ROCKY VIEW COUNTY

UTILITY SERVICES

TO:	Council		
DATE:	July 13, 2021	**DIVISION:**	All
FILE:	N/A	**APPLICATION:**	N/A
SUBJECT:	Waste to Energy (WtE) Solutions Report		

POLICY DIRECTION:

On March 23, 2021 at a regular meeting of Council, Administration was directed to bring back a report on waste to energy solutions, including technologies, regional markets and economic cost/benefits to Council by end of July 2021.

EXECUTIVE SUMMARY:

Waste to energy (WtE) technologies that treat municipal solid waste (MSW) can be categorized as proven technologies, including mass burn combustion and refuse derived fuel (RDF), or emerging technologies such as pyrolysis, gasification and plasma arc gasification. WtE, also referred to as recovery, fits into the waste management hierarchy just below recycling and just above landfilling.

Rocky View County manages about 8,000 tonnes of materials per year through the transfer sites. Of this total only a fraction, less than half, would be suitable for WtE treatment. Most proven technologies require 100,000 tonnes per year to be viable. The County would need to greatly increase the amount of waste managed or be part of a regional solution to pursue WtE at this time. These realities limit WtE applications for the County, but consideration could be given to monitoring opportunities for the following:

- attracting proponents in the WtE industry to a site within the County;
- forming partnerships with large scale commercial waste producers and/or energy users to find workable technology solutions for specific situations;
- joining established regional coalitions to compile amounts of waste required for economies of scale for proven technologies; and/or
- hosting a facility (pilot or permanent, micro, small or larger scale).

In alignment with the 2021 Solid Waste Servicing Strategy, Administration will remain current on WtE options and their costs and pursue innovative solutions as they arise.

ADMINISTRATION RECOMMENDATION:

Administration recommends Option #1.

BACKGROUND:

In March 2021, Council directed Administration to bring back a report, on waste to energy technology solutions, costs and benefits, and the regional context to supplement their knowledge on the topic. Sonnevera International Corporation was contracted to prepare this report. Their full report is found in Attachment ‘A’.

Administration Resources
Jennifer Koole, Utility Services

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Technology Solutions Overview

Waste to energy is a term that is used to categorize a wide range of technologies that in some way, either directly or indirectly, convert waste materials into heat or fuel. The most common types of WtE technologies include mass burn incineration, gasification, pyrolysis, anaerobic digestion, and refuse derived fuel (RDF). Of these, only incineration uses the waste material as fuel, and it is the only type proven on a large scale.

The primary goal of WtE is to provide an alternative to landfilling. This is done in order to save landfill space or prolong a landfill's life. The energy recovery component, while a bonus, is secondary. The physical reduction of waste, with the conversion to energy, is usually between 75 per cent by weight and 90 per cent by volume. The remaining 10 to 25 percent ash, char, or slag still needs to be landfilled.

Cost/Benefit

The estimated cost to implement a WtE facility is between $100-500 million in capital investment, with operating costs up to $15 million per year, with a facility requiring at least 100,000 tonnes per year of waste to be cost effective and technically feasible. Operating costs are reduced with increased feedstock as the greater throughput creates system efficiencies. Investing in waste reduction and diversion programming in order to reduce waste to landfill volumes is almost always an economically preferred option compared to the capital and operating costs of a WtE facility.

Conditions that make WtE solutions more viable include factors such as a lack of or decreasing amount of available landfill space (existing or future), a large distance between source of waste and treatment options, or high landfill cost per tonne. WtE is also more economically attractive when there is a high price for the sale of energy, a specific demand for alternative energy sources, a strong and consistent market for any derived fuels to be used for energy or feedstocks (e.g. plastics), or a strategic use for a decentralized heat or energy source. In some jurisdictions, carbon credits can be earned and sold for energy produced from WtE facilities. These factors are all dependent on the location of the facility and the state of the energy market at the time. Most of these conditions are currently not favourable in Alberta; thus, most municipalities rely on landfilling the materials that cannot otherwise be recycled or composted.

Regional Markets

Canada: In Canada there are seven (7) large scale WtE facilities in operation with most treating greater than 100,000 tonnes per year of pre-screened, pre-treated waste. In general, these facilities are a part of an integrated waste management system built for populations of greater than 1 million people where landfill availability is constrained.

Alberta: A scan of current state WtE facilities in Alberta yielded the table provided in Attachment 'B'. One gasification plant, in Edmonton, that uses gasification to convert non-divertible waste to biofuels has successfully grown from bench-scale to pilot-scale over the past ten years and is building towards a commercial level. Other technologies are being tested in more remote communities where transportation of recyclables are challenging and landfill space is a premium. For example, a Biomass Energy Techniques unit is being piloted in the Peace Region. Sylvan Lake is considering a pyrolysis technology as a part of their "No Landfill Disposal Facility" pledge to their community. A few other, small scale, biomass (e.g. furnaces) are being used to treat waste wood for heating landfill facilities. One larger scale project in the province includes the Southern Alberta Energy from Waste

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Association, where more than 60 municipalities are committed to researching and implementing a WtE facility.

Rocky View County: Goals 1 and 2 in the recently approved Solid Waste Servicing Strategy state that all residential and ICI (industrial, commercial, and institutional) waste produced in the County be managed to the 3R's hierarchy. This includes the preference that energy is recovered from waste instead of landfill disposal.

At present, Rocky View County has limited ability to pursue WtE because disposal services are out sourced and there are no commercial WtE options in the province accepting waste for treatment. In addition, relatively small amounts of waste are produced in the County and they are geographically dispersed. This makes even small scale options, if they were proven, difficult to implement.

BUDGET IMPLICATIONS:

This report is for information only and provides no implications on the 2021 budget.

STRATEGIC OBJECTIVES:

This report supports the Council approved 2021 Solid Waste Servicing Strategy.

OPTIONS:

Option #1: THAT the Waste to Energy (WtE) Solutions report be received as information.

Option #2: THAT alternative direction be provided.

Respectfully submitted,

"Byron Riemann"

Executive Director
Operations

Concurrence,

"Kent Robinson"

Acting Chief Administrative Officer

JK/bg

ATTACHMENTS:

ATTACHMENT 'A': Waste to Energy Review
ATTACHMENT 'B': Waste to Energy Regional Scan