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ERM 19-13

REPORT TO PARKS & ENVIRONMENT COMMITTEE
MEETING OF WEDNESDAY, FEBRUARY 27, 2019

SUBJECT **Landfill Gas Utilization – Alternatives**

ISSUE

To determine the preferred landfill gas utilization technology to enhance and optimize the benefits of recovering this resource from Hartland Landfill.

BACKGROUND

Landfills produce landfill gas, containing approximately 50% methane, through the decomposition of organic material. The Capital Regional District's (CRD) Hartland Landfill collects the landfill gas generated through a comprehensive network of gas collection infrastructure. Currently, Hartland Landfill gas is utilized for power generation with the electricity being sold to BC Hydro. The volume of gas collected at the landfill has exceeded the capacity of the current power generation equipment and, as a result, two enhanced utilization alternatives have been evaluated:

- Renewable Natural Gas (RNG): install a gas processing plant at Hartland Landfill to upgrade the landfill gas to RNG and sell the upgraded gas onto the FortisBC gas pipeline (backgrounder attached as Appendix A).
- Green Power: expand the existing power generation equipment and sell more electricity to BC Hydro (backgrounder attached as Appendix B).

At its May 9, 2018 meeting, the CRD Board directed staff to proceed with further development of Hartland Landfill gas utilization alternatives prior to the Board finalizing the CRD landfill gas utilization strategy in early 2019.

Expanding the existing utilization gas plant to generate more green power involves:

- In June 2018, the Province of BC initiated a Comprehensive Review of BC Hydro to contain rate increases, control costs and position BC Hydro for future success. The initial phase of the review is anticipated to be completed in February 2019.
- Subject to the Comprehensive Review, enter into a new 20-year Power Purchase Agreement for the sale of electricity from the expanded power generation facility.
- Procurement and installation of incremental power generation equipment at the Hartland Landfill power generation facility.

Upgrading landfill gas to RNG involves:

- Procuring, constructing and operating facilities at Hartland Landfill to upgrade the landfill gas to pipeline quality biomethane (i.e., RNG).
- Extension of the Fortis natural gas pipeline to interconnect to Hartland Landfill and injecting RNG into the Fortis natural gas system.
- Entering into a 20-year renewable natural gas supply agreement between FortisBC and the CRD.

Emerging renewable energy markets in BC appear to be shifting away from small green independent power projects towards the approval of new large BC Hydro green power generation projects. In contrast, Fortis is very interested in expanding its RNG portfolio to meet the increase in consumer demand for natural gas alternatives.

ALTERNATIVES

That the Parks & Environment Committee recommend to the CRD Board:

Alternative 1

1. That staff proceed with developing the Hartland Renewable Natural Gas (RNG) project to optimize Hartland Landfill gas utilization, including execution of the tasks listed under Next Steps;
2. That this staff report be referred to the Solid Waste Advisory Committee for feedback on recommendations and next steps; and
3. That the Environmental Resource Management Capital Budget of $23.7 million for the Hartland RNG project be recommended for consideration in the 2019 budget approval process, subject to all funding sources being finalized.

Alternative 2

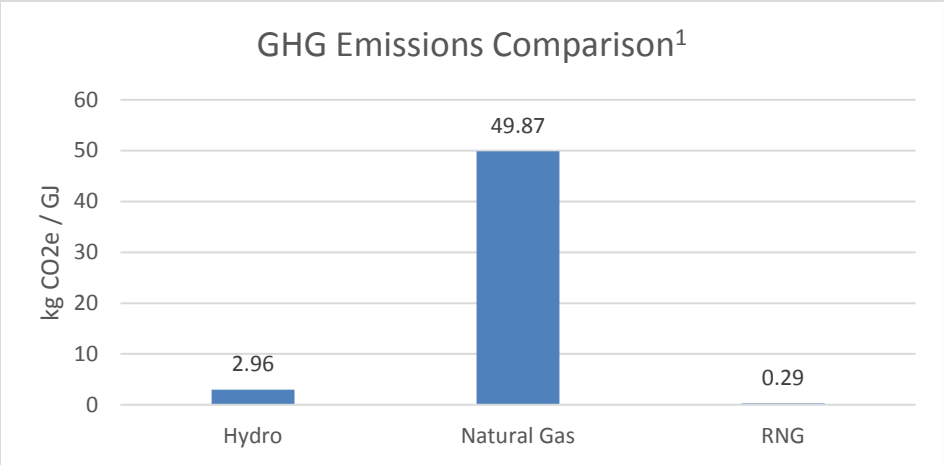
That the decision on landfill gas utilization be delayed until the BC Hydro Comprehensive Review is complete and the CRD power purchase agreement implications are known.

ENVIRONMENTAL IMPLICATIONS

Using landfill gas in the production of RNG, for sale onto the Fortis gas distribution system, results in the displacement of conventional natural gas, which aligns with the Board's Climate Emergency declaration and helps meet the Board's objective to achieve regional carbon neutrality by 2030. The use of landfill gas for the production of green power displaces BC Hydro electricity and results in minimal greenhouse gas (GHG) reductions. (BC Hydro is already green power.)

When waste is buried within the landfill, it produces landfill gas that includes methane, or biogas, generated from the decomposing organic waste embedded in the landfill. The gas produced can be flared or can be upgraded for beneficial use, as a source of energy. Not only does the CRD have an environmental and climate change responsibility to divert the methane, a GHG, but it has the ability to reduce costs and add green capacity to the electrical or natural gas systems. This reinforces the circular economy, as the CRD is not only dealing with all aspects of the waste cycle, but is also generating environmental and financial benefits for the community.

The decomposition of organic material in Hartland Landfill results in the production of landfill gas containing approximately 50% methane, a GHG. Hartland Landfill collects the landfill gas generated by the landfill through a comprehensive network of gas collection infrastructure, in an attempt to avoid the release of methane into the atmosphere. In an effort to maximize collection efficiency, Hartland staff work to optimize the gas collection system and annual capital investments are made to enhance Hartland gas collection.



[1] based on the 2016 MOE best practices calculation methodology

The production of approximately 200,000 GJ of RNG annually for 20 years opens up several opportunities for the CRD to achieve reductions in operational and/or regional GHG emissions, and to support research and innovation for further climate action.

When injected into the natural gas pipeline, this RNG would have the potential to avoid annual emissions equivalent to each of the following (based on 2012 CEEI data):
1. more than 10% of all emissions from natural gas in CRD homes
2. more than 3% of all emissions from natural gas in CRD homes and businesses
3. more than 500% of all emissions from CRD operations

This project has the potential to provide corporate climate leadership regarding the CRD declared climate emergency and the Board's objective to achieve carbon neutrality for the region by 2030. Fuel switching CRD operations to RNG was identified in the CRD's corporate climate action strategy. Staff are investigating options for a project governance structure that would allow the CRD to use RNG from Hartland to displace conventional natural gas in both CRD and municipally-owned facilities to maximize GHG reductions resulting from the project.

ECONOMIC IMPLICATIONS

Environmental Resource Management's (ERM) sustainability reserve is $27.5 million at the end of 2018. All CRD cash reserves are managed according to the legislated investment requirements of the Local Government Act and currently earn 2% per year. Can the CRD increase the rate of return on the reserve through strategic capital investments, while still meeting ERM's solid waste mandate, without significantly increasing risk?

CRD staff have engaged a number of specialized renewable energy consultants to help refine our capital estimates and ensure that the preliminary economics are realistic and comprehensive. To ensure potential contract negotiations with BC Hydro or FortisBC are not compromised, a detailed and comprehensive business case is presented in the closed portion of this meeting.

Green Power: doubling the existing Hartland power plant capacity:
- estimated capital investment is $4.5 million
- annual net revenues is $300,000 (based on existing power plant financial performance)

- return on Green Power Investment is 7% per year
- technology risk is low; gas power generation is a mature technology
- return on Sustainability Reserve is 2.8%, including this investment

The estimated $300,000 per year in net revenue is the actual 5-year average from the existing Hartland power plant. The BC Hydro Comprehensive Review may restrict the CRD's current Power Purchase Agreement renewal or expansion options, but the review will not likely increase the price BC Hydro is willing to pay for the project's green power. As a result, the anticipated 7% return is likely a best case scenario.

Renewable Natural Gas: installing infrastructure (RNG plant and pipeline) to upgrade landfill gas to RNG and sell the RNG onto the Fortis pipeline:

- estimated capital investment is $23.7 million
- assuming the maximum RNG rate allowed under the provincial Greenhouse Gas Reduction Regulation, the maximum project return is estimated to be 12%/yr
- maximum potential return on RNG Investment is estimated at 12%/year; actual return will be substantially determined by the negotiated RNG price
- technology risk is low/mid; biogas upgrading is a commercial technology
- return on Sustainability Reserve is estimated at 10.6%, including this investment

The RNG project, more than Green Power, has the potential to attract significant provincial and/or federal grants. Once a project is endorsed by the Board, it becomes eligible for grant funding opportunities that have the potential to significantly decrease the CRD's investment and, as a result, increase the project return.

INTERGOVERNMENTAL IMPLICATIONS

Staff are investigating options for a CRD project governance structure that would potentially allow the CRD to use RNG from Hartland to displace conventional natural gas in both CRD and municipally-owned facilities and/or fleets to maximize GHG reductions resulting from the project.

In addition, informal conversations with the BC Ministry of Energy, Mines and Petroleum Resources, University of Victoria and FortisBC have indicated much support for further investigating potential for hosting a Renewable Fuels Research Center at Hartland. Staff continue to investigate this option. By making gas streams from the Hartland RNG facility available to a research partnership with the University of Victoria and associated research facility, the Hartland RNG initiative can target regional GHG benefits and innovation while also mitigating risk through employing proven technologies to make best use of the RNG and associated waste streams.

SOCIAL IMPLICATIONS

The development of the RNG project would require both onsite and offsite construction. The most significant implication would be the extension of the FortisBC natural gas pipeline along West Saanich Road to the Hartland site.

The expansion of the Hartland power plant will not have significant social implications. Increased power production, and its sale to BC Hydro, will not impact operations at Hartland Landfill.

SOLID WASTE MANAGEMENT PLAN IMPLICATIONS

CRD staff have Board direction to update the CRD's Solid Waste Management Plan (SWMP) and to advance the utilization of landfill gas generated by Hartland Landfill. Ensuring that all stakeholders understand the upcoming decision, and where they can learn more and provide input, will be important to the success of the initiative and the overall SWMP engagement process.

Any resulting gas utilization facility would form part of the overall solid waste management system and any financial implications related to the project would have implications on the overall solid waste financial model.

NEXT STEPS

Renewable Natural Gas

1. RNG community consultation plan
2. RNG procurement and capital funding strategy
3. RNG financial model
    - distribution of RNG dividends/benefits
    - Fortis RNG term sheet (price and volume)
    - capital grant application(s)
    - BC Hydro contract transition
4. Hartland Renewable Fuels Innovation potential (UVic partnership)

Green Power

Return to the Board for direction, once BC Hydro Comprehensive Review is complete, regarding the impact of the review on the gas utilization alternatives.

CONCLUSION

The development of the RNG project is aligned with the Board's objective to achieve regional carbon neutrality by 2030. In addition, the RNG project has an attractive financial return based on a long-term, BC Utilities Commission approved, gas sales contact with FortisBC. The RNG option results in a utility grade infrastructure investment, responsible utilization of Environmental Resource Management's discretionary financial reserves and has the greatest potential to address the Board's environmental priorities.

RECOMMENDATIONS

That the Parks & Environment Committee recommend to the Capital Regional District Board:

1. That staff proceed with developing the Hartland Renewable Natural Gas (RNG) project to optimize Hartland Landfill gas utilization, including execution of the tasks listed under Next Steps;
2. That this staff report be referred to the Solid Waste Advisory Committee for feedback on the recommendations and next steps; and
3. That the Environmental Resource Management Capital Budget of $23.7 million for the Hartland RNG project be recommended for consideration in the 2019 budget approval process, subject to all funding sources being finalized.

Submitted by:	Russ Smith, Senior Manager, Environmental Resource Management
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Attachments: Appendix A – Renewable Natural Gas Backgrounder
Appendix B – Green Power Backgrounder