

Decision Support System (DSS) Report

Group 4

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Decision Support System (DSS) Report

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1 Problem Set Scope

Determine the environmental permitting requirements for each of the options to help a manufacturing facility achieve an improvement in material reuse and resource efficiency.

2 Methodology and Terms

In this report, the Decision support system is used for analyzing the decision-making process in complex system.

ECA - Environmental Compliance Approval

EPA - Environmental Protection Act

EASR - Environmental Activity and Sector Registry

EAA - Environmental Assessment Act

EBR – Environmental Bill of Rights

ESDM - Emission Summary and Dispersion Modelling

OWRA – Ontario Water Resources Act

3 Background and Existing Operations Scenario

Facility Type: manufacturing decorative aluminum fixtures

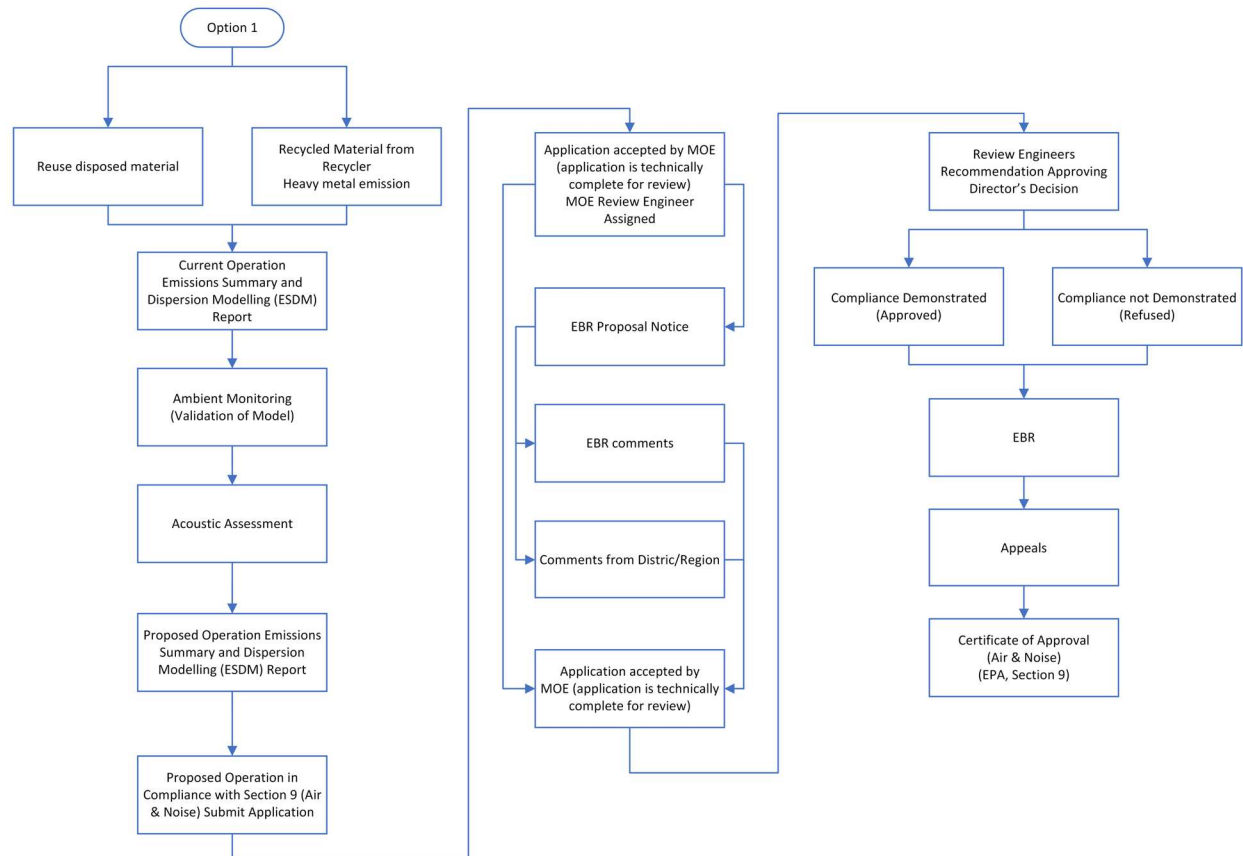
Facility Location: Ontario

Appropriate environmental permits, including Environmental Compliance Approvals (air, noise and water discharge)

4 Operation Opportunities

4.1 Option 1

4.1.1 DSS Flowchart



4.1.2 Summary

- The proposal activities will generate heavy metal emission, so it needs to comply with EPA section 9 (Air & Noise). The facility manufactures decorative aluminum fixtures. Its NAICS code begins with primary NAICS code listed in O. Reg. 1/17, which is 331 (Primary metal manufacturing), therefore, it is not eligible for EASR and needs ECA.

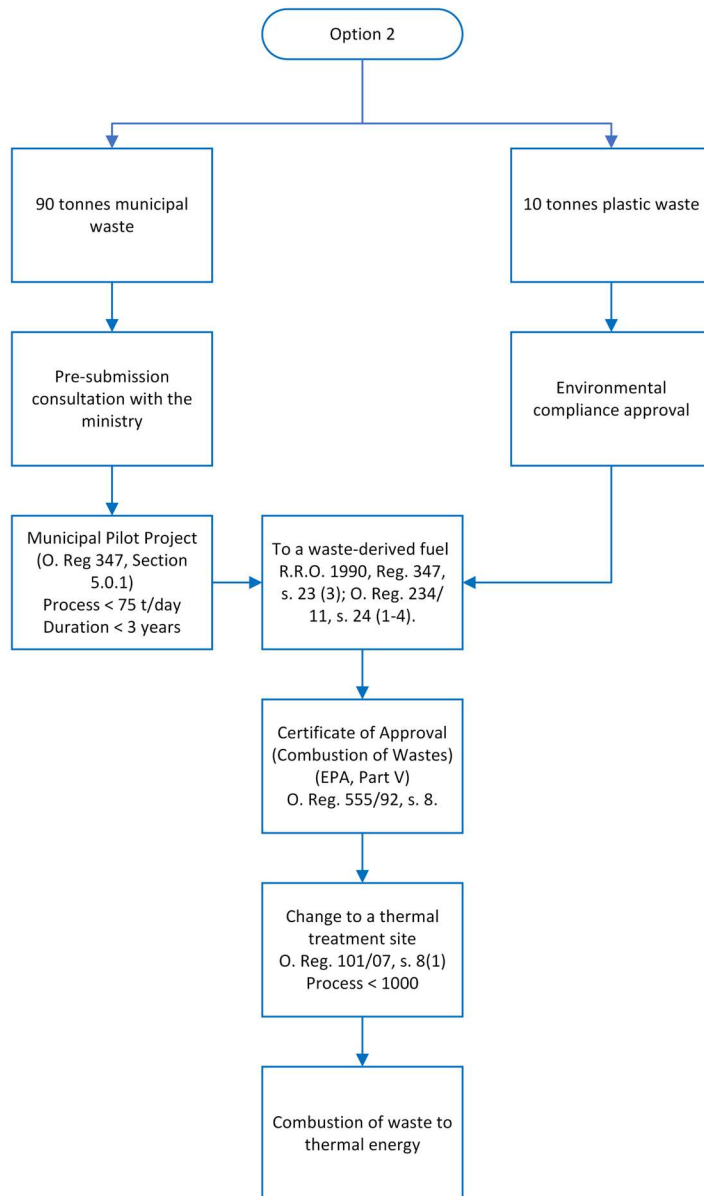
Additionally, the proposal activities involve reuse of disposal material and recycled material, so they need to comply with EPA section 27 (Waste). However, the activities do not require approval under the Environmental Assessment Act.

- Timeline:** at least 1 year. The ECA has a 1-year service standard, however, the time required will depend on the quality, complexity, and associated concerns with the application.

- **Potential Challenge:** One challenge arises from the involvement of a third-party recycler, leading to potential variations in recycled material components over time. Consequently, accurately quantifying heavy metal emissions may prove difficult. This uncertainty could raise concerns among stakeholders during the ECA approval and consultation process. Moreover, heavy metal emissions have the potential to significantly impact the environment and human health, eliciting negative feedback from the public.

4.2 Option 2

4.2.1 DSS flowchart



4.2.2 Summary

- Requirements:**

Municipal waste needs a pre-submission consultant with the ministry, then gives the Director a written notice according to O. Reg. 347 R.R.O. 1900. Section 5.0.1 under the Environmental Protection Act (EPA) to apply the Pilot Project (Waste-Derived Fuel Sites). Then transfer the waste to Waste-Derived Fuel Sites according to O. Reg. 347. s.23(3); O. Reg. 234/11, s.24 (1-4).

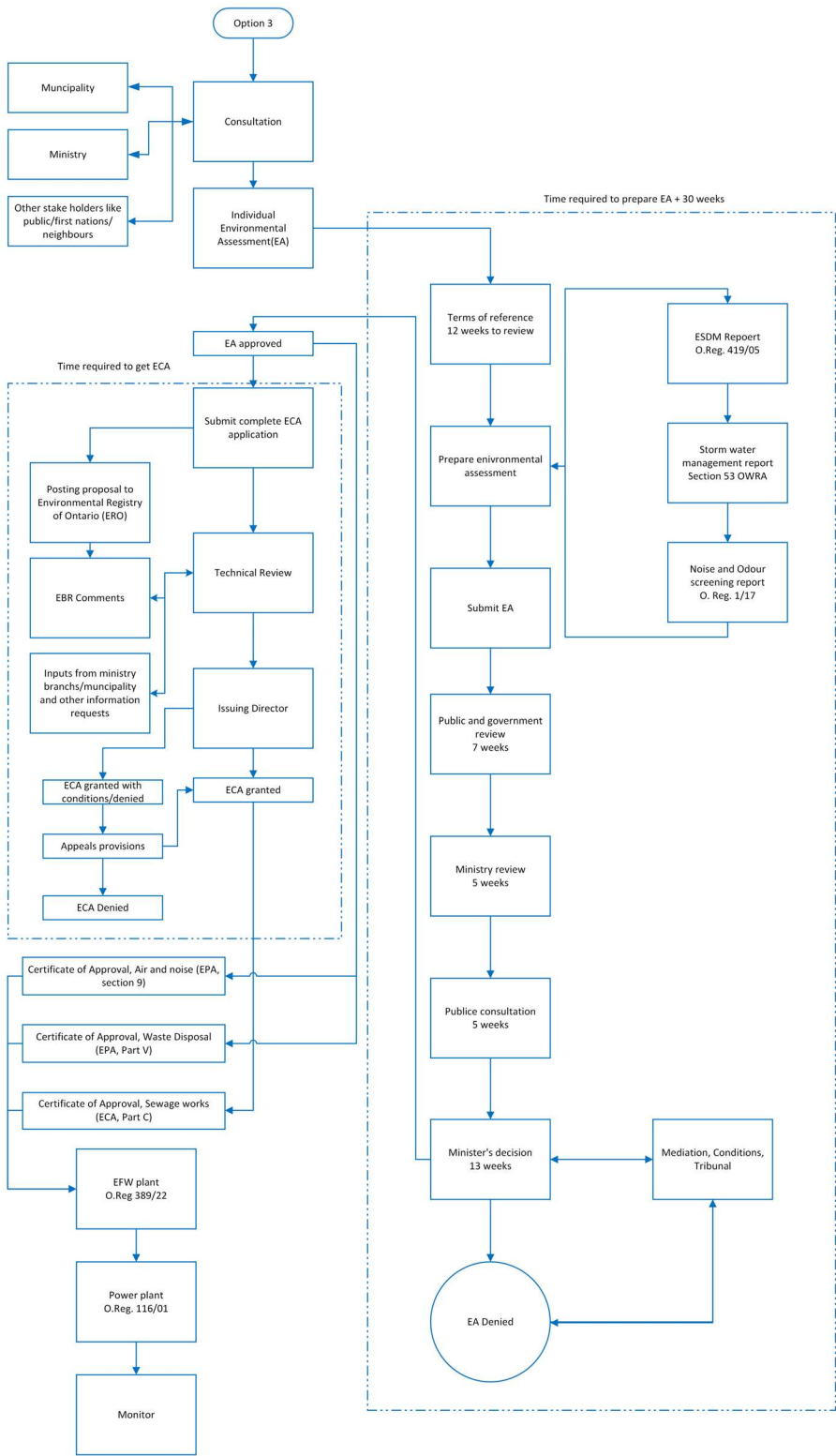
Plastic waste needs to get environmental compliance approval and transfer the waste to Waste-derived fuel according to O. Reg. 347. s.23(3); O. Reg. 234/11, s.24 (1-4).

Also need to obtain a Certificate of Approval on the combustion of wastes, according to O. Reg. 555/92, s. 8. Then change it to a thermal treatment site according to O. Reg. 101/07, s. 8(1).

- **Restrictions:** The Pilot Project (Waste-Derived Fuel Sites) for municipal waste is limited to processing not more than 75 tonnes per day, and the duration is no more than 3 years.
- **Timelines:** The process of obtaining a municipal waste permit and launching a pilot project is expected to take several months.
- **Potential Challenges:** The policy regulations for the project are very complex, and ensuring that each stage can comply with the regulations is a challenge. The original pilot program can only last three years and making it permanent is a challenge.

4.3 Option 3

4.3.1 DSS flowchart



4.3.2 Summary

- Need to understand the emissions that might occur from establishing the waste-to-energy plant and transporting the liquid industrial waste from the nearby factory to the plant, where the waste will be used as a fuel source to heat up the water in the boiler to form steam, which then runs a turbine to generate electricity. The kinds of pollutants that may be of concern are primarily air pollution and pollution due to the storage and usage of liquid industrial waste. The odour from using industrial waste and the noise from running the turbines for electricity generation can be considered as other pollutants. The facility is receiving liquid industrial waste generated from another facility and the potential pollutants are unknown, an individual environmental assessment is necessary for this option. Once the environmental assessment is carried out and approved, the ECA and other certificates of approval are needed.
- **Related Regulations:** Reg. 419/05, Section 53 OWRA, Reg. 1/17, Reg. 389/22, Reg. 116/01.
- **Timeline:** at least 1 year and 30 weeks to gain the necessary permits, of which 30 weeks for EA and 1-year service standard for ECA. However, the time required will depend on the quality, complexity, and associated concerns with the application.
- **Potential challenges:** The extensive environmental assessment that needs to be carried out, along with the high cost, technology, and time required for installing such a project.

5 Comparison and Conclusion

From comparing all the 3 options, the first option reuses waste materials from the existing processes and a nearby recycler to create a zero-waste system, resulting in better material usage. Although the output from the facility is not affected, this will result in the facility sourcing fewer virgin materials from outside and an overall reduction in operation costs. In the second situation, the combustion of plastics and municipal waste provides the thermal energy needed for the smelters. In the third option, the electrical energy needs of the plant are substituted with electricity generated from liquid industrial waste.

As all the options are tackling different challenges in the facility, all the projects can be seen as viable options. However, if minimum investment and time frame for acquiring the necessary compliance certificates are concerns, then option 2 can be seen as the first priority to implement as it requires the least amount of permits and technological changes to the existing system. Option 1 can be implemented as a medium-term project, as it would require additional permits and processes for using the recycled materials and dealing with the heavy metal emissions. Option 3 can be implemented as a long-term project, as the duration for acquiring the necessary permits and implementing the project would be the longest.