COMMITTEE OF THE WHOLE

ADMINISTRATIVE REPORT

Topic: Tri-Municipal Organics Processing Facility Feasibility Study

Introduction:

The following report provides a summary of the recently-completed feasibility and pre-engineering design study for a Tri-Municipal organics processing facility. As of November 2016 all project work outlined in external grant contracts has been completed, however further work and discussions centred around other regional facilities, financial analysis, grant availability, risks, benefits and location are required to determine if the project is feasible for Parkland County and the Tri-Municipal Region.

Facts (Background Information):

On July 15, 2014 the County of Parkland, Town of Stony Plain and the City of Spruce Grove together with Albert Innovates Energy and Environmental Solutions, entered into an agreement to examine a long term, viable and cost effective option for processing organic waste in the Tri-Municipal Region. The Capital Region Waste Minimization Advisory Committee also identified the need to analyze organics system resiliency and capacity in their Integrated Regional Solid Waste Management Plan.

Components of this project included:

- Waste Characterization study of the Tri-Municipal region,
- Economic modelling,
- Technology review,
- Governance review,
- Pre-FEED (Front and End Engineering Design).

Funding for this project was covered by:

- Regional Collaboration Program
  - $65 000 (12%)
- Alberta Community Partnership Program
  - $225 000 (40%)
- Alberta Innovates
  - $225 000 (40%)
- Municipalities for Municipal staff-time *in-kind*
  - $45 000 (8%)

KEY PROJECT DELIVERABLES:

1. A waste characterization study addressing quality, quantity, and control of Municipal Solid Waste (MSW) in the Tri-Municipal Region.

2. A Pre-FEED study that details the recommended option for the Tri-Municipal Region based on the outcomes of the technology review. The study determines the facility size and location, project standards, functional design criteria and operational philosophy, as well as project risk management plans, and preliminary design drawings. In addition, it includes equipment specifications, preliminary equipment lists, evaluation of supplier submissions, project budgets, and permit requirements.

3. A collection of reports to develop implementation plans from if the municipalities agree to establish a jointly owned organic waste processing facility.

4. A potential model for other municipalities to follow and learn from. The study provides the necessary information to allow the participating municipalities to decide if a jointly owned organic conversion facility for the Tri-Municipal Region is feasible, and forms the foundation for the Implementation Plan, which can be adapted by other similar municipalities.

Analysis:

1. Waste Characterization Study

This study examined the quantity and characteristics of residential; and industrial, commercial and institutional (ICI) sectors within the Tri-Municipal Region. Since the ICI sector is privately managed, the consultant undertaking the study identified a number of companies that are handling ICI waste in the Tri-Municipal Region and determined their willingness to utilize a local organics processing facility via interviews.

In total, the Tri-Municipal Region disposes of 17,387 tonnes of single family curbside residential and residential drop off annually. Compostable organics were found to form a higher percentage of the residential waste stream in fall and winter months.

Sector results- organics as a percent of total waste across the Tri-Region:

A) Residential

- Single Family Residential- 35.3%
- Multi-Family Residential- 36.9%

B) ICI

- Grocer- 55.7%
- Food distributor-57.6%
- Hospital- 9.5%

2. Economic Analysis: Development of a Waste to Energy Decision Analysis Model for a Municipality in the Province of Alberta

This work was conducted by a University of Alberta research team from the Department of Mechanical Engineering using funding directly from Alberta Innovates- Energy and Environmental Solutions (AI-EES). A case study was conducted to determine the best location within Parkland County for a waste conversion facility given criteria, such as proximity to roads, urban area, water bodies and infrastructure, as well as what waste conversion technology was most suitable given inputs like waste volumes, selling rates for electricity and biofuel, and existing landfill tipping fees. A couple sites were identified for a proposed facility location and two technologies were identified. Composting was shown to be the most economical technology given a waste availability of 25,000-50,000 tonnes/year, but composting with

gasification as an add-on was more attractive once the waste availability was increased from 50,000-150,000 tonnes/year.

3. Governance and Funding Models

The Governance Review recommended governance and funding models to consider in constructing and operating a jointly owned organic waste processing facility within the Tri-Municipal Region. The top two governance models based on the assessment criterion were:

- A municipally controlled corporation, and
- A regional services commission

A municipally controlled corporation received a high rank for each assessment criterion except two: Alberta Capital Finance Authority financing is not obtainable and Ministerial consent is required to set up the structure. A regional services commission also received a high rank for each assessment criterion except in two cases. A commission allows for a greater influence on user fees and operational costs by the Minister and individual municipalities, as representatives on the Board would be Councilors, and it requires Ministerial consent for member municipalities to enter or exit the membership structure. Both options have advantages and disadvantages to consider, but either could work for a Tri-Municipal Organics Processing Facility.

The study also considered that the private sector could build, operate and manage the facility as well. Under this scenario, the municipalities would only be required to commit feedstock, and to pay the required tipping fees. The municipalities would not however have any say over the operations, management, and fee setting.

The report examined a number of case studies including the current operation of the Tri-Leisure Centre and joint police services facility. The study also looked at case studies of similar municipal waste facilities across the country including the Durham-Work waste to energy facility, Gesterra (Central Quebec) waste compost and sorting facility and REACT (31 urban and 16 rural municipalities in Saskatchewan).

Various options for funding were explored with each governance model; including P3's given the mandate set by the current government for alternative energy, greenhouse gas reduction and diversion from landfills. Through this, as well as a desire to stimulate the economy through infrastructure projects, there is a potential for both federal and provincial grants to support this project.

4. Technology Review

A technology inventory was prepared to identify common and emerging technologies for the management of, and energy recovery from, organic waste. Two technologies were best suited to the quantity of waste available: Anaerobic Digestion (AD) and Refused Derived Fuel (RDF). AD is the biologic conversion of organic matter in the absence of oxygen, and it produces compost and biogas. RDF is a process that mechanically and biologically processes mixed solid waste into a fuel (flakes or pellets) that can be used in power generation and cement kilns as an alternate fuel to offset coal. The RDF process is proven, but there are few applications of it being utilized in North America.

It was decided to proceed with AD technology, which is a proven technology that can take the entire organic waste stream and convert it into energy and compost. In addition, it was decided at the workshop and subsequently by the Steering Committee, to incorporate into the next stage of the design an RDF component that includes a dirty materials recovery facility as a complement to the AD. This increases the amount of organics recovered and consequently the percentage of waste diverted from landfills.

5. Pre-Front End Engineering Design (Pre-FEED)

The Pre-Feed prepared a preliminary design suitable for cost estimations based upon current and estimated source separated organics and mixed solid waste. The primary and secondary feedstock sources for the design are the Tri-Municipal Region, and Leduc County and area, respectively. The design assumes 75% of source separated organics from the residential sources can be diverted from landfills and between 25% and 50% from the ICI sector. The design also projects a 70% increase in the volume of organics between 2015 and 2043.

The three scenarios within the design include:

Scenario 1: Tri-Municipal Region residential organics only.
Scenario 2: Tri-Municipal Region residential and ICI organics
Scenario 3: Tri-Municipal Region residential and ICI organics plus 50% of the organics from Leduc County, the City of Leduc, and the towns of Beaumont and Devon

Technology types selected were based on the project consultants' professional knowledge and the evaluation criteria were developed by the project team. A request for information was presented to 41 vendors with 7 AD and 8 RDF firms submitting enough detailed information to evaluate operating costs and best engineering practices.

The top vendors identified during the Review (BIOferm for AD and Sutco for RDF) were used to gather process and cost information for the Pre-FEED, which resulted in the high level, integrated facility design. Key considerations of the design include:

- A conservative design approach (separate space for each component)
- Efficient and effective layout (separated visitor and work spaces- parking, vehicular movement)
- Showcase for educational and environmental purposes (learning centre and green building technologies)
- Space for future expansion of the facility (both capacity and additional technology improvements), and
- Minimized impact on surrounding properties (sufficient visual barrier, in-building processing and on-site stormwater management).

A 3D view of the proposed facility

Financial Implications:
None at this time. However if Parkland County were to pursue a regional organics processing facility the following would be relevant:

Total capital costs for the facility are $55,336,000. The recovery of these capital costs forms a major component of overall budget. However, it is not possible to calculate capital recovery costs before the type of project financing has been determined. This is dependent upon whether any design, construction, ownership, or operation of the facility is planned to be public or private. In addition, this figure does not include any partition amoung partners or the inclusion of federal or provincial grants. In order to provide some preliminary perspective on overall project costs, including capital recovery, the following temporary assumptions were made:

- Capital costs are recovered with 5% interest
- Capital is amortized over 20 years on average

These assumptions result in an annual capital recovery cost of $4.438 million.

The cost per tonne of waste processed is the measure by which facility costs are compared to other technologies and other approaches. It is not uncommon for a fully enclosed in-vessel compost system to cost $60 to $100 per tonne (including capital recovery). This means that the potential cost for this system, which greatly exceeds composting in material recovery (recycling), energy recovery, and includes a composting component, is higher in cost.

It can be expected that the per tonne cost will be lower in the future when the facility expands to almost double capacity, since many provisions for expansion are already included in current capital costs and must be carried by current operations. It can further be expected that through competitive procurement, some additional efficiencies will be identified and developed by the proponents, resulting in the reduction of both capital and operating costs. These cannot be quantified at this time, but potential savings of 10% or more are not unrealistic.

Other factors to consider:

- **Increasing landfill costs:** Across Alberta, as landfills reach capacity, new landfills are being located further from populated centres. Even if tipping rates remain low, the cost to get materials to landfill will increase substantially. Standards for new landfills are requiring a higher level of engineering to include leachate collection and higher standards for landfill management. Post closure requirements for a minimum of 25 years add to overall landfill costs. Data from AI-EES indicates that landfill costs for municipal governments will double by 2030.
- **Risk that organics processing facilities currently in place may close:** Although Parkland County's current organics processor has not experienced any significant problems, the City of Leduc, Leduc County and other communities have faced issues when the Growing Power Hairy Hills facility closed in early 2016. The City of Leduc and Leduc County temporarily started to move their organics processing to a facility outside of Strathmore. The City of Edmonton has also indicated that their facilities were built and designed for Edmonton's population and expected population growth, and not for regional inclusion.

Alternatives:

Each project phase included a comparison of various alternatives where applicable, including technologies, governance models, locations and design concepts. What is presented here are the results of evaluating those comparisons.

Conclusion/Summary:

There is no plan to implement the project at this time, however it aligns with a number of Council's Strategic Goals. The project will need to be subject to further Tri-Municipal discussions and commitments. The Councils of the Town of Stony Plain and the City of Spruce Grove are each receiving a presentation on the results of the study from the steering committee, while a workshop was held to communicate the results to pertinent administration and stakeholders.
This could be a favorable opportunity for the Tri-Municipal Region to establish a facility that reduces the risk of escalating landfill costs and potential risks that our contracted facilities may not be able to continue to operate due to regulatory, operational or fiscal issues. The opportunity for government grants to reduce the capital costs for this project is very strong, as the project will likely meet many requirements in the current provincial government's greenhouse gas strategy. The carbon tax beginning in January 2017 will also initiate a funding mechanism to support this type of project. Additional benefits of this project include reducing transport travel time, increasing waste diversion from filling landfills, and creating an energy component that makes the operation more efficient.

Further items to consider to ensure this project is a good investment include:

- The City of Edmonton may allow a financially feasible utilization of their technology for processing organics and solid waste, creating a new opportunity for the Tri-Municipal Region;
- Assurance that all partners are on board with the project and have made a sound business case to determine if the investment makes sense; and
- Determine if the project would qualify for capitol grants and the effect that the new carbon tax would have on the current solid waste management situation (increase in tipping fees).

AUTHOR: Krista Quesnel Department: Community Sustainability

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