Recycling and Composting Law – a Detriment to Landfill Gas Beneficial Use?

A NEWSVT Landfill Case Study

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Overview

- Vermont Act 148
- Vermont Food Recovery Hierarchy
- Vermont Waste Composition Study
- Landfill Gas Overview
- Case Study: New England Waste Services of Vermont, Inc. Landfill
- Landfill Gas Collection Rate Modeling
  - Constant k and Lo
  - Varying k and Lo (Pre and Post Act 148 Implementation)
- Conclusions

Vermont Act 148 (Universal Recycling and Composting Law)

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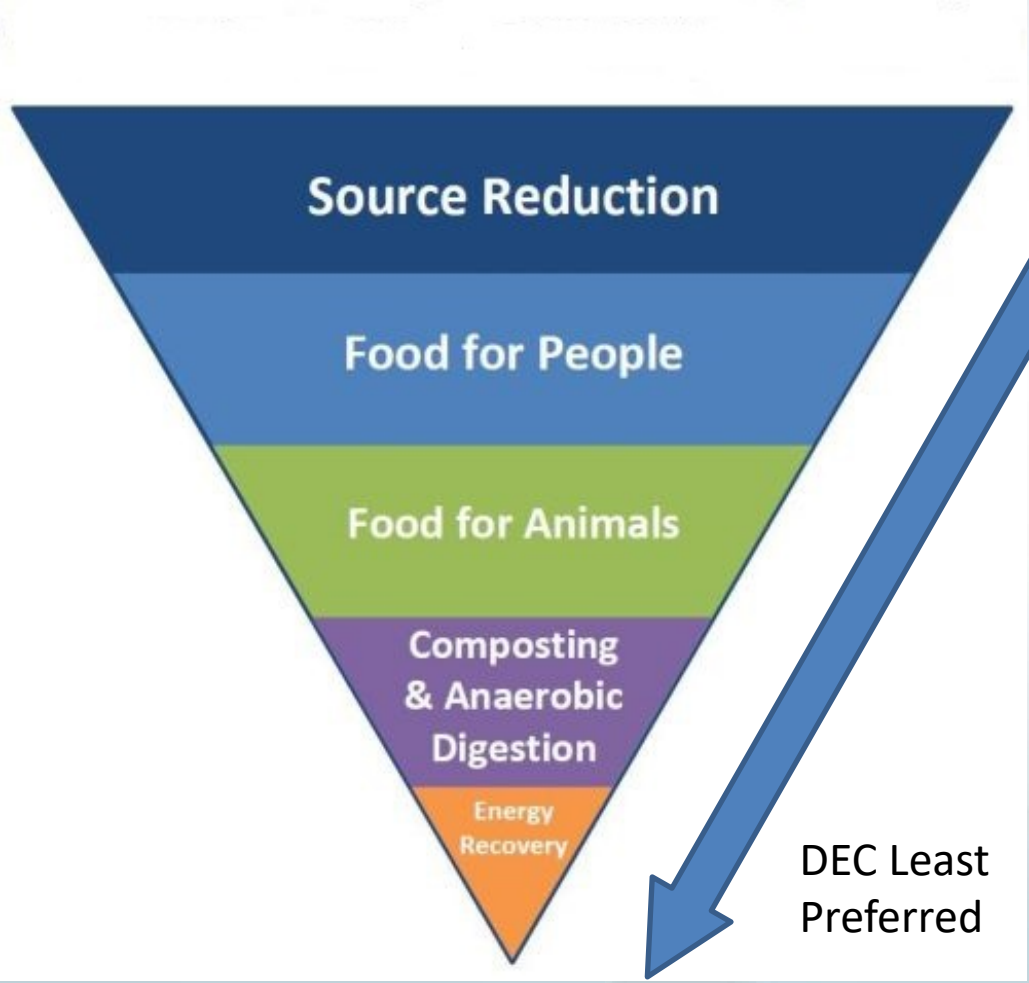
Vermont Food Recovery Hierarchy



https://dec.vermont.gov/waste-management/solid/universal-recycling

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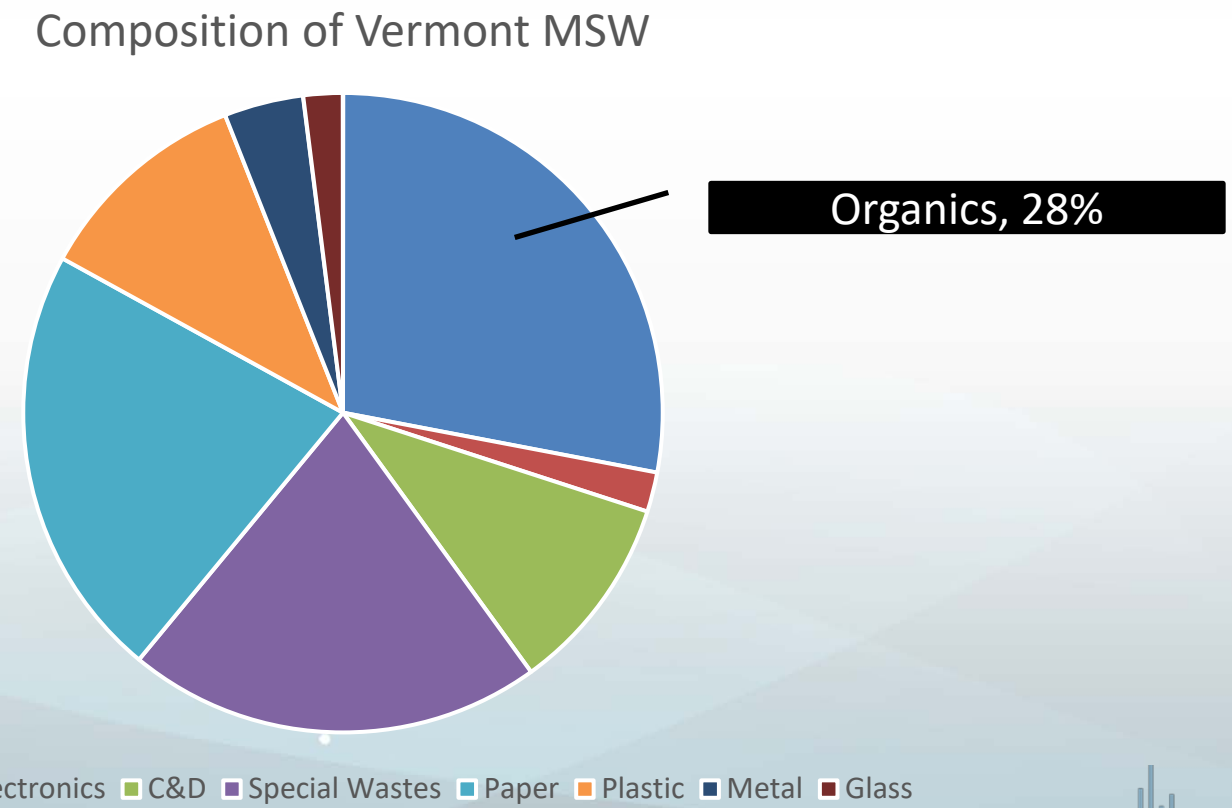
2013 Vermont Waste Composition Study

DSM Environmental on behalf of Vermont DEC



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Landfill Gas (LFG) Overview

- Formed through the decomposition of organic matter in landfills
- Contains ~50% Methane (CH_4)

↓ Organics = ↓ LFG

NEWSVT LFGTE Facility

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LFG Collection Rate Modeling

USEPA's Landfill Gas Emissions Model, Version 3.02 (LandGEM)

k = methane generation rate

L_o = methane generation potential

Site specific values for NEWSVT Landfill:

- k = 0.06 $year^{-1}$
- L_o = 120 m^3/Mg

- Collection efficiency = 85%

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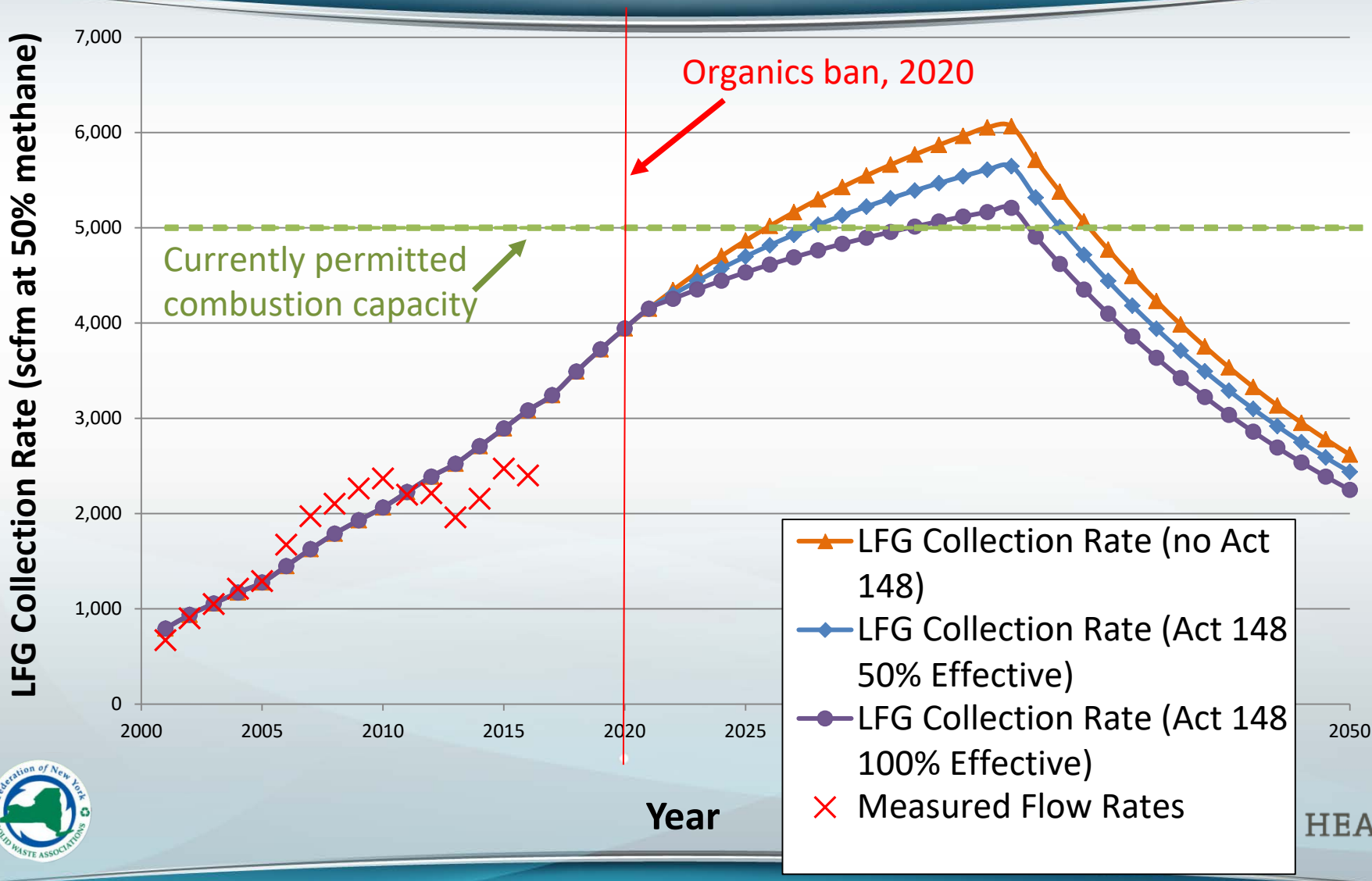
LFG Collection Rate L_o Scenarios (Constant k and L_o)



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LFG Collection Rate Modeling

Varying k and L_o

Prior to full implementation of Act 148:

- k = 0.06 $year^{-1}$
- L_o = 120 m^3/Mg

After full implementation of Act 148:

- k = 0.05 $year^{-1}$
- L_o = 100 m^3/Mg

- Collection efficiency = 85%

k = methane generation rate

L_o = methane generation potential

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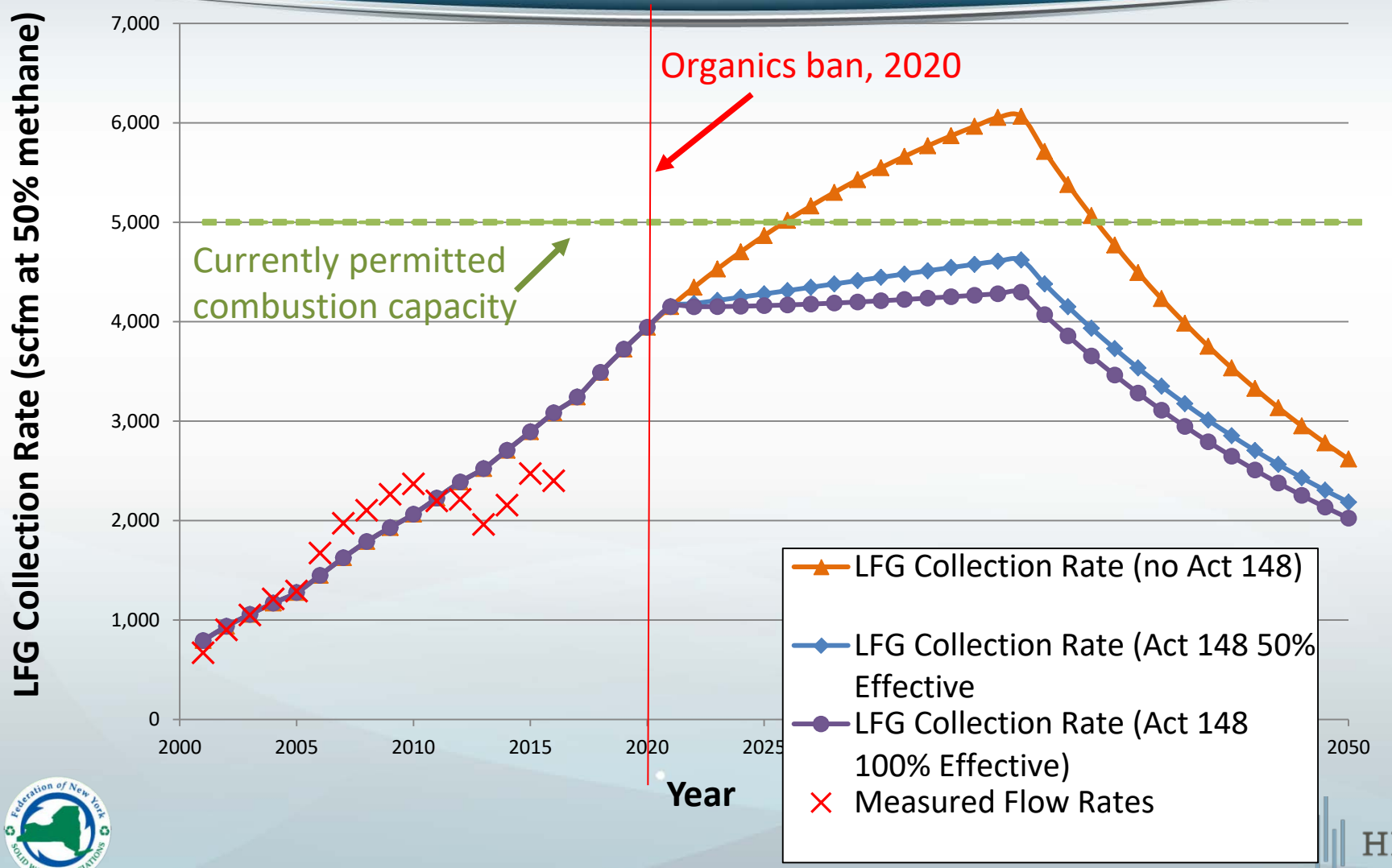
LFG Collection Rate L_o Scenarios (Varying k and L_o)



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Theoretical Loss in LFG Collection

Constant k and Lo

~15% loss (850 scfm at peak production) in LFG collection rate if waste ban is 100% effective

Varying k and Lo

~40% (1,800 scfm at peak production) loss in LFG collection rate if waste ban is 100% effective

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Theoretical Loss in Power Production

During 2018

~2,000 scfm LFG resulted in ~57,000 mWh

- 15% decrease in LFG collection rate

Theoretical loss of 8,500 mWh over a 1 year period

- 40% decrease in LFG collection rate

Theoretical loss of 23,000 mWh over a 1 year period

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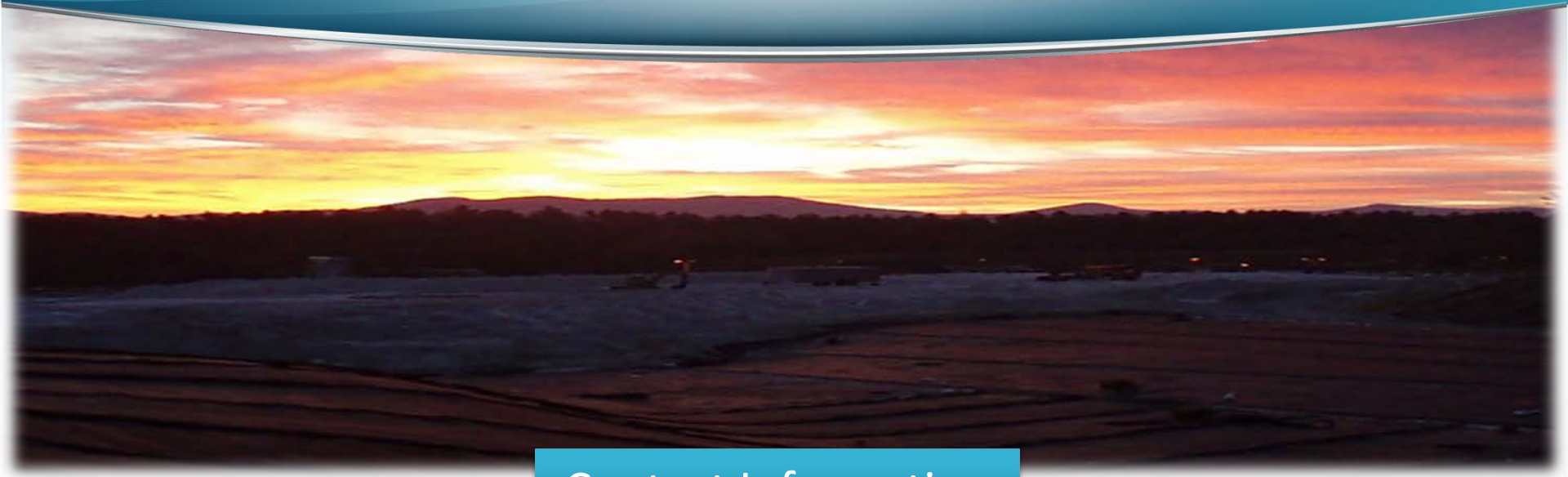
Conclusions

- Vermont's Universal Recycling and Composting Law may result in 15 to 40 percent lower peak LFG collection rates.
- Theoretical loss in power production = 8,500 to 23,000 mWh over a 1 year period.
- Uncertainty in effectiveness of Law at this time.
- There will likely be no need for additional permitted combustion capacity (engines and/or flares).
- Reduction in volume of MSW at expense of power production.

Thank you!



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