Looking into the Future of the U.S. WTE Industry

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Covanta by the Numbers

OVERVIEW OF ASSETS AND ANNUAL OPERATIONS

30+ year operating history

41 EfW facilities in 18 states / provinces
(24 owned and 17 operated)

4,000 employees

110+ boilers

50+ turbine generators

20 million tons of waste processed

10 million MWh of power generated

>500,000 gross tons of metal recovered

20 million tons of CO₂ equivalent offset

We are the largest EfW operator in the world
EfW is Sustainable Waste Disposal

Two choices for post-recycled waste:

**EfW**
- 90% reduction of waste in volume
- Clean energy generation
- Recovers metals for recycling
- Reduces GHG emissions an average of one ton of CO₂ equivalents for each ton of waste processed
- Renewable energy generation from EfW: ~550 kWh per ton of waste

**Landfill**
- Landfills are a major source of man-made methane
- Methane is 28 – 34x more potent than carbon dioxide over 100 years; 84 – 86x stronger over 20 years
- Non-sustainable use of land
- Renewable energy generation from landfills: ~65 kWh per ton of waste

EfW produces over 9 times the energy per ton compared to landfills.
EfW is the Only Power Source Which Reduces GHGs

ELECTRICITY SOURCES: GHG COMPARISON

EfW reduces GHG emissions when including avoided landfill CH₄ emissions

The United States has Fallen Behind...

- **U.S.:** 64% Recycling, 29% Landfilling, 7% EfW
- **EU Avg.:** 38% Recycling, 40% Landfilling, 22% EfW
- **Denmark:** 45% Recycling, 52% Landfilling, 3% EfW
- **Germany:** 62% Recycling, 34% Landfilling, 3% EfW

*Source: Eurostat, WERT - Columbia University*
Why?

Economics

– Cheap landfilling
– Historically low natural gas prices driving wholesale electricity rates
– Roll-off of long term Power Purchase Agreements
– Volatile commodity pricing
– Cheap aggregate

Policy

– No national solid waste & energy policies
– National GHG policy under development
Why? Cheap & Plentiful Natural Gas sets the Price

- Natural gas surpassed coal electrical generation in 2015
- The U.S. is now the leading global producer of oil & gas (combined)

Monthly net electricity generation, all sectors (Jan 2011 - Dec 2016)

Estimated petroleum and natural gas hydrocarbon production in selected countries
Consideration of Climate Could Change the Equation

- Monetizing the GHG benefit of EfW could fundamentally change the economics of waste management
- Landfills would become the more expensive option, if the social cost of carbon were applied
- The use of landfill taxes has been a significant analogous driver in the EU
A First Step? EfW under the EPA Clean Power Plan

• Regulation Basics
  – Sets targets for Individual states to reduce GHG emissions from the electricity sector
  – Key component of meeting U.S. targets under Paris agreement
  – All eyes on the D.C. Circuit Court: on hold due to litigation

• Benefit to EfW development?
  – EfW isn’t regulated and our power is “zero-carbon”
  – New capacity can generate Emission Rate Credits (ERCs)
  – The financial upside to EfW is real, but specifics yet to be determined
And Growing Interest in Sustainable Waste Management

- Over 80% of S&P 500 reports on Sustainability, four-fold increase since 2011
- In a review of almost 80 corporate sustainability reports, 90% had some form of a waste related goal (e.g. zero waste to landfill, recycling, reduction)
- Assured Destruction
- Zero Waste to Landfill
- Industrial Services
  - Cleaning, spill response, remediation, etc.
- Recycling and Repurpose Solutions
  - De-packaging
  - Solidification
  - E-Waste
- Liquid Waste Management
  - Treatment
  - Destruction
Summary

• EfW will be a key to improving the state of sustainable waste management in the U.S.

• Greenhouse gas benefits being overlooked. Policy support needed for growth in the U.S.

• International growth of EfW shows a large addressable market

• We see exciting organic growth opportunities in leveraging current assets and serving new customers in the U.S.