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RENEWABLE ENERGY FROM WASTE

WTE Developments in the United States 2010-2012

Ted Michaels
President
Energy Recovery Council

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WTERT 2012 Bi-Annual Conference

Columbia University
New York, NY

Energy Recovery Council & Industry Overview

- ERC represents companies and local governments engaged in the nation's waste-to-energy sector.
    - WTE providers
    - Local governments and solid waste authorities
    - Developers, contractors, consultants, law firms, etc.
- There are 85 waste-to-energy facilities in the United States operating in 23 states which produce clean, renewable energy through the combustion of municipal solid waste in specially designed power plants equipped with the most modern pollution control equipment to ensure clean emissions.
- The 85 waste-to-energy plants in the nation have a baseload electric generation capacity of approximately 2,700 megawatts and can process more than 28 million tons of trash per year.

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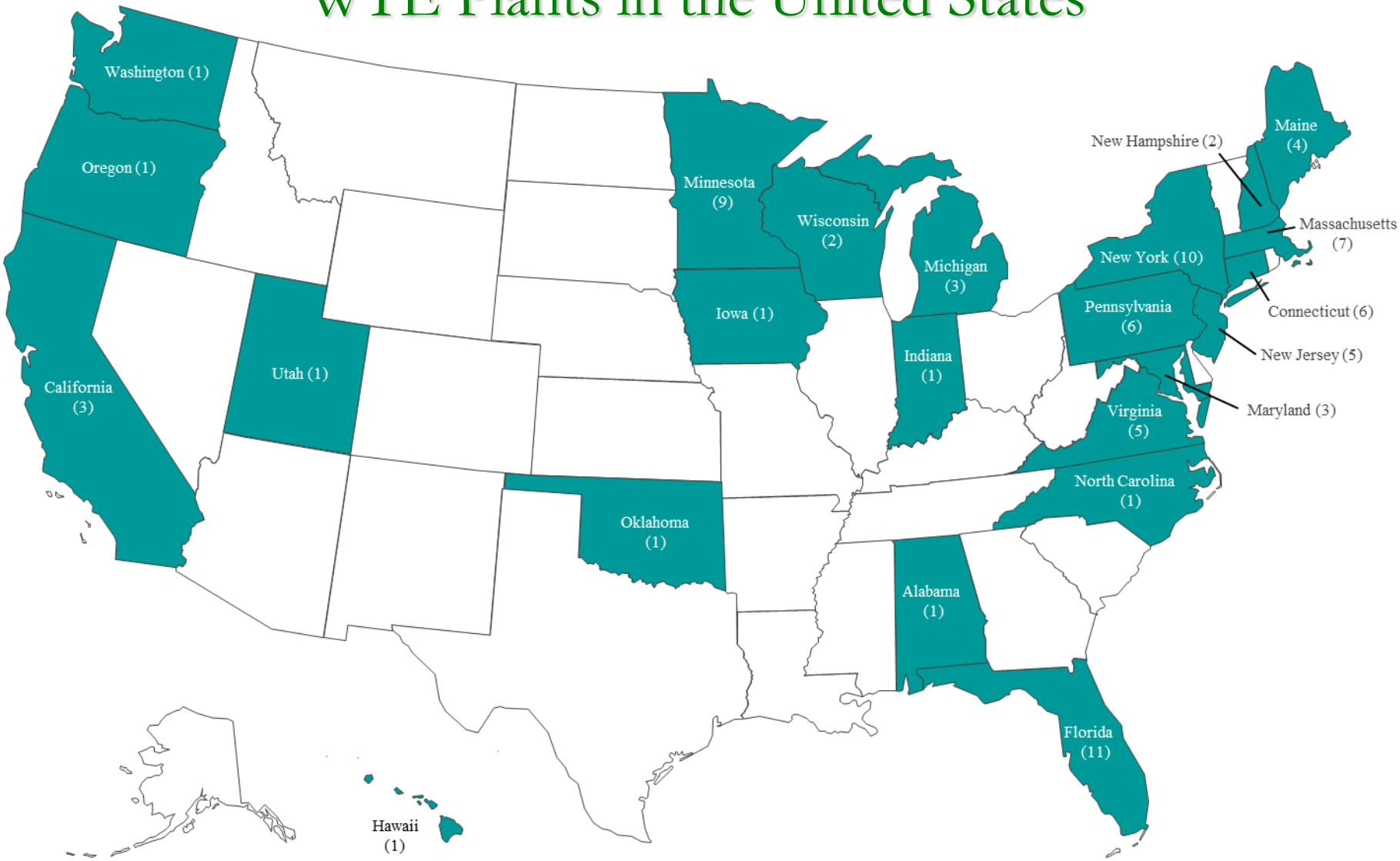
WTE Plants in the United States



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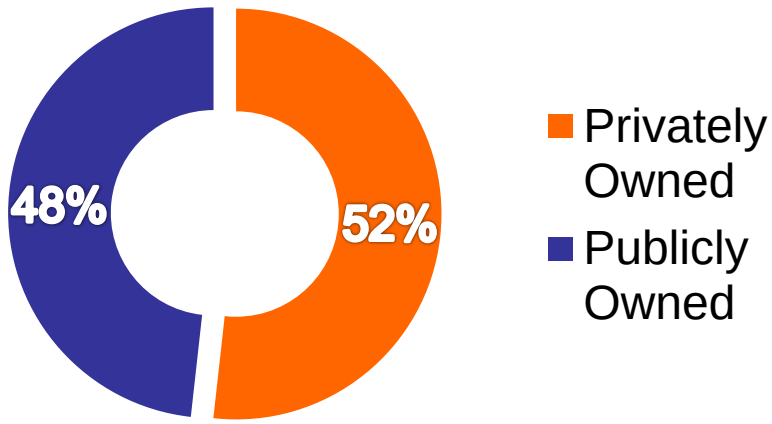
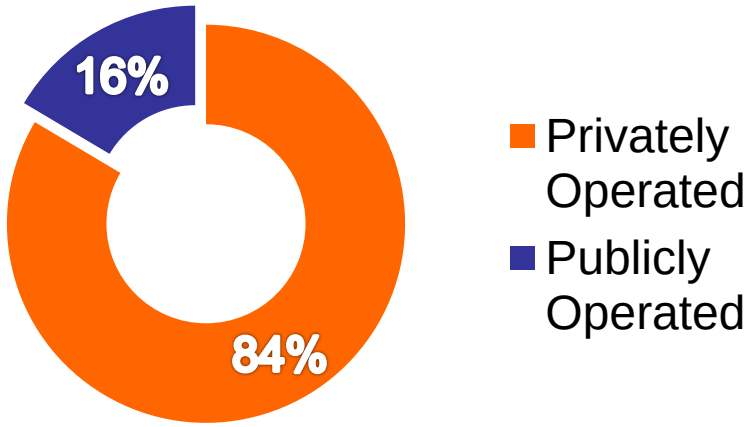
States with WTE Plants (number of plants in state)

Waste-to-Energy in the United States (Owners and Operators)

WTE Facility Ownership in the U.S.



WTE Facility Operation in the U.S.



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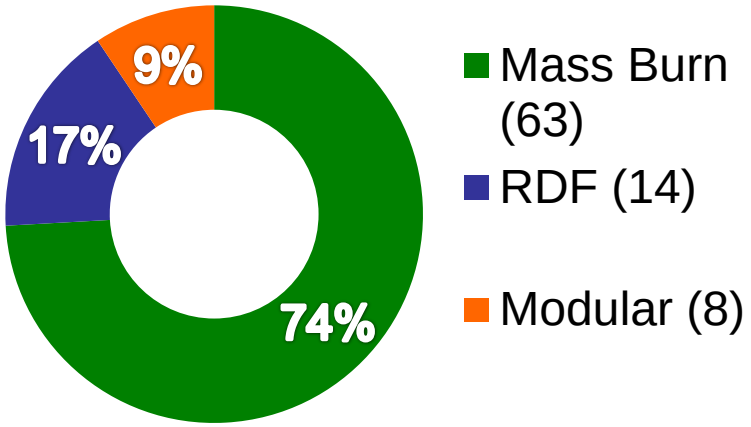
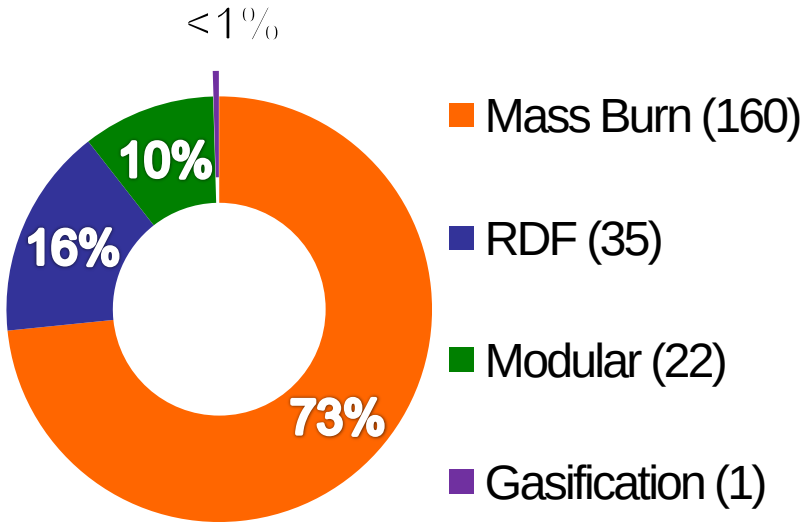
Waste-to-Energy in the United States (Technology Type)

WTE Facilities in the U.S. by Technology Type



WTE Units Operating in the U.S. by Technology Type



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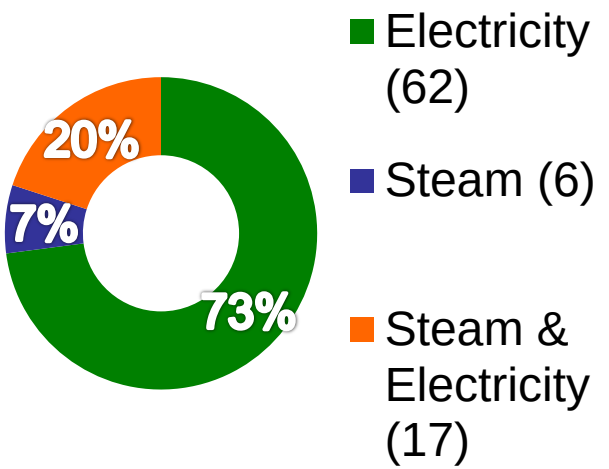
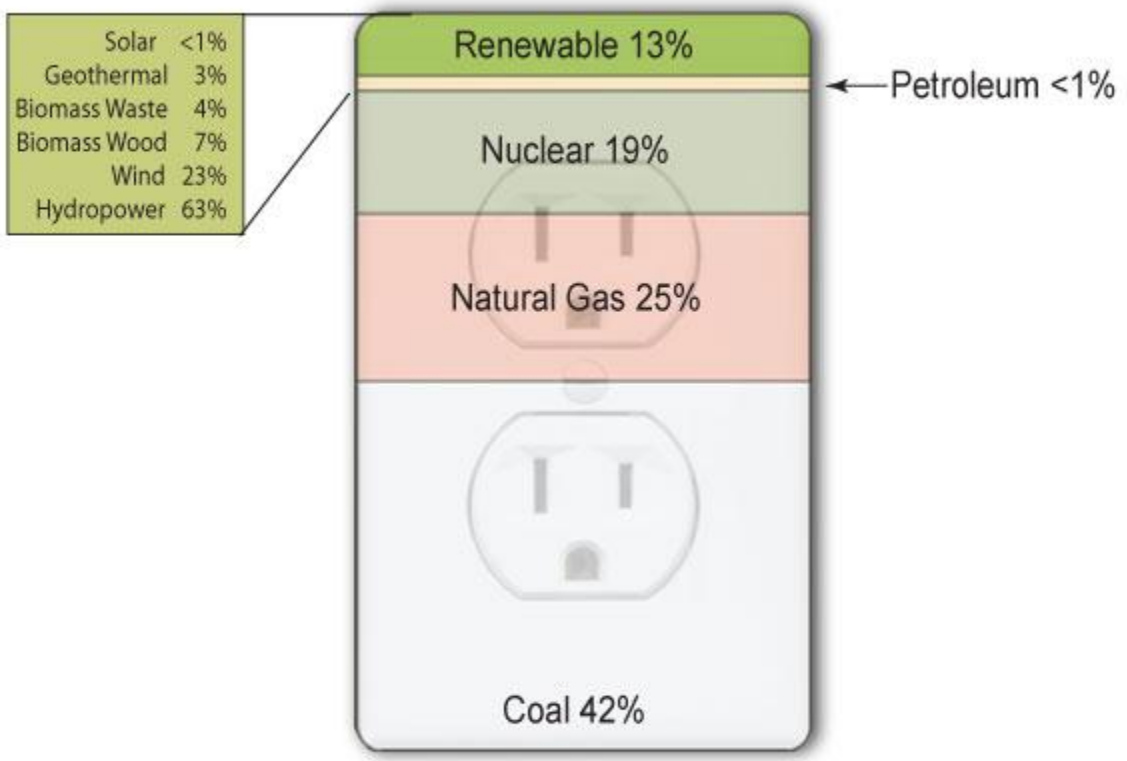
Waste-to-Energy in the United States (Energy)

WTE Facilities in the U.S. by Energy Product



Sources of Electricity Generation, 2011



Note: Includes utility-scale generation only. Excludes most customer-sited generation, for example, residential and commercial rooftop solar installations

Source: U.S. Energy Information Administration, *Electric Power Monthly* (March 2012). Percentages based on Table 1.1, preliminary 2011 data.

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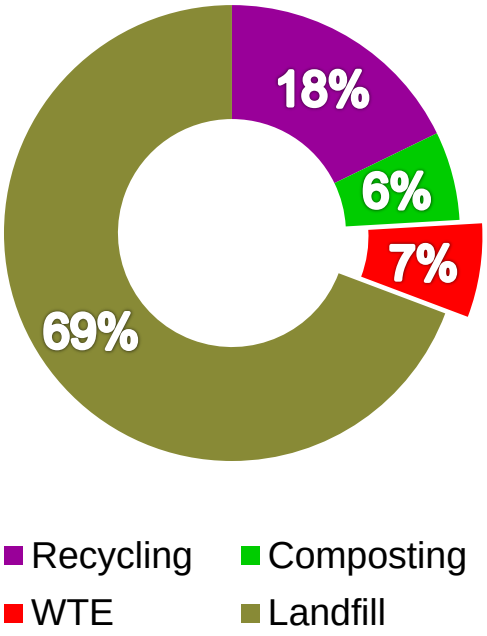
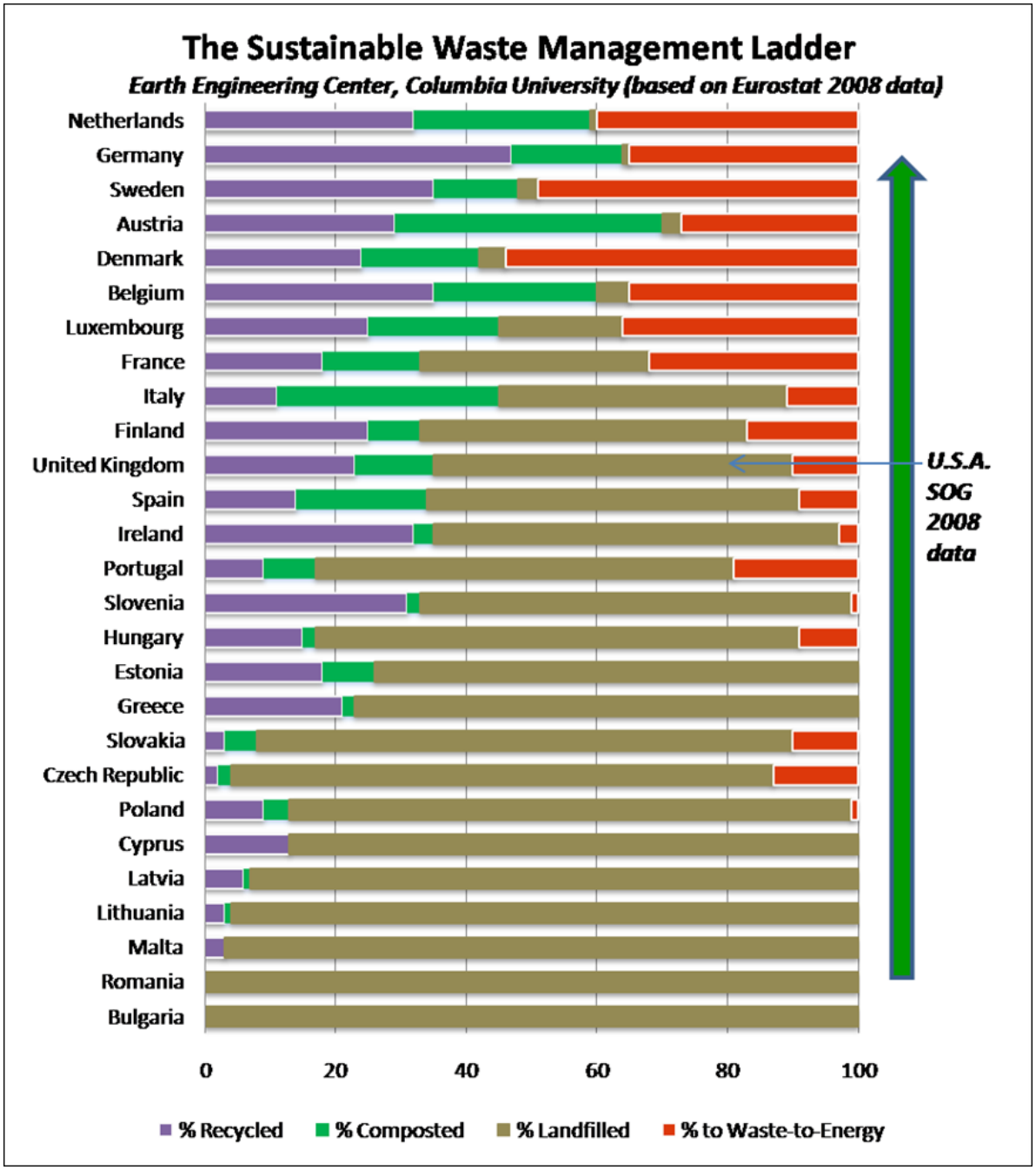
Where Does The U.S. Stand in Sustainable Waste Management



Source: State of Garbage in America (BioCycle/Columbia), 2010



Development of Waste-to-Energy Capacity in the United States

Expansions:

Lee County, FL
Hillsborough County , FL
Olmsted County, MN
Pope/Douglas County, MN
Honolulu, HI

Greenfield Development:

Palm Beach County, FL
Frederick County, MD
Baltimore, MD
Arecibo, Puerto Rico
City of Los Angeles, CA

U.S. Companies Developing in Canada:

Durham/York, Ontario
Metro Vancouver, BC

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Examples of Locations Considering Alternatives to Combustion

- Ada County, ID
- Baton Rouge, LA
- City of Allentown, PA
- City of Cleveland, OH
- City of Dallas, TX
- City of Glendale, CA
- City of Green Bay WI
- City of Plano, TX
- City of San Antonio, TX
- City of Taunton, MA
- Columbia, SC
- County of Maui, HI
- Fulton, MS
- Gallatin County, KY
- Hennepin County, MN
- Lake County, IN
- Los Angeles County, CA
- New York City NY
- Prince William County, VA
- Salinas Valley, CA
- San Bernardino County, CA
- Santa Barbara County, CA
- St. Lucie County, FL

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Source: Harvey Gershman, GBB Wastecon, August 14, 2012

WTE Policy & Politics

- MACT Emissions Regulations
  - Under EPA consideration. The process is undefined, but the potential policy has been forecast.
- Production Tax Credit
  - The existing tax credit for new capacity is expiring in 2013. Congress is working to extend it, but "green programs' have become a presidential issue.
- Clean Energy Standard
  - This proposed program could benefit existing capacity, but has been embroiled in regional and partisan politics for a decade.
- Greenhouse Gas Regulation
  - It is commonly accepted that federal legislation is impossible in this current political climate, but that will give states an opportunity to lead.

History of the Federal Renewable Energy Standard

107th Congress (2001-02)	*GOP House* No RES	*GOP then Dem Senate* RES passes
108th Congress (2003-04)	*GOP House* No RES	*GOP Senate* RES passes
109th Congress (2005-06)	*GOP House* No RES	*GOP Senate* RES passes
110th Congress (2007-08)	*Democratic House* RES passes	*Democratic Senate* No RES
111th Congress (2009-10)	*Democratic House* RES passes	*Democratic Senate* No RES
112th Congress (2011-12)	*GOP House* No RES/CES	*Democratic Senate* No RES/CES

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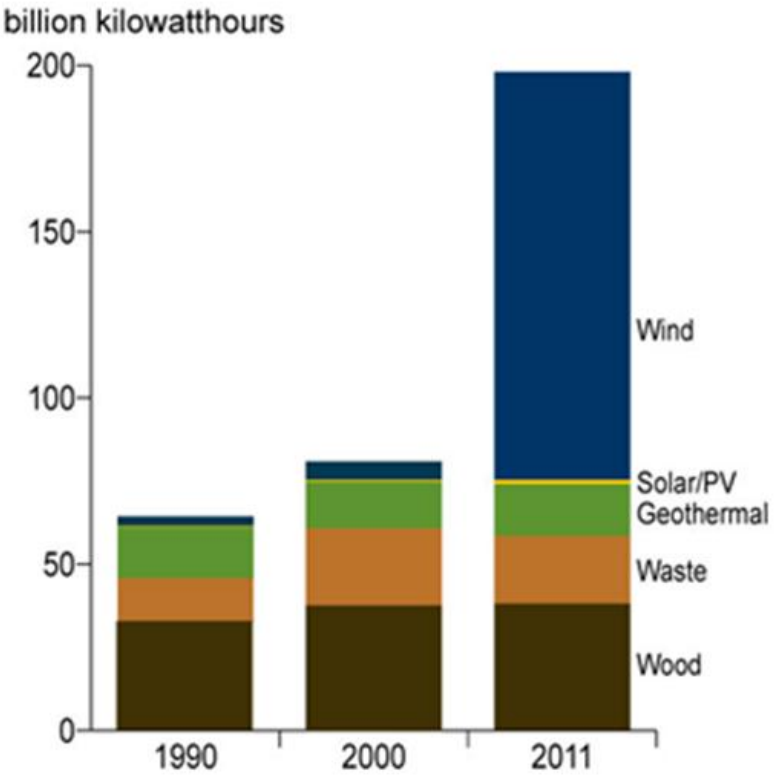
Potential Impact of Policy on Renewable Development

- The Section 45 Production Tax Credit was enacted in 1992 and applied to wind generation.
- WTE and other renewables were added to Section 45 in 2004, but have used the credit very little given the short extensions of the credit and long-lead times to develop baseload technologies.
- It is reasonable to assume that the proper policy drafted specifically to benefit WTE would allow WTE to capitalize on the vast amount of waste generated in the U.S.

Nonhydropower Renewable Electricity Generation by Source, 1990-2011



Source: U.S. Energy Information Administration, *Annual Energy Review,* Table 8.2 (October 2011), *Electric Power Monthly* (March 2012) preliminary 2011 data.

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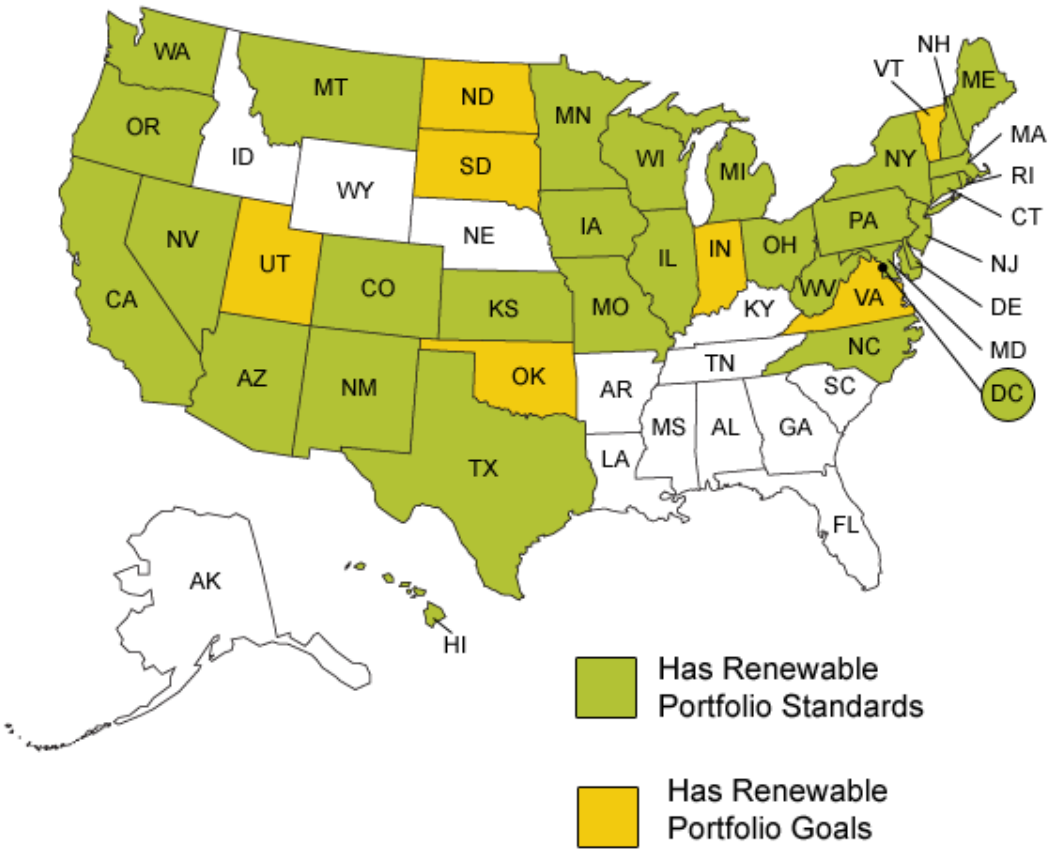
WTE Policy Developments

- Maryland RPS Law signed by Gov. Martin O'Malley on May 17, 2011
  - Elevates WTE from a Tier 2 renewable to Tier 1
  - Other states including CT and PA are considering
- 31 states, DC, and 2 territories define WTE as renewable.
  - 22 jurisdictions include WTE in RPS
- Waste generated in the U.S. Capitol Building and House and Senate Office Buildings are sent to WTE in Virginia.
- Policies that promote waste-to-energy on a level playing field with other renewables will drive investment.



Source: Interstate Renewable Energy Council, Database of State Incentives for Renewables & Efficiency (accessed September 2011).

Recent Example of Progressive Policy Development

Maryland

October 18, 2010 – Energy Answers International hosted a kick-off ceremony for its Fairfield Renewable Energy Project. Maryland Governor Martin O'Malley said "Maryland is a national leader in innovation and entrepreneurship, and our 'green' economy can not only create jobs, but also produce clean, sustainable energy for Maryland's homes and businesses. The Energy Answers project and accompanying Eco-Industrial Park will support more than 2,000 jobs during construction and when fully operational. This project will help us achieve the goal we've set - as One Maryland - to create or save at least 100,000 green jobs by 2015."

February 4, 2011 – Legislation (SB 690/HB 1121) introduced in the Maryland legislature that would elevate waste-to-energy from a Tier 2 to a Tier 1 renewable under the state renewable portfolio standard

March 8-9 – Hearings held in House and Senate committees
April 6-7 – Bills passed by the House and Senate
May 19 – Bill signed into law by Governor O'Malley

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It's the Economy, [!]

Waste-to-energy has a significant impact on local jobs and the local economy. As ERC lobbies to elevate WTE from a Class 2 renewable to a Class 1 renewable in the Connecticut RPS, it is helpful to illustrate how important WTE is to the local economy. In these economic and political times, this data carries much weight.

WTE facilities in Connecticut:	6
WTE Jobs in Connecticut:	405
WTE Payroll in Connecticut:	$45,000,000 annually
Local Taxes/Payments:	in excess of $10,000,000 annually
$ Spent on Local Goods and Services:	Approx. $50 million annually

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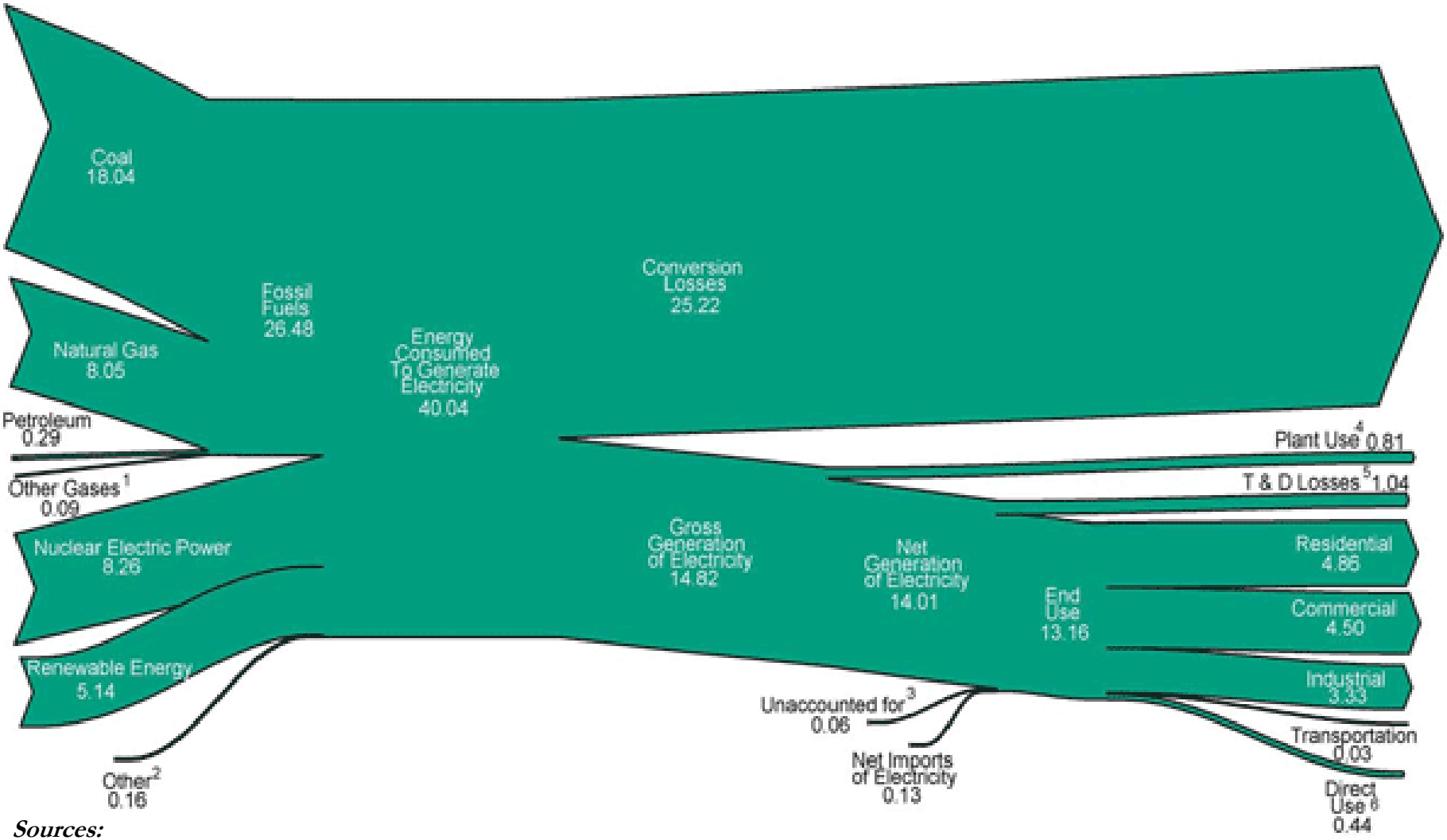
WTE Opportunities & Challenges

- Ash Reuse
  - Challenges
    - Technology Barriers
    - Regulatory Barriers
    - Commercial Barriers
  - Opportunities
    - Significant reduction in disposal cost, or potential revenue stream

- Energy Pricing
  - Challenges
    - Cheap natural gas supply is making wholesale electricity prices much lower
    - Proposed wind, nuclear, and coal have all been shelved due to energy prices
  - Opportunities
    - WTE facilities can operate as CHP facilities and significantly increase efficiency with heat recovery. This can create opportunities for increased energy revenue.
- Governmental Policy
  - The power is in the pen.

Electricity Flow in the United States

2011 (Quadrillion BTUs)



Sources:

U.S. Energy Information Administration, Annual Energy Review 2011 Tables 8.1, 8.4a, 8.9, A6 (column 7), and U.S. Energy Information Administration, Form EIA-923, "Power Plant Operations Report."

NAWTEC Call for Papers
(Deadline November 14, 2012)

Fort Myers, FL | April 22-24, 2013

The North American Waste-to-Energy Conference is the premiere event for those interested in municipal waste-to-energy, combustion engineering science, and emerging waste conversion & processing technologies. NAWTEC brings together the leading public and private waste-to-energy players from across North America and abroad.

Submissions requested for traditional and emerging waste-to-energy technologies and projects in the areas of:

Gasification (Demonstration/Commercial)
Policy (North American/International)
Financing
Research (Fundamental/Applied)
Air Emissions Control Technologies
Metal Recovery
Energy Pricing
Contracts
Public Perception
New Technology Developments
Case Studies
Ash Management and Reuse
Plant Management & Operation

Abstracts may be submitted at: https://www.research.net/s/K83TX3S

For more information, visit: http://www.nawtec.org

Summary

- Federal legislation has the ability to provide significant incentives for waste-to-energy, but the current political environment is incredibly difficult.
- Waste conversion technologies will benefit from policies that have been designed to provide incentives to renewable technologies, including traditional combustion-based WTE technologies.
- Federal regulations have the ability to create serious concerns for all industries if MACT standards are not established reasonably.
- Policies that promote waste-to-energy on a level playing field with other renewables will drive investment.

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RENEWABLE ENERGY FROM WASTE

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