

Given the present convergence of attitude shifts, technological improvements, and the national goal of reducing dependence on fossil fuels and foreign oil, it is appropriate and recommended to explore the benefits that would result from specific exemptions to the yard waste ban for the production and practical use of renewable energy generated from landfill gas. A targeted exemption to Michigan’s yard waste ban to allow more organic materials into the energy-creation process would optimize production of renewable energy from landfill gas.

An exemption should establish criteria for landfill energy-production facilities (LEPFs) similar to those that other states have adopted or are currently considering. It should be noted that proposed regulations are in addition to all those that traditional landfill operators already must meet by law to safeguard public health and safety. These proposed standards would set up collection design criteria for a facility to qualify for the yard waste ban exemption as an LEPF and require a legitimate collection system and practical end use.

There is a readily available supply of renewable power from landfill gas-to-energy technology. In the near term, this study shows that potential for a 30 percent increase in renewable energy production can be realized through two simple actions:

- ▶ Reintroduce yard waste into the municipal waste stream to be received at facilities designated as a LEPF, and
- ▶ Develop all landfill gas collection potential.

Now is the time to consider an exemption to the yard waste ban for landfill energy-producing facilities to capitalize on the benefits they can produce: job creation, a healthier environment, and renewable energy production consistent with energy policies like the *Michigan 21st Century Electric Energy Plan*.

A specific exemption to the yard waste ban for LEPFs could generate an additional 52.8 MW statewide, which translates into powering 33,574 homes.

Policy Brief on “Examining Increased Renewable Energy Production from Landfill Gas in Michigan”

Technological advances touch every part of our lives, often without our knowledge and in places we’d least expect. Landfills may be one of these overlooked occurrences. Landfills are most commonly considered the place where our garbage goes, but increasingly over the past decade they have become sources of renewable energy that can be generated from that waste.

While energy demands are expected to increase in the future, conventional capacity to meet those needs is uncertain. Consumers and policymakers are looking at renewable energy to fill the gap. Landfill energy is one such alternative. In order to meet growing energy needs, however, landfills will need an influx of organic matter such as grass and leaves, generally called “yard waste,” to fuel energy production.

In Michigan, yard clippings have been banned from disposal in municipal solid waste landfills since March 1995. Banning yard waste from landfills was considered a means of promoting composting and recycling. However, given the increased public support for renewable energy and the national objective of reducing dependence on fossil fuels and foreign oil, a review of waste disposal policy and alternatives to the yard waste ban is warranted.

This study set out to examine potential increased renewable energy production from landfill gas in Michigan to determine whether an exemption for landfill energy-producing facilities under the existing yard waste ban would prove fruitful. Despite the complexity of the issue, a number of clear conclusions can be drawn from the research and modeling involved in this study.

Recycling yard waste can now yield two options: a soil amendment through composting, and a renewable energy source through landfill gas recovery technology.

Acknowledgements

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Statewide Landfill Energy-Production Capacity

| Facility type | Yard waste | MW | | Peak | |
|------------------------------------|------------|-------|-------|------|-------|
| | | 2007 | 2015 | Year | MW |
| Current Major | Excluded | 188.8 | 230.4 | 2014 | 232.0 |
| | Included | 204.8 | 265.6 | 2015 | 265.6 |
| Current Major plus Potential Major | Included | 241.6 | 315.2 | 2016 | 316.8 |

SOURCE: NTH Consultants Ltd. 2007.
 NOTE: Current major facilities are landfills with existing landfill energy-production facilities. Potential major facilities are landfills that produce enough landfill gas to generate 1.6 MW or more.

► The economic, political, and societal changes that Michigan (and the world) has seen over the past decade have spurred increased support for renewable energy. This report cites three very recent and significant developments.

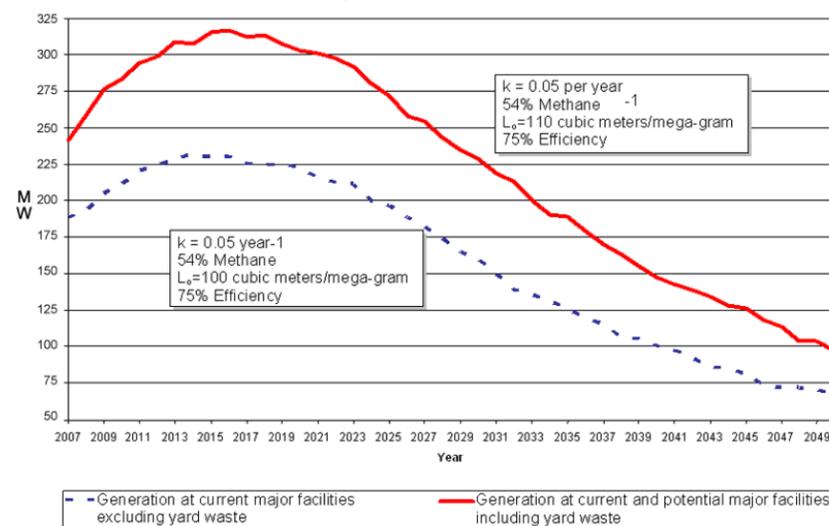
▷ In January, 2007, *Michigan's 21st Century Electric Energy Plan* demonstrated the need for additional electricity-generating resources by 2015 to meet increasing demands, preserve electric reliability, and provide affordable energy. **It is interesting that the modeling in the present study shows that if inputs are boosted, landfill energy-production facilities will be at peak capacity within 14 to 16 years—precisely when Michigan will need alternative energy sources the most.** The *21st Century Plan* recognizes landfill gas as a viable and economical form of renewable energy generation. Landfill gas is readily available and the fastest way to supplement current electricity generation.

▷ As recently as February 2007, Michigan's governor discussed her plan to make Michigan a national leader in the production and use of alternative energy by investing more than \$100 million of public and private resources over the next three years in research and production of renewable energy sources. In addition,

she has called for 10 percent of the state's power to come from renewable sources within the next eight years. It cannot be stated more clearly: becoming a leader in alternative and renewable energy generation is one of the key strategies for improving Michigan's economy.

▷ Michigan's recently revised solid waste policy declares that Michigan recognizes solid waste as a resource that should be managed to promote economic vitality, ecological integrity, and improved quality of life in a way that fosters sustainability. By recognizing solid waste as a resource, Michigan can more fully realize the economic, environmental, and social benefits of utilizing waste materials that still have inherent value.

Statewide Landfill Energy Production



SOURCE: NTH Consultants Ltd. 2007.

► Composting yard waste poses operational challenges that were not fully considered when Michigan's yard waste ban was implemented in 1995. In view of these challenges, the true costs of composting have yet to be realized. Additionally, the yard waste ban has produced mixed results. In many areas of the state a market for compost simply does not exist.

► Among sources of waste that have not already been captured, yard waste has the highest organic content and fewest operational challenges to overcome to produce more landfill gas and therefore is an excellent candidate to introduce into landfills to boost energy production.

► Since 1985, landfill gas recovery technology has advanced into a viable renewable energy option. Forward-thinking companies have begun to harness methane to produce energy by installing collection piping as each landfill cell (portion of facility) is filled, not after it is filled. This development has demonstrated the vast potential of landfill energy-production facilities and provides the basis for the current discussion.

► Based on existing landfill energy-production facilities and modeling, adding yard waste to landfills can increase the creation of renewable energy. Modeling shows that we can capture even more power than we are currently producing by reintroducing organic yard waste material. In addition to the study results in graphical form, the study also finds:

▷ By 2015 and adding yard waste in Michigan landfills that currently operate landfill energy-production facilities, we can increase renewable energy capacity 265.6 MW or 41 percent over current levels. If we further developed all potential landfill energy-production facilities in Michigan, we can increase renewable energy capacity 315.2 MW or 67 percent over current levels!

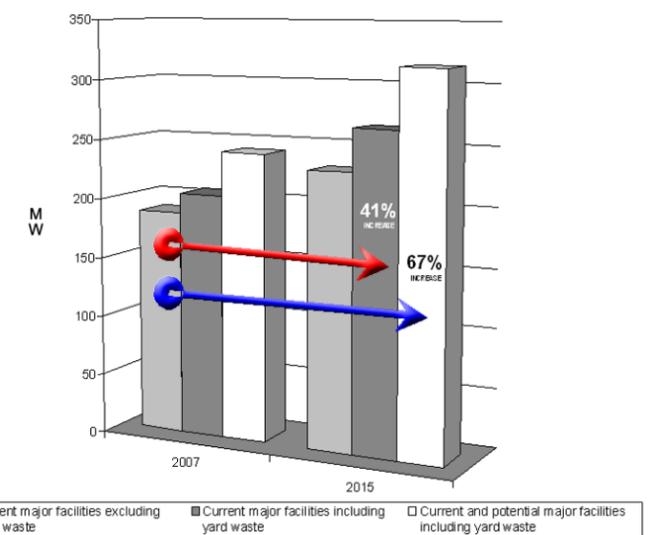
▷ Landfill gas-to-energy projects provide unparalleled reliability and availability as a renewable energy source. As long as there is solid waste, there will be landfill gas that can produce methane fuel. Additionally, landfills can provide a long-term energy source, as they produce gas for 20 to 30 years after closure.

▷ Landfill gas is a sustainable source of renewable energy, derived from landfill biomass that does not significantly limit overall landfill capacity. It is estimated that as a result of the decomposition process, yard waste loses half of its weight and 50 to 75 percent of its volume.

► Attempts to repeal the yard waste ban in other states have met with mixed results for a variety of reasons. Recently, however, policymakers in other states have become more amenable to considering exemptions. It is time to revisit this policy in Michigan to examine whether it is producing beneficial results.

Based on analysis of current landfill energy-production capacity, landfills should be considered a source for reliable, sustainable, renewable energy. However, if landfill energy-production technology is to play a role in helping Michigan meet its future energy needs and improve its economy, we must first boost creation of landfill gas so that more renewable energy can be produced. One way to increase the organic waste stream is to allow yard waste back into landfills. There are, of course, other means to this end, but none as intuitively simple because yard waste has the highest amount of organic content available in the non-landfilled waste stream.

Michigan Landfill Energy Production Capacity, Including and Excluding Yard Waste



SOURCE: NTH Consultants Ltd. 2007.