

OPTIONS FOR BIOSOLIDS

THIS CHAPTER PROVIDES AN OVERVIEW OF:

- the options for biosolids in Ontario

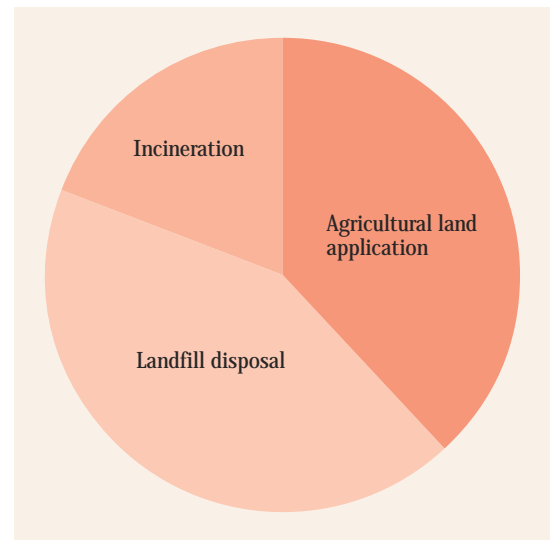
- the regulatory requirements for each option

- the implications of each option.

The most-used biosolids management options practised by Ontario municipalities are:

- landfill disposal
- incineration or energy from waste (EfW)
- land application.

A common option for municipalities is disposal in landfills, but this is becoming more expensive due to scarcity of available landfill capacity and more difficulty in establishing new landfills.



LANDFILL DISPOSAL

Landfill disposal offers the simplest solution by concentrating the material in a single location. The risk of release of biosolids-borne pollutants and pathogens is minimal if the landfill is properly constructed and maintained.

Sometimes biosolids must be landfilled, as in these cases:

- biosolids do not meet legislated quality criteria
- storage facilities have reached their capacity
- during winter, when ground is snow-covered or frozen, and application is not permitted.

Not all landfills are permitted under their Certificate of Approval to accept municipal biosolids.

There are risks with landfill disposal. Buried organic wastes undergo anaerobic decomposition, which produces methane gas. Methane is 20 times more potent than carbon dioxide as a greenhouse gas and contributor to climate change. There is also a risk of leakage from landfills. Contaminants, other chemicals, and nutrients pose a risk to groundwater resources near landfills that don't have appropriate leachate or surface water collection systems.

Another downside is the loss of potential benefits from the organic matter and plant nutrients in biosolids. This option also uses up valuable landfill space.

REGULATORY REQUIREMENTS

Licenses and approval documents are issued by the Ministry of the Environment (MOE).

Each landfill site may be subject to the requirements of the Environmental Assessment Act (EAA). Each landfill site must be approved under Part V of the Environmental Protection Act (EPA) to accept sewage biosolids.

Sewage biosolids must be hauled from the sewage treatment plant to the landfill site by vehicles licensed under the EPA for this purpose.

Biosolids must be managed at the landfill site in accordance with the Certificate of Approval for the site as issued under the EPA.

In some municipalities, biosolids don't qualify for land application because of the concentration of metals in the biosolids.

INCINERATION OR ENERGY from WASTE (EfW)

Incineration reduces the biosolids volume, kills pathogens, destroys most organic chemicals, and may provide energy.

Incineration is one of the more expensive options for biosolids disposal, because it requires sophisticated systems to remove fine particulate matter (fly ash) and volatile pollutants from stack gases.

The incinerator ash is a stable, relatively inert, inorganic material that possesses 10–20% of the original volume. Trace elements are not destroyed during incineration, which increases their concentrations substantially. The ash containing the higher trace element concentrations is usually landfilled.

Incineration releases carbon dioxide (a greenhouse gas).

As with landfilling, the potential benefits of organic matter and nutrient utilization are lost.

The option of incineration reduces the net volume of biosolids – but misses the opportunity to return nutrients to cropland.



REGULATORY REQUIREMENTS

Incinerators, whether private or municipally operated, must be established and operated under a Certificate of Approval issued by MOE. Also:

- ▶ incinerators are subject to the requirements of the EAA
- ▶ there are strict controls on the air emissions from incineration that must be met by the owner/operator
- ▶ the incinerator ash generated must be disposed of in an environmentally acceptable manner – strict environmental quality standards must be met for the final disposal of incinerator ash at a disposal (landfill) facility approved under the EPA.

FURTHER PROCESSING

Some larger wastewater treatment plants also treat biosolids by dewatering, lime stabilization, or pelletization.

This further treatment results in lower transportation costs, other marketing opportunities, and in some cases a reduction in pathogens. Sometimes the material is sold as a commercial fertilizer and regulated under the federal Fertilizers Act.

Composting is another option but is not commonly done in Ontario due to strict regulatory requirements on the regulated metal content of the feedstock materials used.



Mid-size to large composting facilities are suited for further processing of dewatered biosolids.

AGRICULTURAL LAND APPLICATION

Although sewage biosolids can be used in land reclamation and forest management, the majority of land application is to agricultural land. This is considered beneficial use rather than another form of disposal. It recycles valuable nutrients and organic matter, doesn't put further demand on waste disposal facilities, and when properly managed is environmentally friendly.

REGULATORY REQUIREMENTS

There are strict rules governing the land application of sewage biosolids in Ontario.

MOE and the Ministry of Agriculture, Food and Rural Affairs (OMAFRA) govern this activity by setting and enforcing criteria for the land application of sewage biosolids in Ontario. The regulations and protocols make possible the use of biosolids and other non-agricultural source materials (NASMs) on agricultural land, while protecting environmental quality, consumer and animal health, food quality, and the land's productivity.

The regulations and protocols outline criteria that must be met before biosolids can be considered for use on cropland. Biosolids supply essential plant nutrients and/or organic matter, or other constituents that will maintain crop production or soil health. Before OMAFRA will grant approval, it must be demonstrated that management of the biosolids will not degrade the natural environment.

“The application of biosolids is considered beneficial by most producers. There isn't nearly enough livestock manure to improve soil conditions. Biosolids are a reliable alternative.”

**Harry Buurma,
WEAO/BUC Biosolids
Forum, 2008, Barrie**



LAND APPLICATION – SOCIETAL ASSURANCE THROUGH SAFETY AND PROFESSIONALISM

Science, compliance monitoring, and enforcement combine to reduce the risk of land application of biosolids.

Sites must be assessed to determine their suitability for application.

Increases in metal concentrations in soils receiving biosolids can be limited with analyses and quality control, and frequency of application and application rates.

A farmer's NASM plan:

- ▶ generates options for appropriate application rates, method and timing of application
- ▶ determines nutrient application rates by assessing crop needs, site limitations, and existing soil nutrient levels
- ▶ sets liquid loading limits to reduce the risk of runoff, and
- ▶ establishes separation distances from sensitive features such as surface water.

Site operations are monitored by the landowner or land application representative.

Records must be kept regarding the operation, application rates, application method, weather, and site conditions, etc.

The application procedure must abide by regulated separation distances from residences, wells and surface waters.



Throughout the land application process, record-keeping is essential for effective quality control.