COVANTA ENERGY

for a cleaner world

Readying Michigan To Make Good Energy Decisions

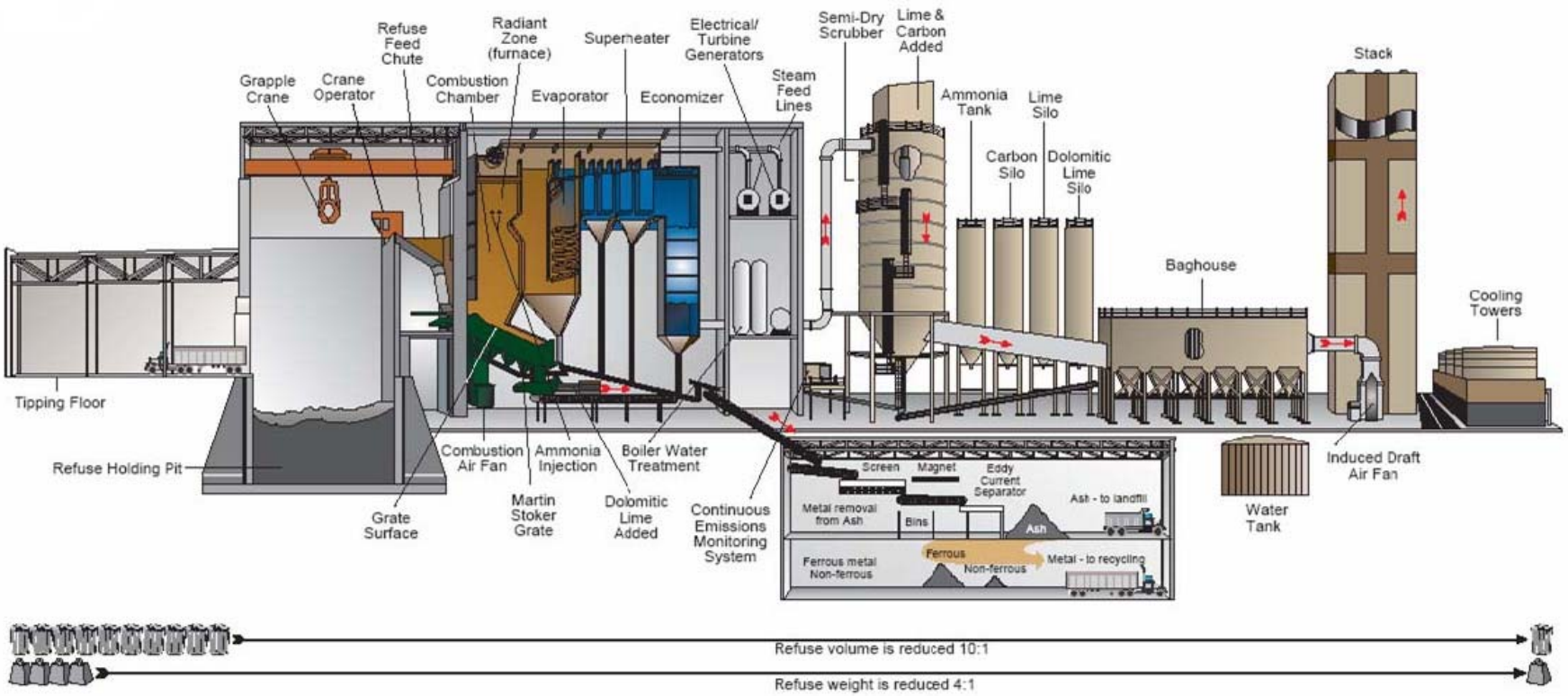
Traverse City – April 22, 2013

Introduction

- Covanta Energy
  - World leader in Energy from Waste
  - 44 EfW Plants Owned and/or Operated Worldwide
  - Operator of Kent County EfW Facility
- Governor Snyder's Special Message: Ensuring Our Future: Energy and the Environment
  - Energy: Review The State's RPS
  - Environment: Increase Recycling
    - How are the RPS and Recycling Related?
- Michigan RPS
  - EfW capped
  - Landfills not capped

Introduction – What is Energy from Waste

A Specially Designed Energy Generation Facility That Uses Household Waste As Fuel

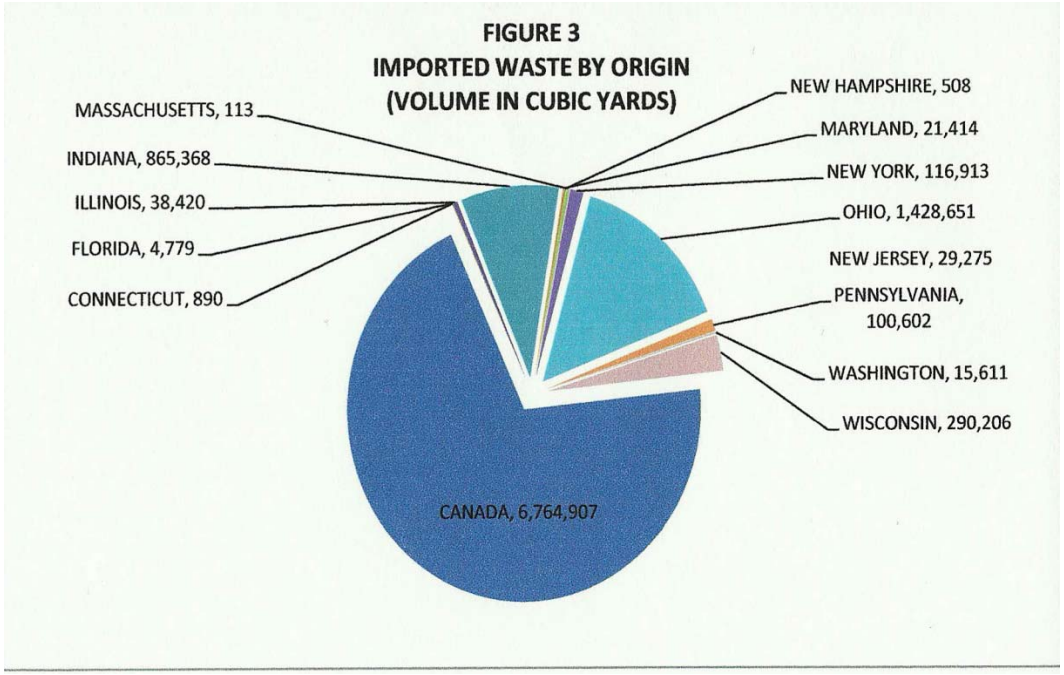


Landfills – For The Birds (Literally)

Landfills – For The Birds

- One of the largest sources of manmade methane - a Greenhouse Gas (“GHG”) 25 times as potent as carbon dioxide over 100 yrs. and 72 times as potent over 20 yrs.
- Fugitive uncontrolled emissions of over 170 air pollutants, 44 of which are air toxics, including 4 known and 13 probable carcinogens
- Significant risk of groundwater contamination from leachate
- Forever renders useless significant acres of land
- 15 of the 86 US EPA National Priorities List sites in MI are landfills
- Metals lost forever - 370,000 tons of metal lost in MI landfills in 2012 alone

Michigan – Dependent on Landfills



- There are 70 active landfills in Michigan
- 44.3 million cubic yards of waste landfilled (14.8 million tons)
- 9.6 million cubic yards of waste imported (3.2 million tons)

If 25% of this waste was processed at an EfW Facility, it would mean:

- 373 MW of Reliable, Baseload, Renewable Electricity Generated In Michigan
- 6600 Construction Jobs and 880 Full Time, Post Construction Michigan Jobs
- 92,300 Tons of Ferrous Metal Recycled

EfW – The Superior Alternative to Landfills

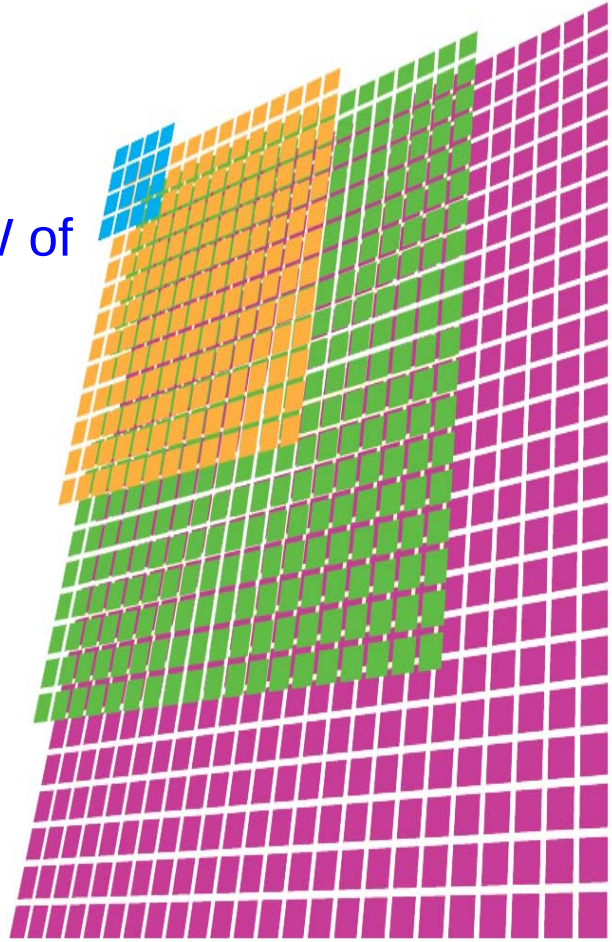
- 9 to 14 Times More Electricity Than Landfill Gas
- More Jobs
- Better Economic Development Opportunities
  - Sustainable Companies Moving to “Zero Landfill”
  - GM Has 100 Zero Landfill Plants
- EfW Reduces Volume Of Waste By 90%
- Recovery of Metals
- EfW Can Reuse Low Grade Water, Such As Greywater And Landfill Leachate, For Process Water
- More Efficient Use of Land
- Processes Waste In An Hour vs. 100 Years

	EfW Facility	Landfill
Electricity Generated from 1 Ton of Waste: *EfW facilities are much more efficient at turning waste into energy, generating nearly 10x more electricity from one ton of waste than landfill-gas-to-energy plants.*	**550 kWh** (Enough to power the avg. home for 2 weeks)	**65 kWh** (Enough to power the avg. home for 2 days)
Regulation / Emissions: *On average, Covanta's EfW facilities operate at 60-80% better than permitted emission limits.* ***Landfills are subject to minimal regulation of air emissions, despite emission of over 170 air pollutants and 44 air toxics.***	Highly regulated. Advanced air pollution control.	CO_2 Minimally regulated. No air pollution control.
Metals Recoveredfrom 1 Ton of Waste: *Covanta's EfW facilities recover more than 400,000 tons of metals for recycling every year.* ***Landfills recover zero.***	**50 lbs**	**Ø none.**
Long-term Implications: *With EfW, it takes approximately 1 hour to process a ton of MSW and deliver the resulting electricity.* ***It is estimated that the decomposition of waste in a modern landfill takes 100 to 150 years.***	**1 Hr.**	**100-150 YEARS**

EfW – The Superior Alternative to Landfills

EfW is one of the most efficient uses of land per megawatt (acres MW)

- EfW facilities require an average of .7 acres MW of electricity
- Solar requires 8 acres MW
- Wind requires18 acres MW
- Landfill gas to energy 27 acres MW



Energy-from-Waste

Solar Power

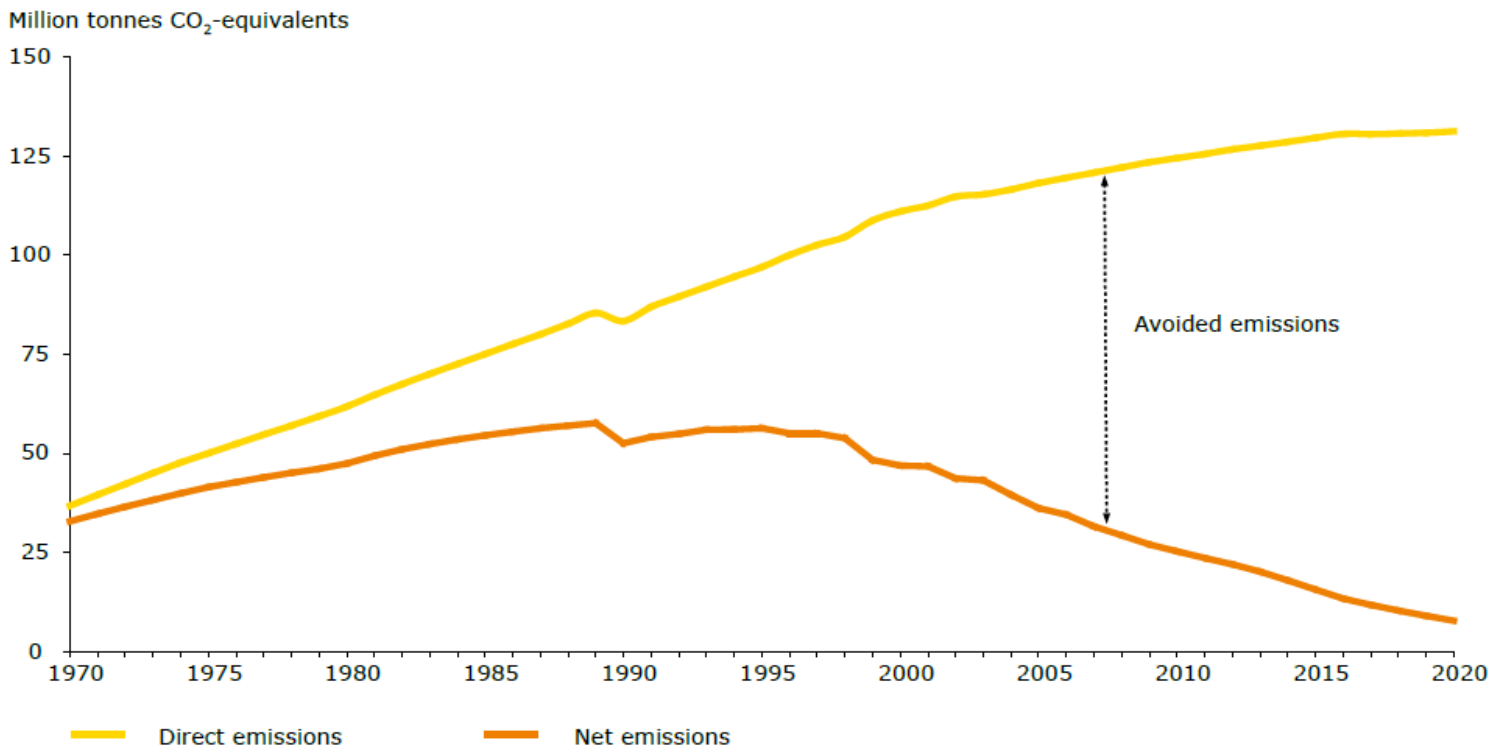
Wind Power

Landfill gas to energy

EfW – The Superior Alternative to Landfills

- Intergovernmental Panel on Climate Change (IPCC) recognizes EfW as a key GHG mitigation technology
- Reduces GHG emissions to combat global warming
  - Prevents generation of methane from landfills (Leading source of greenhouse gas, 25X more potent than CO_2)
  - One ton of waste processed by EfW reduces one ton of GHG emissions
- Reduces dependence on fossil fuel power and offsets fossil CO_2 emissions
  - One ton of waste ~ ¼ ton of coal
  - One ton of waste ~ 1 barrel of oil
  - EfW facilities produce 9 to 14 times more energy per ton compared to landfills
- Recycles tons of metal annually, further preventing GHG emissions

EfW – The Superior Alternative to Landfills



Source: ETC/RWM.

European Environment Agency

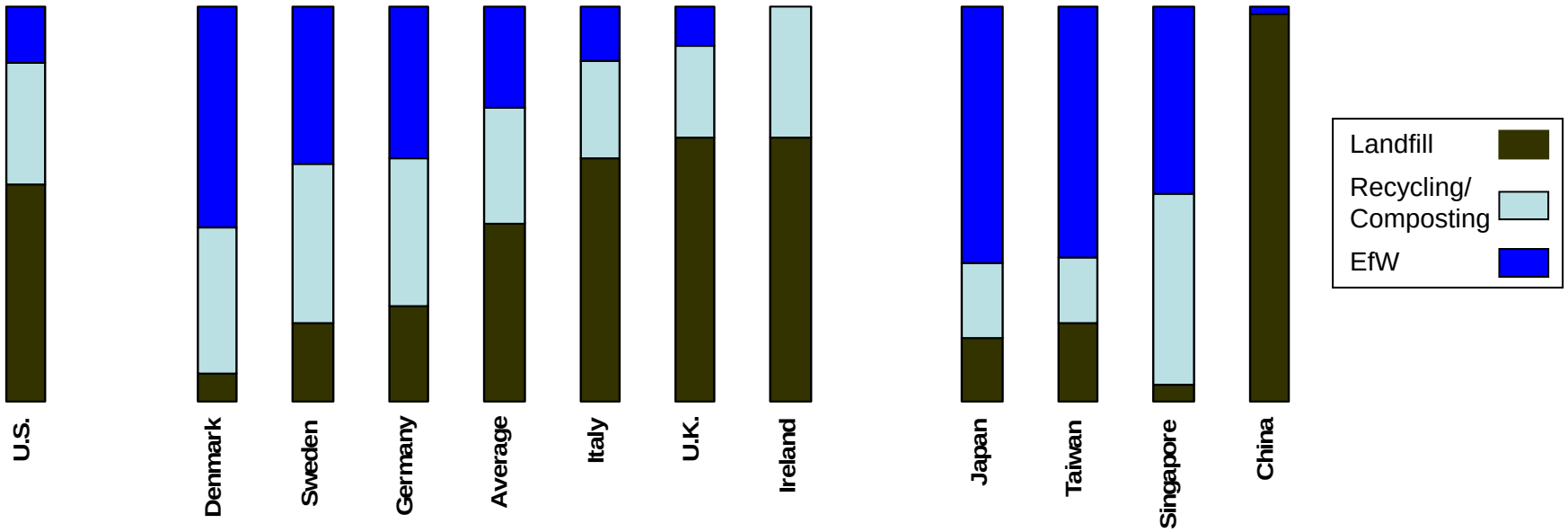
EEA Briefing, "Better management of municipal waste will reduce greenhouse gas emissions"

World Scientific Community Advocates For More EfW and Less Landfilling

- World Economic Forum Davos Report
- Rio Conference
- Intergovernmental Panel on Climate Change
- Kyoto Protocol
- US EPA
- European Environmental Agency

International Use of EfW

EfW 0.2 billion tons Recycling 0.5 billion tons **Landfill 1.0 billion tons**



U.S.
~ 90 EfW facilities
~ 30 million TPY

Western Europe
~ 400 EfW facilities
~ 65 million TPY

Asia
~ 325 EfW facilities
~ 55 million TPY

EfW in the RPS: Leveling the Field

July 2011

Table ES2. Quantified energy-specific subsidies and support by type, FY 2010 and FY 2007 (million 2010 dollars)

Beneficiary	Direct Ex-penditures	Tax Ex-penditures	Research & Develop-ment	DOE Loan Guarantee Program	Federal & RUS Electricity[1]	Total	ARRA Related
2010							
Coal	42	561	663	0	91	1,358	97
Refined Coal	0	0	0	0	0	0	0
Natural Gas and Petroleum Liquids	4	2,690	70	0	56	2,820	0
Nuclear	0	908	1,169	265	157	2,499	147
Renewables	4,696	8,168	1,409	269	133	14,674	6,193
Biomass	57	523	537	0	0	1,117	10
Geothermal	160	1	100	12	0	273	228
Hydro	17	17	52	0	130	216	16
Solar	496	120	348	173	0	1,134	788
Wind	3,556	1,178	166	85	1	4,986	4,852
Other	95	0	205	0	1	302	130
Biofuels	314	6,330	0	0	0	6,644	169
Electricity -Smart Grid & Transmission	461	58		20	211	971	495
Conservation	3,387	3,206	0	4	0	6,597	6,305
End-Use	5,705	693	832	1,011	0	8,241	1,549
LIHEAP	5,000	0	0	0	0	5,000	0
Other	705	693	832	1,011	0	3,241	1,549
Total	**14,295**	**16,284**	**4,365**	**1,570**	**648**	**37,160**	**14,786**

U.S. Energy Information Administration | Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2010 xiii

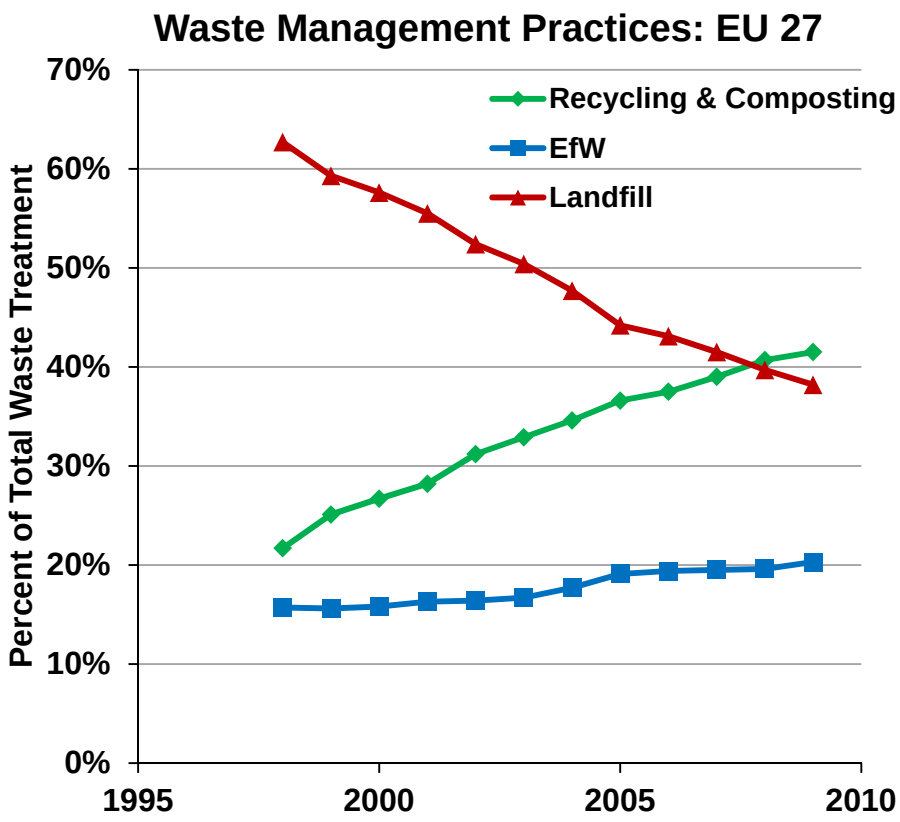
"0"

Direct Federal Financial Interventions and Subsidies in Energy in Fiscal Year 2010

– Energy Information Administration July 2011, page xiii

"Renewable other" (landfill gas, municipal solid waste and hydrogen) received $302M in 2010; however, no subsidies were allocated to MSW (EfW).

How Are The RPS and Recycling Related?



- **Experience in Europe has demonstrated a movement away from landfills toward EfW has resulted in increased recycling**
- **In the US, a recent study proves that communities that use EfW have HIGHER recycling rates than the national average**
- **MI Recycling Rate Is 20% Compared To The National Average of 34%**

"There is no evidence to support" the argument that "incineration of waste with energy recovery hinders the development of recycling"

European Environment Agency, 2007, *Europe's Environment, the 4th Assessment*

How Are The RPS and Recycling Related?

Dramatic Difference – Potential MI Energy

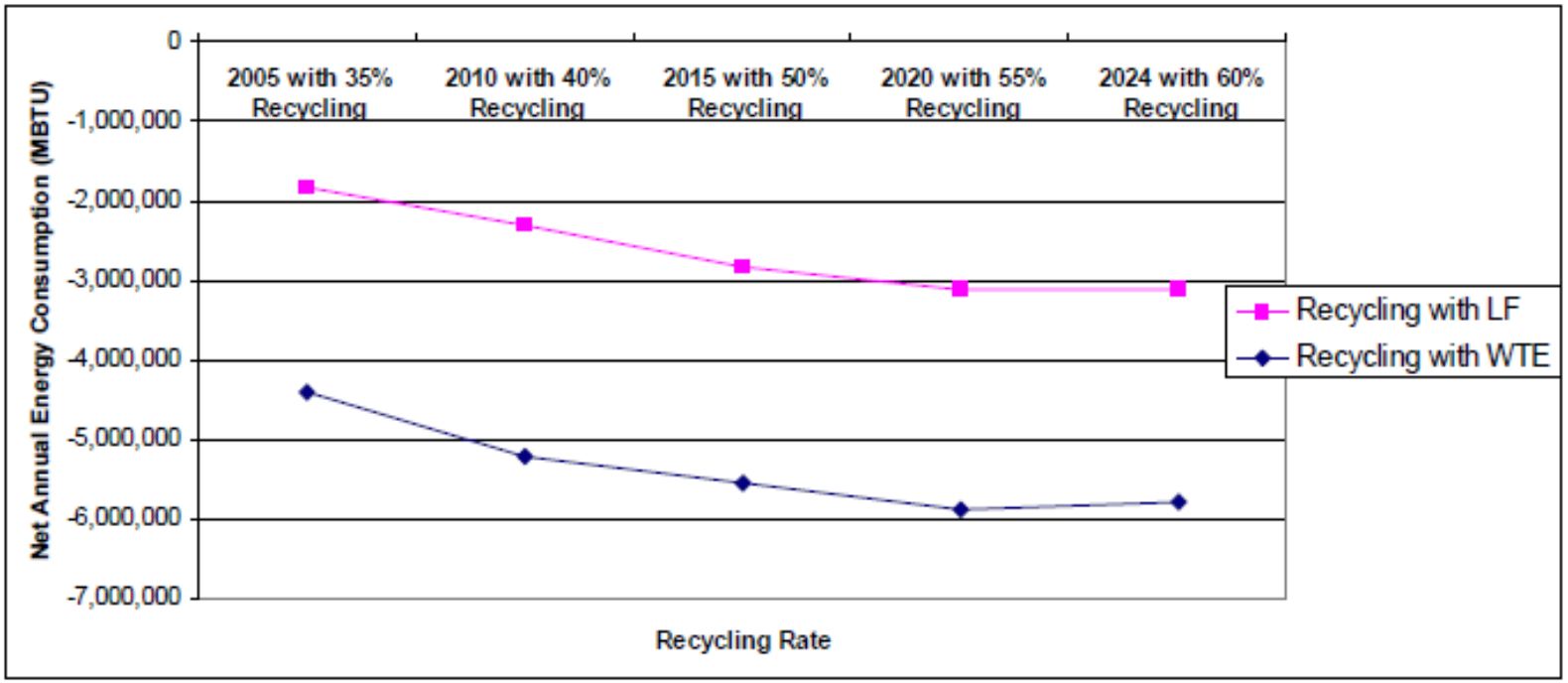


Figure B-6. Energy Consumption Results Analyzing Variations in Recycling Rates.

http://www.nmwda.org/fcqa/pdf/modelling.pdf

Economic Development → Green Jobs

Typical New Facility Creates Nearly <u>$1 Billion of Economic Impact</u>

1,500 ton per day/50MW facility

- Construction for 3 Years of Activity
  - $400 million Construction Cost – 825 Michigan Jobs
    - 250 direct construction jobs per year
    - 575 secondary construction jobs per year
- Operation for Minimum 25 years
  - $31 Million Annual Operating Budget Benefits Local Economy
  - Full Time Job Creation – 110 Michigan Jobs
    - 50 direct jobs to operate facility
      - high paid jobs averaging more than $60K/year
      - Training provided
    - 60 secondary jobs to support facility
  - State Income Tax, Local Taxes Or Payment In Lieu Of Taxes

Economic Development: Companies Embrace "Zero Landfill" Policies

BOEING

The Walt Disney Company

CATERPILLAR®

KRAFT

Walmart
Save money. Live better.

Nestlé

Levi's

P&G
Procter & Gamble

Ford

DUPONT

The Coca-Cola Company

GM

SUBARU

BURT'S BEES

TOYOTA

Economic Development: EfW is Reliable Baseload Power

- EfW is baseload renewable energy, with higher capacity factors than other renewables or traditional fossil generation
- EfW is located close to load centers, reducing transmission losses

U.S. EIA / EPA Capacity Factors	
WTE*	64.6%
Coal	63.8%
Natural Gas combined cycle	42.2%
Hydroelectric	39.8%
Other Renewables	33.9%

* Combined Heat & Power (CHP) Plants excluded

Sources:

U.S. EIA 2009 Electric Power Annual

U.S. EPA eGRID 2012 v1.0

Making Good Energy Decisions

- Increase the RPS In A Responsible Manner
  - Diversify Energy Supply
  - Should Be Done Over a Sufficient Period Of Time
  - Goal Should Be Attainable
- Remove Barriers and Limits on <u>All</u> Renewables
  - Michigan Cannot Run A Manufacturing Economy On Intermittent Power
    - Need Baseload Renewable Power Using Michigan Jobs
  - Private Sector Wants Reliable Renewable Energy Options
    - Can Michigan Deliver?
  - Private Sector Wants “Zero Landfill” Option
    - Can Michigan Deliver?
  - Local Governments Want Choices Regarding Solid Waste

Overview of EfW Facility in Kent County

- Processes about 187,000 tons of waste into electricity
- Generates 16 MW
- 47 jobs - $4.5 m in payroll
- Recovers metals for recycling
- Continuous emission monitoring
- Designated as a Clean Corporate Citizen (C3)

Additional Resources

- New York Times Article: “Europe Finds Fuel In Trash; U.S. Sits Back”
- CBC Report: “Taxes in, Garbage Out”
- Excerpt: World Economic Forum: “Green Investing 2010”
- Excerpt: United Nations Conference on Sustainable Development
- Kaplan, Decarolis & Thorneloe; “Is It Better to Burn or Bury Waste for Clean Electricity Generation?”
- European Environment Agency Briefing: “Better management of municipal waste will reduce greenhouse gas emissions”
- Center for American Progress: “Energy from Waste Can Help Curb Greenhouse Gas Emissions”