Comox Valley REGIONAL DISTRICT

Staff report

DATE: October 4, 2018

FILE: 5360-50

TO: Chair and Directors
Comox Valley Regional District
(Comox Strathcona Waste Management) Board

Supported by Russel Dyson
Chief Administrative Officer

R. Dyson

FROM: Russell Dyson
Chief Administrative Officers

RE: **Comox Valley Waste Management Center Landfill Gas Beneficial End Use Project**

Purpose
To provide an update and recommendation regarding the future beneficial end use for landfill gas generated at the Comox Valley Waste Management Centre (CVWMC).

Recommendation from the Chief Administrative Officer:
THAT the Comox Valley Regional District (Comox Strathcona Waste Management) enter into a Memorandum of Understanding with Fortis Energy Inc. to determine the feasibility of the sale of landfill gas from the Comox Valley Waste Management Centre.

Executive summary
As part of the Comox Valley closure project, landfill gas (LFG) has been collected and flared at the CVWMC since early 2016. Beginning in 2015, a comprehensive exploration of technologies has been undertaken to provide an alternative beneficial end use for the LFG. (The executive summary of the report "Landfill Gas Beneficial Use In-depth Study," is attached as Appendix A). The analysis concluded that selling raw gas to Fortis Energy Inc. (Fortis) for upgrade to renewable natural gas (RNG) provides the greatest return on investment for the solid waste service.

In 2017, staff submitted a grant application for implementation of a technology to upgrade raw LFG to RNG in the hopes of reducing capital costs with grant funds. The application was not successful. Based on the existing analysis, the best end use remains the sale of raw LFG to Fortis for upgrading to RNG.

In 2013 the Village of Cumberland (Village) and the Comox Valley Regional District (CVRD), Comox Strathcona Waste Management (CSWM), entered into a Memorandum of Understanding (MoU) for the possible use of integrated resource recovery from the CVWMC. The agreement includes exploring the provision to the Village of a first option for the use of any integrated resource recovery. The Village has explored this option and in August 2018 presented a proposal (attached as Appendix B) with respect to the use of LFG produced at the CVWMC. The Village's proposal to the CVRD is built on a conceptual proposal from Fortis. The Village's proposal includes the following key elements:

- Develop a LFG utilization project at the CVWMC to convert LFG into RNG with Fortis.
- Allocate a portion of RNG produced from LFG to industrial lands located within the Village while at the same time maximizing the value to LFG for the solid waste service.

- Promote the future installation of a Compressed Natural Gas (CNG) filling station as a means to cost effectively reduce emissions in the regional transportation sector.
- Promote the long term future use of RNG within the CNG filling station to further reduce carbon emissions associated with transportation.

In a follow-up meeting with Fortis, CVRD staff confirmed that:

- The rate that Fortis would pay for LFG would not be affected by Cumberland's proposal;
- Fortis has a keen interest in expanding the supply of RNG for their system;
- Fortis has a focus on reducing emissions from the transportation sector by providing access to CNG at strategic locations on Vancouver Island, and that the Village is one of these locations.

In order to move the project forward, staff recommend that the CSWM upgrade and service enter into a MoU with Fortis (attached as Appendix C), to determine the feasibility of the sale of LFG from the CVWMC. Based upon study results, a follow up report will be presented to the Board explaining the findings and recommending, if appropriate, to enter into a revenue agreement with Fortis.

Prepared by:	Concurrence:	Concurrence:
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Background/Current Situation

A LFG management system was installed at the CVWMC as part of the 2015 Phase 1 closure project. The LFG generated from decomposing waste, began to be captured and flared in early 2016 as mandated by the Ministry of Environment and Climate Change Strategy under the 2009 "BC Landfill Gas Management" regulation.

Tetra Tech was commissioned in 2014 to analyze and compare beneficial use technologies for the LFG and the scope of work for the study was expanded in 2016 to analyze the level of implementation of these technologies in BC. The Executive Summary of the report "Landfill Gas Beneficial Use In-depth Study" is attached as Appendix A.

In 2017, Fortis informed the CVRD that they had received a renewed mandate from the province, and that they were in a position to offer better conditions to the CSWM service with regard to buying the LFG generated from the CVWMC landfill before or after upgrading to RNG.

In June 2017, staff submitted a grant application under the Gas Tax Strategic Priorities fund (SPF) program for implementing a technology to upgrade raw LFG to a RNG, aiming to cut down on capital costs using grand funding. On March 6 2018, the SPF announcements were made and the CVRD application for the LFG utilization grant at the CVWMC was unsuccessful.

In August 2018, the Village presented a proposal (Appendix B) with respect to the use of the LFG produced at the CVWMC, as part of the 2013 Village CVRD MoU (details provided in the Policy

Analysis section of this report). The Village's proposal includes a conceptual proposal from Fortis with the following key elements:

- Develop a LFG utilization project at the CVWMC, to convert LFG into RNG, with Fortis and the CVRD negotiating an agreement that is appropriate for all member communities;
- Allocate a portion of RNG produced from LFG to industrial lands located within the Village, while at the same time maximizing the value to LFG for the solid waste service. RNG consumed at the Bevan Industrial lands will be purchased by businesses directly from Fortis at the regulated tariff rate;
- Promote the future installation of a CNG filling station as a means to cost effectively reduce emissions in the regional transportation sector. Fortis in its sole discretion will determined its feasibility;
- Promote the long term future use of RNG within the CNG filling station, to further reduced carbon emissions associated with transportation.

In order to move the project forward, staff recommends to enter into a MoU with Fortis (Appendix C) to determine the feasibility of upgrading and selling LFG from the CVWMC, and analyze in detail the technical, economical and legal aspects of the project. Based on the results, a follow up report will be presented to the Board explaining the findings and recommending, if appropriate, to enter into a revenue agreement with Fortis.

Policy analysis

The 2010 Comox Valley Sustainability Strategy Objective 3.2.3 states as follows:

a. Establish a policy to maximize gas capture from future landfills where feasible;
b. Review existing landfill facilities for feasibility of capturing and reusing methane for heat and/or power;
c. Establish a land use policy to ensure land uses that can utilize methane or electricity, hear and/or CO_2 from an associated cogeneration system (e.g. industrial, greenhouse, etc.) are located near landfills. Cogeneration (production of both heat and electricity) typically maximizes the energy recovery from landfill gas combustion.

The 2012 Comox Strathcona - Solid Waste Management Plan (CS-SWMP) states as follows:

There are three main objectives associated with the solid waste management plan:

1. The initiatives outlined in the plan work towards a goal of zero waste and aim to minimize the amount of waste buried in landfills;
2. Improvements to the solid waste management system will reduce greenhouse gases emissions from solid waste management activities;
3. All CSWM landfills will be designed and operated to minimize impact on the environment and the surrounding community and to satisfy the BC landfill criteria for municipal solid waste.

The 2013 Village and CVRD MoU states as follows:

The CVRD will explore with the Village the possible uses for any integrated resource recovery from the CVWMC, including exploring the provision to the Village of a first option on the use of any integrated resource recovery.

At its April 20, 2017 CVRD CSWM Board meeting, the following resolution was passed:

> *THAT the Comox Valley Regional District (Comox Strathcona Waste Management) service submit a grant application for up to a $6 million capital investment to provide a beneficial end use for the LFG generated at the CVWMC, under the Gas Tax SPF.*

Options

The Board has the following options to consider:

1. Enter into a MoU with Fortis to determine the feasibility of the sale of LFG from the CVWMC to Fortis;
2. Do not enter into a MoU with Fortis, and seek alternative Board direction.

Financial Factors

The cost of the feasibility analysis to be undertaken as part of the CVRD Fortis MoU is $50,000. Once the results are known, if the Board decides to enter into a revenue agreement with Fortis, the cost of the CVRD Fortis MoU will be recouped from the future year's revenue. Otherwise, the cost of the CVRD Fortis MoU will be shared evenly between the CSWM service and Fortis.

Cost of the CVRD Fortis MoU to undertake the feasibility analysis can be covered under the 2018 budget for professional or engineering fees, out of function 391, using the uncommitted allowance for other engineering services.

Legal Factors

As Fortis is a regulated utility any landfill bio-gas agreement entered into and subsequent projects are subject to final approval by the BC Utilities Commission.

Regional Growth Strategy Implications

Future beneficial end uses for the landfill gas generated at the CVWMC supports the Regional Growth Strategy (RGS) Objective 5-E: "Reduce regional solid waste and improve landfill performance."

A beneficial end use will also support RGS Object 8-C: "Reduce greenhouse gas emissions in the solid waste sector."

Intergovernmental Factors

The CVRD regularly updates the Village regarding the status of the beneficial use process to adhere to the Village CVRD MoU commitments.

Interdepartmental Involvement

The beneficial end use project is let by Engineering Services with project support provided by Financial Services regarding the public solicitation process, and Corporate Services for future project communications.

Citizen/Public Relations

Working with Corporate Services and the consulting engineer, a communication plan will be developed if the Board decides to move forward with the project.

Appendix A – "Landfill Gas Beneficial Use In-Depth Study Rev1" (executive summary only) by Tetra Tech Canada Inc., dated May 2017"
Appendix B – "First Option Proposal for Renewal Energy Usage" by the Corporation of the Village of Cumberland"
Appendix C – "Fortis CVRD Draft Memorandum of Understanding"

Appendix A

Landfill Gas Beneficial Use In-depth Study
Comox Valley Regional District



PRESENTED TO

Comox Valley Regional District

MAY 31, 2017
ISSUED FOR USE
FILE: 704-SWM.SWOP03358-01

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EXECUTIVE SUMMARY

Tetra Tech Canada Inc. (Tetra Tech) was retained by the Comox Valley Regional District (CVRD) to undertake a desktop study on the utilization of landfill gas (LFG) which is currently being collected at the Comox Valley Waste Management Centre (CVWMC) landfill. The objectives agreed upon for the given study were to:

- Explore the feasibility of LFG supply to FortisBC for use in their natural gas system or for use by other gas brokers;
- Explore the feasibility of providing LFG to an adjacent industrial parcel;
- Evaluate the LFG utilization as a heating source for greenhouses at the Vancouver Landfill;
- Canvass current companies on Vancouver Island and the Greater Vancouver area on Public Private Partnership (PPP) to design, build and operate a LFG utilization system according to the different technologies proposed by Tetra Tech in current report;
- Evaluate the reciprocating internal combustion engine (RICE) technology being implemented in the Regional District of Nanaimo (RDN), Hartland, Salmon Arm and Kamloops landfills; and
- Evaluate the compressed natural gas (CNG) technology being implemented in the Greater Victoria (Hartland) Landfill, Emterra, and RDN landfill.

The results of the study demonstrated the following:

- On average, the LFG at the CVWMC landfill is being collected at flow rate of 514 m^3/hr [302.5 standard cubic feet per minute (scfm)] and 43.5% CH_4 composition. Well field optimization is necessary to achieve long term consistent LFG flow rates with a minimum 50% CH_4 composition.
- FortisBC is eager to work with the CVRD on biogas upgrade project to produce renewable natural gas (RNG). Furthermore, FortisBC can purchase the raw LFG from CVRD's collection field and oversee its treatment and distribution or have the CVRD oversee all biogas upgrade works and purchase the end product.
- There are no other gas distributors besides FortisBC, which can accept and distribute the RNG to end user.
- The Village of Cumberland (VoC) has designated the area adjacent to the site as "Industrial Zone" where the LFG could potentially be used as a source of energy. The VoC cannot yet predict how much and in which form it would like to receive the LFG for industrial zone. The actual demand for the LFG by the industrial zone is expected to arise after five years.
- Interest with respect to LFG utilization was expressed by Cedar Road Bioenergy Ltd; individual follow up is required for analysis of projected demand, expected quality of commodity and terms and conditions of commodity supply.
- A third party is exploring a possibility of using the LFG for a future leachate treatment facility that would be situated east to the existing flare compound. The demand for LFG at the proposed leachate treatment process will be seasonal, therefore, this stand-alone option might not be economically feasible but it could prove to be a mutually beneficial if combined with another project.
- Vancouver Landfill utilizes LFG to generate and sell electricity using RICE technology. Exhaust heat from the conversion process is partly recovered and used to maintain required temperature for the greenhouse and administrative building during cold season.

- Internal combustion engines (RICE) are the most preferred option for LFG to electricity conversion. Issues with the technology are under capacity runs, scheduled maintenances, system rebuilds and remote support requirements. Advantages include negligible LFG pre-treatment.
- Selling electricity to BC Hydro is done under the Standing Offer Program (SOP); as of August 2016, BC Hydro has reached its target capacity for clean energy and therefore does not assign any additional supply volumes until 2020 and beyond until the price and target volume post 2020 are determined by BC Hydro with input from Clean Energy BC.
- There are no active LFG to CNG conversion systems in place at the landfills indicated for this study. The only CNG fueling station located in Victoria for its feedstock utilizes natural gas supplied by FortisBC at constant rate and pre-determined composition. Adoption of this technology could be a high risk investment due to higher capital cost of the project and lower consumer base.
- The most financially feasible LFG utilization option is the supply of raw LFG to FortisBC. Under all circumstances the risks associated with investment are minimal whilst the payback times are considerably shorter and internal rates of return are higher when compared against other options.
- LFG to electrical energy conversion project under both high and low capital investment scenarios yields high net present value and internal rate of return; however, this type of project is very sensitive to the market value of electrical energy and also requires a buyer.
- The proposed next steps for LFG utilization involve the optimization of the existing LFG collection field to improve its quantitative and qualitative aspects for subsequent preparation and release of the Expression of Interest for LFG utilization to all interested parties.

Appendix B

The Corporation of the Village of Cumberland

First Option Proposal for Renewable Energy Usage

Table of Contents

1.0 Introduction

As per the 2013 Memorandum of understanding (MOU) between the Comox Valley Regional District (CVRD) and the Village of Cumberland (Cumberland) this submission represents Cumberland's First Option Proposal for Renewable Energy Usage (the First Option Proposal) with respect to the use of the landfill gas (LFG) produced at the the Comox Valley Waste Management Centre (CVWMC) landfill. This First Option Proposal is based on a project proposal provided by FEI to Cumberland and includes commitments between Cumberland and FEI.

As part of this proposal, Cumberland and Fortis Energy Inc. (FEI) are finalizing a Letter of Intent (Cumberland-FEI Letter of Intent) which is focused on facilitating long-term investment attraction and economic development opportunities for Cumberland. In exercising its First Option opportunity under the CVRD/Cumberland MOU, Cumberland seeks to facilitate growth and development within its industrial lands, while still maximizing the value of the LFG resource within the CVRD and Comox Strathcona Waste Management (CSWM) service areas.

FEI has also provided Cumberland with a Project Proposal (the FEI Proposal) that facilitates social and environmental benefits for all communities within the CVRD and CSWM service areas. Incorporated within this First Option Proposal, the FEI Proposal provides a development model that:

- Limit's the scope of responsibility for the CSWM to the existing gas collection operations where FEI will be responsible for the ownership, operation and maintenance of the gas upgrading and interconnection equipment;
- Positions the CVRD, as a regional representative entity, to negotiate a purchase agreement that is appropriate for all member communities;
- Allows Cumberland, through the Cumberland-FEI Letter of Intent, to leverage the LFG infrastructure and value of the Renewable Natural Gas (RNG), in order to attract investment within its local industrial (and employment) lands;
- Integrates Compressed Natural Gas (CNG) infrastructure as a means to cost effectively reduce emissions in the regional transportation sector; and
- Incorporates the use of locally produced RNG within CNG infrastructure to further lower carbon intensity within the transportation sectors of the CVRD and CSWM service areas.

As identified within the 2017 Landfill Gas Beneficial Use Study developed on behalf of the CVRD, FEI is the only distributor that accepts and distributes RNG to end users and represents the lowest risk option for the CVRD. In addition, the Beneficial Use Study acknowledges that most financially feasible LFG utilization option is the supply of raw LFG to FEI as it provides minimal risks associated with investment while offering internal rates of return that are higher when compared against other options (Tetra Tech 2017).

2.0 CVRD and Cumberland MOU – First Option

In July 2013, the CVRD and Cumberland entered into a Memorandum of Understanding (MOU) to serve as the basis for which the parties work together and engage in discussions regarding the management and operations of the CVWMC as they relate to the Village, including the use of any integrated resource recovery (See Schedule A).

Under Section 1.0 of the MOU (Leachate Treatment/Integrated Resource Recovery), as the host community of the CVWMC, Cumberland has the first option of utilizing the landfill gas (LFG) and is submitting this First Option Proposal as per the MOU and per the evaluation criteria provide by CSWM.

Cumberland recognizes the importance and opportunities presented by the LFG project and acknowledges the importance of this resource to the greater CVRD region. In exercising its First-Option, Cumberland has sought to collaborate with FEI in developing a project concept which will:

- Meet the terms of the CVRD/Cumberland MOU;
- Seek to improve economic development opportunities for the host community; and
- Maximize the value of LFG for the CSWM service.

2.1 Cumberland Industrial Lands

Cumberland's Bevan Industrial Lands, located directly adjacent to the CVWMC, represents approximately 84% of the vacant industrial lands within the Comox Valley and the largest supply of future industrial land for the region. These lands are currently unserviced and include approximately 250 acres of accessible industrial land zoned for heavy industrial (I-2), with a further 400 acres (approx.) designated as Industrial Greenways Reserve (IGR), zoned specifically for marijuana manufacturing and/or silviculture related uses only.

For Cumberland, the Bevan lands provide critical factors for industrial development: buffer from residential areas, access to highway, potential for clustering of businesses with the benefits of co-location, and potential affordability. Cumberland also views the proximity of these employment and industrial lands to the Project as a big advantage and would like to market development opportunities in this area towards industrial uses that strive for a more sustainable pathway of growth.

Similarly, the Comox Valley Economic Development Society acknowledges within its Employment and Industrial Lands – Based FDI Strategy (2016) that the development of RNG production at the landfill can help in supplementing the energy needs of any future development on the lands. CVEDS also noted that such a development would create potential for the development of an Eco-Industrial Park where the alternative energy production possibilities mentioned above can further establish the site as an environmentally sustainable industrial park (CVEDS 2016).

The development of the Bevan industrial Lands is still at its incipient stage with tentative launch time expected in 2021-2023, subject to demand and economic situation. As a primary goal of its First-Option, Cumberland has sought to ensure that an allocation of RNG is available for use within these lands as future development occurs. Such an arrangement allows Cumberland to implement strategic economic development initiatives and confidently promote these lands using local RNG access as a key component towards generating business and employment opportunities for the entire region.

3.0 FortisBC Energy Inc. (FEI)

FEI is the largest supplier of energy in British Columbia and is a leader in innovative energy solutions serving 1.1 million customers in 135 BC communities. To meet the evolving needs of their customers FEI has invested in infrastructure to develop locally produced, carbon neutral Renewable Natural Gas as well as bring cleaner burning Compressed Natural Gas to the transportation sector.

FEI is a proven, innovative utility with direct experience in the areas of renewable natural gas and low carbon transportation fuels. FEI also offers a proven track record of efficiently utilizing LNG, evaluating the implementation of natural gas for transportation, and supporting long-term plans around developing sustainable energy production projects.

3.1 Renewable Natural Gas

As organic waste in a landfill decomposes LFG is produced. This LFG can be purified to remove impurities and leave a high quality, carbon neutral biomethane (also known as Renewable Natural Gas or RNG). Once the LFG has been purified it can be injected in to the existing FortisBC natural gas system where it can be distributed and consumed interchangeably with conventional natural gas for various heating and process applications.

FEI has demonstrated experience in the area of biomethane supply and is one of the first utilities in North America to have an approved program for the supply and delivery to its customers. On the supply side, FEI currently has five operating biomethane suppliers within its service territory, including two municipal landfills and an organics processing facility while continuing to add supply projects to its portfolio. On the customer side, the RNG program has grown to 9,600 voluntary residential and commercial customers from regions across British Columbia including Vancouver Island. The cumulative demand for RNG has resulted in over 30,000 tonnes GHG emissions reductions while supporting local, private, and municipal suppliers to achieve their sustainability and waste diversion strategies.

Due to the continued growth and success of the RNG program FEI has a need for additional biomethane supply to meet the customer demand, and is actively seeking new supply projects. In addition, current BC regulations permit FEI to voluntarily purchase up to 5% biomethane in to its natural gas system.

3.2 Compressed Natural Gas

In addition to delivering natural gas and electricity to homes and businesses, FEI is also involved in providing end to end fueling solutions for customers that operate natural gas vehicles. In BC the transportation industry is responsible for 36 per cent of provincial GHG emissions and there are more than 16.7 million natural gas vehicles worldwide. Since 2011, FEI has been actively pursuing the transportation market through incentives and investment in fueling infrastructure. Under current BC regulations FEI operates a $244 million incentive program to assist fleet operators to purchase natural gas vehicles. These efforts have secured over 800 vehicles and 19 fueling stations utilizing compressed natural gas (“CNG”) or liquefied natural gas (“LNG”) as a transportation fuel.

Natural gas burns cleaner than gasoline or diesel, which can result in less pollution and greenhouse gases. Carbon dioxide (“CO2”) emissions, the principal greenhouse gas that contributes to global warming, are

reduced by up to 30 per cent (Fortis 2018). Natural gas vehicles emit virtually no particulate matter, the harmful microscopic component of air pollution.

4.0 FEI Project Proposal

As per FEIs Conceptual Proposal to Cumberland presented in Schedule B (the FEI Proposal), FEI commits to playing an active role in developing a project at the existing CVWMC landfill located in Cumberland, evaluating the implementation of natural gas for transportation, and supporting future plans around developing a sustainable energy production project from future organic waste.

FEI have based their proposal to support the targets and strategies outlined in the Village of Cumberland Economic Development Strategy, the Comox Valley Sustainability Strategy, and Corporate Energy Plan in the areas of:

- Economic Development
- Environmental Stewardship
- Greenhouse Gas ("GHG") Reductions
- Transportation

To-date, FEI has also had discussions with staff at both the CVRD and Cumberland to help shape their proposal. Based on the strategies and plans in the region, FEI envisions a future where the Comox Valley region of Vancouver Island is converting regional waste to renewable energy and using a low carbon heating and transportation fuel. More specifically, through Cumberland's First Option Proposal, FEI can support the following objectives:

- Develop a LFG utilization project at the CVWMC to convert waste methane (LFG) in to RNG for sale to, and/or use in, corporate facilities, local homes, and businesses;
- Negotiate a purchase agreement with the CVRD, as a regional representative entity, that is appropriate for all member communities;
- Support the development of Cumberland's employment and industrial lands by committing to an allocation of RNG to meet future servicing needs;
- Support the transition to cost-effective, lower emission fuels in the public and private transportation sectors through the deployment of a Compressed Natural Gas (CNG) station;
- Provide additional incentives to support market adoption of CNG throughout the regional transportation sector; and,

- Enhance local quality of life through reduced GHG emissions and improved air quality linking CNG and RNG.

As proposed, the Village of Cumberland and FEI believe the development of the LFG project will situate the CSWM as a hub for sustainability to support the economic and environmental objectives of the broader Comox Valley and Strathcona Regional Districts.

4.1 Cumberland-FEI Letter of Intent

As part of the Cumberland's First Option Proposal FEI and Cumberland will draft a letter of intent to outline an allocation of RNG produced at the CVWMC is available for future use by business and development within the Bevan Industrial Lands. Through discussions with Cumberland staff and Council, FEI understands that providing RNG from the Project to Cumberland's local industrial lands will serve as a strategic means to encourage commercial development within the region.

Respecting that anticipating future allocation demand is subject to a variety of economic factors, the Cumberland-FEI Letter of Intent provides Cumberland with the ability to request an allocation of RNG from FEI facility at the CVWMC landfill to the Bevan lands on a yearly basis based on anticipated industrial demand and growth.

The maximum proportion of available RNG allocation for Cumberland's employment and industrial lands will be determined in discussion between Cumberland, FEI and the CVRD as part of the Project's feasibility analysis. Cumberland is not seeking to purchase the allocated RNG directly, but to have it available for purchase by end users in the adjacent parcels (as needed). If RNG is not required it would continue to be utilized within the broader system.

Although not a commitment of the FEI-Cumberland Letter of Intent, Cumberland has also expressed interest in the development of a CNG fuelling station in the Village. In discussions with FEI it was determined that other locations within the CSWM service area may better serve the interests of the region. Such an opportunity could provide broader reaching access to CNG fueling services for residents and businesses within (and beyond) the CSWM service area.

The Cumberland-FEI Letter of Intent does not include any pre-negotiated form of purchase agreement, including any pre-determined arrangements on LFG price or term. RNG consumed at the Bevan Industrial Lands will be purchased by businesses directly from FEI at the approved tariff rate.

By accepting Cumberland's First Option Proposal, the CVRD and CSWM acknowledge that the commitments made within the Cumberland-FEI Letter of intent with respect to RNG allocation for the Bevan Industrial Lands will be included within future agreements and/or MOUs related to the development of the LFG Project at the CVWMC.

The following sections present information provided within the FEI Project Proposal for a multi-phased project outlined below.

5.0 Phase 1 Vision

Phase 1 is divided into three steps to create a closed loop system linking RNG to CNG while creating regional economic and environmental benefits and includes:

1. Landfill gas utilization
2. Natural Gas for Transportation
3. Closing the Loop from RNG to CNG

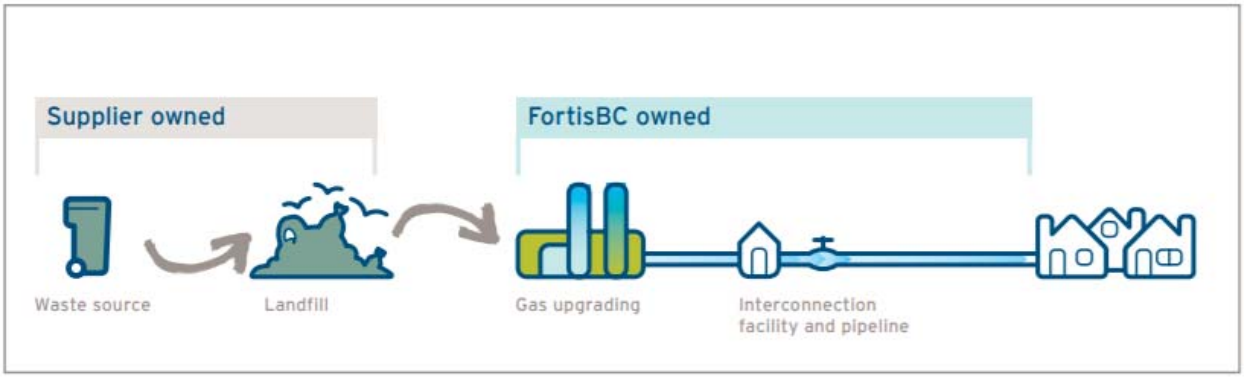
Each of these steps will have varying degrees of support and involvement from FEI.

5.1 Step 1 – Landfill Gas Utilization

Landfill gas which is primarily composed of methane generated from decomposing organic waste deposited at the CVWMC can be converted to a higher value use energy. Traditionally the LFG is flared, converting the methane to carbon dioxide, thereby reducing harmful GHG emissions being released in to the atmosphere. However, LFG can be purified leaving only methane (also known as biomethane or RNG). Once purified, the RNG is interchangeable with conventional natural gas.

For the LFG utilization at the CVWMC, FEI proposes a model to limit the scope of responsibility for the CVRD to the existing gas collection operations where FEI will be responsible for the ownership, operation and maintenance of the gas upgrading and interconnection equipment. FEI can provide a long-term purchase agreement paying a fixed price per Gigajoule ("GJ") to the CVRD for the raw LFG. FEI's proposed ownership model is presented below (Schedule B).

Figure 1 Proposed LFG to RNG Supply Model



Source: FortisBC Energy Conceptual Proposal (2018)

This model minimizes the responsibility of the CSWM and avoids any capital investment. FEI takes the responsibility to optimize the operation of the gas upgrading equipment and delivery to the existing natural gas system.

FEI has done preliminary analysis of a potential project at the landfill based on existing gas generated and captured. Based on this analysis, production at the CVWMC is projected to produce between 60,000 – 130,000 GJ of RNG annually. To provide context FEI estimates that this is the equivalent to enough RNG to provide heat and hot water for up to 1,500 homes each year.

FEI has also confirmed the local system capacity and has identified a potential connection point. Based on this analysis, FEI is confident that this is a viable project and could move quickly to work with CVRD to develop a long-term agreement for the purchase of raw landfill gas.

Residents on Vancouver Island can already participate in the RNG program as customers. However this project would give CVRD residents the opportunity to support a local project. From a community perspective, FEI believes this project supports the local goal of reducing corporate GHG emissions by up to 100 percent below 2009 levels. This is also a key consideration for the Cumberland-FEI Letter of Intent and supports the Village's goal of promoting and establishing the Bevan Industrial Lands as an environmentally sustainable industrial park.

5.2 Step 2 – Natural Gas for Transportation

FEI also proposes that the CVRD integrate Compressed Natural Gas (CNG) as a means to cost effectively reduce emissions in the transportation sector, further supporting the overall reductions of GHG emissions in the region. To support the adoption of CNG in commercial transportation, FEI proposes to build, own

and operate a CNG fueling station to service municipal and private fleets in the region. Through discussions with private waste haulers and medium and heavy duty transportation companies, FEI has identified a need for CNG fueling infrastructure to facilitate the transport of goods and waste material in communities from Nanaimo to Campbell River. Fleet operators in the region have the ability to save 25 to 50 per cent in fuel costs compared to diesel, and communities will benefit from improved air quality with fewer GHG emissions and particulate matter introduced in to the region.

Due to the geographic proximity to the FEI natural gas system and location along a major transportation corridor Cumberland is uniquely positioned to host a fueling station to enable operators with CNG vehicles to serve the region. Preliminary discussions with Cumberland staff have identified one possible industrial site which may be suitable for development of fueling station. Under one possible arrangement where Cumberland owns the lands where a CNG station can be built, Cumberland would benefit from additional revenue generated through fuel sales. Although Cumberland remains interested in this opportunity, there may be additional benefits in locating this infrastructure elsewhere in the CVRD, dependent on who expresses interest.

There is also a market opportunity to develop a CNG station located in Campbell River. This will support regional transit, waste hauler and private fleet operators in adopting cleaner burning natural gas vehicles further reducing GHG emissions and improving air quality within the broader region.

FEI is also exploring additional sites throughout the CSWM service area to access other local fleet operators. As example, it may be advantageous to locate a CNG fueling station in the northern portions of the Strathcona Regional District. Such an opportunity would provide access to CNG fueling services for residents and businesses located in Northern Vancouver Island and/or allow for more affordable transportation of goods travelling to/from the Regional District of Mount Waddington.

5.3 Step 3 – Closing the Loop from RNG to CNG

The final step involves integrating the use of carbon neutral RNG produced locally by the landfill gas utilization project with the CNG Infrastructure to further lower carbon intensity of the transportation sector in the region. Waste haulers and truck fleets operating on CNG have the ability to purchase RNG to further reduce the carbon emissions associated with their operations. Recent amendments to provincial greenhouse gas policy enable FEI to offer an additional $40 million in incentives for fleet operators purchasing CNG vehicles where the source is derived from biomethane.

6.0 Project Timeline

Should the CVRD wish to proceed in collaborating with Cumberland and FEI to develop the project further, the partners submit the following preliminary timeline to serve as a guide for project milestones leading up to construction and may be adjusted as needed based on CVRD requirements.

A timetable for Phase 1 construction (LFG Utilization) is dependent on a variety of factors which will be determined in the course of FEIs feasibility study. Final Project design and schedule will be established in future discussions between FEI, Cumberland, the CVRD and/or CSWM.

Project Milestone	Description	Estimated Timeframe
CVRD Board Review & Approval	To proceed with feasibility analysis	Q4 2018
Execute MOU	To enable cost sharing between FEI and the CVRD for feasibility analysis	Q4 2018
Complete Feasibility Study	Finalize results	Q2 2019
Address Commitments within the Cumberland –FEI Letter of Intent	Identify scale of future demand for RNG at Cumberland's Industrial Lands and establish parameters for future allocation needs.	Q2 2019
Negotiate RNG/CNG Agreements	Executed agreements between FEI and CVRD, and file for regulatory approval	Q3 2019
Project Construction (Phase 1)	Begin construction of RNG LFG Utilization Project	Q1 2020

7.0 Future or Phase II Vision

FEI sees the opportunity for a future project that could take advantage of diverted organic waste as a basis for a future energy project that could follow a similar model to the landfill.

This long-term phase further expands the project concept to the neighboring Strathcona Regional District. Through early discussions with the Cumberland and the CVRD, FEI understands that organics currently being deposited at the CVWMC landfill will begin to be diverted to a new processing facility located in Campbell River in the near future. FEI is exploring the potential for additional biomethane produced from the decomposing organic material in this region.

8.0 Summary of Benefits & Impacts

As identified in FEI's Project Proposal to Cumberland, the Project provides an opportunity to generate a variety of positive social and environmental benefits throughout the CSWM service areas by offering a unique opportunity to show innovation in sustainability. The Project would be the first on Vancouver Island to operate a closed loop renewable energy system, creating direct benefits in several ways:

- CSWM will receive an additional revenue stream from the sale of LFG at the CVWMC landfill;
- CSWM can rely upon FEI to invest capital in infrastructure, reducing the risk of the overall plan for the region;
- Economic growth through job creation and the development of Cumberland's strategic lands to enable and showcase the Comox Valley as a renewable energy center;
- Cumberland and the entire CSWM will show leadership in sustainability, GHG reductions and environmental stewardship;
- The CSWM will be a credible leader in the area of renewable energy for the citizens of the region ("walking the sustainable walk"); and
- Improved air quality for local communities, residents and businesses.

8.1 GHG Reduction Impact

By capturing the LFG collected at the CVWMC landfill and converting it to biomethane, the expected reduction to annual GHG emissions associated with the displacement of conventional natural gas use from the project is between 3,000 to 6,500 tonnes of carbon dioxide equivalent (tCO_2e).

8.2 Financial Impact: RNG Supply

FEI intends to finance, own and operate the equipment associated with the gas purification and interconnection to the FEI natural gas system at the CVWMC landfill. It is further expected that FEI will bear the ongoing normal operating and maintenance costs of this equipment. Generally the responsibility of costs for Cumberland and the CSWM will be limited to project development and any required upgrades to the landfill collection system to connect to FEI equipment.

8.3 Financial Impact: CNG Station

FEI also intends to finance, own and operate the equipment associated with the compression and fueling of CNG for transportation including the normal operating and maintenance costs.

In order to refine the cost estimation and develop a cost of service, including any negotiated prices paid for LFG purchased or CNG, FEI will be required to complete a detailed feasibility analysis. In the event the costs associated with the project are determined by FEI, in its sole discretion, to be not economically feasible, FEI will notify Cumberland and the CVRD as soon as prudently possible.

9.0 Next Steps

Should the CVRD approve of this First Option Proposal, Cumberland and FEI propose the next best step is to work with CVRD staff and Cumberland to further develop the LFG Utilization project concept at the CVWMC. During this time, the CVRD will be able to provide further direction on the CSWMCs review process and identify any potential gaps regarding the financial value of the LFG and/or the technical and operational capabilities of the LNG Utilization Project.

FEI will also need to further develop the feasibility for a landfill gas utilization project. This would require additional work funded by FEI to evaluate gas quality and quantity. This data could then be used to determine the appropriate allocation of RNG to Cumberland's industrial lands, improve the quality of the cost estimate and clarify the division of responsibility.

Respectfully Submitted,

_____

Sundance Topham
Chief Administrative Officer
Village of Cumberland

References

MDB Insight, April 5, 2016. CVEDS Employment and Industrial Lands-Based FDI Strategy: Comox Valley Economic Development Society. Vann Struth Consulting

Tetra Tech, May 31, 2017. Landfill Gas Beneficial use In-depth Study: Comox Valley Regional District

Schedule A - CVRD - Village of Cumberland CVWMC Memorandum of Understanding - Leachate / IRR

This MEMORANDUM OF UNDERSTANDING is entered into on this 15th day of July, 2013

Between:

COMOX VALLEY REGIONAL DISTRICT
600 Comox Road
Courtenay, BC V9N 3P6

(the 'CVRD')

And:

THE CORPORATION OF THE VILLAGE OF CUMBERLAND
Box 340
2673 Dunsmuir Avenue
Cumberland, BC V0R 1S0

(the 'Village')

WHEREAS:

A. The CVRD owns and operates the Comox Valley waste management centre (CVWMC or Facility) located within the Village of Cumberland, at 2400 Pidgeon Lake Road, Cumberland, BC,

B. The CVRD and the Village recognize that the management and operations of the CVWMC will be guided by the following principles:

i. Provides a more equitable and fair response to the affected community and its residents;
ii. Opens up lines of communication between an affected community, its residents and the decision makers regarding the Facility;
iii. Promotes sensitive consideration of the affected residents' concerns;
iv. Fosters better and more equal relationships between the affected residents and the decision makers regarding the Facility;
v. Provides for shared decisions that are usually more actively supported by the affected community;
vi. Directly addresses the fairness of competing interests between those who benefit from the Facility and those who live as its neighbours;
vii. Based on the 20 year Comox Strathcona solid waste management plan (CS-SWMP) operational life for the CVWMC and landfill;
viii. Provides for post-closure communications between host community and owner of the landfill;
ix. Benefits are directly connected to solid waste management plan;
x. Must be financially feasible;
xi. Considers risk analysis; and
xii. Opens up potential economic opportunities.

DATED: February 1, 2013

NOW THEREFORE this Memorandum of Understanding (MoU), which is not intended to, and cannot, create legally binding obligations on the parties, is to serve as the basis for which the parties will work together towards a mutually beneficial wastewater treatment solution and engage in discussions regarding the management and operations of the CVWMC as they relate to the Village.

1.0 Leachate Treatment/Integrated Resource Recovery

The Village and the CVRD recognize the potential economic benefits of shared facility costs for the treatment and management of their respective liquid waste and leachate. The CVRD agrees to work with the Village in exploring the risk and financial assessment of a mutually beneficial solution to a joint sewerage service between the CVWMC and the Village.

The CVRD will explore with the Village the possible uses for any integrated resource recovery from the CVWMC, including exploring the provision to the Village of a first option on the use of any integrated resource recovery.

2.0 Joint CVRD and Village Resources Committee

CVRD and the Village will establish a joint staff-to-staff committee to discuss the resources shared between the parties (Joint Resources Committee). The Terms of Reference for the Joint Resources Committee will include staff meetings twice per year at the CVRD or Village offices to discuss and exchange shared resource ideas and to more fully understand the concerns related to the CVWMC operations, including roadway concerns, litter control, residential complaints, wastewater issues, environmental monitoring (the CVRD will provide a report on compliance update at these meetings) and other issues of common concern. A record of each meeting including the agenda will be forwarded to the Comox Strathcona waste management committee, management advisory committee, and Village of Cumberland for discussion.

The Joint Resources Committee will assist in a feasibility assessment of the Village's preferred wastewater treatment option in relation to a joint wastewater management agreement between Village and CRVD, which agreement would be submitted to the Comox Strathcona solid waste board and the Village council for discussion.

3.0 CVRD will explore the feasibility of ending the operations of the Tervita Bioremediation facility at the CVWMC by January 1, 2014 in support of the concerns expressed by the Village that the CVWMC be a municipal solid waste facility and not an industrial by-product waste site.

The parties have executed this memorandum of understanding as of the day and year first above written.

COMOX VALLEY REGIONAL DISTRICT

Edwin Grieve, Chair

James Warren, Corporate Legislative Officer

THE CORPORATION OF THE VILLAGE OF CUMBERLAND

Leslie Baird, Mayor

Clerk Sundance Topham, Chief Administrative Officer

DATED: February 1, 2013

Schedule B - FortisBC Energy Inc. Conceptual Proposal

FORTIS BC™

CONCEPTUAL PROPOSAL

FortisBC Energy Inc.

Support for Renewable Energy Usage in the
Comox Valley Regional District

July 19, 2018

Table of Contents

Introduction

This is an unsolicited proposal from FortisBC Energy Inc. ("FEI") to the Village of Cumberland ("Cumberland") for Cumberland to provide to the Comox Valley Regional District ("CVRD"). This proposal will support the future GHG reduction goals of the CVRD and outline how FEI can support these objectives by participating in projects related to the waste streams in the region.

This proposal is meant to give Cumberland and the CVRD a better understanding of the possible ways FEI could support the regional objectives related to GHG reduction. It does not create any liability or obligation of any nature whatsoever among the parties. As a reminder, FEI is a regulated utility, and any future binding agreements are subject to final approval by the BC Utilities Commission ("BCUC").

FEI can play an active role in developing a project at the existing landfill located in The Village Cumberland ("Cumberland"), evaluating the implementation of natural gas for transportation, and supporting future plans around developing a sustainable energy production project from future organic waste.

FEI is a proven, innovative utility with direct experience in the areas of renewable natural gas and low carbon transportation fuels.

Long Term Goals

FEI has based this proposal to support the targets and strategies outlined in the Village of Cumberland Economic Development Strategy, the Comox Valley Sustainability Strategy, and Corporate Energy Plan in the areas of:

- Economic Development
- Environmental Stewardship
- Greenhouse Gas ("GHG") Reductions
- Transportation

FEI has also had discussions with staff at both the CVRD and Cumberland to help shape this proposal.

Based on the strategies and plans in the region, FEI envisions a future where this region of Vancouver Island is converting regional waste to renewable energy and using a low carbon heating and transportation fuel. More specifically, FEI can support the following objectives:

1. Harnessing regional resources by developing a landfill gas ("LFG") utilization project at the Comox Valley Waste Management Centre ("CVWMC") to convert waste methane in to Renewable Natural Gas ("RNG") for use in corporate facilities, local homes, and businesses
2. Supporting the transition to cost-effective, lower emission fuels in the public and private transportation sectors through the deployment of a Compressed Natural Gas ("CNG") station and incentives to support market adoption in the transportation sector
3. Enhancing local quality of life through reduced GHG emissions and improved air quality linking CNG and RNG

The Comox Valley can act as a hub for sustainability to support the economic and environmental objectives of the broader Comox Valley and Strathcona Regional Districts under a multi-phased project outlined below.

FortisBC Background

FEI is the largest supplier of energy in British Columbia and is a leader in innovative energy solutions serving 1.1 million customers in 135 BC communities. To meet the evolving needs of our customers FEI has invested in infrastructure to develop locally produced, carbon neutral Renewable Natural Gas as well as bring cleaner burning Compressed Natural Gas to the transportation sector.

Renewable Natural Gas

As organic waste in a landfill decomposes LFG is produced. This LFG can be purified to remove impurities and leave a high quality, carbon neutral biomethane (also known as Renewable Natural Gas or RNG). Once the LFG has been purified it can be injected in to the existing FortisBC natural gas system where it can be distributed and consumed interchangeably with conventional natural gas for various heating and process applications.

FEI has demonstrated experience in the area of biomethane supply and is one of the first utilities in North America to have an approved program for the supply and delivery to its customers. On the supply side, FEI currently has five operating biomethane suppliers within its service territory, including two municipal landfills and an organics processing facility while continuing to add supply projects to its portfolio. On the customer side, the RNG program has grown to 9,600 voluntary residential and commercial customers from regions across British Columbia including Vancouver Island. The cumulative demand for RNG has resulted in over 30,000 tonnes GHG emissions reductions while supporting local, private, and municipal suppliers to achieve their sustainability and waste diversion strategies.

Due to the continued growth and success of the RNG program FEI has a need for additional biomethane supply to meet the customer demand, and is actively seeking new supply projects. In addition, current BC regulations permit FEI to voluntarily purchase up to 5% biomethane in to its natural gas system.

Compressed Natural Gas

In addition to delivering natural gas and electricity to homes and businesses, FEI is also involved in providing end to end fueling solutions for customers that operate natural gas vehicles. In BC the transportation industry is responsible for 36 per cent of provincial GHG emissions and there are more than 16.7 million natural gas vehicles worldwide. Since 2011, FEI has been actively pursuing the transportation market through incentives and investment in fueling infrastructure. Under current BC regulations FEI operates a $244 million incentive program to assist fleet operators to purchase natural gas vehicles. These efforts have secured over 800 vehicles and 19 fueling stations utilizing compressed natural gas ("CNG") or liquefied natural gas ("LNG") as a transportation fuel.

Natural gas burns cleaner than gasoline or diesel, which can result in less pollution and greenhouse gases. Carbon dioxide ("CO_2") emissions, the principal greenhouse gas that contributes to global warming, are reduced by up to 30 per cent.[1] Natural gas vehicles emit virtually no particulate matter, the harmful microscopic component of air pollution.

[1]Northwest Gas Association, Natural Gas Facts, *https://www.nwga.org/wp-content/uploads/2017/06/NWGA_FactsWEB-FINAL.pdf* - *see page 12*

Phase I Vision

This phase is divided in steps to create a closed loop system linking RNG to CNG while creating regional economic and environmental benefits. Figure 1 shows the concept of a closed loop energy system as envisioned by FEI. FEI can play a key role in supporting the closed loop system.

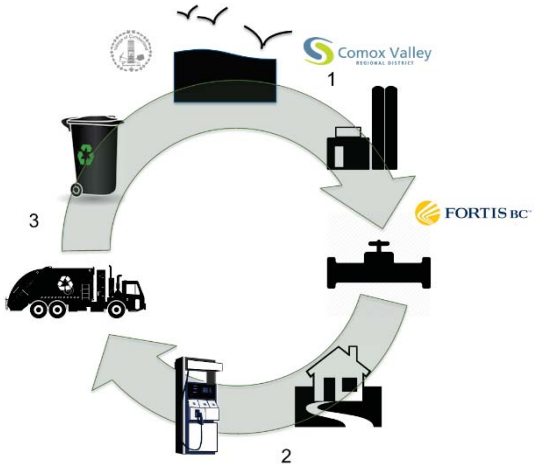


Figure 1: RNG to CNG Closed Loop

This phase would practically be broken into three key steps outlined below. Each step will have varying degrees of support and involvement from FEI.

<u>Phase 1, Step 1 – Landfill Gas Utilization</u>

The first step would be to take advantage of the existing infrastructure at the CVWMC landfill. The LFG generated at the CVWMC can be converted to Renewable Natural Gas.

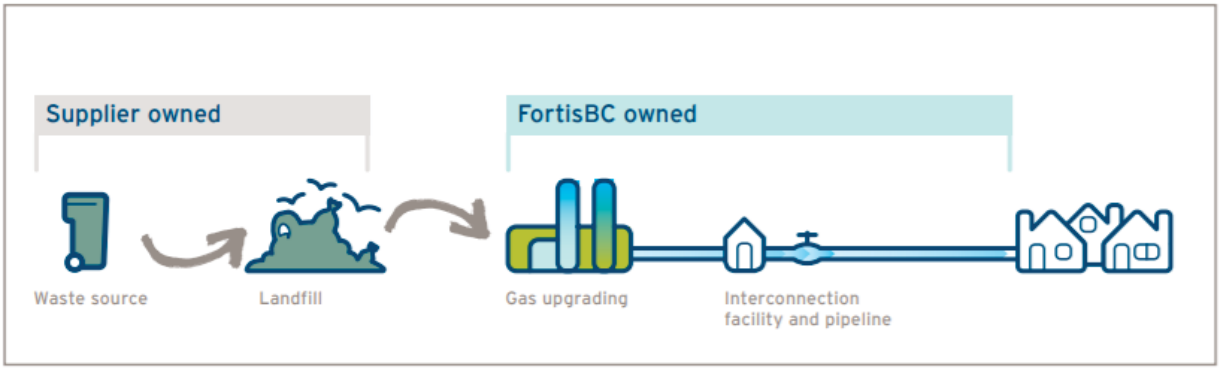
Landfill gas which is primarily composed of methane generated from decomposing organic waste deposited at the CVWMC can be converted to a higher value use energy. Traditionally the LFG is flared, converting the methane to carbon dioxide, thereby reducing harmful GHG emissions being released in to the atmosphere. However, LFG can be purified leaving only methane (also known as biomethane or RNG). Once purified, the RNG is interchangeable with conventional natural gas.

By capturing the methane that may have otherwise escaped in to the atmosphere, and further displacing the use of conventional gas, significant GHG emissions are realized. [2]

The Landfill Project

For the LFG utilization at the CVWMC FEI proposes a model to limit the scope of responsibility for the CVRD to the existing gas collection operations where FEI will be responsible for the ownership, operation and maintenance of the gas upgrading and interconnection equipment. FEI can provide a long-term purchase agreement paying a fixed price per Gigajoule ("GJ") to the CVRD for the raw LFG. This ownership model is highlighted in Figure 2.

Figure 2: LFG to RNG Supply Model



[2]Renewable Natural Gas displaces fossil fuel natural gas that has a carbon intensity of 49.58 kgCO2e/GJ (carbon dioxide equivalent per GJ).

This model minimizes the responsibility of the CVRD and avoids any capital investment. FEI takes the responsibility to optimize the operation of the gas upgrading equipment and delivery to the existing natural gas system.

FEI has done preliminary analysis of a potential project at the landfill based on existing gas generated and captured. Based on this analysis, production at the CVWMC is projected to produce between 60,000 – 130,000 GJ of RNG annually. To provide context FEI estimates that this is the equivalent to enough RNG to provide heat and hot water for up to 1,500 homes each year. [3]

FEI has also confirmed the local system capacity and has identified a potential connection point. Based on this analysis, FEI is confident that this is a viable project and could move quickly to work with CVRD and develop a long-term agreement for the purchase of raw landfill gas.

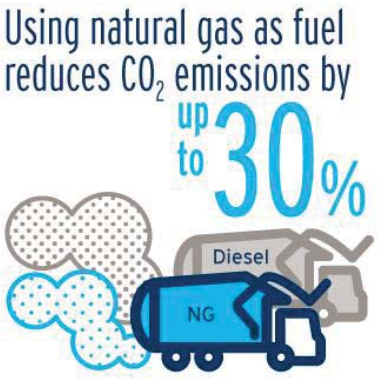
Residents on Vancouver Island can already participate in the RNG program as customers. However this project would give CVRD residents the opportunity to support a local project. From a community perspective, FEI has seen that local projects promote local participation and as a result, this project could support the local goal of reducing corporate GHG emissions by up to 100 percent below 2009 levels.[4]

A local project may also help to promote sustainable economic development. Through discussions with Cumberland staff and council, FEI understands that the availability of RNG from a local project may serve as a strategic means to encourage commercial development within the region. As a result, Cumberland and FEI will seek to develop a letter of intent outlining an allocation of RNG produced by the Project to be available for future customers to utilize at the Bevan Road Industrial Lands as development occurs. This would provide Cumberland with the option of requesting allocation of RNG on an annual basis based on anticipated industrial demand growth. The maximum allocation would be determined in discussion with Cumberland and the CVRD as a part of any future feasibility analysis.

[3] Based on an average residential home consuming 90 GJ/year of natural gas.
[4] Based on CVRD Corporate Energy Plan, 2009 total energy consumption of 76,735 GJ and equivalent 2,442 tonnes of GHG emissions.

Phase 1, Step 2 – Natural Gas for Transportation

FEI would also propose that the CVRD integrate Compressed Natural Gas (CNG) as a means to cost effectively reduce emissions in the transportation sector, further supporting the overall reductions of GHG emissions in the region. To support the adoption of CNG in commercial transportation FEI proposes to build, own and operate a CNG fueling station to service municipal and private fleets in the region. Through discussions with private waste haulers and medium and heavy duty transportation companies, FEI has identified a need for CNG fueling infrastructure to facilitate the transport of goods and waste material in communities from Nanaimo to Campbell River. Fleet operators in the region have the ability to save 25 to 50 per cent in fuel costs compared to diesel, and communities will benefit from improved air quality with fewer GHG emissions and particulate matter introduced in to the region.



Due to the geographic proximity to the FEI natural gas system and location along a major transportation corridor The Village of Cumberland is uniquely positioned to host a fueling station to enable operators with CNG vehicles to serve the region. Preliminary discussions with Cumberland staff have identified one possible industrial site which may be suitable for development of fueling station. Under one possible arrangement where Cumberland owns the lands where a CNG station can be built, Cumber land would benefit from additional revenue generated through fuel sales. FEI is also exploring additional sites with local fleet operators.

Phase 1, Step 3 – Closing the Loop from RNG to CNG

The final step involves integrating the use of carbon neutral RNG produced locally by the landfill gas utilization project with the CNG Infrastructure to further lower carbon intensity of the transportation sector in the region. Waste haulers and truck fleets operating on CNG have the ability to purchase RNG to further reduce the carbon emissions associated with their operations. Recent amendments to provincial greenhouse gas policy enable FEI to offer an additional $40 million in incentives for fleet operators purchasing CNG vehicles where the source is derived from biomethane.

Summary of Benefits & Impacts

Cumberland and the CVRD have the unique opportunity to show innovation in sustainability and would be the first region on Vancouver Island to operate a closed loop renewable energy system. Cumberland and the CVRD will directly benefit in several ways:

- CVRD will receive an additional revenue stream from the sale of LFG at the CVWMC landfill
- CVRD can rely upon FEI to invest capital in infrastructure, reducing the risk of the overall plan for the region
- Economic growth through job creation and the development of strategic lands to enable and showcase the Comox Valley Renewable Energy Centre
- Cumberland and the CVRD will show leadership in sustainability, GHG reductions and environmental stewardship
- Cumberland and the CVRD will be a credible leader in the area of renewable energy for the citizens of the region ("walking the sustainable walk").
- Improved air quality for community residents and businesses

GHG Reduction Impact
By capturing the LFG collected at the CVWMC landfill and converting it to biomethane, the expected to annual GHG emission reductions associated with the displacement of conventional natural gas use from the project is between 3,000 to 6,500 tonnes of carbon dioxide equivalent ("tCO_2e")[5].

Financial Impact: RNG Supply
FEI intends to finance, own and operate the equipment associated with the gas purification and interconnection to the FEI natural gas system at the CVWMC landfill. It is further expected that FEI will bear the ongoing normal operating and maintenance costs of this equipment. Generally the responsibility of costs for Cumberland and the CVRD will be limited to project development and any required upgrades to the landfill collection system to connect to FEI equipment.

Financial Impact: CNG Station
FEI also intends to finance, own and operate the equipment associated with the compression and fueling of CNG for transportation including the normal operating and maintenance costs.

In order to refine the cost estimation and develop a cost of service, including any negotiated prices paid for LFG purchased or CNG, FEI will be required to complete a detailed feasibility analysis. In the event the costs associated with the project are determined by FEI, in its sole discretion, to be not economically feasible, FEI will notify Cumberland and the CVRD as soon as prudently possible.

[5]One GJ of RNG will provide emissions savings of 49.58kg $C0_2$ e. Estimated annual volume of 60,000-130,000 GJ of RNG approximately equal to 2,988-6,474 tonnes of $C0_2e$.

Timeline

Should the CVRD wish to proceed in collaborating with FEI to develop the project further, FEI submits the following preliminary timeline to serve as a guide for project milestones and may be adjusted as needed based on CVRD requirements:

Project Milestone	Description	Estimated timeframe
CVRD Board Review & Approval	To proceed with feasibility analysis	Q4, 2018
Execute MOU	To enable cost sharing for feasibility analysis	Q4, 2018
Complete Feasibility Study	Finalize results	Q2, 2019
Negotiate RNG/CNG Agreements	Executed agreements and file for regulatory approval	Q3, 2019
Project Construction	Begin construction of RNG LFG Utilization Project	Q1, 2020

Future or Phase II Vision

FEI sees the opportunity for a future project that could take advantage of diverted organic waste as a basis for a future energy project that could follow a similar model to the landfill.

This long-term phase further expands the project concept to the neighboring Strathcona Regional District. Through early discussions with the Cumberland and the CVRD, FEI understands that organics currently being deposited at the CVWMC landfill will begin to be diverted to a new processing facility located in Campbell River in the near future. FEI is exploring the potential for additional biomethane produced from the decomposing organic material in this region.

Additionally there is a market opportunity to develop a CNG station located in Campbell River. This will support regional transit, waste hauler and private fleet operators in adopting cleaner burning natural gas vehicles further reducing GHG emissions and improving air quality within the broader region.

Next Steps

FEI proposes the next best step is to work with CVRD staff and Cumberland to further develop the project concept at the CVWMC.

FEI will need to further develop the feasibility for a landfill gas utilization project. This would require additional work funded by FEI to evaluate gas quality and quantity. This data could then be used to improve the quality of the cost estimate and clarify the division of responsibility.

Appendix C

Memorandum of Understanding
(Biogas Utilization Project)

This Memorandum of Understanding ("**MOU**"), dated _____, 2018 (the "**Effective Date**"), is between:

COMOX VALLEY REGIONAL DISTRICT (the "**Owner**")**,** of 600 Comox Road, Courtenay, British Columbia, V9N 3P6

and:

FORTISBC ENERGY INC. ("**FEI**"), of 16705 Fraser Highway, Surrey, British Columbia, V4N 0E8

1. Purpose, Terms of Reference and MOU Activities

1.1 The Owner and FEI wish to review and assess the feasibility of designing, constructing, operating and maintaining a landfill gas processing facility (the "**Biogas Facility**") at the Owner's premises located at 3699 Bevan Road, Cumberland, BC (the "**Lands**") to capture and purify and upgrade biogas to pipeline quality biomethane for injection into FEI's natural gas distribution system (the "**Project**").

1.2 Upon signing this MOU, the parties will collaborate and jointly proceed with determining the feasibility of the Project, including:

(a) financial viability for each party;
(b) the infrastructure to be installed, operated, owned and maintained by each party, including potential locations on the Lands;
(c) the ability or any impediments to installing and operating a Biogas Facility on the Lands, including environmental impacts and requirements.
(d) evaluation of biomethane allocation to the eco industrial park developed around the Comox Valley Waste Management Centre and associated transference of environmental attributes for that biomethane;
(e) a preliminary written summary of the analysis within six months of entering into this MOU.

1.3 To enable FEI to review the suitability of the Lands for the Project, including the installation and operation of the Biogas Facility, the Owner hereby consents to and grants FEI, and its representatives, reasonable access to and use of the Lands during the Term to conduct the necessary analysis to determine the condition of the Lands and any improvements or infrastructure that may be required to accommodate the operation of the Biogas Facility.

1.4 If the parties agree to proceed with the Project, the parties will develop the agreements necessary to implement the Project (collectively, the "**Definitive Agreements**"), which may include a Biogas/Biomethane Purchase Agreement with respect to the installation, operation, ownership and use of the Biogas Facility and the purchase of biogas/biomethane by FEI from the Owner.

2. **Exclusivity -** During the Term, the Owner will work exclusively with FEI in the development of the Project.

3. Expenses

3.1 Subject to sections 3.2 and 3.3, each party will bear its own costs and expenses to complete the activities contemplated by this MOU.

3.2 If the MOU activities require the services of third parties, with the prior written agreement of the Owner on scope and costs, FEI will retain all third parties on behalf of the Owner and FEI, it being the intention of the parties that such costs shall not exceed $50,000 unless otherwise agreed by the parties in writing (the "**Maximum Amount**"). Subject to reimbursement pursuant to section 3.3, FEI will fund such third party expenses. The Owner acknowledges FEI will include any expenses it incurs (including third party expenses) in its costs when determining rates and charges under the Definitive Agreements.

3.3 If the Owner and FEI do not enter into Definitive Agreements prior to the expiry of the MOU or if the Owner terminates FEI's involvement in the Project, the Owner will reimburse FEI for half of the costs of any third party expenses incurred by FEI upon request by FEI, up to the **Maximum Amount**, provided that the failure to enter into the Definitive Agreements or the termination of FEI's involvement in the Project, as the case may be, are not the result of a breach by FEI of the binding terms of this MOU which has not been rectified within 10 days of receipt of notice of default from the Owner.

3.4 The provisions of this section 3 shall survive termination of this MOU.

4. Confidentiality

4.1 All information or documentation (no matter in what form or media) received by the one party (the "**Receiving Party**") from the other (the "**Disclosing Party**") regarding the business affairs or trade secrets of the Disclosing Party, including information and documentation pertaining to or arising from the business relationship and activities between the parties under this MOU (the "**Confidential Information**"), shall be deemed to be confidential and proprietary to the Disclosing Party. Except as otherwise provided herein or as required by law, the Receiving Party shall not directly or indirectly disclose any such Confidential Information to any third party without the prior written consent of the Disclosing Party. Such consent for disclosure is not required where the Receiving Party discloses such Confidential Information:

(a) to its elected or appointed officials, directors, officers, employees, agents, accountants, lawyers, consultants, contractors or financial advisers or those of its affiliates; or

(b) to a third party that is another contractor or consultant retained by the Disclosing Party for the purposes of this MOU and the activities described herein;

who need to know such information for the proper performance of the parties' respective obligations contemplated herein, provided the Disclosing Party advises such representatives of the confidential nature of the Confidential Information and has legally bound such contractor or consultant to protect the Confidential Information.

4.2 Despite the foregoing, the Receiving Party may use the Confidential Information in connection with the preparation for and conduct of submissions to regulatory agencies.

4.3 The obligation of confidentiality set out above shall not apply to material, data or information which: (1) is known to the Receiving Party prior to its receipt thereof; (2) is generally available to the public; (3) has been obtained from a third party which has the right to disclose the same; and
(4) is required by law (including the BC *Freedom of Information and Protection of Privacy Act)*, provided that where disclosure is required by law, the Receiving Party will, unless prohibited by law, forthwith notify the Disclosing Party to enable the Disclosing Party to mount a defense to such disclosure.

4.4 The confidentiality covenants of the parties herein shall survive the expiration or termination of this MOU for a period of two (2) years from the date of expiration or termination.

5. **Term** - This MOU is for an initial period of one (1) year (the "**Term**") commencing on the Effective Date with an option to extend the term one more year at the agreement of both parties or as extended by written approval of the parties,

6. **Assignment** - Neither party may assign its rights and obligations under this MOU without the prior written consent of the other party, not to be unreasonably withheld, conditioned or delayed. Despite the foregoing, it is understood that reference in this MOU to FEI means FortisBC Energy Inc. or any of its affiliates as determined by FEI and that FEI may assign its rights and obligations under this MOU to any of its affiliates, without the need to obtain the prior written consent of the other party.

7. **Binding Terms** - This MOU sets out the understanding that has been reached between the parties as to the key terms and the parties' mutual objectives. With the exception of Sections 2 (*Exclusivity),* 3 (*Expenses*), 4 (*Confidentiality)*, 5 (*Term)*, 6 (*Assignment)* and this section, this MOU is not a binding legal agreement and does not create any binding obligations on either party. This MOU reflects an understanding and establishes a framework which is intended to assist the parties in determining whether to proceed with the Project and negotiate the Definitive Agreements.

The parties have signed this MOU as of the day and year first written above.

COMOX VALLEY REGIONAL DISTRICT by its authorized signatory(ies):

Name: Bruce Jolliffe
Title: Chair

Name: James Warren
Title: Corporate Legislative Officer

FORTISBC ENERGY INC., by its authorized signatory(ies):

Name: Sarah Smith,
Title: Director, NGT and Regional LNG and RNG