any Environmental Attributes or energy certification or tracking system, and any other information the Buyer requires to enable it or any of its Affiliates to obtain and realize the benefit of the Environmental Attributes,

all consistent with Good Utility Practice.

1.66 "Revenue Meter" means a revenue meter leased by the Buyer to the Seller that is: (a) capable of being remotely interrogated; and (b) calibrated to measure on an hourly basis the quantity of Energy delivered by the Seller to the POI after adjusting for any line losses associated with the transmission of Energy from the Seller’s Plant to the POI.

1.67 "Seller" means the Party so identified on page one of this EPA, and its successors and permitted assigns.

1.68 "Seller Confidential Information" means any of the Seller’s confidential technical or financial information provided by the Seller to the Buyer in confidence with express written notice to the Buyer of the confidential nature of the information and any communications by the Seller with any lawyer providing a Verification and all work product of the lawyer providing the Verification, but excluding:

(a) this EPA; and

(b) information that (i) is or becomes in the public domain, other than as a result of a breach of this EPA by the Buyer, or (ii) is known to the Buyer before disclosure to it by the Seller, or becomes known to the Buyer thereafter by way of disclosure to the Buyer by any other Person who is not under an obligation of confidentiality with respect thereto.

1.69 "Seller’s Plant" means the Seller’s plant described in Appendix 2 and all rights, property, facilities, assets, equipment, materials, Permits and contracts required to design, engineer, procure, construct, commission, operate and maintain the plant described in Appendix 2 and to interconnect that plant to the Distribution System or the Transmission System, as applicable, whether real or personal and whether tangible or intangible including all land tenure and all books, records and accounts with respect to the Seller’s plant described in Appendix 2.

1.70 "Standing Offer Confidentiality and Compliance Agreement" means the confidentiality and compliance agreement, a copy of which is attached as Appendix 9 to this EPA.

1.71 "Standing Offer Program" means the Buyer’s power procurement program described as the Standing Offer Program.

1.72 "Target COD" means ____________, as revised pursuant to section 3.9.

[Note to Developers: The blank above will be taken from the Application and the interconnection study reports for the Seller’s Plant.]

1.73 "Term" has the meaning given in Article 2.
1.74 “Transmission Authority” means such Person or division of a Person, which for greater certainty may be a division of the Buyer, that carries out the interconnection and grid operation functions that British Columbia Transmission Corporation carried out prior to July 5, 2010.

1.75 “Transmission System” means the transmission, substation, protection, control and communication facilities: (a) owned by the Buyer or by the Transmission Authority; and (b) operated by the Transmission Authority in British Columbia, and includes all additions and modifications thereto and repairs or replacements thereof.

1.76 “UCA” means the Utilities Commission Act (British Columbia).

1.77 “Verification” has the meaning given in subsection 3.11.1.

2. INTERPRETATION

2.1 Headings - The division of this EPA into Articles, sections, subsections, paragraphs and Appendices and the insertion of headings are for convenience of reference only and do not affect the interpretation of this EPA.

2.2 Plurality and Gender - Words in the singular include the plural and vice versa. Words importing gender include the masculine, feminine and neuter genders.

2.3 Governing Law - This EPA is made under, and will be interpreted in accordance with, the laws of the Province of British Columbia. Subject to section 7.5, any suit, action or proceeding (a “Proceeding”) arising out of or relating to this EPA may be brought in the courts of the Province of British Columbia at Vancouver, and those courts have non-exclusive jurisdiction in respect of any Proceeding and the Parties hereby irrevocably attorn to the jurisdiction of such courts in respect of any Proceeding.

2.4 Industry Terms - Technical or industry specific phrases or words not otherwise defined in this EPA have the well known meaning given to those terms as of the date of this EPA in the industry or trade in which they are applied or used.

2.5 Statutory References - Reference to a statute means, unless otherwise stated, the statute and regulations, if any, under that statute, in force from time to time, and any statute or regulation passed and in force which has the effect of supplementing or superseding that statute or those regulations.

2.6 Currency - References to dollars or $ means Canadian dollars, unless otherwise stated.

2.7 Reference Indices - If any index, tariff or price quotation referred to in this EPA ceases to be published, or if the basis therefor is changed materially, there will be substituted an available replacement index, tariff or price quotation that most nearly, of those then publicly available, approximates the intent and purpose of the index, tariff or quotation that has so ceased or changed. This EPA shall be amended as necessary to accommodate such replacement index, tariff or price quotation, all as determined by written agreement between the Parties, or failing agreement, by arbitration under section 7.5.

2.8 Conversions - If a value used in a calculation in this EPA must be converted to another unit of measurement for purposes of consistency or to achieve a meaningful answer, the value will be converted to that different unit for purposes of the calculation.
2.9 **Payment Calculations** - All payments under this EPA will be calculated applying the following principles:

(a) all payment calculations will be rounded to the nearest cent;
(b) Energy will be expressed in MWh rounded to two decimal places; and
(c) if Statistics Canada (or the then recognized statistical branch of the Canadian Government):

(i) computes, at any time after the Effective Date, the CPI on a basis different to that employed at the Effective Date, then the CPI will be converted using the appropriate formula recommended by Statistics Canada (or the then recognized statistical branch of the Canadian Government);
(ii) at any time ceases to publish or provide the CPI, then the provisions of section 2.7 of Appendix 1 will apply;
(iii) has not published the CPI for a relevant period at the time the Seller is required to provide the Buyer with an invoice, the Seller shall prepare the invoice based on the CPI in effect at the time the invoice is issued and when the CPI for the relevant period is published, the Seller shall recalculate the invoice amounts in the next succeeding invoice and shall include a credit or debit, without interest, in the next succeeding invoice based on the results of the recalculation; or
(iv) recalculates the CPI within 36 months after an invoice affected by that CPI calculation has been issued, then the Seller shall recalculate the invoice amounts for the relevant period in the next succeeding invoice and shall include a credit or debit, without interest, in the next succeeding invoice based on the results of the recalculation.

2.10 **Additional Interpretive Rules** - For the purposes of this EPA, except as otherwise expressly stated:

(a) “this EPA” means this EPA as it may from time to time be supplemented or amended and in effect, and includes the Appendices attached to this EPA;
(b) the words “herein”, “hereof” and “hereunder” and other words of similar import refer to this EPA as a whole and not to any particular section, subsection or other subdivision;
(c) the word “including” or “includes” is not limiting whether or not non-limiting language (such as “without limitation” or “but not limited to” or words of similar import) is used with reference thereto;
(d) the words “year” and “month” refer to a calendar year and a calendar month;
(e) any consent, approval or waiver contemplated by this EPA must be in writing and signed by the Party against whom its enforcement is sought, and may be given, withheld or conditioned in the unfettered discretion of the Party of whom it is requested, unless otherwise expressly stated;
(f) all rights and remedies of either Party under this EPA are cumulative and not exclusive of
any other remedies to which either Party may be lawfully entitled, and either Party may
pursue any and all of its remedies concurrently, consecutively and alternatively, and

(g) any notice required to be given, or other thing required to be done, under this EPA on or
before a day that is not a Business Day, shall be deemed to be given or done when
required hereunder if given or done on or before the next following Business Day.

3. ADDRESSES FOR NOTICES

3.1 Notices to Buyer - Except as noted below, all notices addressed to the Buyer shall be delivered to
the following address:

Commercial & Portfolio Management, Energy Procurement
333 Dunsmuir Street, 10th floor
Vancouver, B.C.
V6B 5R3
Attention: (Note to Developers: name to be inserted in Project EPA)
Email: IPP.Contract@bchydro.com

Invoices and Statements
To: IPP Invoicing
333 Dunsmuir Street, 9th floor
Vancouver, B.C.
V6B 5R3
Attention: (Note to Developers: name to be inserted in Project EPA)
Email: IPP.Invoicing@bchydro.com

Insurance and Network Upgrade Security
To: Commercial & Portfolio Management, Energy Procurement
333 Dunsmuir Street, 10th floor
Vancouver, B.C.
V6B 5R3
Attention: (Note to Developers: name to be inserted in Project EPA)
Email: IPP.Contract@bchydro.com

3.2 Notices to Seller - All notices addressed to the Seller shall be delivered to the following address:

[Note to Developers: This information will be completed based on the information provided in the
Developer’s Application.]
APPENDIX 2

SELLER'S PLANT DESCRIPTION

1. Location: [Insert nearest community, latitude and longitude and PID]

2. Fuel:

3. Point of Interconnection:

4. Plant Capacity: ___ MW

5. General Description: [Include number of generating units in the Seller's Plant and the nameplate capacity of each generating unit.]
APPENDIX 3

NETWORK UPGRADES

1. Definitions

In this Appendix 3 or elsewhere in the EPA, the following words and expressions have the following meanings:

(a) “Base Case” means the base power flow, short circuit and stability data models used for the most recent dated interconnection study prior to the Effective Date.

(b) “Interconnection Network Upgrades” means additions, modifications and upgrades to the Transmission System or Distribution System that are determined by the Transmission Authority (as to the Transmission System) or the Distribution Authority (as to the Distribution System) to be interconnection network upgrades under the applicable policies of the Distribution Authority or under the Transmission Authority’s OATT in effect from time to time.

(c) “Interconnection Network Upgrade Costs” means all costs incurred by the Transmission Authority and/or the Distribution Authority after the Effective Date for the design, engineering, procurement, construction, installation and commissioning of Interconnection Network Upgrades.

(d) “Letter of Credit Failure” means:

(i) a failure to renew or replace the Network Upgrade Security by no later than 30 days prior to the expiry thereof; or

(ii) the Seller fails to amend or replace the Network Upgrade Security as required under subsection 3(d) of this Appendix by no later than the date specified in that subsection; or

(iii) the issuer of the Network Upgrade Security fails to maintain a credit rating of at least the minimum rating specified in this Appendix; or

(iv) the issuer of the Network Upgrade Security fails to comply with or perform its obligations under the Network Upgrade Security; or

(v) the Network Upgrade Security fails or ceases to be in full force and effect for purposes of this EPA (whether or not in accordance with its terms) prior to the date specified in this Appendix for return of the Network Upgrade Security to the Seller.

(e) “OATT” means the Transmission Authority’s Open Access Transmission Tariff, as filed with and accepted by the BCUC, as amended and refiled from time to time.
(f) "Network Upgrades" means both Interconnection Network Upgrades and Transmission Network Upgrades.

(g) "Network Upgrade Threshold" means $ ___________. [Note to Developers: This blank will be completed with a total dollar value based on the Interconnection Network Upgrade Threshold (as defined in the Standing Offer Program Rules) and the size of the Seller’s Plant as set out in the interconnection studies for the Seller’s Plant.]

(h) "Network Upgrade Costs" means all Interconnection Network Upgrade Costs and Transmission Network Upgrade Costs.

(i) "Network Upgrade Security" means a letter of credit in an amount described in subsection 3(d) of this Appendix that:

(A) is in the form of the Network Upgrade Security set out in Appendix 6, with such modifications as approved by the Buyer in writing,

(B) is issued by a Canadian bank or financial institution with a long-term credit rating not less than Standard & Poor’s A-, Moody’s A3, or Dominion Bond Rating Service A (low) (or other financial institution as approved by the Buyer in writing),

(C) is available for presentation in Vancouver, British Columbia, and

(D) has a term of not less than one year and provides that it is renewed automatically, unless the issuing financial institution advises otherwise by the date specified in Appendix 6.

(j) "Transmission Network Upgrades" means additions, modifications and upgrades to the Transmission System or Distribution System that are determined by the Transmission Authority (as to the Transmission System) or the Distribution Authority (as to the Distribution System) to be transmission network upgrades under the applicable policies of the Distribution Authority or under the Transmission Authority’s OATT in effect from time to time.

(k) "Transmission Network Upgrade Costs" means all costs incurred by the Transmission Authority and/or the Distribution Authority after the Effective Date for the design, engineering, procurement, construction, installation and commissioning of Transmission Network Upgrades.

2. Network Upgrades

(a) Buyer’s Obligation - Except as otherwise set out in this EPA, the Buyer shall pay (i) all Interconnection Network Upgrade Costs up to an amount not exceeding the Network Upgrade Threshold; and (ii) all Interconnection Network Upgrade Costs in excess of the Network Upgrade Threshold to the extent those costs are solely attributable to, and would not have been incurred but for, a change in the Base Case after the Effective Date, and where the change in the Base Case is not attributable, directly or indirectly, in whole or in part to the Seller or the Seller’s Plant; and (iii) all Transmission Network Upgrade Costs.
(b) **Seller’s Obligation** - The Seller shall pay all Interconnection Network Upgrade Costs in excess of the Network Upgrade Threshold, except for those costs for which the Buyer is responsible pursuant to subsection 2(a) of this Appendix. The Seller shall pay any Interconnection Network Upgrade Costs for which the Seller is responsible under this Appendix within 15 days after receipt of an invoice for such costs from the Buyer.

(c) **Payment on Termination** - If this EPA is terminated by the Buyer under any section of this EPA on or before the date that is 90 days after COD or by the Seller under subsection 8.3(a), (c) or (d) on or before COD, the Seller shall within 15 days after receipt of an invoice from the Buyer reimburse the Buyer for: (i) all Interconnection Network Upgrade Costs incurred by the Buyer, or which the Buyer has become contractually obligated to pay, prior to the termination of the EPA including, for greater certainty, Interconnection Network Upgrade Costs the Buyer would otherwise be responsible for under subsection 2(a) of this Appendix; (ii) any incremental Interconnection Network Upgrade Cost liability the Buyer will incur as a result of the termination of the EPA up to a maximum amount not exceeding the required amount of the Network Upgrade Security; and (iii) any Network Upgrade Costs the Seller is responsible for under any reimbursement agreement pursuant to section 3.3 of this EPA or section 7 of this Appendix.

3. **Network Upgrade Security**

The following terms and conditions apply to the Network Upgrade Security:

(a) The Seller shall deliver the Network Upgrade Security to the Buyer after receipt by the Seller of the Final Interconnection Study Report and prior to entering into the Facilities Agreement with the Distribution Authority.

(b) The Buyer shall return the Network Upgrade Security, less the amount of any draws on the Network Upgrade Security the Buyer is entitled to make under this EPA, within 10 Business Days after the date that is 90 days after COD.

(c) The Buyer may draw on the Network Upgrade Security in an amount equal to the amount of any Interconnection Network Upgrade Costs or liabilities the Seller has failed to pay to the Buyer under section 2 of this Appendix and for any Network Upgrade Costs the Seller is responsible for under any reimbursement agreement pursuant to section 3.3 of this EPA or section 7 of this Appendix. The Seller shall within 5 Business Days after any such draw, replenish the amount of the Network Upgrade Security to comply with the requirements of subsection 3(d) of this Appendix.

(d) The required amount of the Network Upgrade Security from time to time shall be equal to the full amount of the Interconnection Network Upgrade Costs estimated from time to time by the Distribution Authority and the Transmission Authority less the amount of any Interconnection Network Upgrade Costs previously paid by the Seller under section 2 of this Appendix and the Seller shall increase the amount of the Network Upgrade Security as necessary to comply with this section within 5 Business Days after delivery to the Seller of a revised estimate of the Interconnection Network Upgrade Costs prepared by the Distribution Authority or the Transmission Authority. The Seller acknowledges that the Buyer may request a revised Interconnection Network Upgrade Cost estimate from the Transmission Authority or the Distribution Authority at any time.
(e) The Seller shall notify the Buyer of any Letter of Credit Failure forthwith. If a Letter of Credit Failure occurs, the Seller shall deliver replacement Network Upgrade Security in the amount and form required under this EPA within 5 Business Days after the Letter of Credit Failure occurred.

(f) The Buyer may draw on the Network Upgrade Security if a Letter of Credit Failure occurs. The Buyer may hold the proceeds of such draw until the Seller delivers replacement Network Upgrade Security in the required form and amount.

(g) If the Seller has failed to maintain the Network Upgrade Security at the level required hereunder, subject to any cure period specified in this Appendix, the Buyer may withhold payment of any amount owing by the Buyer to the Seller under this EPA until 5 days after the date when the Seller has delivered the required amount of Network Upgrade Security to the Buyer. Any amounts withheld by the Buyer in accordance with this subsection will not bear interest.

4. EPA Termination

In addition to any other right to terminate this EPA expressly set out in any other provision of this EPA, the Buyer may terminate this EPA by notice to the Seller if:

(a) the Seller has failed to deliver the Network Upgrade Security to the Buyer as required under subsection 3(a) of this Appendix within 5 Business Days after notice from the Buyer; or

(b) the Seller has failed to replenish or increase the amount of the Network Upgrade Security as required under subsection 3(c) or subsection 3(d) of this Appendix; or

(c) if a Letter of Credit Failure has occurred and the Seller has failed to deliver a replacement Network Upgrade Security within 5 Business Days after the Letter of Credit Failure occurred.

5. Consent to Disclosure of Information

The Seller hereby consents to the Distribution Authority and the Transmission Authority disclosing to the Buyer on request:

(a) all information with respect to Network Upgrades, including any information provided by the Seller to the Transmission Authority or the Distribution Authority that relates to, or affects, Network Upgrades, including any Interconnection applications, studies and reports and all information, data and calculations relating to such applications, studies and reports;

(b) all metering data collected by, or provided to, the Transmission Authority or the Distribution Authority with respect to the Seller’s Plant;

(c) copies of any notice of a breach of, or default under, the Facilities Agreement or the Interconnection Agreement given or received by the Transmission Authority or Distribution Authority, as applicable; and
6. Requirement to Provide Interconnection Studies

The Seller shall provide to the Buyer a copy of all interconnection studies completed by the Transmission Authority or the Distribution Authority with respect to the Interconnection of the Seller’s Plant to the Transmission System or the Distribution System, as applicable, promptly on receipt by the Seller of any such reports. The Seller shall comply with the requirements of subsection 3(d) of this Appendix based on the estimated Interconnection Network Upgrade Costs as set out in each such report.

7. Advancement of Network Upgrades

The Seller shall not request the Distribution Authority or Transmission Authority to complete any study or work or take any other step of any kind whatsoever that would change the position of the Seller’s Plant in the interconnection queue or otherwise affect the validity of any interconnection study for the Seller’s Plant without the prior consent of the Buyer. The Seller acknowledges that the Buyer may as a condition of its consent require that the Seller agree to reimburse the Buyer for any incremental liability for Network Upgrade Costs with respect to the Seller’s Plant or any other project incurred by the Buyer as a result of such study, work or other step and that the Seller provide security to the Buyer to secure such reimbursement obligation.
APPENDIX 4

DELIVERY TIME ADJUSTMENT TABLE

1. **Definitions**: In this Appendix 4, the following words and expressions have the following meanings:

   (a) "**Off-Peak Hours**" means all hours other than Super-Peak Hours and Peak Hours.

   (b) "**Peak Hours**" means the hours commencing at 06:00 PPT and ending at 16:00 PPT, and commencing at 20:00 PPT and ending at 22:00 PPT, Monday through Saturday inclusive, but excluding British Columbia statutory holidays.

   (c) "**Super-Peak Hours**" means the hours commencing at 16:00 PPT and ending at 20:00 PPT Monday through Saturday inclusive, but excluding British Columbia statutory holidays.

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</table>
APPENDIX 5

COD CERTIFICATE

__________________ PROJECT

TO: British Columbia Hydro and Power Authority (the “Buyer”)

RE: Electricity Purchase Agreement (“EPA”) made as of __, 20__ between the Buyer and __ (the “Seller”) for __________ Project

I, [name of senior officer], in my capacity as [title of senior officer] of the Seller, and not in my personal capacity, certify on behalf of the Seller that:

1. Defined Terms - Words and phrases having initial capitalized letters in this Certificate have the meanings given in the EPA.

2. COD Requirements - The Seller has satisfied the requirements for COD as set out in the definition of “COD” in Appendix 1 of the EPA. Attached to this Certificate is all evidence required to demonstrate that the Seller has satisfied all such requirements.

3. No Material Default - No event which would entitle the Buyer to terminate the EPA has occurred. The Seller is not in material default under any Permit (and all Permits are in full force and effect), or Law applicable to the construction, commissioning or operation of the Seller’s Plant or under any land tenure agreement for the site on which the Seller’s Plant is located or under the Facilities Agreement or the Interconnection Agreement.

Dated this ___ day of ____________, 20__.

__________________

[name of senior officer]

[title of senior officer]

[Note to Seller: Attach to the COD Certificate in tabbed format all documents and evidence required to demonstrate that COD has occurred in accordance with the definition of “COD” in Appendix 1. Where documents have previously been provided to the Buyer, so indicate and attach a copy of the letter transmitting such documents to the Buyer.]
APPENDIX 6
SAMPLE FORM LETTER OF CREDIT

[Issuing Bank Name and Address]       Date of Issue: [Date]

Irrevocable Standby Letter of Credit

No. [Number]

Applicant: [Seller Name and Address]

Beneficiary: British Columbia Hydro and Power Authority
            333 Dunsmuir Street
            Vancouver, BC
            V6B 5R3

At the request of and for the account of the Applicant, we hereby establish in favour of the Beneficiary our irrevocable standby Letter Of Credit No. [Number] (hereinafter called the “Letter of Credit”) for an amount not exceeding [Currency and Amount both in letters and numbers].

We, [Issuing Bank Name and Address] hereby unconditionally and irrevocably undertake and bind ourselves, and our successors and assigns, to pay you immediately, the sum, which you claim upon receipt of the following documents:

(1) your signed written demand specifying the amount claimed (not exceeding [dollar amount]), and certifying that such amount is due to you by [Insert name of Seller] under the terms of an Electricity Purchase Agreement between you and [Insert name of Seller]; and

(2) this original Network Upgrade Security - Letter of Credit must be presented with your demand for payment for endorsement purposes.

Partial drawings are allowed. The amount of this Network Upgrade Security - Letter of Credit shall be automatically reduced by the amount of any drawing paid hereunder.

This Network Upgrade Security - Letter of Credit takes effect from the date of issue set forth above, and shall remain valid until [Date]. However, it is a condition of this Network Upgrade Security - Letter of Credit that it will be automatically extended without notice for a further one year period from the present or any future expiry date unless at least ninety (90) days prior to such expiry date we notify you in writing by courier or registered mail at your address above that we elect not to consider this Network Upgrade Security - Letter of Credit to be extended for any additional period.
This Network Upgrade Security - Letter of Credit is subject to the International Standby Practices 1998 ("ISP98"). All matters not covered by ISP98 will be governed by the laws applicable in the Province of British Columbia. The parties hereby irrevocably attorn to the non-exclusive jurisdiction of the courts of British Columbia. The number of this Letter of Credit must be quoted on all documents required hereby.

__________________________________________  ____________________________________________
Authorized Signing Officer                     Authorized Signing Officer
[Bank Name]                                     [Bank Name]
APPENDIX 7

SAMPLE FORM LENDER CONSENT AGREEMENT

(See section 7.4(c))

THIS AGREEMENT is made as of ________________, 20__

AMONG:

BRITISH COLUMBIA HYDRO AND POWER AUTHORITY, a corporation continued under the Hydro and Power Authority Act, R.S.B.C. 1996, c. 212, having its head office at 333 Dunsmuir Street, Vancouver, British Columbia, V6B 5R3,

(the “Buyer”)

AND:

[COMPANY], a company under the laws of ____________ having an address at _______________________________________,

(the “Company”)

AND:

[LENDER], a ______________ under the laws of ____________ having an address at _______________________________________,

(the “Lender”).

WHEREAS:

A. The Buyer and the Company entered into an Electricity Purchase Agreement made as of ________________, ___ (as amended from time to time, the “EPA”);

B. The Company has obtained certain credit facilities (the “Credit”) from the Lender for the purposes of financing the design, construction, operation and maintenance of the Seller’s Plant (as defined in the EPA);

C. To secure the due payment of all principal, interest (including interest on overdue interest), premium (if any) and other amounts payable in respect of the Credit and the due performance of all other obligations of the Company under the Credit, the Company has granted certain security to and in favour of the Lender, including an assignment of the right, title and interest of the Company under the EPA and security on the Seller’s Plant (collectively, the “Lender Security”); and

D. The Lender has requested the Buyer to enter into this Agreement confirming certain matters.

NOW THEREFORE THIS AGREEMENT WITNESSES that in consideration of the premises and of the sum of $10 and other good and valuable consideration now paid by each of the Company and the Lender
to the Buyer (the receipt and sufficiency of which are hereby acknowledged by the Buyer), the parties covenant and agree that:

1. **Additional Definitions:** In this Agreement, including the recitals:
   
   (a) "Assumption Notice" means a notice given by the Lender to the Buyer pursuant to subsection 6.1(a) of this Agreement;

   (b) "Default or Termination Notice" means a notice given to the Company by the Buyer under the EPA that, with or without the lapse of time, entitles, or shall entitle, the Buyer to terminate the EPA, subject to rights, if any, of the Company to cure the default or other circumstance in respect of which the notice is given;

   (c) "Receiver" means a receiver, manager or receiver-manager appointed or designated by, or on the initiative of, the Lender; and

   (d) words and phrases defined in the EPA, and not otherwise defined herein, when used herein have the meanings given in the EPA.

2. **EPA Amendments:** The Buyer and the Company acknowledge and agree that the EPA is in full force and effect, and that the EPA, as originally executed, has been amended only by the documents attached hereto as Schedule A.

3. **Buyer Confirmations Concerning the EPA:** The Buyer confirms to the Lender that:
   
   (a) the EPA has been duly authorized, executed and delivered by the Buyer;

   (b) the Buyer has not received any notice of assignment by the Company of all or any part of their right, title and interest in and to the EPA, except to the Lender;

   (c) the Buyer has not given any Default or Termination Notice;

   (d) the Buyer is not aware of any default or other circumstance that would entitle the Buyer to give a Default or Termination Notice, provided however that the Buyer has not undertaken any investigation or due diligence in respect of this confirmation; and

   (e) the Buyer shall not enter into any agreement with the Company to materially amend the EPA, or enter into any agreement with the Company to terminate the EPA, without giving the Lender not less than 30 days' prior written notice.

4. **Assignment of EPA to Lender:**

   **4.1 Buyer Acknowledgement:** The Buyer acknowledges receipt of notice of, and consents to, the assignment by the Company to the Lender of all the right, title and interest of the Company in and to the EPA made pursuant to and in accordance with the Lender Security.

   **4.2 Lender Acknowledgement:** The Lender acknowledges that:

   (a) it has received a copy of the EPA; and
(b) the assignment by the Company to the Lender of the EPA pursuant to the Lender Security is subject in all respects to the terms and conditions of the EPA and this Agreement.

4.3 Confidentiality: The Lender covenants and agrees with the Buyer to be bound by the provisions of section 7.8 of the EPA regarding confidentiality, as if an original signatory thereto.

4.4 Company Representation: The Company represents and warrants to the Buyer that the Lender is the only person to whom it has granted a security interest in the EPA or the Seller’s Plant.

5. EPA Notices: The Buyer covenants and agrees with the Lender that, except as hereinafter otherwise permitted, the Buyer:

(a) shall give the Lender a copy of any Default or Termination Notice concurrently with, or promptly after, any such notice is given to the Company;

(b) shall not exercise any right it may have to terminate the EPA until the later of: (i) the date that is 45 days after the date on which the Buyer delivered to the Lender a copy of the Default or Termination Notice entitling the Buyer to terminate the EPA; and (ii) the date on which the Buyer is entitled to terminate the EPA;

(c) shall not, provided that there is no other Buyer Termination Event under the EPA, terminate the EPA based on the Bankruptcy or Insolvency of the Seller if the Lender is promptly and diligently prosecuting to completion enforcement proceedings under the Lender Security until 30 days after the expiry of any court ordered period restricting the termination of the EPA; and

(d) shall not exercise any right it may have under section 5.6 of the EPA to deduct any amounts owing by the Seller to the Buyer under the EPA from amounts owing by the Buyer to the Seller under the EPA until the date that is 15 days after the date the Buyer provides the Lender with a copy of the notice delivered by the Buyer to the Seller under section 5.6 of the EPA.

Nothing in this Agreement prevents or restricts: (i) the exercise by the Buyer of any other right or remedy that it may be entitled to exercise under or in relation to the EPA; or (ii) the right of the Lender to cure, or cause the cure of, any default of the Company under the EPA that would be curable by the Company, whether or not an Assumption Notice is given.

6. Realization by Lender:

6.1 Assumption Notice and/or Sale: If the Company has defaulted under the Credit or the Lender Security and the Lender has elected to take possession of the Seller’s Plant, either by a Receiver or in any other way, pursuant to the Security, the Lender shall either:

(a) give the Buyer written notice (an “Assumption Notice”) stating that the Lender is assuming the EPA. whereupon:

(i) the Lender shall be entitled to all the rights and benefits, and shall have assumed, and shall perform and discharge, all the obligations and liabilities, of the Company under the EPA, and the Lender shall be a party to, and bound by, the EPA as if an original signatory thereto in the place and stead of the Company;
(ii) notwithstanding subparagraph (i), the Lender shall not be liable to the Buyer for defaults of the Company occurring before the Assumption Notice is given, except to the extent that such defaults continue thereafter; provided however that the Buyer may at any time before or after such notice is given exercise any rights of set-off in respect of any such prior default under or in relation to the EPA which the Buyer would otherwise be entitled to exercise; or

(b) give written notice to the Buyer that the Lender wishes to cause the Company to assign all of the Company's right, title and interest in and to the EPA and the Seller's Plant to a third person or persons, subject however to the Company and the assignee complying with all provisions of the EPA relative to such assignment.

The Buyer agrees that if the Lender enters the Seller's Plant for the purpose of viewing or examining the state of repair, condition or operation thereof such shall not constitute taking possession thereof.

6.2 Lender Liability and Release: The Lender assumes no liability to the Buyer under the EPA unless and until the Lender gives an Assumption Notice. Thereafter, if the Lender completes an assignment to a third person or persons pursuant to and in accordance with the applicable provisions of the EPA, the Lender shall be released from all liability and obligations of the Company to the Buyer under the EPA accruing from and after completion of that assignment.

6.3 Company not Released: Nothing in this Agreement, and neither the giving of an Assumption Notice, nor any assignment pursuant to subsection 6.1(b) of this Agreement releases the Company from its obligations and liabilities to the Buyer under and in relation to the EPA.

6.4 Receiver Included: References in this section 6 to the Lender include a Receiver.

7. Notices: Any notice required or permitted to be given under this Agreement must be in writing and may be given by personal delivery, or by transmittal by facsimile, addressed to the respective parties as follows:

(a) Buyer at:

British Columbia Hydro and Power Authority

__________________________________________

Attention: __________________________________
Facsimile No.: ___________________________

(b) [Company] at:

__________________________________________

Attention: _________________________________
Facsimile No.: ____________________________

______________________________
(c) [Lender] at:

______________________________
Attention: ____________________
Facsimile No.: ________________

Notices given by facsimile shall be deemed to be received on the Business Day next following the date of transmission.

8. **Choice of Law:** This Agreement is governed by British Columbia law, and the laws of Canada applicable therein.

9. **Jurisdiction:** Each party to this Agreement attorns irrevocably and unconditionally to the courts of the Province of British Columbia, and to courts to which appeals therefrom may be taken, in connection with any action, suit or proceeding commenced under or in relation to this Agreement. Notwithstanding the foregoing, the Lender acknowledges that upon an Assumption Notice being given, the Lender shall become party to, and bound by, the agreements to arbitrate contained in section 7.5 of the EPA.

10. **Termination:** This Agreement, and all rights and liabilities among the parties hereunder shall terminate upon the full and final discharge of all of the Lender Security. The Lender shall give the Buyer prompt notice of the full and final discharge of all of the Lender Security.

11. **Amendment:** This Agreement may be amended only by an instrument in writing signed by each of the parties hereto.

12. **Enurement:** This Agreement enures to the benefit of, and is binding upon, the parties hereto, and their respective successors and permitted assigns.

13. **Counterparts:** This Agreement may be executed by facsimile and in any number of counterparts, each of which is deemed an original, and all of which together constitute one and the same document.

14. **Effective Date:** This Agreement is not binding upon any party unless and until executed and delivered by all parties, whereupon this Agreement shall take effect as of the day first above written.

IN WITNESS WHEREOF each of the parties have duly executed this Agreement as of the day and year first above written.

**BRITISH COLUMBIA HYDRO AND POWER AUTHORITY**

By: ____________________________
   (Signature)

Name: __________________________

Title: __________________________

{COMPANY}

By: ____________________________
   (Signature)

Name: __________________________

Title: __________________________
By: _____________________________
   (Signature)

Name: ___________________________

Title: ___________________________
APPENDIX 8
SAMPLE FORM DEVELOPMENT PROGRESS REPORT

Quarterly Development Report
For the quarter ending: _
Report Number: _
Project Name: _

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Permitting:

[Note to Proponents: This section shall be expanded in the EPA to contain a list of Permits relevant to the Seller's project based on the information in the Seller's SOP Application.]

Financing:
- Construction
- Project Equity
- Long Term Financing

Project Design:
- Preliminary
- Final

Interconnection:
- Studies (Please describe the status of each interconnection study)
- Construction

Major Equipment:
- Ordering
- Delivery
- Installation

Construction:
- Road

---
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<th>Actual</th>
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<td>Financing Complete</td>
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<td>Major Equipment Ordered</td>
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<td>Commence Construction</td>
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<td>Interconnection Agreement Signed</td>
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<tr>
<td>Begin Commission</td>
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**COD:**

Target COD: ________________

Current Estimate: ________________

Prepared by: ____________________

Submitted by: ________________
APPENDIX 9

STANDING OFFER CONFIDENTIALITY AND COMPLIANCE AGREEMENT

[Note to Developers: To be attached.]
APPENDIX 10

CODE OF CONDUCT GUIDELINES

[Note to Developers: See Standing Offer Program Reference Documents]
APPENDIX 11

DESCRIPTION OF SPECIAL TERMS AND CONDITIONS

The following is a description of some of the revisions that will be made to the Standard Form EPA for the Standing Offer Program depending on the nature of the Developer and the project type, location and/or configuration. This is not an exhaustive list of possible amendments to the Standard Form EPA. In several of the cases noted below there may be additional substantive revisions required depending on the exact configuration of the project and there will likely be a number of consequential changes to the EPA. Capitalized terms used in this Appendix that are not defined in Appendix 1 have the meaning given to those terms in the Standing Offer Program Rules - Glossary.

New Generator Added to Existing Generation (Direct Interconnection to the Transmission System or Distribution System)

Projects Located Behind a Customer Load

The following changes apply where the Seller’s Plant consists of any of the project types listed above:

- If the proposed location of the Revenue Meter is such that the Revenue Meter will measure output from any existing generators:
  - The Seller will be required to ensure that all energy delivered to the Buyer is Clean Energy, except for Energy generated using Auxiliary Fuel, provided that the use of such Auxiliary Fuel in each calendar year does not exceed the Auxiliary Fuel Annual Baseline for that year.
  - Plant Capacity in Appendix 2 will be changed to “Project Capacity”. Project Capacity will be a specified number of MW to a maximum of 15 MW.
  - If a portion of the electricity from the existing generation facility is under contract to the Buyer or a third party, a generator baseline for each month will be established based on the amount of contracted electricity. In that case, the Buyer will only purchase energy under the EPA where the Revenue Meter shows energy deliveries in excess of the generator baseline.
  - The maximum amount of energy the Buyer will purchase is limited to 110% of the Project Capacity.
  - The generator baseline will be adjusted upon expiry or earlier termination of any contractual commitments reflected in the generator baseline.

- The following additional changes apply to a project located Behind a Customer Load:
Where the facility through which the Project has an Indirect Interconnection is a BC Hydro customer, the POI is the point at which the BC Hydro customer interconnects with the Transmission System or Distribution System. However, energy delivered to the BC Hydro customer will be deemed to have been delivered to the POI for payment purposes under the EPA.

Where the facility through which the Project has an Indirect Interconnection is a facility that purchases power from a third party that purchases power from BC Hydro, the POI will be a specified point of interconnection on the Transmission System or Distribution System. The Buyer will pay for Energy that is generated by the Seller’s Plant above the generator baseline (described below) and that is delivered to that POI.

In either case described above, a generator baseline for each month will be established based on the historical generation of the existing generation facility and, if a portion of the electricity from the generation facility is under contract to the Buyer or to a third party, the existing contracted electricity. The generator baseline will not be adjusted to reflect variations in the customer’s energy consumption.

Where the facility through which the Project has an Indirect Interconnection is a BC Hydro customer, the Seller may be required to install a direct interconnection to the Transmission System or Distribution System if the facility ceases to be a customer of BC Hydro.

Projects interconnected to the Transmission System or Distribution System Through a Privately-Owned Transmission or Distribution Line

The following changes apply where the Seller’s Plant is interconnected to the Transmission System or the Distribution System through a privately owned transmission or distribution line:

- The EPA will be amended to reflect the fact that the Facilities Agreement and the Interconnection Agreement may be between the owner of the private line and the Distribution Authority or the Transmission Authority.
- COD requirements will include a requirement that the Seller not be in default under any agreement with the owner of the private line and that the owner of the private line is not in default under any agreements between the owner of the private line and the Transmission Authority or the Distribution Authority.
- The Seller will covenant to comply with the terms and conditions of its agreements with the private line owner during the term of the EPA.
- The Seller will covenant to deliver a consent from the owner of the private line to disclosure by the Transmission Authority or the Distribution Authority of all information relating to the private line and the interconnection of that line to the Transmission System or the Distribution System.
- Disconnection of the private line from the Distribution System or the Transmission System will excuse the Buyer from its obligation to accept delivery at the POI.
- There will be no entitlement to payments under section 4.7 if a Distribution/Transmission Constraint or Disconnection is attributable to the private line or any other generator attached to the private line.
BC Hydro Standing Offer Program – Standard Form EPA

• Incremental losses associated with any other generating facility interconnected to the private line in addition to the Seller’s Plant will be accounted for in the meter calibration process.

• The Buyer will be entitled to terminate the EPA if at any time during the Term the agreement that allows the Seller to transmit power on the private line expires or is terminated or the Seller otherwise loses the right to transmit power on the private line unless within 30 days the Seller can demonstrate to the Buyer, acting reasonably, that the Seller can lawfully transmit power to the POI.

**Projects interconnected to the Distribution System or Transmission System through a Public Utility Transmission/Distribution System owned and operated by a Person other than the Transmission Authority**

The following changes apply where the Seller’s Plant is interconnected to the Distribution System or the Transmission System through a public utility transmission/distribution system owned and operated by a third party, other than the Transmission Authority:

• The term “POI” will be defined as a specified point where the public utility transmission/distribution system interconnects with the Distribution System or the Transmission System.

• Appendix 3 may be deleted depending on the circumstances of the particular Project. However, Developers should be aware that, in some cases, security may be required for any upgrades to the Transmission System or the Distribution System that are required to enable the delivery of energy from the Seller’s Plant into the Transmission System or the Distribution System, as applicable.

**Auxiliary Fuel**

The following changes apply where the Seller’s Plant is capable of using alternate fuel sources to generate Energy:

• In the case of Projects that are capable of using alternate fuel sources to generate energy, the Seller will be required to deliver to the Buyer, an annual report together with supporting documents (including third party audits and/or certifications(s)) as requested by the Buyer, acting reasonably, to confirm the fuel types and quantities used in the Seller’s Plant during the immediately preceding 12 month period and the Seller shall ensure that all fuel used by the Seller is such that the energy will be considered Clean Energy, except for Auxiliary Fuel, not exceeding in each calendar year the Auxiliary Fuel Annual Baseline for that year. Breach of these requirements is a “material default” for purposes of subsection 8.1(i) of the EPA.

• The Seller shall pay to the Buyer in each year an amount equal to the MWh of Energy generated by that portion of Auxiliary Fuel, excluding Start-Up Fuel, that exceeds the Auxiliary Fuel Annual Baseline for that year multiplied by the price payable under section 5.2 for Energy generated during that year. The Seller may satisfy this payment obligation by showing the amount owing as a credit in the statement delivered to the Buyer under section 5.4 of the EPA in February, but must pay any amount still owing after applying that credit.
• The “Auxiliary Fuel Annual Baseline” means (i) for a new generator, 3% of the total fuel, excluding Start-up Fuel, and determined in GJ used to generate Energy in each calendar year; or (ii) for all other generators, means the percentage of the total fuel used to generate energy sold to BC Hydro under a Project EPA as determined by BC Hydro in its discretion and specified in the Project EPA based on the information provided in the Application with respect to that generator.

High Efficiency Co-Generation Projects

The following changes apply where the Seller’s Plant is a High Efficiency Co-generation project:

• If the Seller’s Plant uses natural gas or oil to generate electricity for delivery to the Buyer pursuant to the EPA, the Seller will be required to deliver to the Buyer, on each anniversary of COD, written confirmation from the Seller together with supporting documents (including third party audits and/or certification(s)) as requested by the Buyer, acting reasonably, to confirm that the Seller has complied with Policy Action No. 18 (zero net greenhouse gas emissions) and Policy Action No. 19 (zero net greenhouse gas emissions by 2016) of the 2007 Energy Plan, as applicable, with respect to fuel used to generate the electricity in excess of the generator baseline for sale to the Buyer under the EPA. Breach of these requirements is a “material default” for purposes of subsection 8.1(i) of the EPA.

• If the Seller fails to comply with the foregoing requirements, the Buyer may suspend accepting deliveries of that portion of the Energy in respect of which confirmation has not been provided to the Buyer and the Buyer may suspend payments under the EPA for any portion of the Energy for which confirmation has not been provided until such time as the Seller delivers the required confirmation and/or switches to a fuel that will ensure that the energy delivered to the Buyer under the EPA will be considered Clean Energy.

All Projects with Greenhouse Gas Emissions

• A provision will be added to the EPA requiring the Seller to report to BC Hydro concerning the greenhouse gas emissions from the Seller’s Plant.

Seller is a Joint Venture or Partnership

The following changes apply where the Seller is a joint venture or partnership:
• The partners or joint venture participants will be jointly and severally liable for all obligations under the EPA.
• Other consequential amendments will be made to the EPA (e.g., the definition of “Bankrupt or Insolvent” will be revised so that it applies to the partnership or the joint venture and each of the members of the partnership or the joint venture).

**CPI Data Not Available**
The following changes apply where the EPA is executed prior to the date on which the CPI data required to adjust the base price as indicated in Section 3 of the Standing Offer Program Rules is available:

• The EPA will include a provision for adjustment of the price specified in section 5.2 to be consistent with the escalated base price for the year in which the EPA is signed upon the relevant CPI data becoming available.

**Projects Interconnected to the Transmission System**
The following changes apply where the Seller’s Plant is connected to the Transmission System:

• Definitions such as “Facilities Agreement” will be revised to reflect the equivalent terminology used by the Transmission Authority.

**Projects Where the Term of the Permit or Tenure is Less than the EPA Term**

• The following provision will be added to section 8.1 as an event that entitles the Buyer to terminate the EPA:
  • any material Permit or land tenure agreement for the Seller’s Plant is terminated or expires and is not renewed or replaced within 30 days after such termination or expiry. A definition of “Material Permits” will be developed based on the permits and approvals required for the Seller’s Plant.