



RULES COMMITTEE: 10/30/19
ITEM: G.3

Memorandum

TO: RULES AND OPEN GOVERNMENT COMMITTEE **FROM:** Kerrie Romanow

SUBJECT: SEE BELOW

DATE: October 24, 2019

Approved

D. D. S. L.

Date

10/24/19

SUBJECT: MUNICIPAL SOLID WASTE CLEAN INCINERATION TO GENERATE ENERGY

RECOMMENDATION

Direct the City Manager to deprioritize the pursuit of this approach to the management of solid waste.

BACKGROUND

In August of 2018, Environmental Services staff provided Council Member Khamis with a technical analysis on the conceptual feasibility of Municipal Solid Waste Incineration (Attachment A). At the December 5, 2018 Rules and Open Government Committee meeting, Council Member Khamis inquired about staff providing some feasibility analysis on the issue.

Regionally and nationally, San José has long been recognized for its success in reaching very high rates of diversion from local landfills. Part of this successful diversion involves the separation of plastic, paper, and wood (green waste) from the solid waste stream destined for the landfill. San José, like other cities, is in the process of adjusting to changing recycling markets and is embarking on developing a new Zero Waste Plan. Waste to Energy technologies, including incineration of Municipal Solid Waste, will be evaluated by June 2020.

/s/

KERRIE ROMANOW
Director, Environmental Services

For questions, please contact Valerie Osmond, Deputy Director, at 408-535-8557.

Attachment: Municipal Solid Waste Incineration - Conceptual Feasibility Discussion

Municipal Solid Waste Incineration

Conceptual Feasibility Discussion

Summary

Incineration of municipal solid waste is a proven technique used in much of the developed world to reduce the volume of material sent to landfills and to recover energy from waste. Incineration of municipal solid waste is technically possible for San José. However, building and operating an incinerator would increase costs compared to the current use of a landfill for disposal. This document summarizes the issues that affect the viability of incineration. Process details would result from a more comprehensive feasibility study.

Advantages:

- **Reduced Waste Volume** – Incineration decreases the quantity of waste sent to a landfill by approximately 80 percent.
- **Power Generation** – Incineration of solid waste can be used to generate hot water and/or electrical power (1.5 to 2 MW-hr/metric ton (MT)).
- **Greenhouse Gas Emission Reduction** – Incineration eliminates the release of fugitive methane from waste that would otherwise be landfilled. Even with gas capture at some facilities, fugitive releases still occur.

Disadvantages:

- **Cost** – the cost of construction and operation of an incineration plant is significantly greater than landfill disposal in the United States.
- **Air Emissions** – Even with sophisticated emissions control equipment, some emissions of toxic contaminants including dioxins and furans will occur.
- **Public Perception** – Residents can have a forceful negative reaction to a new incinerator in or near their community.
- **Alternative to Recycling** – Recycling materials such as plastics is an environmentally preferred alternative to incineration.

Capacity – Even a substantial incineration facility would not likely have the capacity or the capability to process all of San José's waste that goes to landfill; therefore, implementation of all existing waste reduction efforts will likely continue.

Analysis

Waste Characteristics

The composition and quantity of the waste to be incinerated affect the feasibility of an incinerator. According to a study commissioned by the World Bank (<http://siteresources.worldbank.org/INTUSWM/Resources/463617-1202332338898/incineration-dmg.pdf>), a minimum of 50,000 MT per year of waste with a heat content of at least 7 Mg/kg would be required to make an incinerator feasible. The quantity of waste is available in San José. However, efforts

to separate plastic, paper, and wood from the waste stream reduce the heat content of the waste. It isn't clear if the remaining waste would have sufficient energy to make an incinerator viable, so some fundamental changes to the way the City's approaches its Zero Waste goals might be required.

Would the City be asking people to abandon sorting trash from recyclables? San José was one of the first cities to roll out curbside recycling in the 1980s, and the overall region has been moving towards more streams, not fewer. Current recycling efforts don't have to be impacted. However, removing paper, wood, and plastics from the waste stream reduces the energy content of the waste stream to be incinerated and could make the process non-viable.

Air Regulations

Incinerators are subject to multiple air quality regulations including Federal New Source Performance Standards and California Health Risk Requirements. Current technology can meet the requirements of the regulations, but the cost is significant. The California requirements for limiting human health risk could prevent an incinerator from locating near residential or commercial properties and thereby limit potential sites. Permitting and compliance would be challenging, but regulations for permitting these types of facilities do exist, so permitting should be possible.

Greenhouse Gas

Incineration of solid waste reduces greenhouse gas emissions compared to landfilling by eliminating methane generation that would occur in a landfill. Methane is a significantly more potent greenhouse gas than carbon dioxide. The magnitude of the reduction depends on how the landfill would be managed and on the composition of the waste stream. Incineration of a waste stream that is high in plastics would have higher anthropogenic GHG emissions than a waste stream composed primarily of organic waste. Rules are in the process of being developed due to the passage of SB 1383 in 2016 that would divert organics from landfills that are also designed with GHG reductions in mind.

Electricity generated by the incinerator would reduce electricity needs from other sources such as natural gas combustion and could indirectly reduce greenhouse gas emissions from other sources. Conversely, a well-managed landfill with a landfill gas recovery system and beneficial use of the recovered gas would decrease landfill emissions. The uncertainty in landfill emissions and waste stream composition affect the magnitude of the difference in greenhouse gas emissions between the two alternatives. However, the overall net effect of incineration is expected to be a reduction in greenhouse gases.

Ash Disposal

Bottom ash from the incinerator would likely be disposed in a conventional landfill unless a beneficial use could be identified. Fly ash from an incinerator could be classified as hazardous waste and would require disposal in a specially designed landfill.

Costs

The cost of incineration would be a key factor in determining feasibility. A full evaluation of the project would be required to provide a reasonable estimate of costs. However, multiple sources indicate that incineration is significantly more expensive in the United States than disposal at a landfill. The cost of incineration compared to landfills is the most significant reason why landfilling is preferred by most

municipalities in the United States. Current landfill tipping fees are likely lower than what would be required to operate an incinerator, so customer rates would probably go up.

Public Opinion

The public is not always supportive of solid waste incineration. Public opinion would need to be considered when determining the siting and feasibility of an incinerator. Negative public reactions could force the siting of the incineration unit to a more remote location, thereby increasing hauling costs and truck emissions.

Other Considerations

California environmental regulations and City waste management efforts focus on the upstream reduction of waste and the reuse or recycling of the waste generated. These efforts are not entirely consistent with incineration where the incinerator would be competing with other diversion efforts for the highest energy value fuels (primarily wood, paper, and plastics). Other waste-to-energy technologies such as gasification, pyrolysis, and thermal depolymerization, are continually in development and constantly improving. Given the State of California's stance on environmental issues, it may be advantageous to seek out alternatives to incineration as those technologies continue to improve.