

# Hot Topics for Waste-to-Energy Investors and Developers

## **Moderator:**

Craig Kettler, Deloitte Financial Advisory Services LLP

## **Speakers:**

Gary Hecimovich, Deloitte Tax LLP

Mark Hindes, Deloitte Tax LLP

Marc Machlin, Pepper Hamilton LLP

Todd Reinstein, Pepper Hamilton LLP



March 6, 2013



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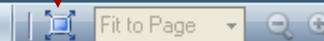
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March 6, 2013

**Deloitte.**

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Ask, answer, or manage questions

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No questions have been answered yet.

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**Deloitte.**

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**Pepper Hamilton LLP**  
Attorneys at Law



202.378.5068  
ckettler@deloitte.com

- Director, Deloitte Financial Advisory Services, LLP
- Former co-founder of the first independent electric transmission company in the US (Trans-Elect)
- Practice focuses on valuation issues for M&A, tax restructuring, and general management planning including evaluation of financing and strategic alternatives
- Clients cover a wide range of developmental stages and industries including technology, alternative energy and energy conservation, electric transmission, government contracting, aerospace/defense, and financial services





202.220.1439  
machlinm@pepperlaw.com

- Partner in the Washington office of Pepper Hamilton LLP
- Head of the Regulatory Section within the firm's Commercial Litigation Practice Group
- Practice covers a broad range of areas, including environmental and energy; infrastructure projects and renewable energy projects; transportation and product safety; public utility regulation and railroad regulation
- Member of the firm's Sustainability, CleanTech and Climate Change Team

# Current Status of Waste-To-Energy Sector in the United States



- As of 2013, approximately 85 plants in 23 states process municipal solid waste
  - 70 waste-to-energy plants
  - 14 plants burn refuse derived fuel / 1 plant using pyrolysis and/or gasification
  - These figures do not include landfill gas projects, or facilities burning wood waste, anthracite coal waste, railroad ties, and/or tires or tire-derived fuels
    - 594 active landfill gas projects
    - 540 additional landfills believed to be viable locations by EPA
- The 85 plants have capacity to process more than 97,000 tons of MSW per day
- Approximately 26 million tons of MSW processed per year

Source: Ted Michaels, Energy Recovery Council; USEPA.

# Current Status of Waste-To-Energy Sector in the United States



- Waste-to-energy facilities may be designed to produce steam and/or chilled water (CHP or cogeneration)
  - Facilities in Baltimore, Indianapolis, Detroit and Grand Rapids provide steam through district heating systems
  - Facilities in Alabama, Maryland, Utah, and Virginia provide steam to military facilities and/or federal government facilities
  - Other WTE facilities serve nearby industrial plants in Massachusetts and Minnesota

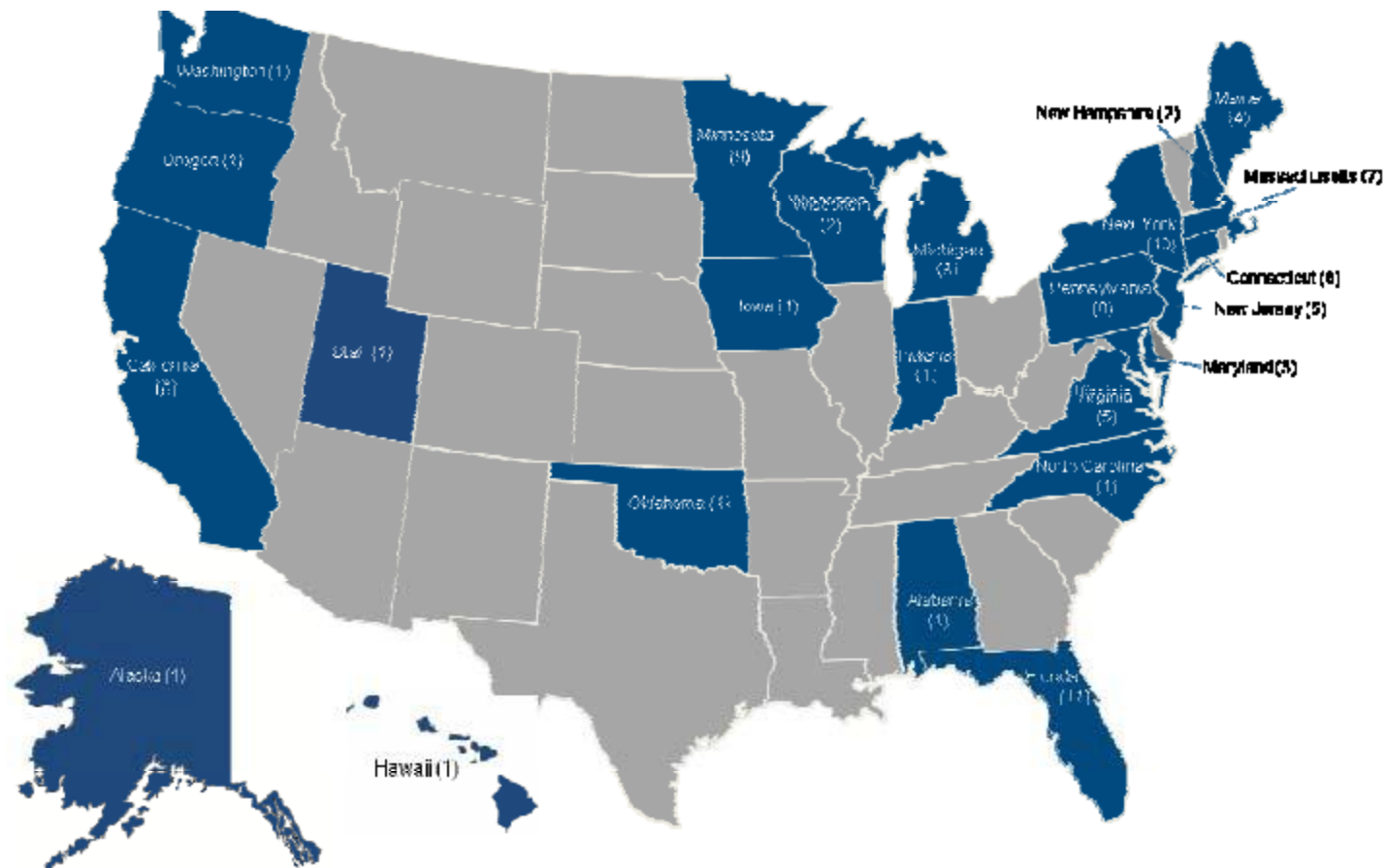
Source: Ted Michaels, Energy Recovery Council; USEPA

# Current Status of Waste-To-Energy Sector in the United States



- The 85 existing plants have the capacity to generate the equivalent of 2,800 megawatt hours of electricity per year
  - 2572 megawatt hours power
  - Equivalent of 218 megawatt hours of steam
- MSW-powered generating plants typically operate 90 percent of the time; these plants provide baseload power
- Many States designate waste-to-energy as a renewable energy resource
  - 25 States, plus the District of Columbia and Puerto Rico define renewable energy to include WTE facilities
  - WTE facilities often qualify as a renewable energy resource under State renewable portfolio standards

# Operating MSW Waste-To-Energy Plants



Florida - 11 facilities

Minnesota - 9 facilities

New York - 10 facilities

Massachusetts - 7 facilities

Source: USEPA, Waste-to-Energy in the U.S. and Trends for the Future, Jesse Miller, August 9, 2011

# Waste-To-Energy Offers Many Environmental Benefits



- EPA estimates that for every ton of MSW processed by a waste-to-energy plant, emissions of greenhouse gases (CO<sub>2</sub> and other gases) decline by one ton
- Reductions in greenhouse gas emissions occur in several ways
  - Reduced emissions of methane (a very potent greenhouse gas) from landfills; less waste decays in landfills
  - Reduced emissions from coal-fired and gas-fired power plants

# Waste-To-Energy Offers Many Environmental Benefits



- Reduced CO<sub>2</sub> emissions from recovery of metals
  - Waste-to-energy plants recover more than 700,000 tons of ferrous and non-ferrous metals each year
  - Recycling metals reduces energy consumption and avoids carbon dioxide emissions that are generated when virgin metals are mined and new metals are manufactured

# Mass Burn Plants; Reduction in Waste Volume

## Mass Burn Plants

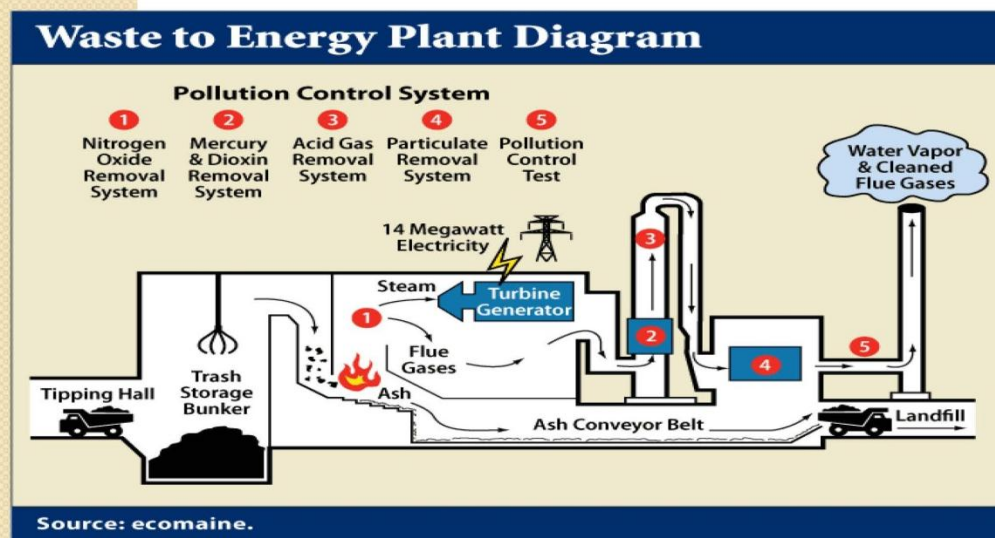
Mass burn (WTE) plants are designed to be highly reliable with consistent operation

They typically operate at about 25% efficiency

- (Coal plants, by comparison, typically operate at 35% efficiency)

WTE plants run constantly, and experience very little down time due to the decreased efficiency

WTE plants reduce waste volume by 90% and the remaining residual ash goes to a landfill



Source: USEPA



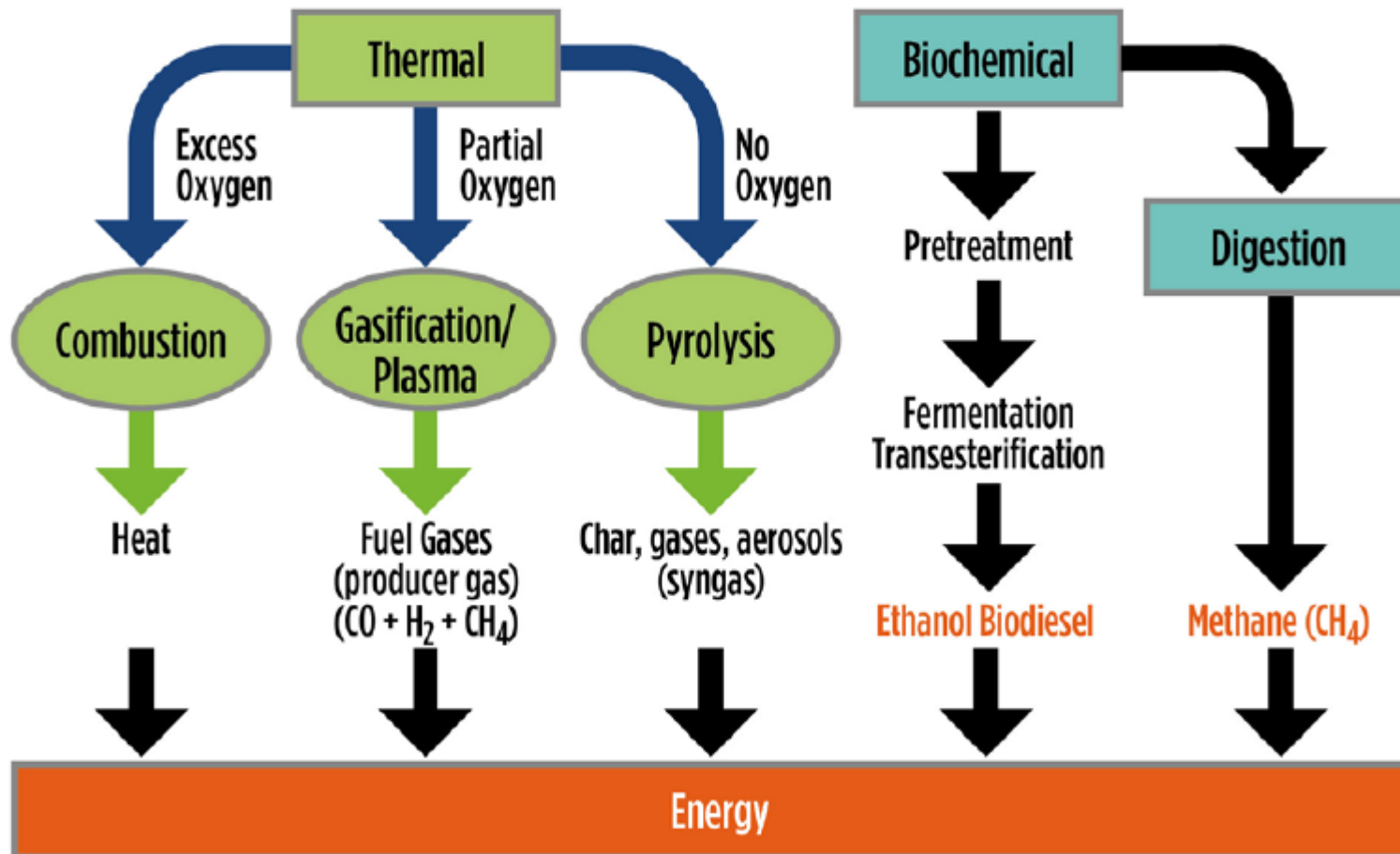
# Municipal Solid Waste Still an Abundant Resource



	<b>1980</b>	<b>2010</b>
Solid Waste Generation	3.66 #/Capita/Day	4.43 #/Capita/Day
Amount Recycled	<10%	34%
Disposed of in Landfills	89%	54%

Sources: USEPA; Bob Brickner, Gershman, Brickner & Bratton, Inc.

# Many Technologies Available



Source: National Renewable Energy Laboratory

# Economics of Waste-To-Energy



- Many successful facilities in North America and a few failures
- Several different technologies in use; more technologies in development, but cities, counties, and private developers lean to proven technologies
- Economics on new MSW projects typically enhanced for facilities that burn 1000 – 1500 tons per day
  - Yet not all communities generate this volume or have interest in teaming with neighboring cities or counties
  - Existing modular facilities do not seem to be meeting demand for economical smaller systems
  - Smaller facilities with new designs would potentially fill a gap; Covanta is apparently developing a 300 ton per day gasification plant; now being tested
- For large and small facilities, concerns about air emissions standards being tightened in the future



- New WTE projects are in the pipeline in several states and provinces, including Florida, Maryland, Puerto Rico, and Ontario, but it is not easy to locate, permit, and finance large mass burn facilities
  - permitting process arduous for large new facilities
  - public opposition often a factor; environmental groups often raise questions about large new projects
  - expansions; retrofits, upgrades may face less opposition



- Substantial interest in smaller plants that process waste into a liquid or gas, which is then used to generate electricity
  - Smaller plants may be designed to process all or virtually all municipal solid waste
  - Or, smaller plants may be designed for a particular waste stream (i.e., food waste, wood waste, sewage sludge, or animal waste)
  - Smaller plants may rely upon anaerobic digestion as the first step in the process, or they may use other technologies



- Facilities supported by several revenue streams
  - Tipping Fees
  - Electricity Sales
  - Sales of Recovered Metals
  - Production Tax Credit or Investment Tax Credit
  - Renewable Energy Credits In Select States
- Successful facilities must have an assured volume of incoming waste
  - Careful development of waste supply agreements
  - Evaluation of whether waste volume can be guaranteed through flow controls improved by local authorities



- Capital costs for large new WTE facilities are substantial
  - One prominent example: new 95 MW plant being developed by Solid Waste Authority Of Palm County, Florida (West Palm Beach)
  - Capacity to process 3,000 tons per day of MSW; new facility on a 24 acre parcel adjacent to existing plant
  - Construction cost estimated at \$668 million
  - A smaller facility still may have a substantial capital cost (*i.e.*, 17.6 MW facility in Ontario, producing power and steam; estimated cost of \$260 million)

# The Future of Waste-To-Energy



- Development of large new MSW facilities in specific markets or states; and expansion of existing facilities; new projects driven by a multiple of factors
  - Assured waste supply
  - High landfilling costs
  - Site that is acceptable to community; preferably linked to vibrant road network
  - Landfill for ash and for waste not suitable for process
  - Strong political support
  - Ability to raise capital
  - Power prices



# The Future of Waste-To-Energy



- Projects seeking to qualify for PTC or ITC in 2013 face challenges in reconciling the tax laws and the environmental laws.
  - Substantial physical work on site helps for tax purposes
  - However, unless the project developer has obtained a construction permit under the Clean Air Act, the developer in most States may not begin “actual construction”
    - Landscaping; grading; site preparation often allowed by EPA, States
    - Installation of buildings, foundations, permanent structures usually not allowed

# The Future of Waste-To-Energy



- In some states, Clean Air Act rules may allow a developer to construct at its own risk
- Allowed activities under Clean Air Act may depend partly on whether a facility will be a major source; evaluation may require data on projected air emissions
- Projects that already have (or are close to obtaining) construction permits under the Clean Air Act will have huge advantage in meeting the 2013 deadline

# The Future of Waste-To-Energy



- Advantages for smaller projects targeted to particular types of waste (such as food waste, sewage sludge, landfill gas)
  - Private ownership more feasible for projects with a lower capital costs, and with a shorter time line to completion
  - Air permitting may be less burdensome, less time consuming for projects with a smaller array of pollutants and with a lower volume of pollutants
  - Private ownership allows for use of federal tax incentives, but private firms may have a higher cost of capital
  - Smaller projects less likely to attract opposition from environmental groups or adjacent property owners
  - Smaller projects have much less impact on local roads, truck traffic

# The Future of Waste-To-Energy

- Still need strong local political support, but small projects pose less risk for political leaders, regulators
- In some States, grants, loans, or loan guarantees available
- In some instances, captive private sector projects may be viable
  - land leased by private developer from County or municipality or public authority
  - waste supplied partly or wholly by public sector entity under long-term agreement
  - electric power, gas, or biofuel sold back to public sector entity under long-term agreement
  - private company provides capital and engineering services and operations and maintenance services

# The Future of Waste-To-Energy



## The Bottom Line:

- There are many opportunities in North America
- Continued efforts are needed to build public support, document benefits to the community



202.879.4936  
ghecimovich@deloitte.com

- Partner in the Washington National Tax Office of Deloitte Tax LLP and a member of the firm's Federal Tax Accounting, Periods, Methods and Credits Group
- 20 years of public accounting experience specializing in federal income tax credits and incentives and related accounting method issues
- Provides due diligence, structuring, application writing and transactional consulting with respect to a wide array of federal income tax incentives

# Importance of Defining when Construction Begins



- Prior to the passage of ATRA, eligibility for the PTC (or ITC in lieu of PTC) was centered around the date a qualified facility was “placed in service.”
- ATRA changed eligibility requirements to center on whether “construction begins” before January 1, 2014 with respect to qualified facilities (including trash and landfill gas facilities)
- This represents a significant change in the way the credit works and introduces a great deal of uncertainty



- It is expected that the IRS will “borrow” from “begun construction” rules used to administer the ARRA section 1603 grant program
- Under the ARRA section 1603 program construction began when:
  - Physical work of a significant nature commenced, or
  - 5% of the total project cost was “paid or incurred”
    - Applicants could also “look through” to the costs of contractors engaged under a “written binding contract”



# Begun Construction



- Uncertainty remains in the following key areas:
  - Transferring of projects after they have “begun construction”
  - Applying the contractor “look through” rules:
    - Extent to which “written binding contracts” can be modified
    - Determining when an EPC contractor has “paid or incurred” an amount
    - Determining when an EPC contractor has commenced physical work of a significant nature
  - Defining the boundaries of the “qualified facility”



- Uncertainty remains in the following key areas (cont'd):
  - Can the taxpayer adopt an “aggregation rule”
    - Unit-of-property by unit-of-property
    - Facility-by-facility
    - Project-by-project
  - Program of continuous construction
  - Documentation necessary to affirm that construction has begun

# Begun Construction



- The IRS has stated their intention to provide guidance in the spring of 2013
- May be a “two-step” guidance project

# Begun Construction



- Taxpayers may claim either an ITC or PTC on qualified trash facilities and landfill gas facilities the construction of which begins prior to January 1, 2014
  - Qualified Trash Facilities must use “municipal solid waste” to produce electricity (including facilities that also use another qualifying resource to produce electricity)
  - Landfill gas facilities must generate electricity from gas derived from the biodegradation of municipal solid waste



Mark Hindes  
Deloitte Tax LLP  
202.220.2186  
mhindes@deloitte.com

- Senior manager in the Washington National Tax Office of Deloitte Tax LLP and a member of the firm's Federal Tax Accounting, Periods, Methods and Credits Group
- Ten years of experience helping clients maximize federal tax benefits
- Experience working with companies in the computer, software, and alternative energy industries

# Federal Tax Credit for WTE Plants



- Taxpayers may claim either an ITC or PTC on qualified trash facilities and landfill gas facilities the construction of which begins prior to January 1, 2014
  - Qualified Trash Facilities must use “municipal solid waste” to produce electricity
  - Landfill gas facilities must generate electricity from gas derived from the biodegradation of municipal solid waste

# Defining Municipal Solid Waste



- The tax code defines “municipal solid waste” as having the meaning given to the term “solid waste” under section 2(27) of the Solid Waste Disposal Act (42 U.S.C. 6903).
- Additionally, recent changes to the tax code also exclude commonly recycled paper which has been segregated from other solid waste.

# “Solid Waste” under the SWDA



- The definition of "solid waste" is central to the authority of the EPA to regulate certain materials generated by industry
- Materials meeting the SWDA definition of “solid waste” are subject to numerous regulations with respect to handling, storage, transportation, incineration, and disposal
- Generally, the determination as to whether a material constitutes “solid waste” for EPA purposes is made before any consideration of whether such material is “solid waste” for tax credit purposes



# “Solid Waste” under the SWDA



- Under the SWDA the definition of "solid waste" includes:
  - garbage
  - refuse
  - sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility
  - other discarded material

# “Solid Waste” under SWDA



- The term “other discarded material” includes: “solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities.”

# “Solid Waste” under SWDA



- Not included within the of “Solid waste” are:
  - solid or dissolved material in domestic sewage
  - solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act
  - Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954

# SWDA Definition of Solid Waste



- The definition of “solid waste” has been subject to a great deal of litigation.
- The Courts generally focus on the term “discarded”
- Courts found certain factors relevant in determining when a material is **not** “solid waste”:
  - Where industrial byproducts are immediately recycled following generation
  - Where Industrial byproducts are chemically indistinguishable from a commercial product
  - Where byproducts are readily tradable commodities
  - Where byproducts are used in “legitimate” recycling

# Uncertainty with Respect to Tax Credits



- One of the key uncertainties surrounding the tax credit is whether a substance can be treated as a “solid waste” for tax purposes if it is not regulated as “solid waste” for EPA purposes.
  - Certain TDF made from recycled tires are not regulated by the EPA as “solid waste”
  - Certain materials treated as a “valuable commodity” may not be regulated by the EPA as “solid waste”
  - Certain waste that is “chemically indistinguishable” from a commercial product is not regulated by the EPA as a “solid waste”
- It seems counterintuitive that the very thing the tax credit is trying to encourage (recycling materials through waste-to-energy projects) could render the material ineligible for the credit.

# Uncertainty with Respect to Tax Credits



- It seems clear that the first step in evaluating tax credit eligibility is to determine if a material is “solid waste” for EPA purposes
- What is less clear is whether there are any cases under which a material might be “solid waste” for tax purposes but not regulated as “solid waste” for EPA purposes



202.220.1520  
reinsteint@pepperlaw.com

- Tax partner with Pepper Hamilton LLP, resident in the Washington office
- Member of the firm's Sustainability, CleanTech and Climate Change Team
- Advises clients on structuring issues associated with claiming the credit for electricity produced from renewable resources (Section 45) and the solar investment tax credit (Section 48)
- Has advised clients on the new Renewable Energy Grant program and certification of Qualified Advanced Energy Manufacturing Projects Credit (Section 48C)

# Grant in Lieu of Tax Credits: Exam Activity



- Audits by Treasury and IRS
  - Treasury published audit reports available (nine audits through August 2012)
  - Solar City disclosed in SEC filings that Treasury OIG and IRS has examined awards
- Exam Issues
  - Cost basis
  - Beginning construction



# Grant in Lieu of Tax Credits: Sequestration?



- Sequestration impact on section 1603 grants
  - Grant payments with respect to grant award letters issued on or after March 1, 2013 through September 30, 2013 will be reduced by 8.7%.
  - This sequestration percentage may change for the 2014 federal government fiscal year

# Grant in Lieu of Tax Credits: Commence Construction



May demonstrate that construction has begun in one of two ways

- Subjective test: Begin physical work of a significant nature; or
- Objective test: Meet a 5% safe harbor

Work performed by other persons under a written binding contract is taken into account

- Written binding contract means
  - Enforceable under state law and does not limit damages to a specified amount
  - Limitation equal to 5% or more of the contract price is not a specified amount
  - Contracts providing full refund are not binding
  - Conditions not within the control of either party are permitted
  - Insubstantial changes or terms to be determined by standards not within the control of either party are permitted (i.e., minor modifications to design specifications)

# Grant in Lieu of Tax Credits: Commence Construction



## Safe Harbor Transfer of Energy Property

- If a person (the transferor) contributes, assigns or transfers energy property to a second person (the transferee) and the transferee uses the property in a project, the transferee is generally treated for purposes of the 5% safe harbor as having paid or incurred, at the same time as the transferor, the costs that the transferor paid or incurred to acquire the property, but only if the transferor (1) acquired the property for use in that project and (2) is related to the transferee.
  - Related person is generally defined in Section 197(f)(9)(C) as having a minimum 20% interest
  - Essentially allows transferee to step into the shoes of the transferor with respect to the amounts the transferor paid
- If an entity owning property that meets the 5% safe harbor is transferred after December 31, 2011 but before the property is placed in service, the entity's eligibility for a grant is not adversely affected if (1) the purchaser is otherwise an eligible grant applicant and (2) the entity had commenced development of the project



- PA Sunshine Solar Program Received \$7.25 Million in funding
- NY solar incentives have \$70 Million and will be issuing awards between the March 14<sup>th</sup> and August 29<sup>th</sup>



## **Hot Topics for Waste-to-Energy Investors and Developers – Part 2**

Wednesday, April 10, 2013

Noon – 1:30 p.m. EST

To register:

[http://www.regonline.com/webinar\\_04102013](http://www.regonline.com/webinar_04102013)

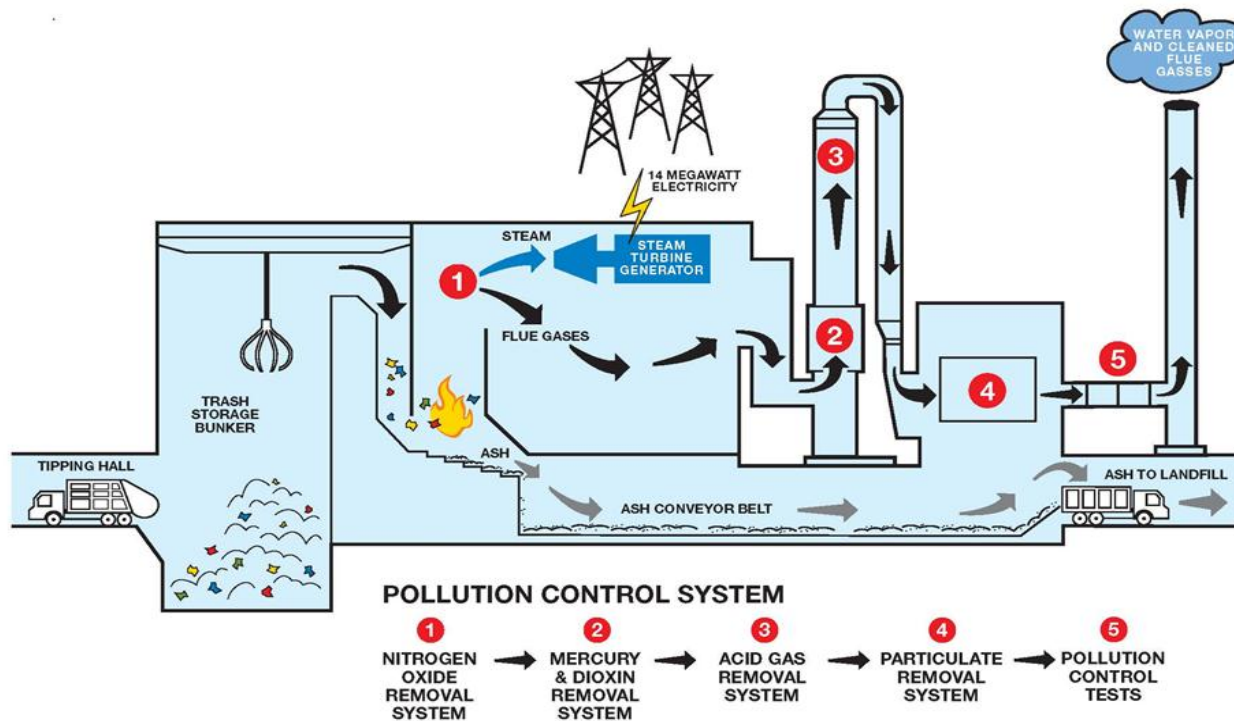
# Questions & Answers





# APPENDIX

# Schematic Diagram Of Mass Burn WTE Facility



## Waste-to-Energy

- 90% reduction of trash volume
- Power generation
- Pollution control

Source: [www.ecomaine.org](http://www.ecomaine.org)



# CO<sub>2</sub> Air Emissions Of Waste-To-Energy Plants Compare Favorably



## Air Emissions of Waste-To-Energy and Fossil Fuel Power Plants (Pounds per Megawatt Hour)

Facility Type	Direct CO <sub>2</sub> <sup>1</sup>	Life Cycle CO <sub>2</sub> E <sup>2</sup>
Coal	2,138	2,196
Oil	1,496	1,501
Natural Gas	1,176	1,276
Waste-To-Energy <sup>3</sup>	1,294	-3,636

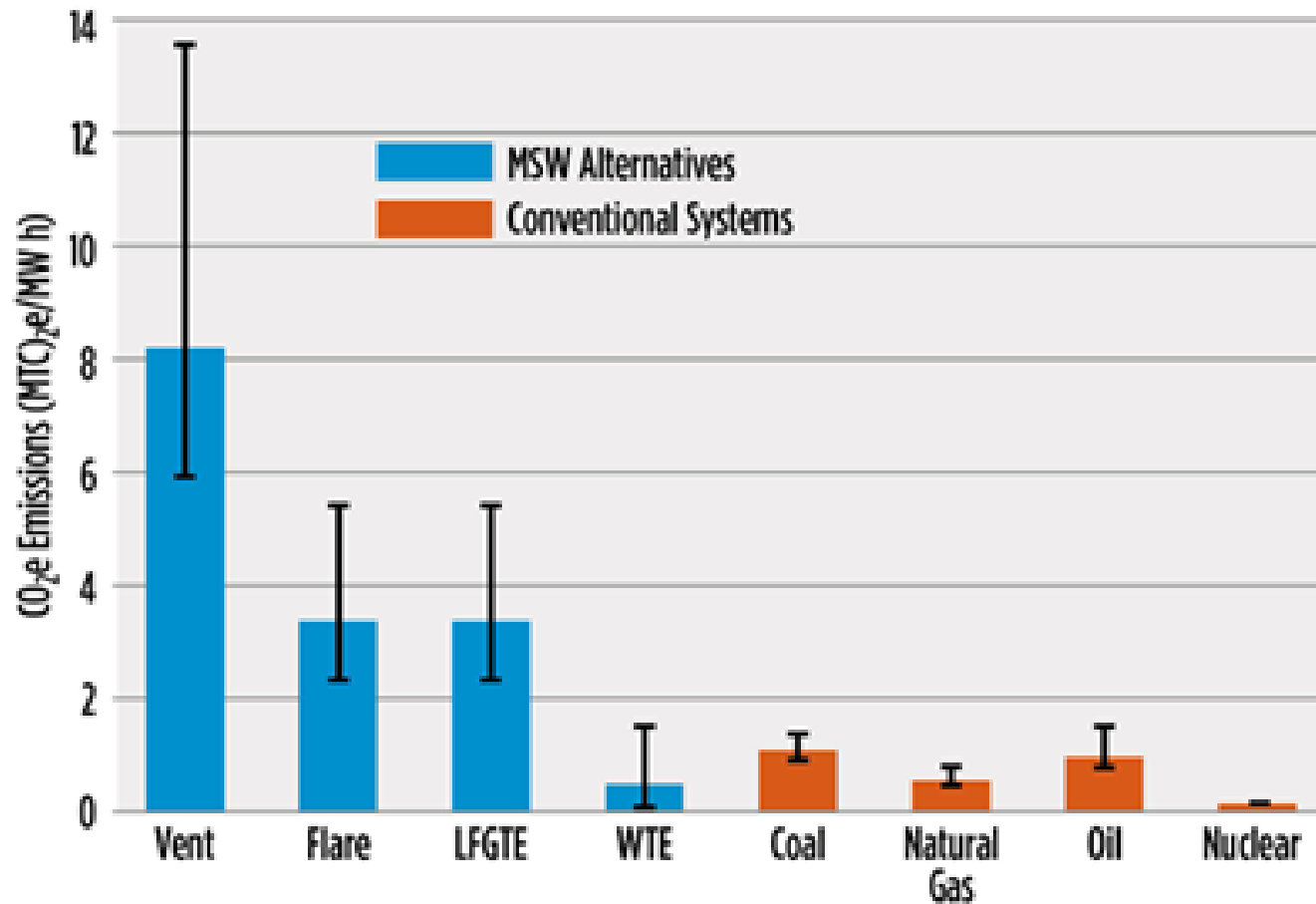
<sup>1</sup> Based on 2007 EPA eGRID data except WTE which is a nationwide average using 34% anthropogenic CO<sub>2</sub>.

<sup>2</sup> Life Cycle CO<sub>2</sub>E for fossil fuels limited to indirect methane emissions using EPA GHG inventory and EIA power generation data. Life Cycle value would be larger if indirect CO<sub>2</sub> was included.

<sup>3</sup> Life Cycle CO<sub>2</sub>E for WTE based on nominal nationwide avoidance ratio of 1 ton CO<sub>2</sub>E per ton of MSW using the Municipal Solid Waste Decision Support Tool, which includes avoided methane and avoided CO<sub>2</sub>.

Source: Energy Recovery Council; *The 2010 ERC Directory of Waste-to-Energy Plants*

# Comparative Analysis Of Air Emissions – Carbon Footprint



Source: National Renewable Energy Laboratory; *Waste-to-Energy Evaluation: U.S. Virgin Islands*, August 2011.

# Waste-To-Energy Facilities Have An Improved Air Emissions Profile



## Emissions from Large and Small MSW Combustion Facilities Pre- vs. Post-MACT Comparison

<b>Pollutants</b>	<b>1990 Emissions (tons per year)</b>	<b>2005 Emissions (tons per year)</b>	<b>Percent Reduction</b>
Mercury	57	2.3	96%
Cadmium	9.6	0.4	96%
Lead	170	5.5	97%
Particulate Matter	18,600	780	96%
Hydrogen Chloride	57,400	3,200	94%
Sulfur Dioxide	38,300	4,600	88%
Nitrogen Oxides	64,900	49,500	24%

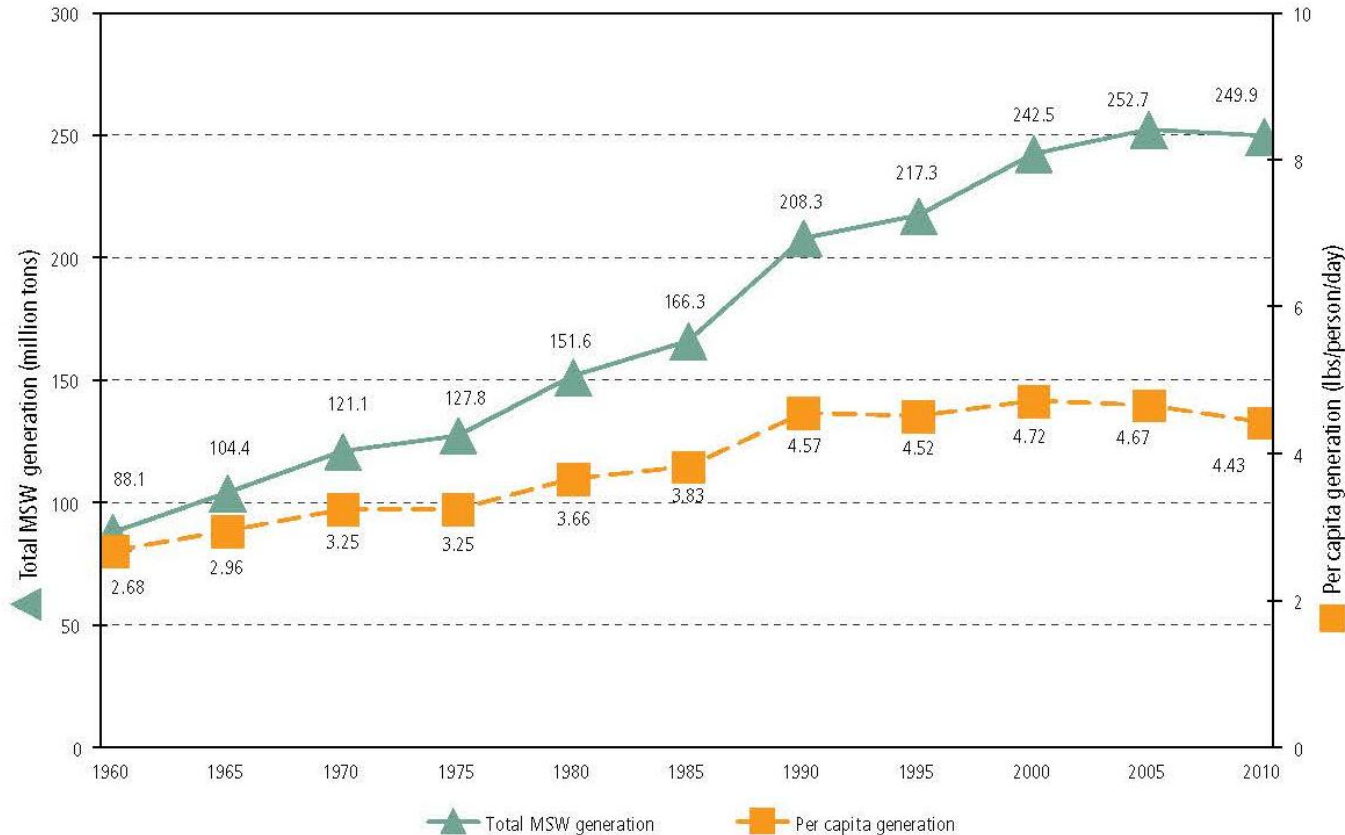
Dioxin and furan emissions are measured in grams on what is known as a “toxic equivalent quantity” or TEQ basis. There are many kinds of dioxins and furans. “TEQ” takes into account the fact that different dioxin and furan molecules have different hazard levels. Dioxin and furan emissions declined more than 99 percent from 4,400 grams TEQ in 1990 to 15 grams TEQ in 2005.

Source: USEPA, Air Emissions from MSW Combustion Facilities, History of changes over time from MSW combustion facilities and other sources

See: <http://www.epa.gov/epawaste/nonhaz/municipal/wte/airem.htm#5>

# MSW Generation Rates, 1960 to 2010

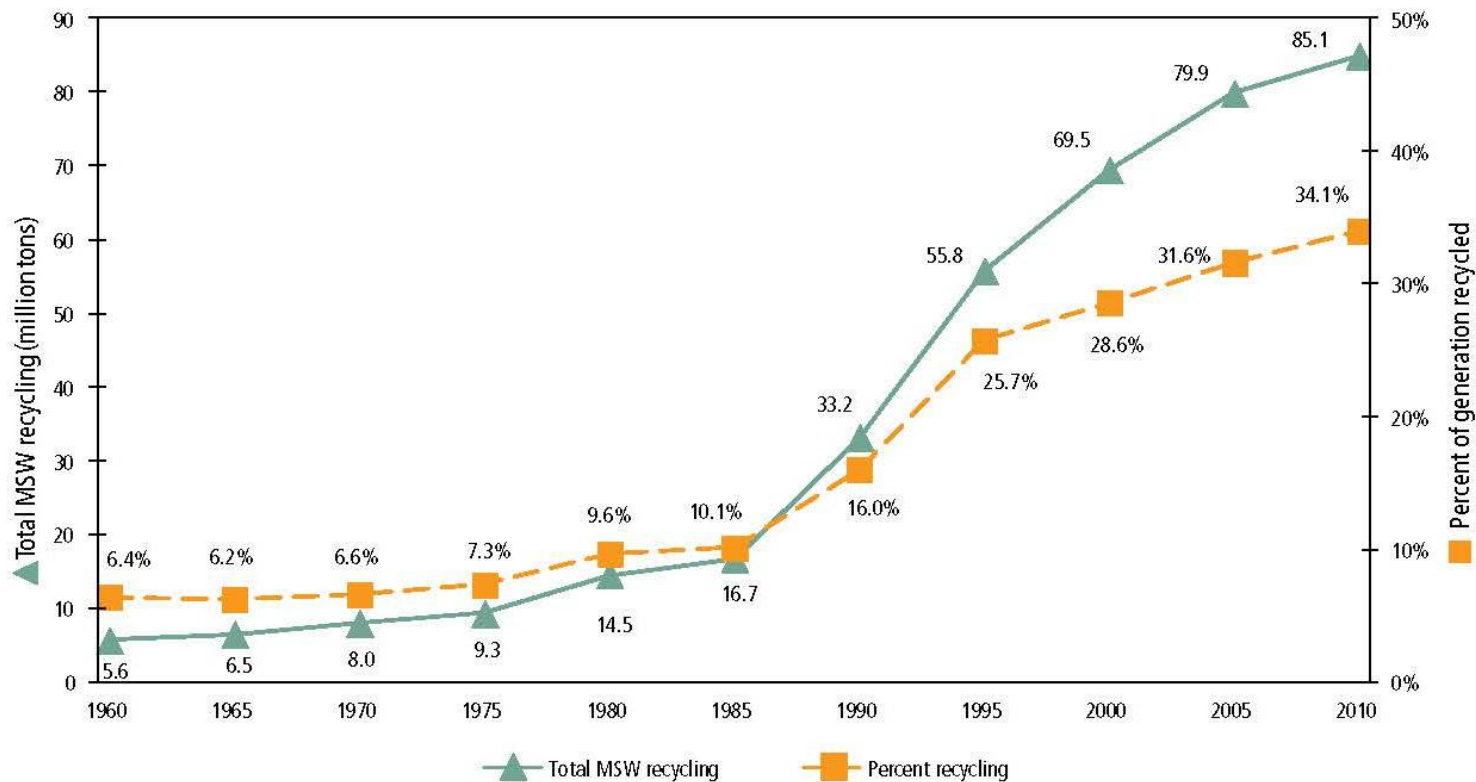
Figure 1. MSW Generation Rates, 1960 to 2010



Source: USEPA

# MSW Recycling Rates, 1960 to 2010

Figure 2. MSW Recycling Rates, 1960 to 2010



Source: USEPA

# Technologies and Perceived Implementation Risk

Alternative	Risks/Liability	Risk Summary
Mass Burn/WaterWall	Proven commercially	Very Low
Mass Burn/Modular	Proven commercially	Low
RDF/ Dedicated Boiler	Proven commercially	Low
RDF/ Fluid Bed	Proven technology; limited U.S. commercial experience	Moderate
Pyrolysis	Previous failures at scale, uncertain commercial potential;	High
Gasification	Limited operating experience at only small scale	High

Anaerobic digestion, mixed-waste composting, and chemical decomposition are other options that some communities are pursuing.

Source: USEPA (2011)

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