The 2014 ERC Directory of Waste-to-Energy Facilities

The Energy Recovery Council is the national association representing companies, organizations, and local governments engaged in the waste-to-energy sector in the United States.

By Ted Michaels

Waste-to-energy is a proven technology used globally to generate clean, renewable energy from the sustainable management of municipal solid waste (MSW). Progressive communities around the world employ strategies to reduce, reuse, recycle, and recover energy from waste. With approximately 29 percent of America's waste being recycled, 7.6 percent processed at waste-to-energy facilities and 63.5 percent landfilled, MSW is an abundant, valuable, and underutilized source of domestic energy. By processing this material, waste-to-energy facilities:

- Produce renewable, baseload energy
- Reduce greenhouse gases
- Create good-paying, green jobs
- Operate with superior environmental performance
- Complement and enhance recycling goals

Eighty-four waste-to-energy facilities in 23 states have the capacity to process more than 96,000 tons of waste per day with a baseload electric capacity of 2,769 megawatt hours. Due to superior operational reliability, the nation's waste-to-energy facilities process in excess of 30 million tons of trash per year, sell more than 14.5 million megawatt hours to the grid, and recover more than 730,000 tons of ferrous metals for recycling. In addition, many facilities sell steam directly to end users offsetting the use of fossil fuels to make that energy.

ENERGY RECOVERY COUNCIL

renewable energy from waste

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Connecticut
5) Bristol Resource Recovery Facility (Bristol)
6) CRRA Hartford Trash-to-Energy Plant (Hartford)
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8) Wallingford Resource Recovery Facility (Wallingford)
9) Wheelabrator Bridgeport, L.P. (Bridgeport)
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15) McKay Bay Refuse-to-Energy Facility (Tampa)
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18) Pasco County Solid Waste Resource Recovery Facility (Spring Hill)
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Washington
82) Wheelabrator Spokane Inc. (Spokane)

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84) Xcel Energy French Island Generating Station (LaCrosse)

Italicized facilities represent inactive capacity. These facilities are not currently operating.

Waste-to-Energy Capacity

Waste-to-energy facilities produce clean, renewable energy through the thermal conversion of municipal solid waste. The most common energy products produced at these facilities are steam and electricity. There are 84 total facilities in the United States today, including 80 that are currently operating, and 4 that are currently inactive but may return to active service at a future date. One additional facility is under construction and will be placed in service in 2015. Many others are in various stages of development.

Sixty-four facilities (76.2%) employ mass burn technology which allows MSW to be combusted without pre-processing. Thirteen facilities (15.5%) utilize refuse derived fuel (RDF) which is pre-processed municipal solid waste. Seven facilities (8.3%) utilize modular combustion units which are similar to mass burn, but are typically smaller and pre-fabricated.

The 84 facilities produce a combination of energy products. Sixty-two facilities (73.8%) produce electricity for sale to the grid as the only energy product. Four facilities (4.8%) export steam without any electric generation. Eighteen facilities (21.4%) are cogeneration—or combined heat and power—facilities, which export steam to end users and also have the ability to generate power.

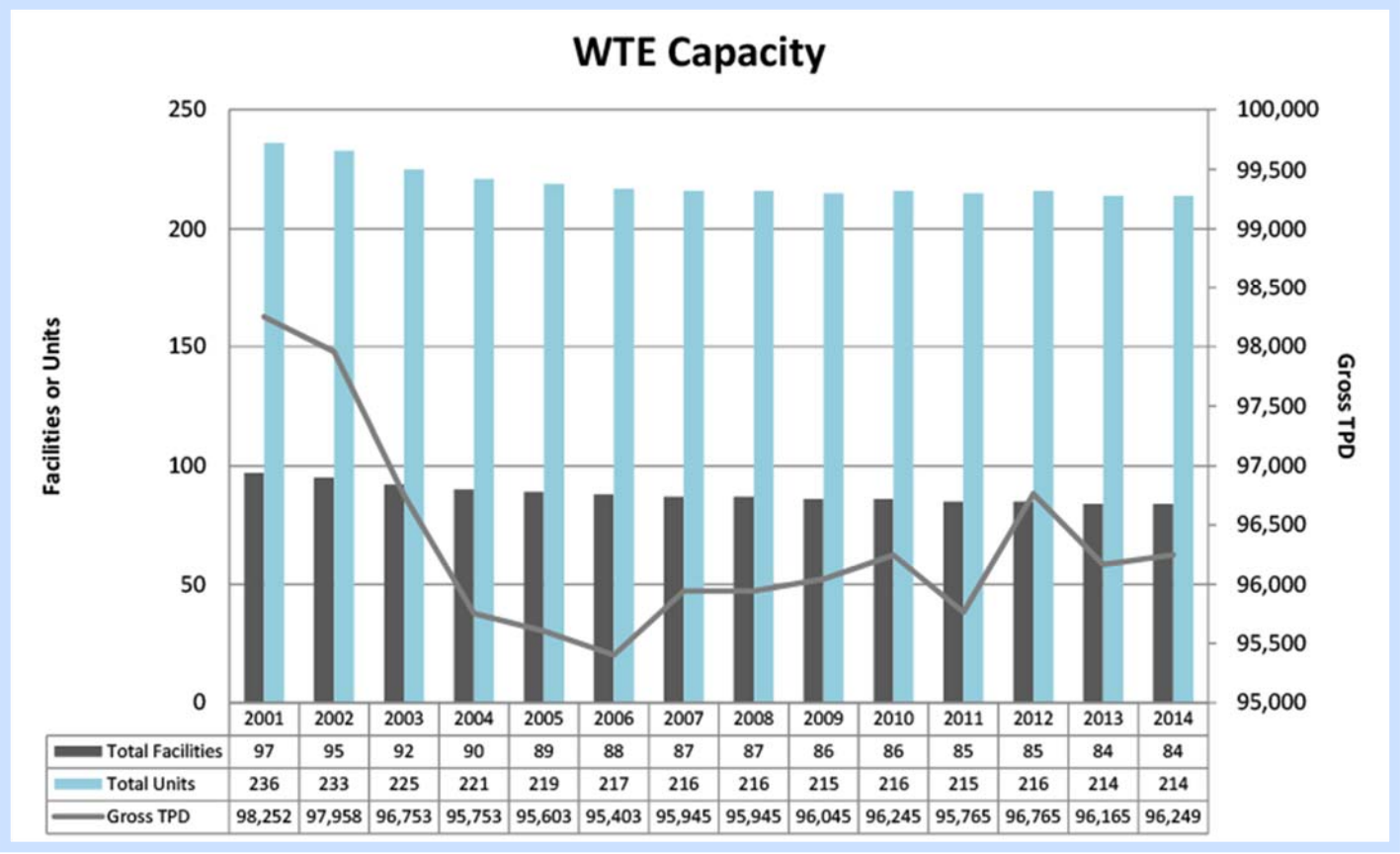
The daily throughput capacity of the nation's waste-to-energy facilities in 2014 is 96,249 tons of MSW per day. The gross electric generating capacity of these facilities is 2,554 megawatts. When the energy value of the exported steam is factored in and expressed in megawatts, the nation's 84 facilities have a equivalent generating capacity of 2,769 megawatts.

Status of WTE Facilities in the U.S.	
Operating Facilities	80
Inactive Facilities	4
Total Facilities in the U.S.	84
Facilities Under Construction	1

WTE Facilities in the U.S. (by Technology)	
Mass Burn	64
Refuse Derived Fuel (RDF)	13
Modular	7

WTE Facilities in the U.S. (by Energy)	
Electricity Generation	62
Steam Export	4
Combined Heat & Power	18

WTE Capacity	
Daily Throughput (tpd)	96,249
Gross Electric Capacity (MW)	2,554
Equivalent CHP Capacity (MW)	2,769



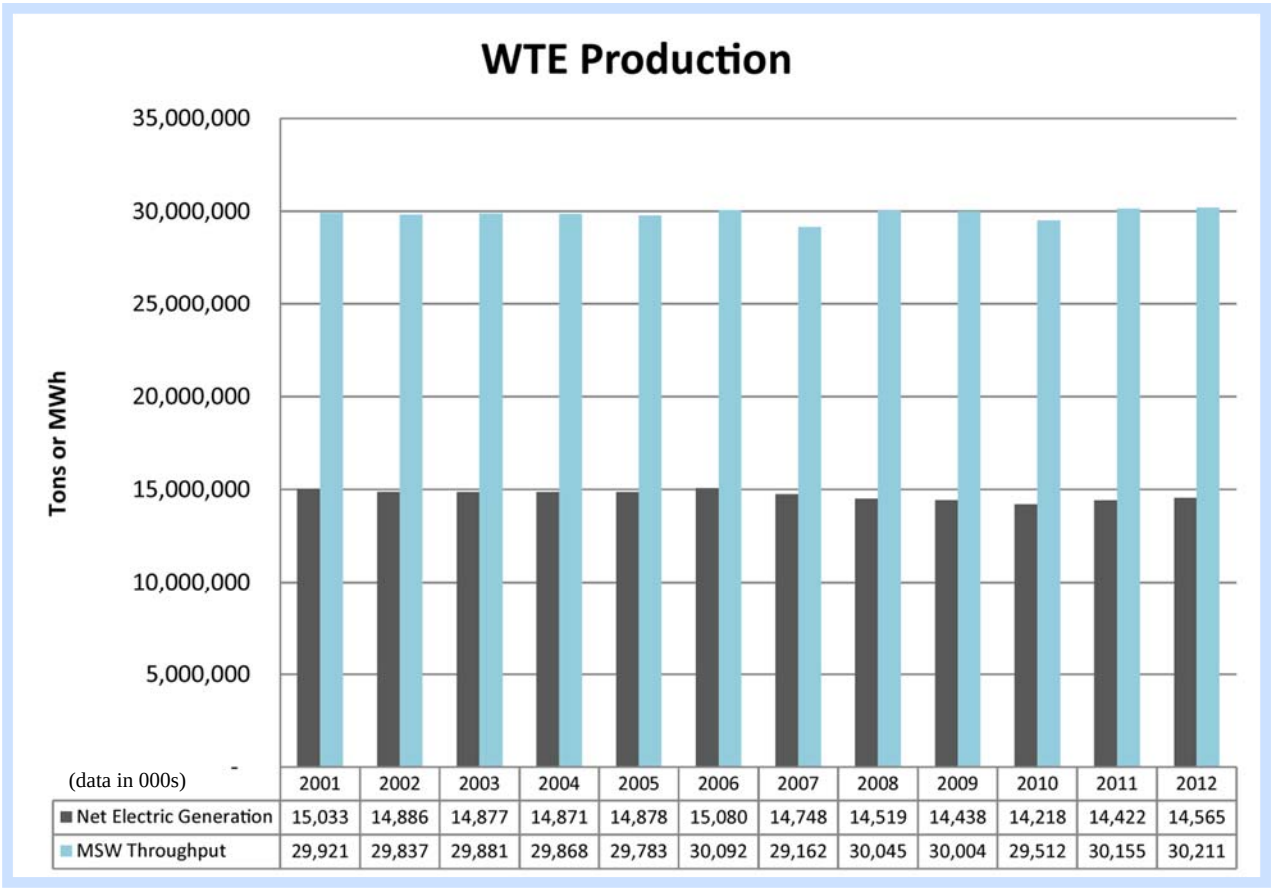
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total Facilities	97	95	92	90	89	88	87	87	86	86	85	85	84	84
Total Units	236	233	225	221	219	217	216	216	215	216	215	216	214	214
Gross TPD	98,252	97,958	96,753	95,753	95,603	95,403	95,945	95,945	96,045	96,245	95,765	96,765	96,165	96,249

Capacity represents potential and production is that potential realized. Waste-to-energy operators are extremely proud of their ability to process waste and generated energy 24 hours per day, seven days per week, all year long. Their technological and operational expertise allow facilities to achieve high availability so they may provide baseload electricity to the grid and steam to their customers. While the primary purpose of a waste-to-energy facility is to manage municipal solid waste, energy production is a valuable part of the equation in order to maximize energy efficiency, environmental benefits, greenhouse gas mitigation, and economic revenue.

The graph below illustrates that waste-to-energy facilities are extremely stable and reliable. In 2012, the waste-to-energy sector processed more than 30.2 million tons of waste and generated over 14.5 million megawatt hours (or 14.5 billion kilowatt hours) of net electrical generation. This is the amount of electricity sold to the grid and does not include electricity that was used internally to operate the facility. In addition to the amount of net electrical generation, 22 facilities export steam to local users. This energy is used for heating and cooling or for use in industrial processes and displaces the use of fossil fuels to make that energy.

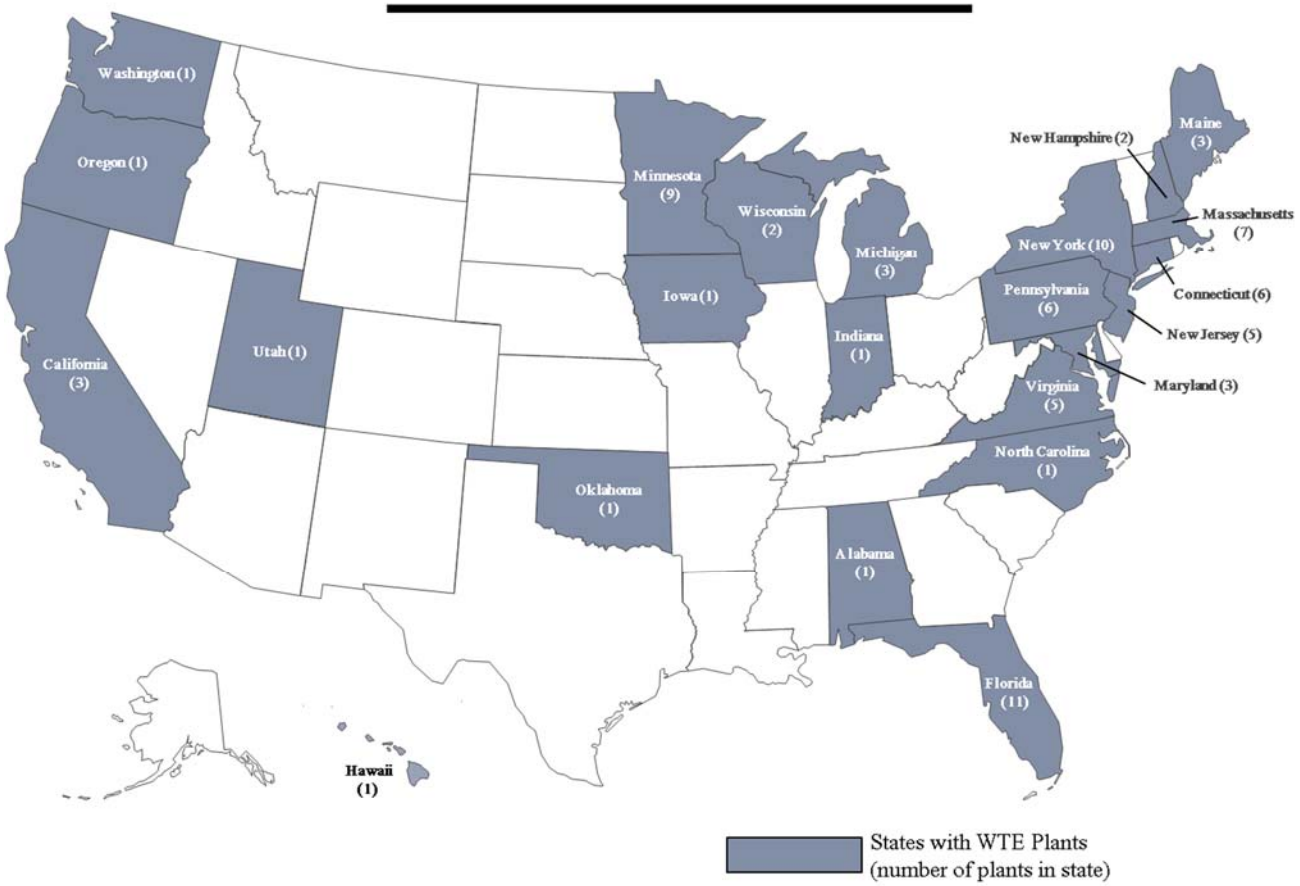
WTE Production	
2012 MSW Throughput (tons)	30,211,120
2012 Net Elec. Generation (MWh)	14,565,467

These incredibly reliable facilities have operated in this capacity for decades. This is a testament to maturity and reliability of the technology. While some units eventually close, and some new units have been added, waste-to-energy facilities have a proven track record of operational availability, reliability. Challenging market conditions in the energy and waste markets have served as an impediment to constructing more facilities and recovering energy from more of the 250 million tons of post-recycled waste that is sent to landfills each year.

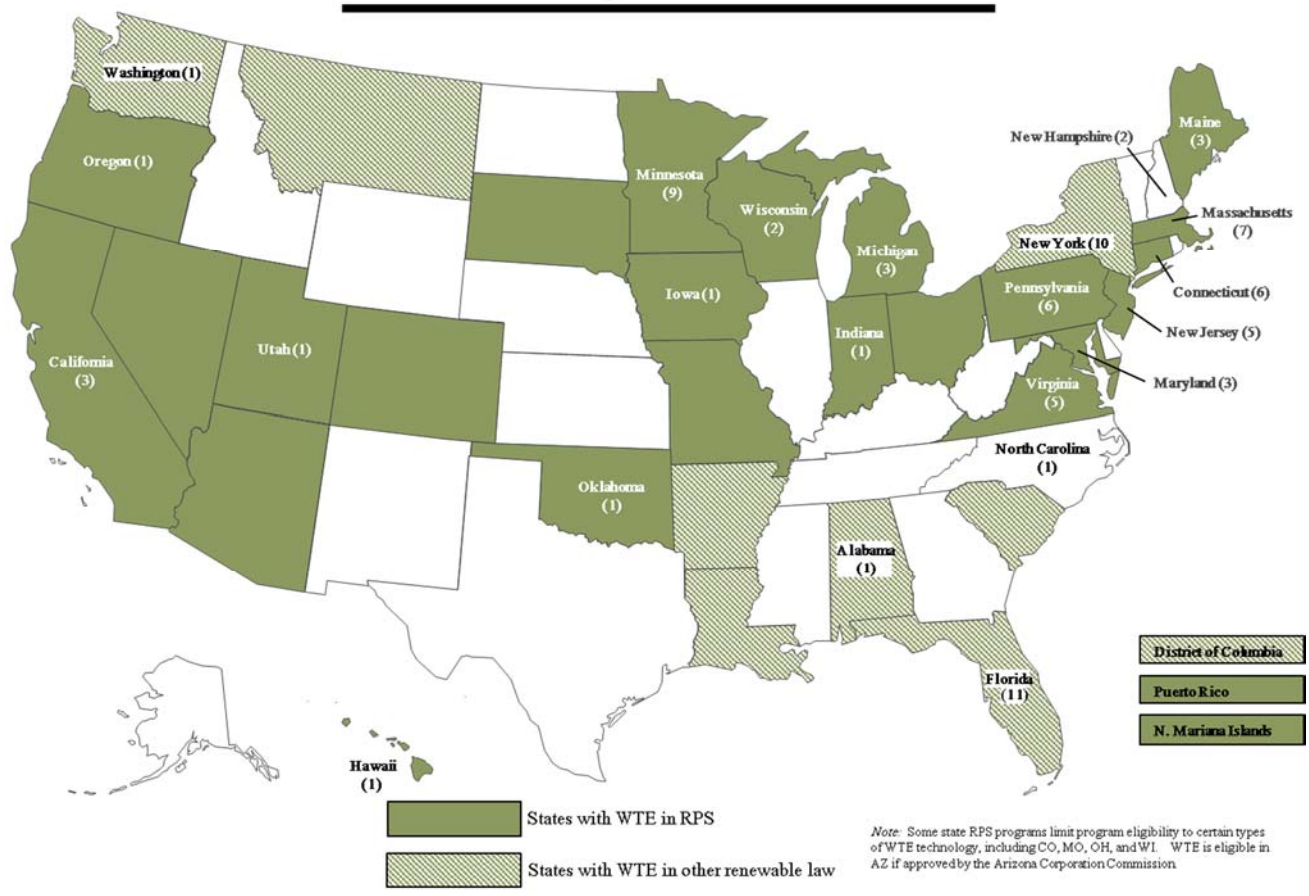


(data in 000s)	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Net Electric Generation	15,033	14,886	14,877	14,871	14,878	15,080	14,748	14,519	14,438	14,218	14,422	14,565
MSW Throughput	29,921	29,837	29,881	29,868	29,783	30,092	29,162	30,045	30,004	29,512	30,155	30,211

WTE Plants in the United States



States Defining WTE as Renewable



Note: Some state RPS programs limit program eligibility to certain types of WTE technology, including CO, MO, OH, and WI. WTE is eligible in AZ if approved by the Arizona Corporation Commission.

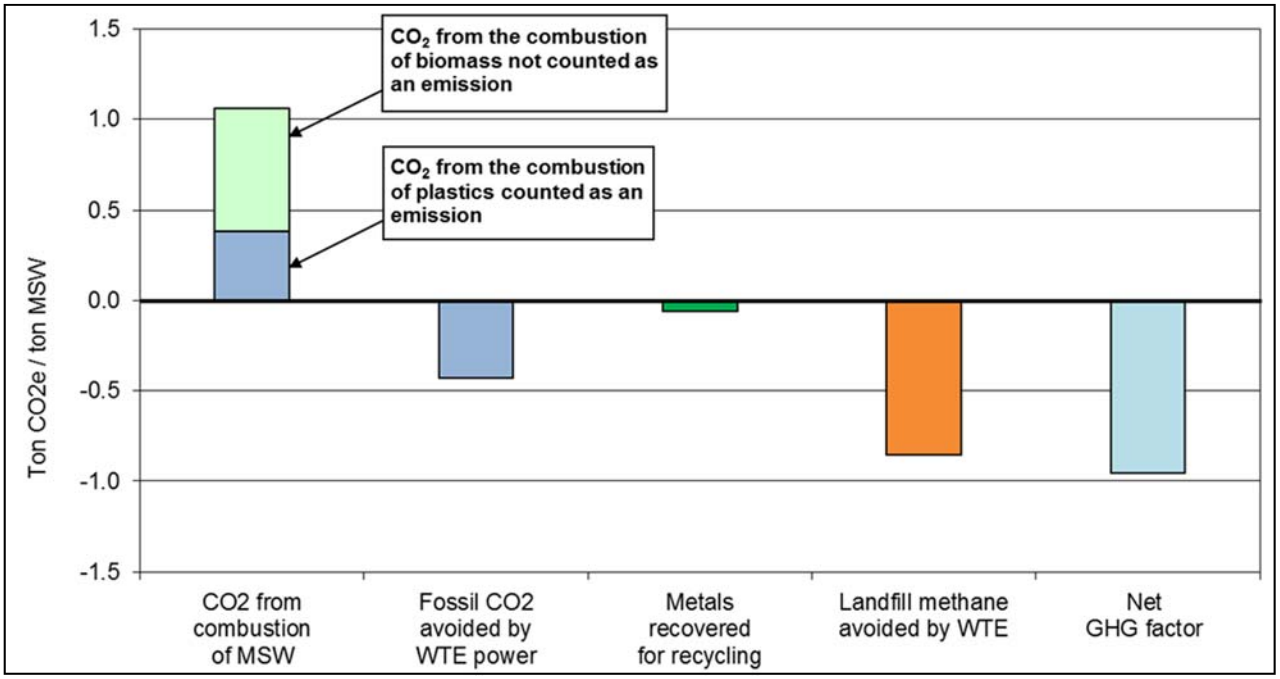
According to U.S. EPA, life cycle emission analysis show that waste-to-energy (WTE) facilities actually reduce the amount of greenhouse gases expressed as CO_2 equivalents (GHGs or CO_2e) in the atmosphere by approximately 1 ton for every ton of municipal solid waste (MSW) combusted. (http://www.epa.gov/wastes/nonhaz/municipal/wte/airem.htm#7)

U.S. EPA scientists, in a prominent peer reviewed paper, concluded WTE facilities reduce GHG emissions relative to even those landfills equipped with energy recovery systems. In addition, many other governmental and nongovernmental organizations have formally recognized WTE for its role in reducing world-wide GHG emissions including the:

- Intergovernmental Panel on Climate Change ("IPCC") called WTE a "key GHG mitigation technology",
- World Economic Forum (WEF) which identified WTE as one of eight renewable energy sources expected to make a significant contribution to a future low carbon energy system,
- European Union,
- U.S. Conference of Mayors, which adopted a resolution in 2005 endorsing the U.S. Mayors Climate Protection Agreement, which identifies WTE as a clean, alternative energy source which can help reduce GHG emissions. As of January 1, 2014, 1,060 mayors have signed the agreement.
- Clean Development Mechanism of the Kyoto Protocol,
- Voluntary carbon markets, and
- Center for American Progress.

Lifecycle Assessment of WTE GHG Reductions

WTE GHG reductions are quantified using a life cycle assessment (LCA) approach that includes GHG reductions from avoided methane emissions from landfills, WTE electrical generation that offsets or displaces fossil-fuel based electrical generation, and the recovery of metals for recycling. The GHG reductions associated with these three factors more than offset WTE fossil-based CO_2 emissions from combustion of plastics and other fossil fuel based MSW components. Using national averages as inputs, a LCA results in an approximate one ton reduction in GHG emissions for every ton of MSW combusted as was estimated by the U.S. EPA.



Waste-to-Energy is a Renewable Resource

Waste-to-energy (WTE) meets the two basic criteria for establishing what a renewable energy resource is—its fuel source (trash) is *sustainable* and *indigenous*. Waste-to-energy facilities recover valuable energy from trash after efforts to "reduce, reuse, and recycle" have been implemented by households and local governments. Waste-to-energy facilities generate clean renewable energy and deserve the same treatment as anyother renewable energy resource.

- **Trash Would Otherwise go to a Landfill.** Waste-to-energy facilities use no fuel sources other than the waste that would otherwise be sent to landfills.

- **State Renewable Statutes Already Include WTE.** 31 states, the District of Columbia, and two territories have defined waste-to-energy as renewable energy in various state statutes and regulations, including renewable portfolio standards.

- **Communities with WTE Have Higher Recycling Rates.** Studies have demonstrated that average recycling rate of communities served by waste-to-energy is higher than the national average.

- **WTE Emissions Comply with EPA's Most Stringent Standards**. All waste-to-energy facilities comply with EPA's Maximum Achievable Control Technology (MACT) standards. After analyzing the inventory of waste-to-energy emissions, EPA concluded that waste-to-energy facilities produce electricity "with less environmental impact than almost any other source of electricity."

- **WTE Has a Long History as Renewable**. Waste-to-energy has been recognized as renewable by the federal government for nearly thirty years under a variety of statutes, regulations, and policies. Many state have recognized as renewable under state statutes as well. The renewable status has enabled waste-to-energy plants to sell credits in renewable energy trading markets, as well as to the federal government through competitive bidding processes.

- **Renewable Designations Benefit Many Local Governments and Residents.** The sale of renewable energy credits creates revenue for local governments that own waste-to-energy facilities, helping to reduce a community's cost of processing waste. The U.S. Conference of Mayors has adopted several resolutions supporting waste-to-energy as a renewable resource.

Federal Statutes and Policies Establishing WTE as Renewable (as of 12/31/13)
American Taxpayer Relief Act of 2012
American Recovery and Reinvestment Act of 2009
Emergency Economic Stabilization Act of 2008
Tax Relief and Healthcare Act of 2006
Energy Policy Act of 2005
American Jobs Creation Act of 2004
Biomass Research and Development Act of 2000
Public Utility Regulatory Policies Act (PURPA) of 1978
Federal Power Act
Pacific Northwest Power Planning and Conservation Act
Internal Revenue Code (Section 45)
Executive Orders 13123, 13423, and 13514
Presidential Memorandum on Federal Leadership on Energy Management (12/5/13)
Federal Energy Regulatory Commissions Regulations (18 CFR.Ch. I, 4/96 Edition, Sec. 292.204)

States Defining Waste-to-Energy as Renewable in State Law (as of 12/31/13)		
Alabama	Maine	Oklahoma
Arizona	Maryland	Oregon
Arkansas	Massachusetts	Pennsylvania
California	Michigan	Puerto Rico
Colorado	Minnesota	South Carolina
Connecticut	Missouri	South Dakota
Dist. of Columbia	Montana	Utah
Florida	Nevada	Virginia
Hawaii	New Jersey	Washington
Indiana	New York	Wisconsin
Iowa	N. Mariana Islands	
Louisiana	Ohio	

Summary
The WTE sector creates **$5.6 billion** of gross economic sales output, encompassing nearly **14,000 jobs** and nearly **$890 million** of total labor compensation.

- 5,350 employees servicing 85 plants in the United States earning $459 million in wages, salaries and benefits
- 8,557 additional full time equivalent jobs created in the U.S. sector outside the WTE sector, earning an additional $429 million in wages, salaries and benefits

The WTE sector serves three main functions: 1) managing post-recycled waste; 2) recycling post-consumer metals; and 3) producing energy. The revenues, employment, and labor earnings derived from these activities are the direct economic benefits of waste-to-energy. In addition, these activities generate indirect impacts as well as induced impacts. These impacts were calculated using multipliers from the U.S. Bureau of Economic Analysis RIMS II Handbook.

Total Gross Sales Output

Total gross sales numbers were used to approximate the economic output of the sector. Gross sales of the industry encompass revenues generated from: 1) tip fees—amounts paid to the WTE plant to dispose of refuse; 2) energy sales revenues; 3) recycling sales revenues. Total output (sales revenues) was $3.2 billion. The total national economic impact of these revenues is $5.6 billion, including the initial $3.2 billion produced by the waste-to-energy sector directly. Every dollar of revenue generated by the waste-to-energy industry puts a total of 1.77 dollars into the economy through intermediate purchases of goods and services and payments to employees.

Employment and Wage Earnings

The waste-to-energy industry employs about 5,350 people nationwide. This number includes all workers at 85 specific sites, as well as off-site employees of the several regional and national firms that own and operate waste-to-energy facilities and local government personnel dedicated to plant oversight and maintenance. The WTE sector also creates an additional 8,600 jobs outside of the sector.

Employees at waste-to-energy plants are technically skilled and are compensated at a relatively high average wage. For the purposes of this study a national average salary of $85,700 (inclusive of fringe benefits) was used. Employees in the waste-to-energy industry receive about $460 million in annual salary and benefits. The effect of this direct spending on employee compensation generated another $429 million of compensation for workers across various associated industries.

Conclusion

The waste-to-energy sector provides significant economic value in the communities in which these facilities operate. In addition to the revenues generated by the sector, waste-to-energy facilities provide stable, long-term, well-paying jobs, while simultaneously pumping dollars into local economies through the purchase of local goods and services and the payment of fees and taxes. In addition to the opportunities to provide baseload renewable electric generation, recover metals for recycling, and reduce greenhouse gas emissions, these facilities significantly contribute to the green economy in the communities in which they operate.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

AUG 1 0 2007

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Emissions from Large and Small MWC Units at MACT Compliance

FROM: Walt Stevenson
OAQPS/SPPD/ESG (D243-01)

TO: Large MWC Docket (EPA-HQ-OAR-2005-0117)

This memorandum presents information on the overall emissions reductions achieved by large and small municipal waste combustion (MWC) units following retrofit of Maximum Achievable Control Technology (MACT). This memorandum is a companion to the memorandum titled "Emissions from Large MWC Units at MACT Compliance (note a). Consistent with Clean Air Act (CAA) section 129, large and small MWC units completed MACT retrofits by December 2000 and December 2005, respectively. The performance of the MACT retrofits has been outstanding. Emission reductions achieved for all CAA section 129 pollutants are shown below. Of particular interest are dioxin/furan and mercury emissions. Since 1990 (pre-MACT conditions), dioxin/furan emissions from large and small MWCs have been reduced by more than 99 percent, and mercury emissions have been reduced by more than 96 percent. Dioxin/furan emissions have been reduced to 15 grams per year* and mercury emissions reduced to 2.3 tons/year.

Emissions From Large and Small MWC Units

Pollutant	*1990 Emissions (tpy)*	*2005 Emissions (tpy)*	*Percent Reduction*
CDD/CDF, TEQ basis*	4400	15	99+ %
Mercury	57	2.3	96 %
Cadmium	9.6	0.4	96 %
Lead	170	5.5	97 %
Particulate Matter	18,600	780	96 %
HCl	57,400	3,200	94 %
SO_2	38,300	4,600	88 %
NO_x	64,900	49,500	24 %

(*) dioxin/furan emissions are in units of grams per year toxic equivalent quantity (TEQ), using 1989 NATO toxicity factors; all other pollutant emissions are in units of tons per year.

The MACT performance data presented above is from the initial MACT compliance tests from all large and small MWC units. The inventory of large MWC units at MACT compliance identifies 167 large MWC units located at 66 MWC plants (note b). The inventory of small MWC units at MACT compliance identifies 60 small MWC units located at 22 MWC plants (note c). The baseline 1990 emissions data are from the large and small MWC emissions trend memo (note d and e). In combination, the above information defines the 1990 and 2005 emissions for large and small MWC units.

notes

(a) see docket A-90-45, item VIII-B-11.
(b) see docket A-90-45, item VIII-B-6
(c) see docket OAR-2004-0312, "National Inventory of Small Municipal Waste Combustor (MWC) Units at MACT Compliance (Year 2005)", dated November 1, 2006.
(d) see docket A-90-45, item VIII-B-7
(e) see docket OAR-2004-0312, "National Emissions Trends for Small Municipal Waste Combustion Units [year 1990 – 2005]", dated June 12, 2002.

Update of Findings from Public Health and Environmental Studies of Waste-to-Energy Technologies

By
Sarah Foster
and
Paul Chrostowski, Ph.D.

CPF Associates, Inc.

A large amount of information about the potential public health and environmental impacts of waste-to-energy (WTE) plants has become available since 2000, when the U.S. National Research Council (NRC) published its seminal report, Waste Incineration & Public Health. This information includes four different types of studies that can be used to evaluate WTE plants: risk assessments, epidemiological studies, environmental monitoring studies, and biomonitoring studies. Together, the current database of these studies supports the conclusions of the NRC that modern WTE facilities, designed and operated in accordance with current regulations in North America and the EU, do not adversely impact human health or the environment.

In the U.S., **human health risk assessments** (HHRAs) are highly standardized and widely-accepted procedures for evaluating the probability and nature of health effects associated with existing or proposed emissions. The results of these studies, which address both cancer and non-cancer health effects, are usually compared to benchmark levels developed by regulatory agencies to be protective of public health. Ten HHRAs have been conducted in the past decade for North American WTE facilities. These studies show that emissions from modern WTE plants can meet health-based benchmarks and that adverse public health impacts are not anticipated from exposure to emissions from these facilities.

Environmental monitoring studies rely on measurements of chemicals potentially associated with WTE in the surrounding natural environment to assess potential impacts. The most recent comprehensive review of environmental monitoring studies was conducted in 2009 as part of the Durham/York WTE project. This review evaluated 50 environmental monitoring studies published from 1991 – 2008 and concluded that modern WTE plants are unlikely to impact the surrounding environment, although some old plants with high emissions and poor air pollution controls may have impacted the environment immediately surrounding the facility. The Durham/York study also concluded that environmental monitoring in the vicinity of a modern WTE plant is not justified based on the negligible potential for environmental impacts and because continuous and periodic emissions monitoring required under current regulations can ensure protection against health and environmental impacts. An extensive environ-

"Modern WTE facilities, designed and operated in accordance with current regulations in North America and the EU, do not adversely impact human health or the environment."

mental monitoring program conducted for a WTE plant, at the Montgomery County, Maryland facility, confirms these conclusions. This 14-year environmental monitoring program involved collection of samples from a wide variety of environmental media before and many times after the plant began operating in 1995. The data provide no indication that facility operation has measurably impacted the environment.

Epidemiologic studies investigate how health problems are distributed in groups of people and what factors contribute to these health problems. Essentially, these studies try to determine if there is a difference in disease between people potentially exposed to WTE emissions compared to the general population or those not exposed. These studies must in all cases be evaluated cautiously – they can indicate whether there is a statistical association between exposure and disease, but they cannot indicate whether a specific facility is the cause of reported results. Many factors must be considered before one can leap from association to causation. Numerous epidemiologic studies have been conducted for combustion facilities over the past two decades but most of these have examined old facilities, plants accepting mixtures of different types of waste, or mixtures of WTE plants plus other types of sources. In general, these studies fail to present conclusive evidence of a link between WTE emissions and human illness.

Biomonitoring studies analyze human tissues or excreta for evidence of exposure to chemical substances. These studies can measure internal exposure to compounds, but they do not necessarily indicate whether there may be a health effect. They also reflect total exposure to a person, so do not provide information about the possible sources of exposure. The 2009 study conducted as part of the Durham/ York project evaluated 25 biomonitoring studies from 1998 – 2008 and found no correlation between WTE emissions and those measured in biomonitoring studies. A more recent study of a new WTE plant built in 2005 in Spain shows no increase in dioxin-like compounds or heavy metals among people living near the plant.

In summary, available studies show that modern WTE facilities, designed and operated in accordance with North American or EU regulations, do not adversely impact human health or the environment. A weight of evidence approach can be used to evaluate WTE using different types of studies, but the usefulness of each study type can vary depending on the project needs.

Waste-to-Energy, an Essential Part of Sustainable Materials Management

By
Rick Brandes
and
Eileen Brettler Berenyi, Ph.D

Critics of the use of waste-to-energy (WTE) as an integral component of municipal solid waste (MSW) management in the U.S., the European Union, and Asia often focus on its impact on recycling rates, its cost, and its effect on other renewable energy sources. The problem with these arguments is that they are predicated on the belief that the municipal solid waste stream can be handled by recycling alone. History shows this is not a practical solution. A waste management strategy that combines all tools available to manage this waste is needed. Proponents take the position that WTE provides an essential service to municipalities that must constantly manage those materials that are not, or cannot, be recycled or recovered. WTE's primary purpose, therefore, is to capture from materials value that would otherwise be lost if buried.

Pitting recycling against energy recovery draws public focus away from the real issue: what to do with the more than 260 million tons of waste this country sends to landfills each and every year.

WTE as Part of Sustainable Materials Management

Integrated materials management following the reduce, reuse, recycle, compost and energy recovery hierarchy is proven to work and is embraced by most developed countries. Energy recovery from waste is a key component to achieve MSW diversion and carbon reduction goals. The hierarchy is generally meant to convey preferred waste management priorities, with source reduction and direct reuse as the most desired actions by communities, and land disposal without treatment as the least desired. Overall, the hierarchy recognizes the degree of positive environmental and social benefit of the available waste management options and helps communities integrate them in a cohesive strategy that meets the needs of the communities themselves.

MSW is a valuable energy resource

Under any practical definition, energy recovered from MSW is renewable energy and should be legally defined as such by policymakers seeking to establish and maintain renewable energy portfolios. In a fundamental and realistic sense, MSW is constantly available and continuously replenished the very definition of the basic concept of "renewable energy."

Post-consumer, post-recycled municipal waste is, and will be in the foreseeable future, generated in huge volumes. Post-recycled waste will not go away by idealistically visualizing a society where no waste is created. Forty years of intense focus on recycling and source reduction have succeeded in raising recycling rates but those efforts have not eliminated the generation of MSW. With the waste that is left over after efforts to reduce, reuse, and recycling, sustainable and valuable opportunities to manage this material must be found. WTE facilities can create that value by extracting

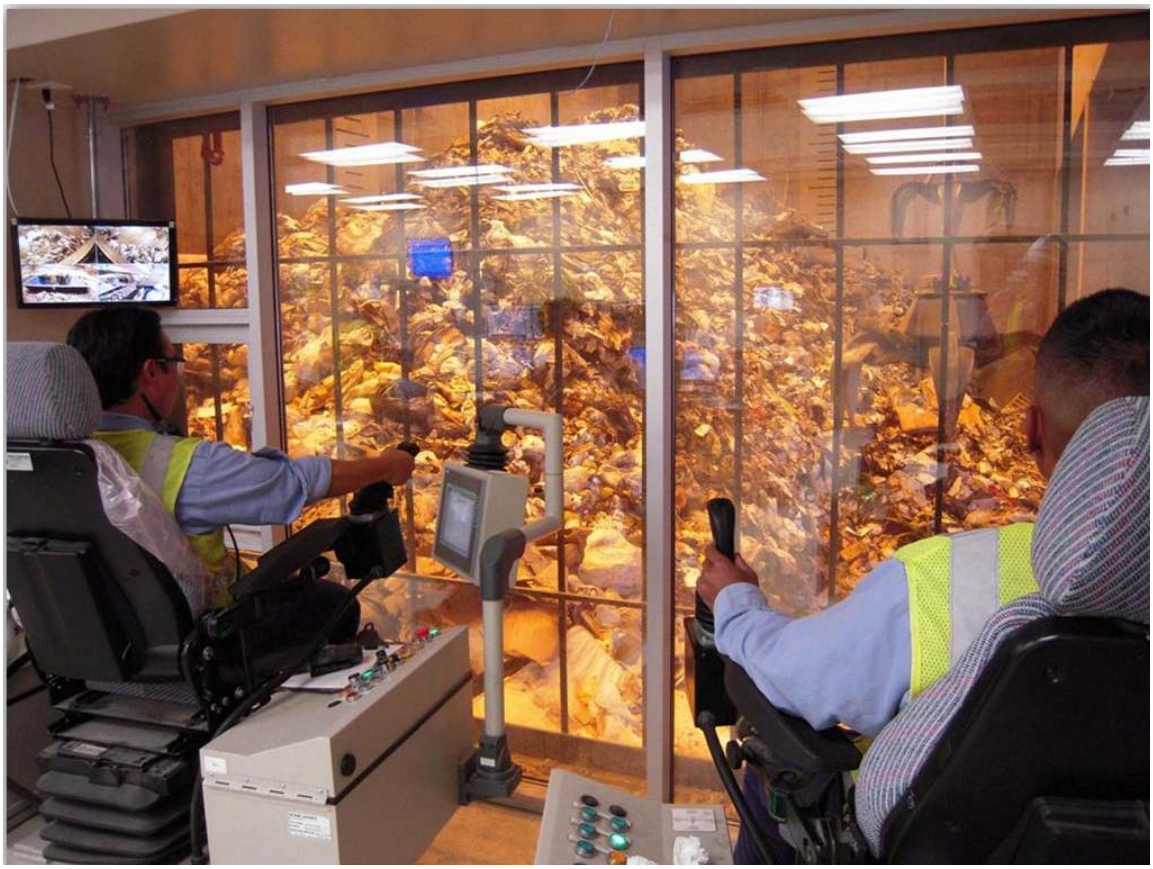
extracting 500 to 700 kilowatt hours of power for each ton of waste they process. By contrast, landfills can only capture about 100 kilowatt hours per ton by burning the methane captured. Additionally, WTE facilities provide continuously available baseload power at the local level, augmenting intermittent renewable energy sources, such as wind and solar.

Recovering energy from MSW has a very desirable carbon emissions impact because the positive carbon balance of WTE is significant. EPA's models for calculating GHG emissions reductions from the various MSW management techniques show that on average one ton of carbon equivalents can be avoided per ton of MSW processed by WTE facilities. The carbon emissions savings accrue from a combination of energy offsets from the displacement of fossil electricity, GHG benefits of metals recovery from waste-to-energy ash, and avoiding methane generation from landfills.

Conclusion

Waste management in the United States is evolving from a focus solely on the disposal of waste inexpensively to a focus on solid waste as a composite of various materials flowing through a consumer society, each to be managed in such a way as to recover the highest value possible. In this paradigm, waste-to-energy has a central role to play along with recycling. Consistent with the waste management hierarchy, this approach embodies the core principles of sustainable materials management and should be incentivized in renewable and clean energy standards, greenhouse gas programs, and other progressive policies.

Rick Brandes *is former chief of the Energy Recovery and Waste Disposal Branch, Office of Resource Conservation and Recovery, of the U.S. Environmental Protection Agency.* ***Eileen Berenyi, Ph.D*** *is President of Governmental Advisory Associates.*



A Compatibility Study: Recycling and Waste-to-Energy Work in Concert, 2014 Update

By Eileen Brettler Berenyi, Ph.D

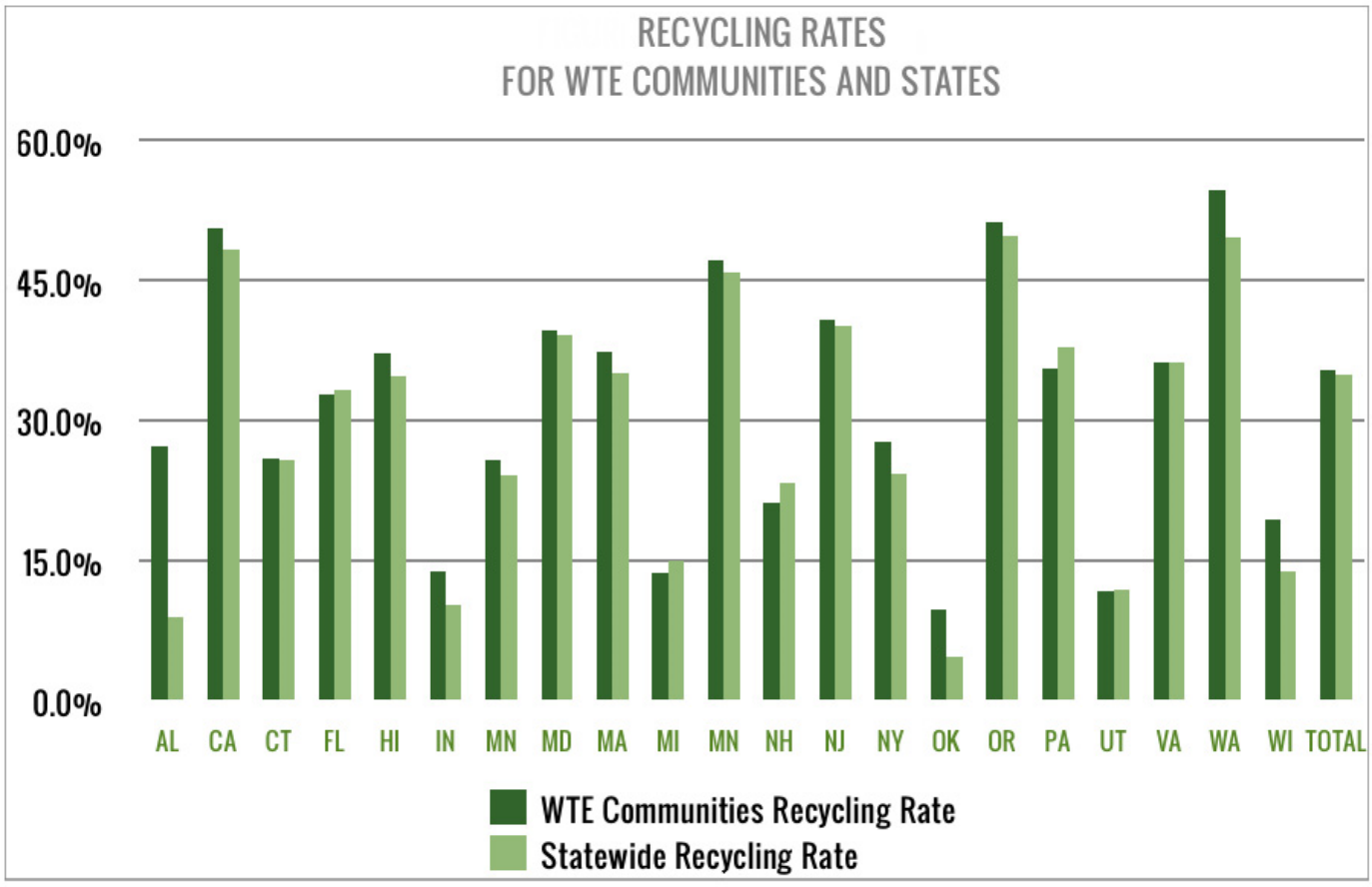
Executive Summary

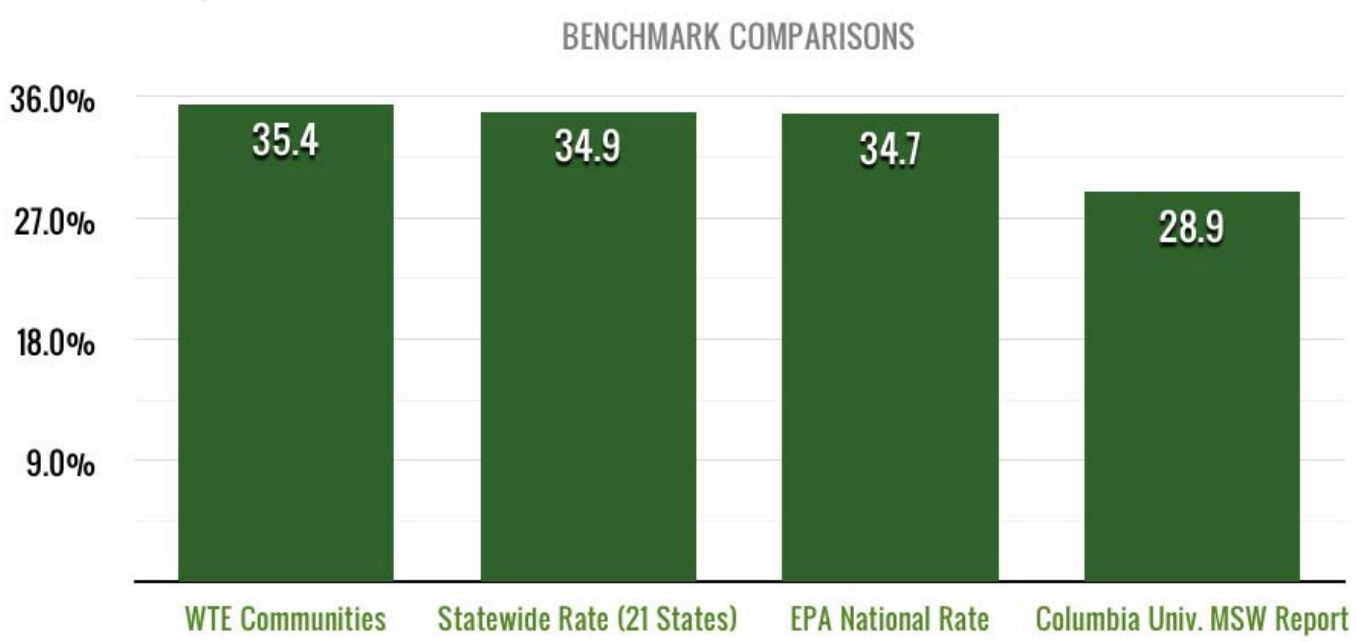
This study updates similar analyses conducted in 2008 and 2009. Their purpose was to answer the question: Does a community's use of a waste-to-energy plant to dispose of its waste impact the level of recycling in that community. The 2008 study answered that question with a resounding no. The means of disposal had no impact on the level of recycling; in fact, many communities which sent their waste to a waste-to-energy plant had higher levels of recycling than averages that prevailed across their state. This current paper, updates the study, using 2012 data as much as possible. In an examination of recycling rates of 700 communities in twenty-one states, which rely on waste-to-energy for their waste disposal, it was again demonstrated that this means of disposal had no impact on recycling. In fact, overall communities using waste-to-energy had a slightly higher level of recycling than that observed across their states and across the nation.

Key Findings:

- The study covers 80 waste-to-energy facilities in 21 states serving about 30% of the population of those states. Recycling data was obtained from 700 local governments, including 601 cities, towns and villages and 98 counties, authorities or districts In addition, statewide data was obtained for each of the 21 states. The population of these states comprises about 56% of the U.S. population.

- As reported by the U.S. EPA the national recycling rate as of 2011 was 34.7%. The recycling rate for communities, using WTE plants is at 35.4%. Interestingly, the average recycling rate for the 21 states surveyed is 34.9%. Figure ES-1 below shows these rates graphically. Only tenths of a percent separate the three averages, indicating that waste-to-energy as a disposal method has no impact on the level of recycling in a community or a state.





- All communities using waste-to-energy provide their residents an opportunity to recycle and most have curbside collection of recyclables. In fact, some of these communities are leaders in the adoption of innovative recycling programs, such as single stream collection and food waste collection and composting. The coincident nature of recycling programs and waste-to-energy in each community is evidence that these two waste management strategies easily exist side by side. They often complement each other, in that a waste-to-energy plant is often the largest recycler of post-consumer metal in the state.

- In most cases, recycling rates in waste-to-energy communities closely track the statewide recycling rate in the state where they are located as shown in Figure ES-2. State solid waste policies and programs, not whether a community relies on waste-to-energy as a disposal option, are a key influence on local recycling behaviors and rates.

- In conjunction with the graph above, Table ES-1 below indicates how individual community recycling rates mirror the overall state rate. In 16 of the 21 states which rely on waste-to-energy facilities, individual communities using these facilities have a slightly higher recycling rate than the overall state average. In total, rates have risen since 2009, with additional communities adopting single stream curbside recycling and more communities moving to curbside organics collection.

The author is the president of Governmental Advisory Associates, Inc. in Westport, CT. The 2014 Update of this report builds upon reports she published on this topic in 2008 and 2009.

WTE Supports High Quality Jobs

The waste-to-energy sector provides significant economic value in the communities in which these facilities operate. In addition to the revenues generated by the sector, waste-to-energy facilities provide stable, long-term, well-paying jobs, while simultaneously pumping dollars into local economies through the purchase of local goods and services and the payment of fees and taxes. In addition to the opportunities to provide base-load renewable electric generation, recover metals for recycling, and reduce greenhouse gas emissions, these facilities significantly contribute to the green economy in the communities in which they operate.

The Global Waste-to-Energy Research and Technology Council (www.wtert.org)

By Prof. Nickolas J. Themelis, Director of Earth Engineering Center of Columbia University (EEC)

Starting in 1995, the Earth Engineering Center (EEC) of Columbia University has researched various aspects of existing and novel technologies for the recovery of materials and energy from "wastes" and disseminated the results of these studies by means of publications, presentations and the web. The guiding principle of EEC research is that "wastes" are resources and must be managed on the basis of science and best available technology and not on ideology or economics that exclude environmental costs. The general principles of sustainable waste management are illustrated in the EEC Hierarchy of Waste Management (Figure 1). The EEC resources are its Research Associates and the graduate students who pursue degrees on sustainable waste management.

One of the EEC activities is the periodic Survey of Waste Management in the U.S. The 2013 Survey was just completed and showed (see Table below) that landfilling remains at about 64% (247 million short tons) of the total U.S. MSW. In contrast, several nations, including Austria, Denmark, Germany, Japan, Netherlands, and Singapore have practically eliminated landfilling by a combination of recycling/composting and waste-to-energy (WTE). It is interesting to note that some U.S. states, e.g. Connecticut, are much more advanced with regard to managing their MSW. The main reason that the U.S. lags behind other developed nations is that there is no government policy on integrated waste management.

In recognition of the fact that there was not enough academic research and training on sustainable waste management, in 2003 EEC co-founded, with the Energy Recovery Council of the U.S., the Waste-to-Energy Research and Technology Council. WTERT brings together scientists, engineers, and managers concerned with advancing sustainable waste management in the U.S. and worldwide. During the first ten years of its existence, WTERT has sponsored many academic research studies and published over one hundred papers on all means of waste management, including waste reduction, recycling, aerobic and anaerobic composting, waste-to-energy, and landfill gas recovery. By now WTERT has sister organizations in Brazil, Canada, China, France, Germany, Greece, India, Italy, Japan, Mexico, Singapore, South Korea, and the U.K. All these organizations are part of the Global WTERT Council (GWC).

Disposition of U.S. MSW in 2011 (2013 EEC National Survey)

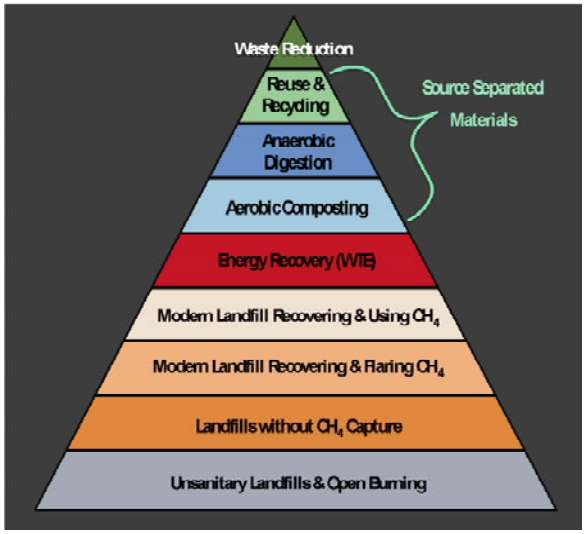
Percent Recycled	Percent Composted	Percent Combusted	Percent Landfilled
22.6	6.3	7.6	63.5

COLUMBIA UNIVERSITY
EARTH ENGINEERING CENTER
Advancing the Goals of Sustainable Waste Management

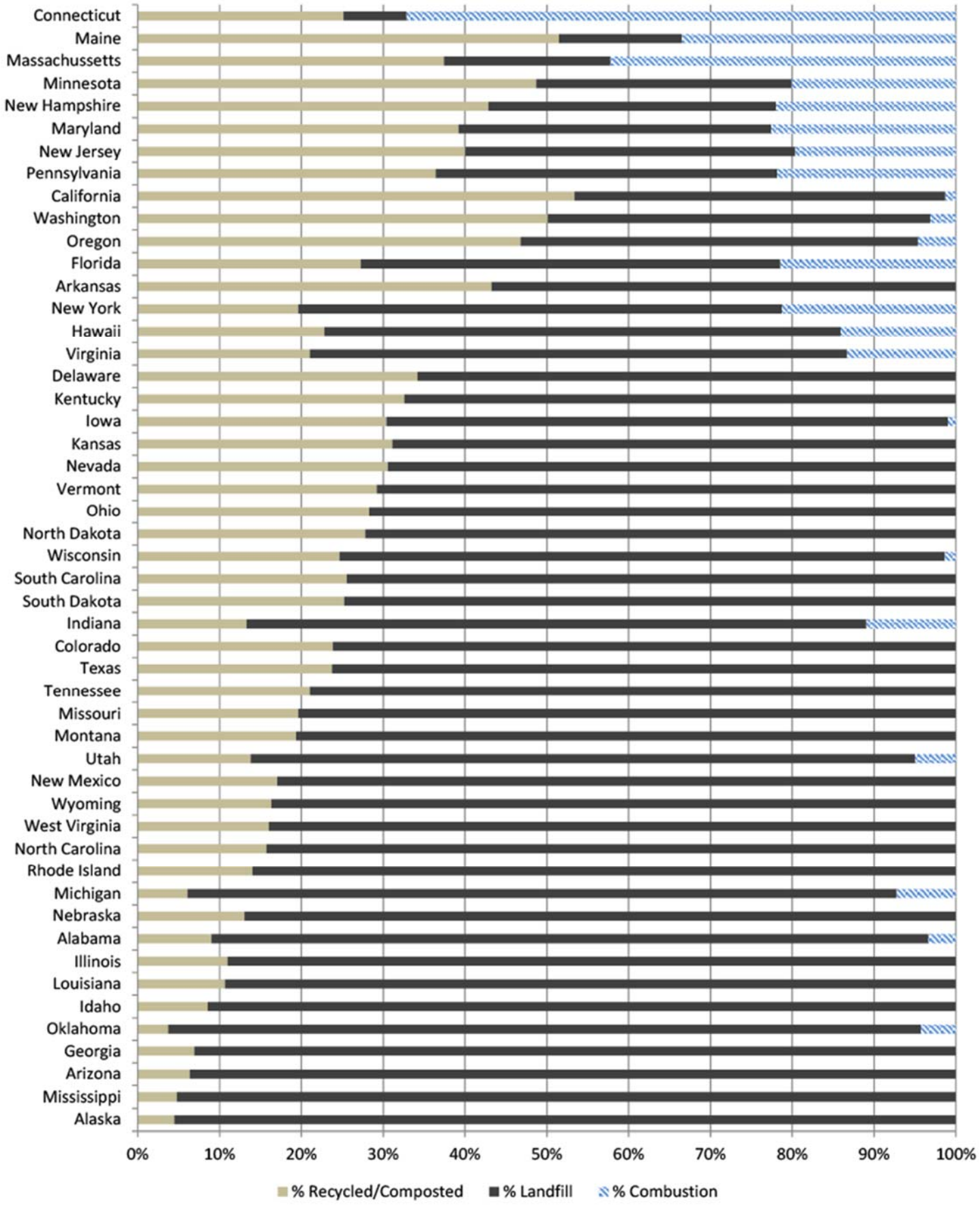
Information to the Public on Sustainable Waste Management

Each year, WTERT-U.S. and its sister organizations receive many requests for information on WTE and waste management practice, in general. The principal means of communication between WTERT and the general public are the various national web pages that, worldwide, continue to be the premier source of up-to-date information on advances in managing "wastes". Also, in 2012-2013, GWC contributed chapters to three books and half a volume to the Encyclopedia of Sustainability Science and Technology (Springer). In 2013, EEC published the WTE Guidebook for Latin America and the Caribbean, under the sponsorship of the InterAmerican Development Bank.

Figure 1. The EEC hierarchy of waste management

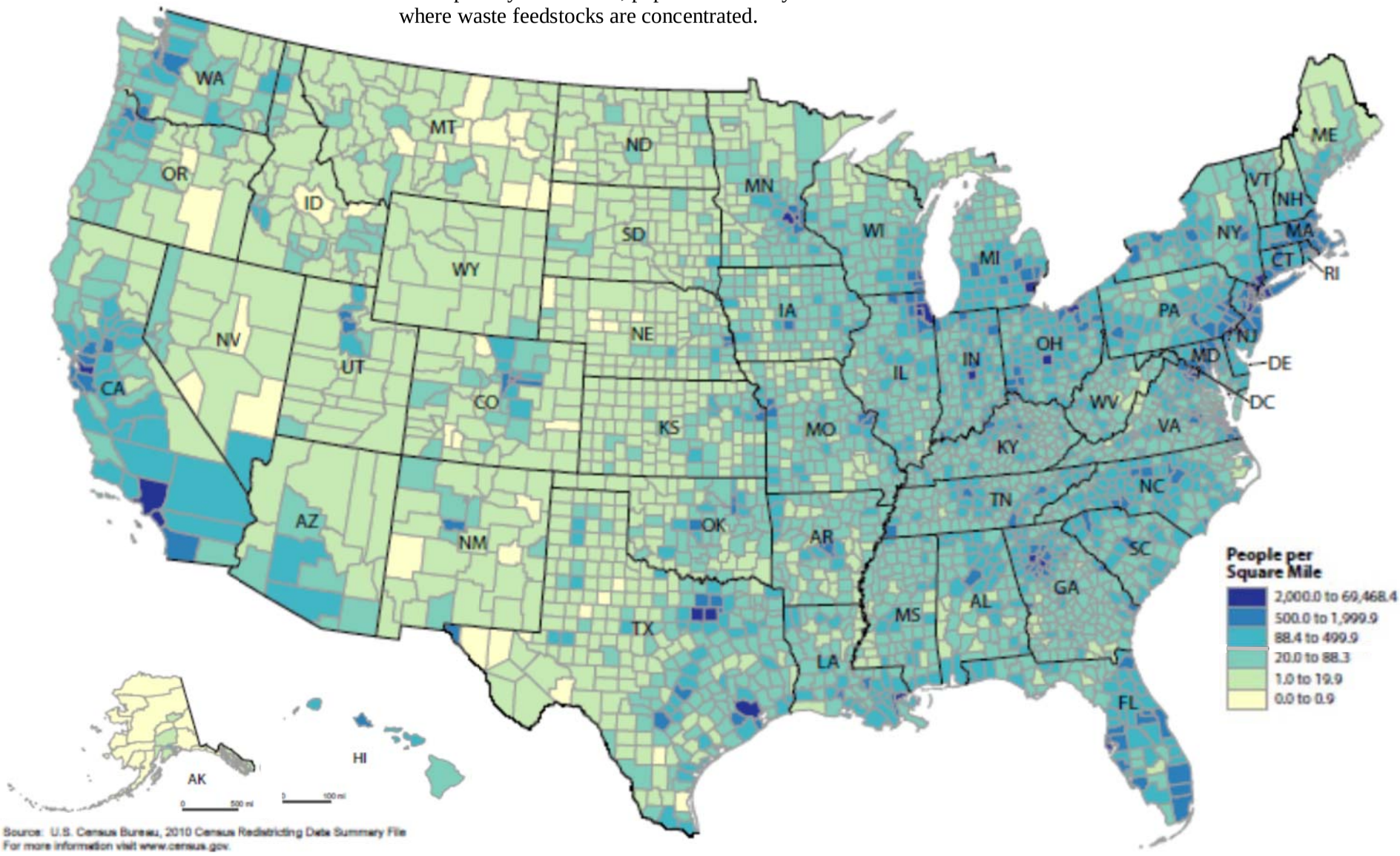


Disposition of MSW in U.S. States (EEC study, 2013)



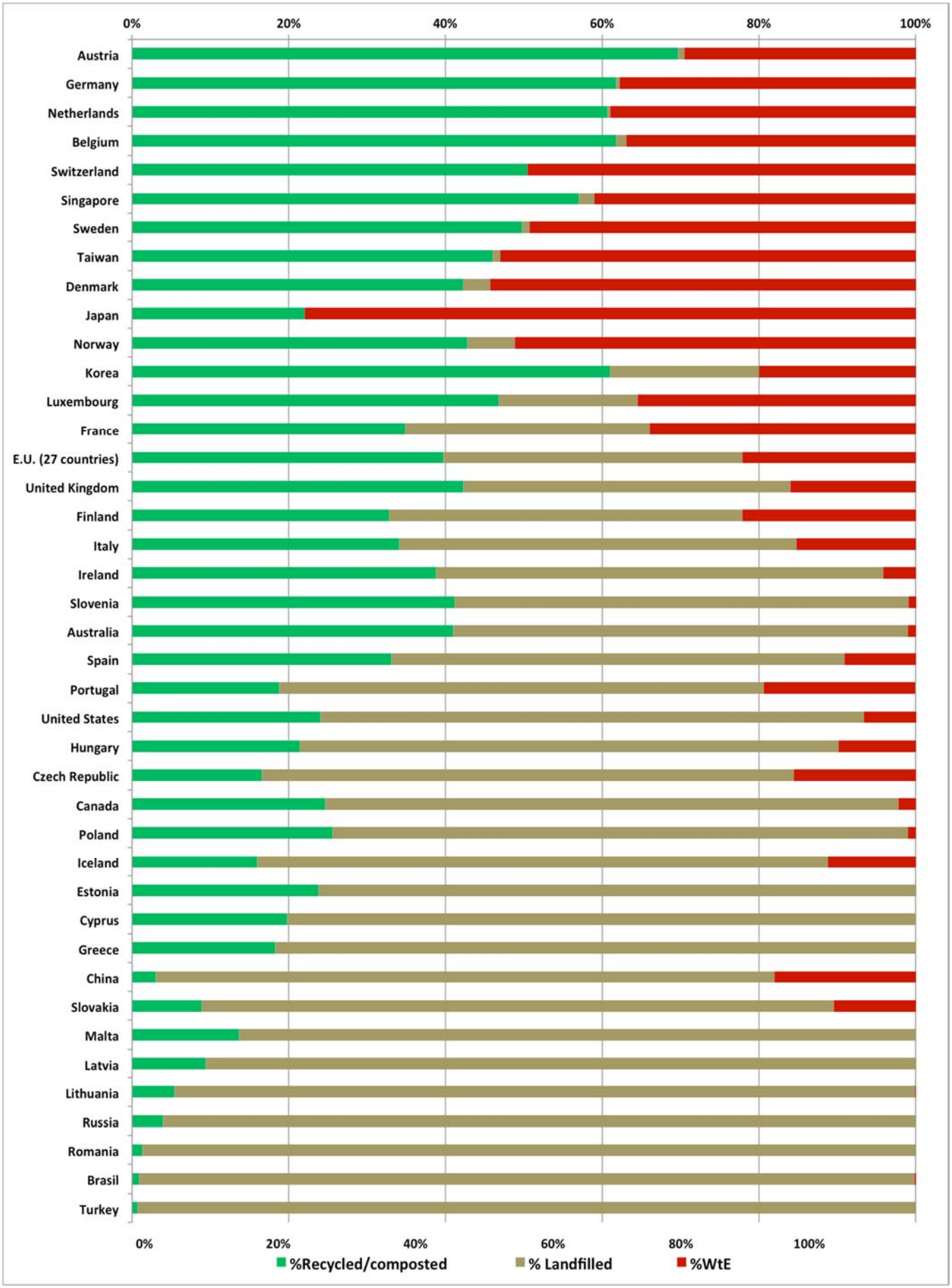
Waste Feedstocks Track Population Density

Waste is everywhere. With almost 250 million tons of waste landfilled each year, opportunities to recover valuable energy and materials from waste abound. The average American generates nearly 7 pounds of waste per day. Therefore, population density is an excellent indicator of where waste feedstocks are concentrated.



Source: U.S. Census Bureau, 2010 Census Redistricting Data Summary File
For more information visit www.census.gov.

Disposition of MSW in various countries (EEC study, 2013)



WTE in Corporate Sustainability Efforts

Companies in the United States and around the world have identified zero waste practices as a sound management practice in pursuit of sustainability, environmental achievement, and economic efficiency. Companies that have pledged to eliminate waste from landfills rely on waste-to-energy facilities for waste that cannot be recycled. Homogenous waste streams in industrial settings yield higher recycling rates than can be achieved on the residential curbside, but residual waste remains which must be managed in a waste-to-energy facility. The electricity that can be generated by a waste-to-energy facility is a feedstock in most industrial manufacturing settings, which allows the energy from the residual waste to be fed right back into the industrial process.

"We are proud of our role as stewards of the environment and of our progress in eliminating waste from our operations," said Terence O'Day, Senior Vice President of Global Operations at The Hershey Company in 2013 as two more facilities achieved zero waste to landfill status. "We achieved zero waste to landfill at these facilities through a rigorous process of eliminating waste, recycling and converting waste to energy. Our employees understand the importance of sustainability across our company and are working together to reach our reduction goals."

General Motors

GM is committed to waste reduction throughout its operations. Currently, more than half of GM's manufacturing facilities are landfill-free, bringing the total count to 85. On average, 97% of the waste generated from everyday manufacturing operations at these plants is recycled or reused, and 3% is converted to energy at waste-to-energy facilities.

The Hershey Company

The Hershey Company has six U.S. plants that no longer dispose routine waste into landfills. To achieve zero waste to landfill status, Hershey's manufacturing facilities have both reduced their overall waste streams and increased recycling rates to approximately 90 percent. All remaining waste is sent to nearby waste-to-energy plants, which also reduces overall reliance on fossil fuels.

Proctor & Gamble

Procter & Gamble announced in 2013 that 45 of their facilities have achieved zero manufacturing waste to landfill. Through quality assurance, packaging reduction, compaction and recycling efforts, the company now ensures that 99% of all materials entering P&G plants leaves as finished product or is recycled, reused or converted to energy at waste-to-energy facilities.

Subaru

The Subaru of Indiana Automotive (SIA) manufacturing plant in Lafayette, Indiana, became the first auto manufacturing plant to achieve a zero landfill status. All of the plant's manufacturing waste goes is recycled and reused or sent to waste-to-energy.

SIA recycles 99.3 percent of its of excess steel, plastic, wood, paper, glass and other materials. The remaining 0.7 percent is shipped to the Indianapolis waste-to-energy facility where it is converted to energy for the downtown steam loop.

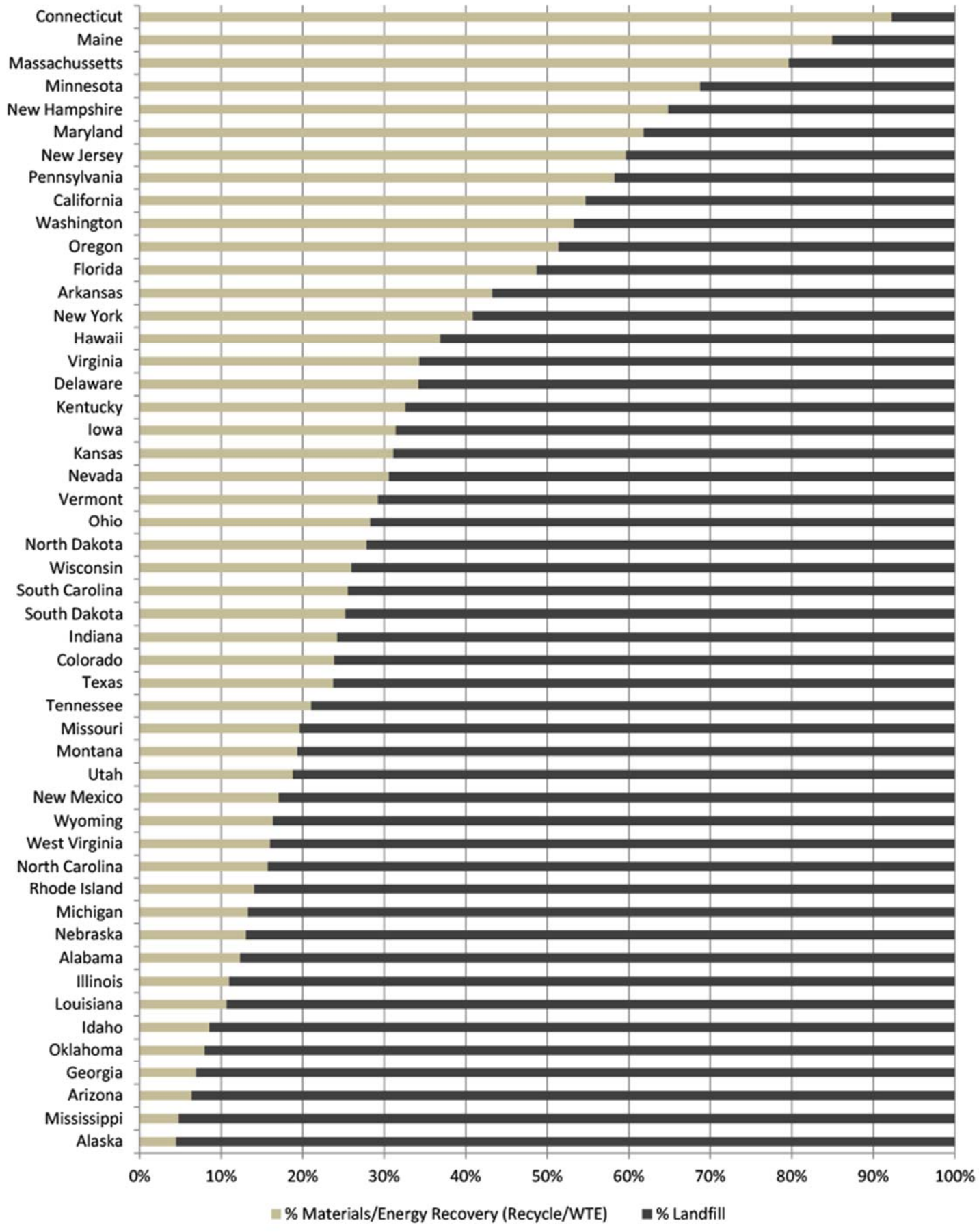
Toyota

Toyota's target is to achieve near-zero waste to landfill (measured annually as a 95% or greater reduction in waste to landfill, averaged across our North American plants). Their zero landfill metric is driven by the Toyota Production System, where the elimination of waste in all aspects of business is a main objective. For example, to avoid sending nonhazardous waste to a landfill, waste from our design centers in Michigan is sent to a waste-to-energy facility.

Unilever

In 2013, Unilever United States and Canada announced that all 26 of its manufacturing and non-manufacturing headquarter facilities are now zero waste to landfill (ZLF). The key driver for this achievement in both North America manufacturing and non-manufacturing headquarter facilities is the elimination of waste. Where reduction of waste is not sufficient, the company's facilities reuse, recycle, or recover energy from waste to reach zero waste to landfill.

Materials and Energy Recovery (EEC study, 2013)



Workplace Health & Safety — A Waste-to-Energy Priority

The Occupational Safety & Health Administration (OSHA) sets standards for America's workers to ensure employees are safe and their health is protected. Waste-to-energy facilities, like all other workplaces, must meet these tough standards. However, waste-to-energy facilities takes tremendous pride in their health and safety programs, which often goes beyond what is required by law. Great importance is placed on developing and implementing successful programs that protect the people working in the plants.

OSHA has recognized the stellar accomplishments of 48 waste-to-energy facilities with the designation of STAR status under the Voluntary Protection Program (VPP). VPP STAR status is the highest honor given to worksites with comprehensive, successful safety and health management systems. STAR sites are committed to effective employee protection beyond the requirements of federal standards and participants develop and implement systems to effectively identify, evaluate, prevent, and control occupational hazards to prevent injuries and illnesses. The keys to health and safety success under VPP are the employee engagement and ongoing involvement in on-site health and safety program development combined with long-term commitment and support from management. VPP-level recipients routinely incur injury and illness rates that are at or below the state average for their specific industry.

Impressively, 48 of the 84 waste-to-energy facilities have earned VPP STAR status. Less than 0.02 percent of all worksites in the United States are enrolled in VPP, yet more than 57 percent of U.S. waste-to-energy facilities are have achieved STAR status. This illustrates the commitment of this sector is superior attention to health and safety.

SAFETY: DO IT FOR LIFE

Created under an ERC-OSHA Alliance Agreement, ERC and its members have celebrated "Hauler Safety Day" at their facilities to educate public and private waste haulers, municipal and private owners and operators, and facility employees about best health & safety practices to ensure a safe and healthy workplace. ERC member companies have coordinated the event by developing and utilizing a unified campaign with posters, stickers and "12 Rule" cards to get the message out regarding health and safety on waste-to-energy tipping floors. Our goal is to ensure that everyone who conducts business at or visits a waste-to-energy facility will return home safe and sound at the end of each and every day.

Waste-to-Energy Owners/Operators

Covanta
445 South Street
Morristown, NJ 07960
(862) 345-5000
www.covanta.com

Green Conversion Systems, LLC
411 Theodore Fremd Ave.
Suite 102
Rye, NY 10580
(914) 925-1077
www.gcsusa.com

Wheelabrator Technologies Inc.
4 Liberty Lane West
Hampton, NH 03842
(800) 682-0026
www.wheelabratortechnologies.com

ERC Municipal Members

Bristol (CT) Resource Recovery Facility Operating Cmte.
City and County of Honolulu, HI
City of Alexandria/Arlington County (VA)
City of Ames (IA) Resource Recovery System
City of Long Beach, CA
City of Tampa, FL
Connecticut Resource Recovery Authority
County Sanitation Districts of Los Angeles County, CA
Dade-Miami County, FL
Delaware Solid Waste Authority
ecomaine
Fairfax County, VA
Hennepin County (MN) Dept. of Environmental Services
Kent County Department of Public Works
Lancaster County (PA) Solid Waste Management Authority
Lee County (FL) Solid Waste Division
Northeast Maryland Waste Disposal Authority
Olmsted County (MN)
Onondaga County (NY) Resource Recovery Agency
Pinellas County (FL) Utilities
Pope-Douglas (MN) Solid Waste Management
Prairie Lakes Municipal Solid Waste Authority (MN)
Solid Waste Authority of Palm Beach County (FL)
Southeastern CT Regional Resources Recovery Authority
Spokane (WA) Regional Solid Waste System
Town of Wallingford (CT)
Virgin Islands Waste Management Authority
Wasatch (UT) Integrated Waste Management District
York County (PA) Solid Waste Authority

ERC Associate Members

C&I Boiler Repair, Inc.
Dvirka & Bartilucci Consulting Engineers
Energy Answers International
Gershman, Brickner, and Bratton, Inc.
Great River Energy
Hawkins Delafield & Wood LLC
HDR, Inc.
Helfrich Brothers Boiler Works, Inc.
Hitachi Zosen Inova USA
INASHCO North America Inc.
Jansen Combustion & Boiler Technologies, Inc.
Martin GmbH
Minnesota Resource Recovery Association
Morris, Manning & Martin, LLP
New England Mechanical Overlay
PERC Holdings LLC
Plasma Power LLC
Plattco Corporation
Powerhouse Technology, Inc.
Ramboll
Renewable Resource Consultants LLC
Resource Recovery Technologies, LLC
RRT Design & Construction
Southern Recycling
Valmet Inc.
Zampell Refractories, Inc.

Waste-to-Energy Directory: Key Terms

City: The city in which the facility is physically located.

County: The county in which the facility is physically located.

U.S. Congressional District: The U.S. congressional district in which the facility is physically located in the 113th Congress (2013-2014).

Owner: The current owner of the facility is listed. Whether the owner is a private or public entity is noted parenthetically.

Operator: The current operator of the facility is listed. Whether the operator is a private or public entity is noted parenthetically.

Project Startup: The actual year in which commercial operation began.

Operating Status: Indicates whether the facility is operating, inactive, or under construction in 2014.

Technology: Indicates whether the facility is mass burn, modular, or refuse derived fuel (RDF).

Throughput Capacity (TPD): Expressed in tons per day, the throughput capacity is the aggregate trash capacity for all units located at a facility.

No. of Boilers: The number of boilers (or units) in use at the facility.

Gross Electric Capacity (MW): Expressed in gross megawatts, the nameplate capacity of the turbine generators located at the facility. This figure represents the largest amount of gross electrical output that can be achieved.

Gross Steam Capacity (lbs/hr): The gross amount of steam that can be generated. For combined heat and power facilities, this amount represents the typical amount of steam exported expressed in pounds per hour, in addition to electric generation.

Full-time Employees: The approximate number of full-time employees that work at a facility. This number is an estimate and fluctuates over time.

Serves Waste Needs of (People): Indicates the number of individuals that are served by the facility in the "waste catchment area".

Certifications: Indicates whether the facility has achieved STAR status under the U.S. Occupational Safety and Health Administration (OSHA) Voluntary Protection Program (VPP) or is ISO certified.

State Based Information

WTE Facilities: The number of facilities located in that state.

Total Waste Capacity: The aggregate trash capacity of all facilities located in that state.

Total Electric Capacity: The aggregate gross electric capacity of all facilities located in that state.

Total Steam Capacity: The aggregate gross steam capacity typically exported (expressed in lbs/hr) of all facilities located in that state.

Population in 2010: The population of the state as reported in the 2010 census by the U.S. Census Bureau.

MSW Managed in 2011: The total amount of MSW processed at all facilities in the state in 2011, as reported by the 2013 Columbia University EEC Survey.

% of MSW Managed by WTE in 2011: The percentage of the state's waste processed by WTE in 2011, as reported by the 2013 Columbia University EEC Survey.

WTE as % of Non-Hydro Renewable Elec. Generation in 2012: WTE electricity, expressed as a percentage of all non-hydro renewable electricity, generated in that state in 2012.

Energy Produced by WTE in a State is enough to power (#) homes: The figure is derived by expressing energy capacity (electric and steam) in megawatts and dividing it by EIA's estimate that each household uses 1.24 kilowatts of capacity per hour (10,837 kwh per year).

Recycling Rate of WTE Communities: The aggregate recycling rate of all WTE communities in the state, as reported by Eileen Berenyi's 2014 Recycling compatibility report.

Jobs at WTE Facilities: The aggregate FTE jobs at facilities in the state listed in the directory.

Total Jobs (Direct, Indirect, & Induced) Created by WTE: The total number of direct, indirect, and induced jobs created by WTE in the state, as reported by Eileen Berenyi in the 2013 National WTE Economic report.

Total Economic Output (Direct, Indirect & Induced) by WTE: The total number of direct ,indirect and induced economic output created by WTE in the state, as reported by Eileen Berenyi in the 2013 National WTE Economic report.

State Law Defining WTE as Renewable: Citation of a state law defining WTE as renewable. In some states, more than one reference to WTE as renewable may exist, but may not be listed here.

ALABAMA

WTE Facilities: One

Total Waste Capacity: 690 **tons** per day

Total Steam Capacity: 178,620 **Lbs/**Hr

AL Population in 2010: 4,779,736

MSW Managed in AL in 2011: 5,395,280 **tons**

% of AL MSW Managed by WTE in 2011: 3.3 **percent**

Energy Produced by WTE in Alabama is Enough to Power: 11,551 **homes**

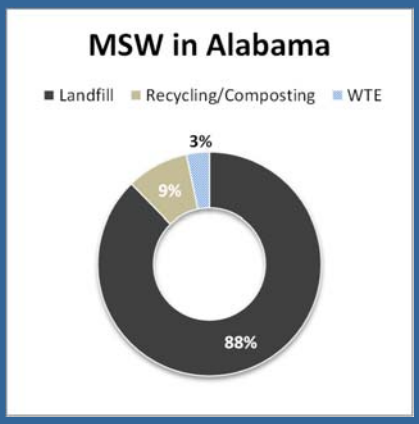
Recycling Rate of WTE Communities in AL: 27.2 **percent**

Jobs at WTE Facilities in AL: 38 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in AL: 109 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Alabama: $47,100,000

State Law Defining WTE as Renewable: ALA §40-18-1



Huntsville Waste-to-Energy Facility

City: Huntsville, AL
County: Madison
US Congressional District: 5th
Owner: City of Huntsville Solid Waste Disposal Authority *(public)*
Operator: Covanta Huntsville, Inc. *(private)*

Project Startup:	1990
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	690
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	178,620
Full-time Employees:	38
Serves Waste Needs of (people):	277,000
Certifications:	VPP STAR

Websites: www.swdahsv.org
www.covanta.com

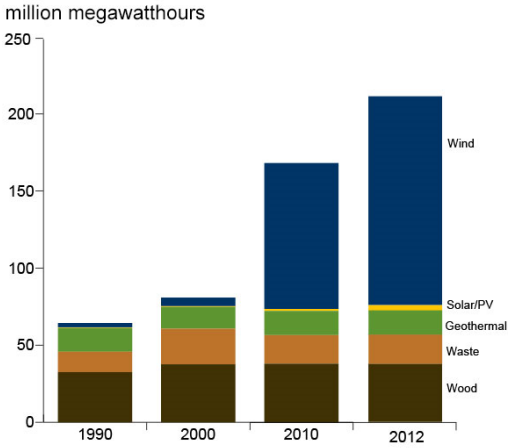
Notes: The Huntsville facility sells steam to the U.S. Army's Redstone Arsenal, which for more than 50 years has been the Army's center for rocket and missile programs.

Renewable Energy Generation in the United States

In 2012, U.S. power plants used renewable energy sources — water (hydroelectric), wood, wind, waste-to-energy, geothermal, and sun — to generate about 12% of domestic electricity.

The availability of renewable resources can vary. Hydroelectric generation increases in some years and decreases in others, primarily due to variation in the amounts of rainfall and melting snowfall occurring in watersheds where major hydroelectric dams are located. The availability of biomass, waste, and geothermal energy is generally consistent over the short term as is the generation from these resources. The availability of wind and solar energy has daily and seasonal patterns, so resulting generation fluctuates widely.

Nonhydropower Renewable Electricity Generation by Source, 1990-2012



Source: U.S. Energy Information Administration, the *Electric Power Monthly* (March, 2013).

The U.S. Energy Information Administration (EIA) tracks electric generation from all sources in detail. For updated information, see www.eia.gov.

CALIFORNIA

WTE Facilities: Three

Total Waste Capacity: 2,540 **tons** per day

Total Electric Capacity: 70.4 **MW**

CA Population in 2010: 37,253,956

MSW Managed in CA in 2011: 66,299,346 **tons**

% of CA MSW Managed by WTE in 2011: 1.3 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in CA in 2012: 1.0 **percent**

Energy Produced by WTE in California is Enough to Power: 56,907 **homes**

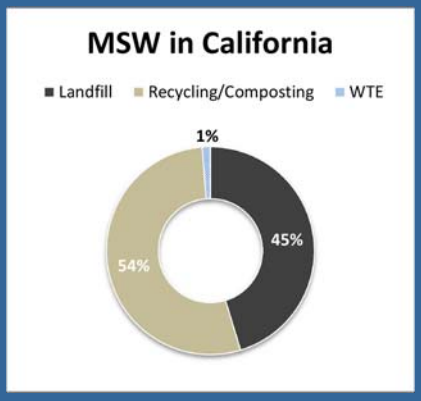
Recycling Rate of WTE Communities in CA: 50.5 **percent**

Jobs at WTE Facilities in CA: 146 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in CA: 503 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in California: $139,800,000

State Law Defining WTE as Renewable: CA Public Utility Code §399.12



Commerce Refuse-to-Energy Facility

City: Commerce, CA
County: Los Angeles
US Congressional District: 40th
Owner: Commerce Refuse-to-Energy Authority *(public)*
Operator: Sanitation Districts of Los Angeles County *(public)*

Project Startup:	1987
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	360
No. of Boilers:	1
Gross Elec. Capacity (MW):	12
Full-time Employees:	39
Serves Waste Needs of (people):	1,115,000

Websites: www.lacsd.org/solidwaste

Notes: The original goal of the Commerce facility was to demonstrate that refuse-to-energy is a viable alternative method of solid waste management in the South Coast Air Basin, where air pollution requirements are the toughest in the world.

Southeast Resource Recovery Facility (SERRF)

City: Long Beach, CA
County: Los Angeles
US Congressional District: 47th
Owner: Southeast Resource Recovery Facility Authority *(public)*
Operator: Covanta Long Beach Renewable Energy Corp. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,380
No. of Boilers:	3
Gross Elec. Capacity (MW):	36
Full-time Employees:	60
Serves Waste Needs of (people):	500,000

Websites: www.lacsd.org/solidwaste
www.covanta.com

Notes: As a public service, this facility began destroying narcotics in 1992. Since its inception, the program has successfully destroyed an average of 17,000 pounds of narcotics each month.

Stanislaus County Resource Recovery Facility
City: Crows Landing, CA
County: Stanislaus
US Congressional District: 10th
Owner: Covanta Stanislaus, Inc. *(private)*
Operator: Covanta Stanislaus, Inc. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	800
No. of Boilers:	2
Gross Elec. Capacity (MW):	22.4
Full-time Employees:	47
Serves Waste Needs of (people):	521,497
Certifications:	VPP STAR

Websites: www.covanta.com
www.stancountywte.com

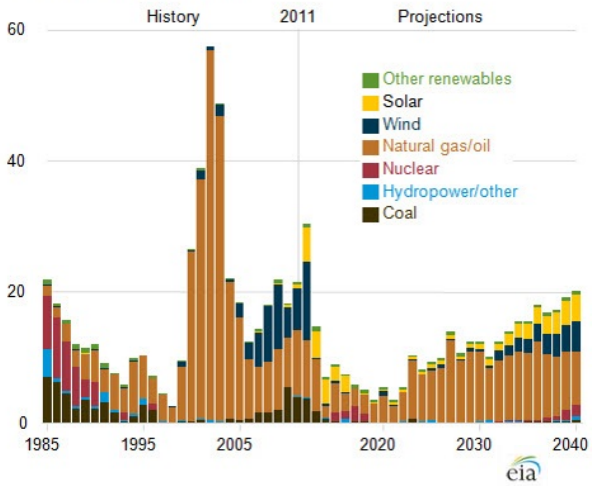
Notes: The Stanislaus County Resource Recovery Facility won the Solid Waste Association of North America's (SWANA) 2007 Waste-to-Energy Gold Excellence Award.

EIA Electric Generating Capacity Outlook

EIA's *Annual Energy Outlook 2013* (*AEO 2013*) states that investments in electricity generation capacity have gone through boom-and-bust cycles. A construction boom in the early 2000s saw capacity additions averaging 35 gigawatts a year from 2000 to 2005. Since then, average annual builds have dropped to 18 gigawatts per year from 2006 to 2011.

In the *AEO 2013* Reference case, capacity additions from 2012 to 2040 total 340 gigawatts, including new plants built not only in the power sector but also by end-use generators. Annual additions in 2012 and 2013 remain relatively high, averaging 22 gigawatts per year. Annual builds drop significantly after 2013 and remain below 9 gigawatts per year until 2023. Between 2025 and 2040, average annual builds increase to 14 gigawatts per year, as excess capacity is depleted and the rate of total capacity growth is more consistent with electricity demand growth.

Figure 78. Additions to electricity generating capacity, 1985-2040 (gigawatts)



Center for American Progress

Energy from Waste Can Help Curb Greenhouse Gas Emissions

By Matt Kasper
April 17, 2013

[Excerpt] The United States currently generates 390 million tons of trash per year, or 7 pounds per person per day. Although many states have the physical space for trash, it is environmentally unsustainable to take garbage and bury it in the ground at landfills, where it decomposes and releases potent greenhouse-gas pollution. Though garbage is not something we tend to actively think about on a daily basis, specifically as it relates to climate change, the United States must begin developing policies to limit the environmental consequences that result from our generation of garbage.

There is an alternative waste management option that America has not significantly utilized but that could help stem the flow of waste, and thus pollution emissions, in our country: energy-from-waste facilities. According to the EPA, for every ton of garbage processed at an energy-from-waste facility, approximately one ton of emitted carbon-dioxide equivalent in the atmosphere is prevented.

Both energy from waste and recycling and composting efforts are a win-win-win for the United States. Energy-from-waste generates clean electricity, decreases greenhouse gases that would have been emitted from landfills and fossil-fuel power plants, and pairs well with increased recycling rates in states. The United States must begin developing national policies to deal with the waste-management problem our country faces every day. Doing so will ultimately reduce emissions that cause climate change.

To read the full article:
http://www.americanprogress.org/issues/green/report/2013/04/17/60712/energy-from-waste-can-help-curb-greenhouse-gas-emissions/

The Center for American Progress is a progressive public policy research and advocacy organization.

CONNECTICUT

WTE Facilities: Six

Total Waste Capacity: 7,359 **tons** per day

Total Electric Capacity: 195.3 **MW**

CT Population in 2010: 3,574,097

MSW Managed in CT in 2011: 3,208,768 **tons**

% of CT MSW Managed by WTE in 2011: 67.1 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in CT in 2012: 100 **percent**

Energy Produced by WTE in Connecticut is Enough to Power: 157,869 **homes**

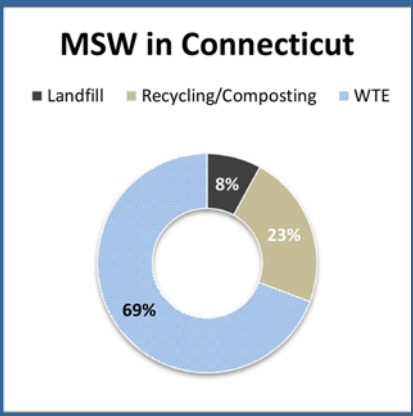
Recycling Rate of WTE Communities in CT: 25.9 **percent**

Jobs at WTE Facilities in CT: 360 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in CT: 1,052 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Connecticut: $428,000,000

State Law Defining WTE as Renewable: **CT** §16-1(a)(27)



Bristol Resource Recovery Facility

City: Bristol, CT
County: Hartford
US Congressional District: 1st
Owner: Covanta Bristol, Inc. *(private)*
Operator: Covanta Bristol, Inc. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	650
No. of Boilers:	2
Gross Elec. Capacity (MW):	16.3
Full-time Employees:	40
Serves Waste Needs of (people):	373,150
Certifications:	VPP STAR

Websites: www.covanta.com
www.brrfoc.org

Notes: In 2010, Covanta Bristol received the "The Distinguished Business of the Year Award" from the Central Connecticut Chambers of Commerce.

CRRA Hartford Trash-to-Energy Plant

City: Hartford, CT
County: Hartford
US Congressional District: 1st
Owner: Connecticut Resource Recovery Authority *(public)*
Operator: NAES Corp. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	2,850
No. of Boilers:	3
Gross Elec. Capacity (MW):	69
Full-time Employees:	133
Serves Waste Needs of (people):	1,208,813

Websites: www.crra.org
www.naes.com

Notes: The facility includes a state-of-the art odor control system for the waste processing facility to thermally destroy the odors. The system has the capacity to exchange each day the amount of air that would fill 4 Louisiana Superdomes.

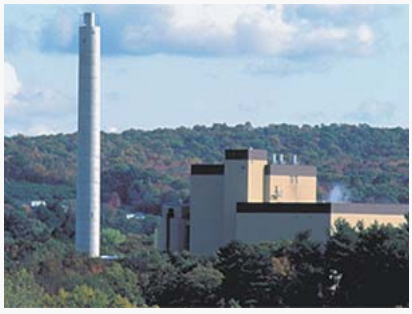
Southeastern Connecticut Resource Recovery Facility

City: Preston, CT
County: New London
US Congressional District: 2nd
Owner: Covanta Company of Southeastern Connecticut *(private)*
Operator: Covanta Company of Southeastern Connecticut *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	689
No. of Boilers:	2
Gross Elec. Capacity (MW):	17
Full-time Employees:	43
Serves Waste Needs of (people):	248,233
Certifications:	VPP STAR

Websites: www.covanta.com
www.scrrra.org

Notes: The SECONN facility received the State of Connecticut DEP Green Circle Award in 2010 for promoting pollution prevention, waste reduction, natural resources conservation and environmental awareness. The facility also received a U.S. Environmental Protection Agency New England Environmental Merit Special Recognition for outstanding efforts in improving New England's environment.



Wallingford Resource Recovery Facility

City: Wallingford, CT
County: New Haven
US Congressional District: 3rd
Owner: Covanta Projects of Wallingford, L.P. *(private)*
Operator: Covanta Projects of Wallingford, L.P. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Modular
Design Capacity (TPD):	420
No. of Boilers:	3
Gross Elec. Capacity (MW):	11
Full-time Employees:	37
Serves Waste Needs of (people):	214,934
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: This facility began commercial operation in May 1989 and is located between Hartford and New Haven. Its renewable energy output is sold to Connecticut Light and Power Company.

Wheelabrator Bridgeport, L.P.

City: Bridgeport, CT
County: Fairfield
US Congressional District: 4th
Owner: Wheelabrator Bridgeport, L.P. *(private)*
Operator: Wheelabrator Bridgeport, L.P. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,250
No. of Boilers:	3
Gross Elec. Capacity (MW):	67
Full-time Employees:	74
Serves Waste Needs of (people):	815,807
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: In 2013, Wheelabrator Bridgeport marked its 25th year of service, during which time it has processed 18.5 million tons of waste, generated 13 million megawatt hours of electricity, and recycled nearly 400,000 tons of ferrous metals.

Waste is a Valuable Domestic Energy Resource and Waste-to-Energy is a Critical, yet Underutilized Technology

389 million **TONS** of trash generated in the US every year

247 million **TONS** landfilled

112 million **TONS** recycled or composted

At **84 WTE** plants:

energy recovery from **30** million **TONS**

Selling more than 14.5 billion kilowatt hours of renewable electricity

Recovering and recycling more than 730,000 tons of ferrous and non-ferrous metals

GHGs—Avoiding more than 30 million tons of CO_2e carbon dioxide equivalents

WITH SO MANY BTUs BURIED, THE NEED FOR WTE IS **IMMENSE**

Wheelabrator Lisbon Inc.
City: Lisbon, CT
County: New London
US Congressional District: 2nd
Owner: Eastern Connecticut Resource Recovery Authority *(public)*
Operator: Wheelabrator Lisbon Inc. *(private)*

Project Startup:	1995
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	500
No. of Boilers:	2
Gross Elec. Capacity (MW):	15
Full-time Employees:	33
Serves Waste Needs of (people):	225,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com
www.ecrra.org

Notes: The facility is actively engaged in the community, supporting the fire department, the local school system, and the local civic group that organizes the annual Lisbon Fall Festival.

Green Investing
Towards a Clean Energy Infrastructure

In this report released in Davos, Switzerland in January 2009, the World Economic Forum highlighted eight renewable energy technologies which look particularly promising.

1. Onshore Wind
2. Offshore Wind
3. Solar Photovoltaic Power
4. Solar Thermal Electricity Generation
5. **Municipal Solid Waste-to-Energy (MSW)**
6. Sugar Based Ethanol
7. Cellulosic and Next Generation Biofuels
8. Geothermal

FLORIDA

WTE Facilities: Eleven

Total Waste Capacity: 19,364 **tons** per day

Total Electric Capacity: 532 **MW**

FL Population in 2010: 18,801,310

MSW Managed in FL in 2011: 27,040,919 **tons**

% of FL MSW Managed by WTE in 2011: 21.4 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in FL in 2012: 49.7 **percent**

Energy Produced by WTE in Florida is Enough to Power: 430,038 **homes**

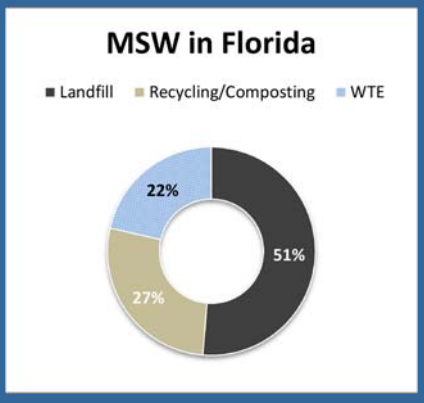
Recycling Rate of WTE Communities in FL: 32.7 **percent**

Jobs at WTE Facilities in FL: 885 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in FL: 2,371 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Florida: $997,500,000

State Law Defining WTE as Renewable: FL §366.91



Bay County Waste-to-Energy Facility

City: Panama City, FL
County: Bay
US Congressional District: 2nd
Owner: Bay County *(public)*
Operator: EnGen, LLC *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	500
No. of Boilers:	2
Gross Elec. Capacity (MW):	15
Full-time Employees:	36
Serves Waste Needs of (people):	169,560
Certifications:	ISO 14001; ISO 18001

Websites: www.engenllc.com

Notes: In 2009, Bay County offered a free program to properly dispose of American flags that were no longer fit for use. The WTE facility was stopped, a private flag burning ceremony was held, and the flags were placed directly in the combustor.

Hillsborough County Resource Recovery Facility

City: Tampa, FL
County: Hillsborough
US Congressional District: 14th
Owner: Hillsborough County *(public)*
Operator: Covanta Hillsborough, Inc. *(private)*

Project Startup:	1987 (Units 1-3); 2009 (Unit 4)
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,800
No. of Boilers:	4
Gross Elec. Capacity (MW):	46.5
Full-time Employees:	54
Serves Waste Needs of (people):	1,234,010
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The Hillsborough facility completed an expansion in 2009 by adding a fourth boiler to process an additional 600 tons per day. The increased capacity generates carbon offsets certified by the Verified Carbon Standard.

Lake County Resource Recovery Facility

City: Okahumpka, FL
County: Lake
US Congressional District: 10th
Owner: Covanta Lake, Inc. *(private)*
Operator: Covanta Lake, Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	528
No. of Boilers:	2
Gross Elec. Capacity (MW):	14.5
Full-time Employees:	36
Serves Waste Needs of (people):	288,379
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The Lake County Resource Recovery Facility was presented with the William C. Schwartz Industry Innovation Award in 2008. This Metro Orlando Economic Development Commission Award is presented annually to companies from the Orlando region.

Lee County Resource Recovery Facility

City: Ft. Myers, FL
County: Lee
US Congressional District: 19th
Owner: Lee County *(public)*
Operator: Covanta Lee, Inc. *(private)*

Project Startup:	1994 (Units 1&2); 2007 (Unit 3)
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,836
No. of Boilers:	3
Gross Elec. Capacity (MW):	57.3
Full-time Employees:	57
Serves Waste Needs of (people):	626,502
Certifications:	VPP STAR

Websites: www.leegov.com/solidwaste
www.covanta.com

Notes: The Lee County facility is certified under the Verified Carbon Standard to sell carbon offsets. The facility has won numerous awards from many prestigious organizations since its inception.

McKay Bay Refuse-to-Energy Facility

City: Tampa, FL
County: Hillsborough
US Congressional District: 14th
Owner: City of Tampa *(public)*
Operator: Wheelabrator McKay Bay Inc. *(private)*

Project Startup:	1985
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,000
No. of Boilers:	4
Gross Elec. Capacity (MW):	22
Full-time Employees:	43
Serves Waste Needs of (people):	336,823
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com
http://www.tampagov.net/dept_Solid_Waste/information_resources/mcKay_bay/

Notes: The McKay Bay facility underwent a significant retrofit project between 1999-2001.

Miami-Dade County Resource Recovery Facility

City: Miami, FL
County: Miami-Dade
US Congressional District: 25th
Owner: Miami-Dade County *(public)*
Operator: Covanta Dade Renewable Energy *(private)*

Project Startup:	1982
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	3,000
No. of Boilers:	4
Gross Elec. Capacity (MW):	77
Full-time Employees:	190
Serves Waste Needs of (people):	2,531,789
Certifications:	VPP STAR; ISO 14001

Websites: www.covanta.com
www.miamidade.gov/publicworks/resources-recovery.asp

Notes: The Miami Dade facility won the ASME Large waste-to-energy facility award in 2002. Its RDF unit won the ASME Material Recovery Facility award in 2003.

Palm Beach Renewable Energy Facility #1

City: West Palm Beach, FL
County: Palm Beach
US Congressional District: 18th
Owner: Solid Waste Authority of Palm Beach County *(public)*
Operator: Palm Beach Resource Recovery Corp. (Babcock & Wilcox) *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	2,000
No. of Boilers:	2
Gross Elec. Capacity (MW):	61
Full-time Employees:	221
Serves Waste Needs of (people):	1,270,000

Websites: www.swa.org
www.babcock.com

Notes: Palm Beach REF #1 underwent a major refurbishment/ modernization in 2011 to extend its service life by an additional 20 years.

Palm Beach Renewable Energy Facility #2

City: West Palm Beach, FL
County: Palm Beach
US Congressional District: 18th
Owner: Solid Waste Authority of Palm Beach County *(public)*
Operator: Babcock & Wilcox *(private)*

Project Startup:	est. 2015
Operating Status:	Under Construction
Technology:	Mass Burn
Design Capacity (TPD):	3,000
No. of Boilers:	3
Gross Elec. Capacity (MW):	96
Full-time Employees:	TBD
Serves Waste Needs of (people):	1,270,000

Websites: www.swa.org
www.babcock.com

Notes: The Palm Beach Renewable Energy Facility #2 is the first greenfield mass burn waste-to-energy project constructed in the United States in over 15 years.

Pasco County Solid Waste Resource Recovery Facility

City: Spring Hill, FL
County: Pasco
US Congressional District: 12th
Owner: Pasco County *(public)*
Operator: Covanta Pasco, Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,050
No. of Boilers:	3
Gross Elec. Capacity (MW):	29.7
Full-time Employees:	40
Serves Waste Needs of (people):	439,702
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The Pasco County Solid Waste Resource Recovery Facility is one of four waste-to-energy facilities serving the greater Tampa Bay area. The facility uses secondary sewer treatment effluent from a nearby wastewater treatment plant for part of its process water make-up. In addition, as part of the facility, there is a public drop-off center where local residents can bring non-hazardous household items for disposal.

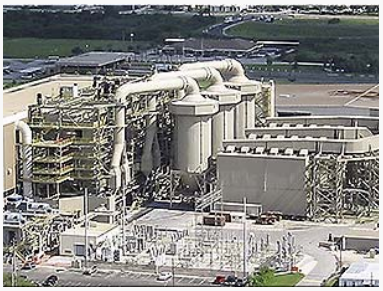
Pinellas County Resource Recovery Facility

City: St. Petersburg, FL
County: Pinellas
US Congressional District: 13th
Owner: Pinellas County *(public)*
Operator: GCS Energy Recovery of Pinellas, Inc. *(private)*

Project Startup:	1983
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	3,150
No. of Boilers:	3
Gross Elec. Capacity (MW):	75
Full-time Employees:	70
Serves Waste Needs of (people):	1,000,000

Websites: www.pinellascounty.org/utilities/wte.htm
www.gcsusa.com

Notes: The Pinellas County Resource Recovery Facility is one of four waste-to-energy facilities serving the greater Tampa Bay area. It won the ASME Large Waste-to-Energy Facility Award in 2004.



Wheelabrator North Broward Inc.

City: Pompano Beach, FL
County: Broward
US Congressional District: 21st
Owner: Wheelabrator North Broward Inc. *(private)*
Operator: Wheelabrator North Broward Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,250
No. of Boilers:	3
Gross Elec. Capacity (MW):	68
Full-time Employees:	66
Serves Waste Needs of (people):	850,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator North Broward uses reclaimed water for cooling water purposes throughout the plant, saving an additional 50 million gallons of water per year that is currently pulled from the Florida Biscayne Aquifer.

American Chemistry Council's Chemistry to Energy Campaign

The American Chemistry Council's (ACC) is the trade association representing companies engaged in the business of chemistry, including the manufacturers of plastic resins. ACC has launched a "Chemistry to Energy" campaign highlighting the role of chemistry in shale gas, energy efficiency, and **energy recovery**.

Chemistry: Transforming Waste into a Valuable Energy Resource

Although recycling rates for many plastics in the U.S. are growing and must continue to do so, tons of non-recycled plastics are buried in landfills every day – wasting a valuable energy source. Non-recycled plastics, however, are being transformed right now into alternative energy through advanced energy recovery technologies like waste-to-energy and plastics-to-oil. Waste-to-energy facilities produce clean, renewable energy in the form of electricity or heat from municipal solid waste, while plastics-to-oil transforms non-recycled plastic into a valuable commodity, creating a reliable source for alternative energy from an abundant, no-cost feedstock.

A 2011 study from Columbia University found that if all of the non-recycled waste produced in the United States each year were recovered for energy, it could power over 16 million American homes. If all of our non-recycled plastics were converted into alternative energy, rather than buried in landfills, they could power at least 6 million cars each year. And if those same non-recycled plastics were sent to waste-to-energy plants to be converted into electricity, they could power over 5 million American homes annually.

Our nation's energy policy must harness all of America's viable energy sources, including recovering energy from waste, to continue creating the innovative products and jobs our economy needs, strengthen our economy, make our domestic energy supplies go further than ever and improve our energy security.

Wheelabrator South Broward Inc.
City: Ft. Lauderdale, FL
County: Broward
US Congressional District: 23rd
Owner: Wheelabrator South Broward Inc. *(private)*
Operator: Wheelabrator South Broward Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,250
No. of Boilers:	3
Gross Elec. Capacity (MW):	66
Full-time Employees:	72
Serves Waste Needs of (people):	850,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

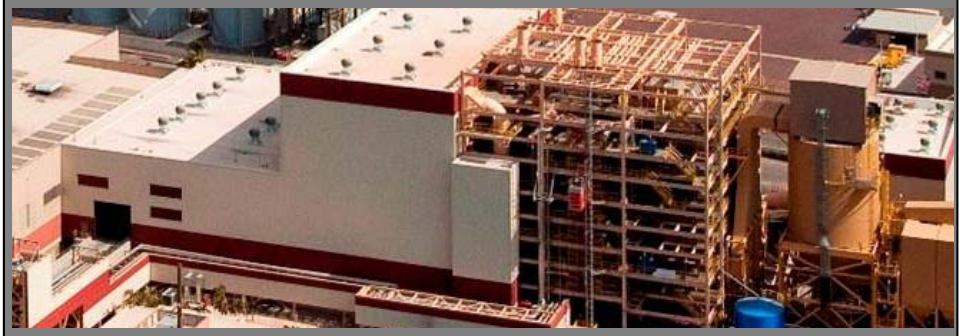
Notes: Wheelabrator South Broward is a long-time supporter of SOS Children's Village in Florida, which opened in 1993. The Village allows for brothers and sisters, who are typically separated while in foster care, to reunite and maintain their family connection.

Recent Capacity Additions

Since 2007 — 6 Expansions of Existing WTE Facilities

Lee County, FL (2007); Hillsborough County, FL (2009); Olmsted, MN (2010); Pope-Douglas, MN (2011), Honolulu, HI (2012); Perham, MN (2014)

Aggregate Expansion Capacity Additions: 2,540 tons per day; 54 MW electric



Greenfield WTE Facility Under Construction

West Palm Beach, FL (2015)

Capacity Additions Under Construction: 3,000 tons per day, 96 MW electric

HAWAII

WTE Facilities: One

Total Waste Capacity: 3,000 tons per day

Total Electric Capacity: 90 MW

HI Population in 2010: 1,360,301

MSW Managed in HI in 2011: 3,884,163 tons

% of HI MSW Managed by WTE in 2011: 14.1 percent

WTE as % of Non-Hydro Renewable Elec. Generation in HI in 2012: 28.5 percent

Energy Produced by WTE in Hawaii is Enough to Power: 72,751 homes

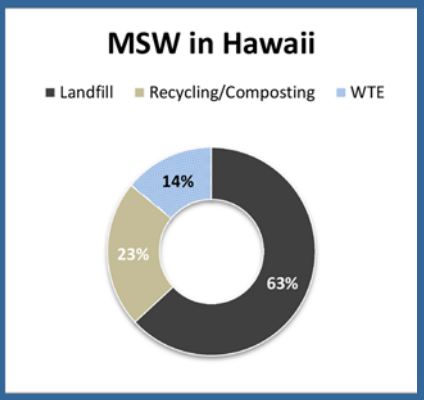
Recycling Rate of WTE Communities in HI: 37.2 percent

Jobs at WTE Facilities in HI: 161 FTE

Total Jobs (Direct, Indirect, & Induced) Created by WTE in HI: 324 FTE

Total Economic Output (Direct, Indirect & Induced) by WTE in Hawaii: $143,400,000

State Law Defining WTE as Renewable: HI §269-91



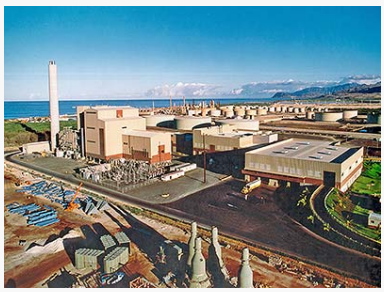
Honolulu Resource Recovery Venture—H-Power

City: Kapolei, HI
County: Honolulu
US Congressional District: 1st
Owner: City and County of Honolulu *(public)*
Operator: Covanta Honolulu Resource Recovery Venture *(private)*

Project Startup:	1990 (Units 1&2); 2012 (Unit 3)
Operating Status:	Operating
Technology:	RDF (Units 1&2); Mass Burn (Unit 3)
Design Capacity (TPD):	3,000
No. of Boilers:	3
Gross Elec. Capacity (MW):	90
Full-time Employees:	161
Serves Waste Needs of (people):	907,574
Certifications:	VPP STAR

Websites: www.covanta.com
www.opala.org

Notes: The H-Power facility completed an expansion in 2012 by adding a 900 tpd mass burn unit to complement the 2 RDF units. H-Power now provides nearly 8 percent of Oahu's electricity.



Growth in Canada

Durham York Energy Centre (DYEC)

Growth in the waste-to-energy sector is occurring in Canada with construction of the Durham York Energy Centre (DYEC) in Ontario and continuing development of waste-to-energy in Vancouver.

Construction of the Durham York Energy Centre is more than halfway complete by the end of 2013, will begin some operations by spring 2014, and will be up and running completely by fall 2014. According to statistics from Covanta, 7,887 cubic meters of concrete have been poured and 2,181 tonnes of structural steel placed as of October, 2013. The facility will have 60,000 linear feet of piping, not including the boiler tubes, when it is completed.

More than 300 construction workers are currently on site at peak times. More than 40 full time permanent positions will be created to operate the facility when complete.

When it is finished, the facility will have a baseload capacity of 17.5 megawatts of electricity, powered by 140,000 tonnes of post-recycled waste annually from the Regions of Durham and York in Ontario. One of the unique features is a 12'x 12' "jumbotron" which will display real-time emissions information to the public, who can also access the data online.

INDIANA

WTE Facilities: One

Total Waste Capacity: 2,362 **tons** per day

Total Steam Capacity: 558,000 **Lbs/**Hr

Total Electric Capacity: 6.5 **MW**

IN Population in 2010: 6,483,802

MSW Managed in IN in 2011: 6,440,739 **tons**

% of IN MSW Managed by WTE in 2011: 10.9 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in IN in 2012: 1.2 **percent**

Energy Produced by WTE in Indiana is Enough to Power: 41,339 **homes**

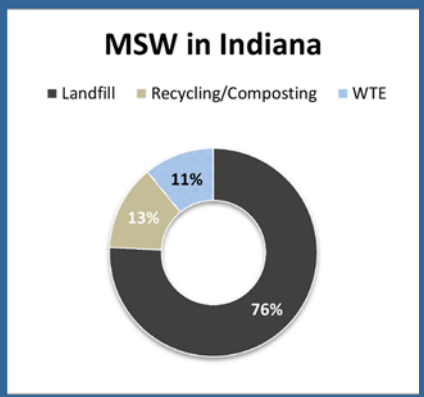
Recycling Rate of WTE Communities in IN: 13.8 **percent**

Jobs at WTE Facilities in IN: 74 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in IN: 197 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Indiana: $74,900,000

State Law Defining WTE as Renewable: IN §8-1-37.4



Indianapolis Resource Recovery Facility

City: Indianapolis, IN
County: Marion
US Congressional District: 7th
Owner: Covanta Indianapolis, Inc. *(private)*
Operator: Covanta Indianapolis, Inc. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,362
No. of Boilers:	3
Gross Steam Capacity (Lbs/Hr):	558,000
Gross Elec. Capacity (MW):	6.5
Full-time Employees:	74
Serves Waste Needs of (people):	808,466
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: Steam exported from the facility powers the downtown heating loop, supplying nearly all downtown businesses, as well as Indiana University, Purdue University's Indianapolis campus, and Eli Lilly.

Confederation of European Waste-to-Energy Plants

www.cewep.eu

The Confederation of European Waste-to-Energy Plants (CEWEP) is the umbrella association of the owners and operators of waste-to-energy plants across Europe. They thermally treat household and similar waste that remains after waste prevention, reuse and recycling by generating energy from it. They deliver this energy (heat and electricity) to citizens and industry, replacing fossil fuels, such as coal, oil or gas used by conventional power plants.

CEWEP aims to highlight that recycling and energy recovery are complementary options in order to divert waste from landfilling. Membership of CEWEP underlines a Waste-to-Energy Plant's commitment to ensuring high environmental standards, achieving low emissions by operating Best Available Techniques and maintaining state of the art energy production from otherwise un-reusable/recyclable materials.

CEWEP represents European Waste-to-Energy Plants at the EU level, through thorough analysis of environmental legislation, on sustainable development and by providing information on the Waste-to-Energy sector to the Commission, Council and European Parliament.

CEWEP Confederation of European Waste-to-Energy Plants

IOWA

WTE Facilities: One

Total Waste Capacity: 175 **tons** per day

Total Electric Capacity: 4 **MW**

IA Population in 2010: 3,046,355

MSW Managed in IA in 2011: 3,930,863 **tons**

% of IA MSW Managed by WTE in 2011: 1.0 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in IA in 2012: 0.2 **percent**

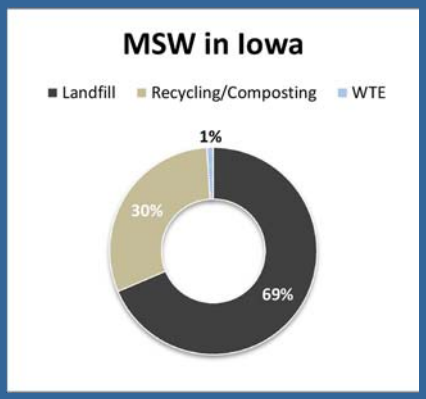
Energy Produced by WTE in Iowa is Enough to Power: 3,233 **homes**

Jobs at WTE Facilities in IA: 15 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in IA: 32 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Iowa: $7,300,000

State Law Defining WTE as Renewable: IA §476.41



Arnold O. Chantland Resource Recovery Plant

City: Ames, IA
County: Story
US Congressional District: 4th
Owner: City of Ames *(public)*
Operator: City of Ames *(public)*

Project Startup:	1975
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	175
No. of Boilers:	1
Gross Elec. Capacity (MW):	4 (RDF attributed)
Full-time Employees:	15
Serves Waste Needs of (people):	68,898

Websites: www.cityofames.org

Notes: The Arnold O. Chantland Resource Recovery Plant (RRP) was the first municipally operated waste-to-energy facility in the nation and was built in 1975. The RRP won the 2011 ASME waste-to-energy facility award.

International Solid Waste Association

www.iswa.org

The International Solid Waste Association (ISWA) is a global, independent and non-profit making association, working in the public interest to fulfill its declared mission: "To Promote and Develop Sustainable and Professional Waste Management Worldwide". ISWA's vision is an Earth where no waste exists. Waste should be reused and reduced to a minimum, then collected, recycled and treated properly.

Solid Waste Association of North America

www.swana.org

For more than 50 years, the Solid Waste Association of North America (SWANA) has been the leading professional association in the solid waste field. SWANA serves over 8,000 members throughout North America, and thousands more with conferences, certifications, publications, and technical training courses. SWANA's prominent and nationally acclaimed technical conferences and training programs cover all aspects of integrated municipal solid waste management, and the Association is a major policy and technical representative of solid waste management practitioners, executives, companies and government organizations.

MAINE

WTE Facilities: Three

Total Waste Capacity: 1,470 **tons** per day

Total Electric Capacity: 44.7 **MW**

ME Population in 2010: 1,328,361

MSW Managed in ME in 2011: 1,412,071 **tons**

% of ME MSW Managed by WTE in 2011: 33.5 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in ME in 2012: 8.9 **percent**

Energy Produced by WTE in Maine is Enough to Power: 36,133 **homes**

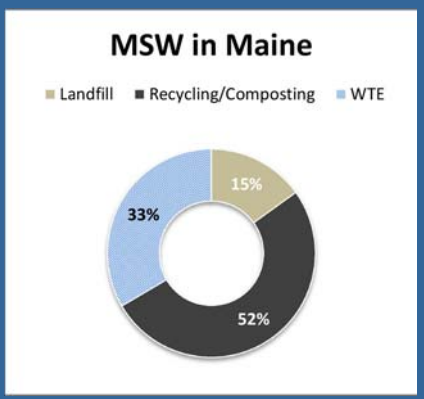
Recycling Rate of WTE Communities in ME: 25.8 **percent**

Jobs at WTE Facilities in ME: 153 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in ME: 615 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Maine: $146,600,000

State Law Defining WTE as Renewable: **ME** 35-A § 3210



ecomaine

City: Portland, ME
County: Cumberland
US Congressional District: 1st
Owner: ecomaine *(public)*
Operator: ecomaine *(public)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	550
No. of Boilers:	2
Gross Elec. Capacity (MW):	14.7
Full-time Employees:	50
Serves Waste Needs of (people):	250,000
Certifications:	ISO 14001

Websites: www.ecomaine.org

Notes: ecomaine won the 2006 the Solid Waste Association of North America's (SWANA) WTE Silver Award and the 2009 ASME Small Combustion Facility of the Year Award.

Mid-Maine Waste Action Corporation

City: Auburn, ME
County: Androscoggin
US Congressional District: 2nd
Owner: Mid-Maine Waste Action Corporation *(public)*
Operator: Mid-Maine Waste Action Corporation *(public)*

Project Startup:	1992
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	200
No. of Boilers:	2
Gross Elec. Capacity (MW):	5
Full-time Employees:	28
Serves Waste Needs of (people):	65,000

Websites: www.midmainewaste.com

Notes: MMWAC is located in Auburn and is owned by 12 municipalities: Auburn, Bowdoin, Buckfield, Lovell, Minot, Monmouth, New Gloucester, Poland, Raymond, Sumner, Sweden, and Wales.

The North American Waste-to-Energy Conference (NAWTEC)

Co-sponsored by the Energy Recovery Council (ERC) and the Solid Waste Association of North America (SWANA), in partnership the Waste-to-Energy Research and Technology Council (WTERT) at Columbia University, the North American Waste-to-Energy Conference (NAWTEC) is widely recognized as the premier conference and trade show focusing on the municipal waste-to-energy sector.

NAWTEC celebrates its 22nd Annual Meeting in 2014. Over the years, it has showcased the latest business development, research, technology, innovations, and policies affecting the municipalities and companies involved in waste-to-energy. The 22nd NAWTEC will take place May 7-9, 2014 in Reston, VA.

http://www.nawtec.org

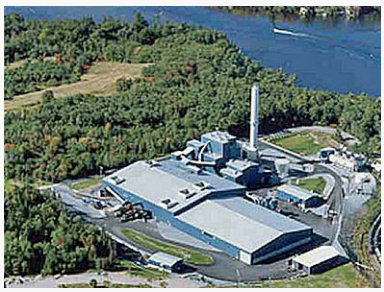
1993 – Islip, NY
1994 – Boston, MA
1995 – Washington, DC
1996 – Atlantic City, NJ
1997 – Research Triangle Park, NC
1998 – Miami Beach, FL
1999 – Tampa, FL
2000 – Nashville, TN
2001 – Miami, FL
2002 – Philadelphia, PA
2003 – Tampa, FL
2004 – Savannah, GA
2005 – Orlando, FL
2006 – Tampa, FL
2007 – Miami, FL
2008 – Philadelphia, PA
2009 – Chantilly, VA
2010 – Orlando, FL
2011 – Lancaster, PA
2012 – Portland, ME
2013 – Ft. Myers, FL
2014 – Reston, VA

Penobscot Energy Recovery Company
City: Orrington, ME
County: Penobscot
US Congressional District: 2nd
Owner: PERC Holdings LLC; communities *(private)*
Operator: ESOCO Orrington, Inc. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	720
No. of Boilers:	2
Gross Elec. Capacity (MW):	25
Full-time Employees:	75
Serves Waste Needs of (people):	400,000

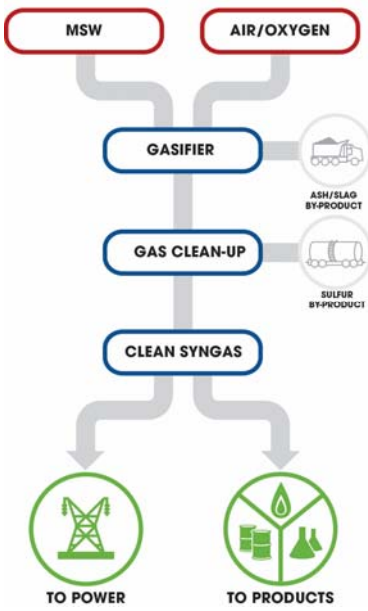
Websites: www.percwte.com
www.mrcmaine.org

Notes: PERC has a unique ownership structure, in which PERC Holdings LLC owns 73% of the facility and 78 local governments are limited partners that together own 23% of the facility.



Waste Conversion Technologies

Energy recovery via gasification of municipal solid waste (MSW) is an emerging conversion technology drawing increasing interest across North America for its potential dual benefits of energy recovery and landfill diversion. Gasification technology potentially offers feedstock flexibility and customization for generating a range of desirable products. Gasification's main product is synthesis gas (syngas) that is further processed into electricity, ethanol, diesel, or other chemicals.



Source: Gasification Technologies Council

Gasification occurs in the presence of limited amounts of air (or oxygen) that allows partial combustion of the material and leads to combustible syngas as a final product. Gasification technologies have been successful in processing coal, pet coke, biomass, and homogeneous industrial waste products. Their application in the field of MSW processing is under development.

MARYLAND

WTE Facilities: Three

Total Waste Capacity: 4,410 **tons** per day

Total Electric Capacity: 124.6 **MW**

Total Steam Capacity: 242,340 **Lbs/**Hr

MD Population in 2010: 5,773,552

MSW Managed in MD in 2011: 2,352,939 **tons**

% of MD MSW Managed by WTE in 2011: 22.6 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in MD in 2012: 52.0 **percent**

Energy Produced by WTE in Maryland is Enough to Power: 116,391 **homes**

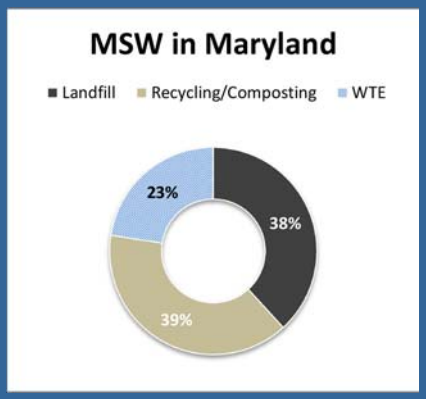
Recycling Rate of WTE Communities in MD: 39.7 **percent**

Jobs at WTE Facilities in MD: 160 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in MD: 458 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Maryland: $183,000,000

State Law Defining WTE as Renewable: MD § 7-701



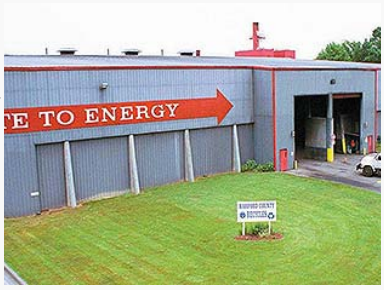
Harford Waste-to-Energy Facility

City: Joppa, MD
County: Harford
US Congressional District: 2nd
Owner: Northeast Maryland Waste Disposal Authority *(public)*
Operator: Energy Recovery Operations, Inc. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Modular
Design Capacity (TPD):	360
No. of Boilers:	4
Gross Elec. Capacity (MW):	1.2
Gross Steam Capacity (Lbs/Hr):	72,340
Full-time Employees:	43
Serves Waste Needs of (people):	242,514
Certifications:	OSHA SHARP

Websites: www.nmwda.org

Notes: The Harford facility provides about 50% of the steam needs of the Edgewood Area of U.S. Army's Aberdeen Proving Ground, which has been used for the development and testing of chemical agent munitions.



Montgomery County Resource Recovery Facility

City: Dickerson, MD
County: Montgomery
US Congressional District: 6th
Owner: Northeast Maryland Waste Disposal Authority *(public)*
Operator: Covanta Montgomery, Inc. *(private)*

Project Startup:	1995
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,800
No. of Boilers:	3
Gross Elec. Capacity (MW):	63.4
Full-time Employees:	49
Serves Waste Needs of (people):	971,600
Certifications:	VPP STAR

Websites: www.nmwda.org
www.covanta.com

Notes: The facility won the Solid Waste Association of North America Gold Excellence Award for Waste to Energy in 2005 and 2010. All waste is brought to the facility in intermodal containers via railcar thereby eliminating truck traffic.

U.S. Congress Relies on WTE

In 2011, Congress began sending approximately 90 percent of its trash to a waste-to-energy facility in Alexandria, VA. The Architect of the Capitol reported that in the first nine months, 3,700 tons of nonrecyclable solid waste from Congressional facilities has processed by waste-to-energy. "Congress has made huge strides to improve our environmental sustainability," said then-House Administration Chairman Dan Lungren (R-Calif.).

The positive report is good news for the House Administration and Senate Rules and Administration which is responsible for managing the waste generated in the U.S. Capitol and congressional office buildings. In 2011, Rep. Jim Moran (D-Va.), the ranking member of the Appropriations Subcommittee on the Interior and Environment, has praised the waste-to-energy program last October. "It's the appropriate thing to do, burning our waste and getting energy from it," he said. "We do it in my district, and it's something we studied carefully when I was the mayor of Alexandria."

Wheelabrator Baltimore, L.P.
City: Baltimore, MD
County: Baltimore
US Congressional District: 3rd
Owner: Wheelabrator Baltimore, L.P. *(private)*
Operator: Wheelabrator Baltimore, L.P. *(private)*

Project Startup:	1985
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,250
No. of Boilers:	3
Gross Elec. Capacity (MW):	60
Gross Steam Capacity (Lbs/Hr):	170,000
Full-time Employees:	68
Serves Waste Needs of (people):	1,427,232
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator opened the Aquaculture Center in 1986 to raise threatened fish species. The water used in the Aquaculture Center comes from the plant's cooling water system. Each fall, approximately five thousand small fish are released into Maryland rivers.

Maryland Recognizes WTE as a Tier 1 Renewable

On May 17, 2011, Maryland Governor Martin O'Malley signed into law a bill that elevated waste-to-energy from Tier 2 to Tier 1 in the Maryland renewable energy standard.

In a statement, Governor O'Malley said: *"Our State has an aggressive goal of generating 20% of our energy from Tier I renewable sources by 2022 and we intend to achieve that goal through as much in-state energy generation as possible. This will require a diverse fuel mix including onshore and offshore wind, solar, biomass including poultry litter, and now waste-to-energy if we are to realize our 20% goal.*

"Marylanders generate tons of solid waste each and every day. If there is no waste-to-energy facility available, these tons of trash are simply dumped into landfills, no value is derived from the waste, and our State continues to rely on coal-fired generation to account for 55% of our energy needs.

"On carbon emissions, those greenhouse gases that degrade our environment and contribute to global warming, waste to energy facilities are better for the environment than the combination of coal generated electricity and land filling of solid waste. It is only through a diverse, renewable fuel mix that we will be able to reach our aggressive goals, protect our precious environment, and create the economic engine to move Maryland forward."

MARYLAND
Smart, Green & Growing

MASSACHUSETTS

WTE Facilities: Seven

Total Waste Capacity: 9,490 **tons** per day

Total Electric Capacity: 256.9 **MW**

Total Steam Capacity: 68,000 **Lbs/**Hr

MA Population in 2010: 6,545,629

MSW Managed in MA in 2011: 7,520,771 **tons**

% of MA MSW Managed by WTE in 2011: 42.2 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in MA in 2012: 68.1 **percent**

Energy Produced by WTE in Massachusetts is Enough to Power: 212,060 **homes**

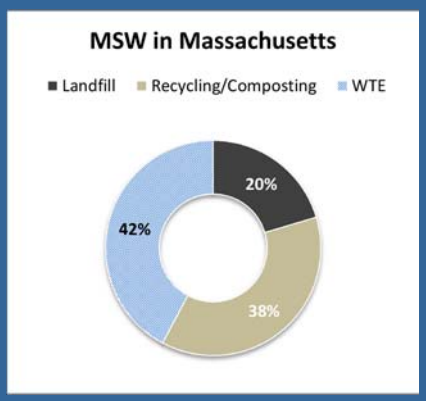
Recycling Rate of WTE Communities in MA: 37.3 **percent**

Jobs at WTE Facilities in MA: 489 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in MA: 1,441 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Massachusetts: $591,600,000

State Law Defining WTE as Renewable: MA §ch.25A § 11F



Haverhill Resource Recovery Facility

City: Haverhill, MA
County: Essex
US Congressional District: 3rd
Owner: Covanta Haverhill, Inc. *(private)*
Operator: Covanta Haverhill, Inc. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,650
No. of Boilers:	2
Gross Elec. Capacity (MW):	44.6
Full-time Employees:	48
Serves Waste Needs of (people):	475,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: Covanta Haverhill, Inc. won the ASME Large Combustion Facility Award in 2004. The facility sits on a 147 acre area in the Ward Hill Neck section of Haverhill.

Pioneer Valley Resource Recovery Facility

City: Agawam, MA
County: Hampden
US Congressional District: 1st
Owner: Covanta Springfield, LLC *(private)*
Operator: Covanta Springfield, LLC *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Modular
Design Capacity (TPD):	400
No. of Boilers:	3
Gross Elec. Capacity (MW):	9.4
Full-time Employees:	41
Serves Waste Needs of (people):	300,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: This facility was one of the first in the United States to successfully co-combust wastewater treatment plant sludge and fats, oil and grease (FOG) with municipal solid waste.

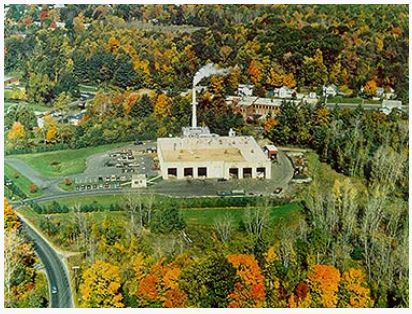
Pittsfield Resource Recovery Facility

City: Pittsfield, MA
County: Berkshire
US Congressional District: 1st
Owner: Covanta Pittsfield, LLC *(private)*
Operator: Covanta Pittsfield, LLC *(private)*

Project Startup:	1981
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	240
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	68,000
Gross Elec. Capacity (MW):	0.9
Full-time Employees:	29
Serves Waste Needs of (people):	70,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: Each year, the Pittsfield Resource Recovery Facility produces over 400 million pounds of steam as well as 3.5 million kW hours of electricity used in-house for facility operations. On a daily basis, the steam generated by the facility and delivered to Crane & Co. enables Crane to run its currency paper manufacturing facility and avoid utilizing 16,000 gallons of oil per day.



SEMASS Resource Recovery Facility

City: West Wareham, MA
County: Plymouth
US Congressional District: 9th
Owner: Covanta SEMASS, L.P. *(private)*
Operator: Covanta SEMASS, L.P. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	2,700
No. of Boilers:	3
Gross Elec. Capacity (MW):	78
Full-time Employees:	85
Serves Waste Needs of (people):	1,000,000

Websites: www.covanta.com

Notes: The facility won the ASME Large Combustion Facility Award in 2007. It processes more than one million tons of trash per year.

Wheelabrator Millbury Inc.

City: Millbury, MA
County: Worcester
US Congressional District: 2nd
Owner: Wheelabrator Millbury Inc. *(private)*
Operator: Wheelabrator Millbury Inc. *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,500
No. of Boilers:	2
Gross Elec. Capacity (MW):	46
Full-time Employees:	54
Serves Waste Needs of (people):	750,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator is strongly committed to supporting Millbury, including volunteering to help build a Victorian Garden at the senior center, restoring the "Great Room" in the historic Asa Water Mansion Museum; and working to establish the state's first inner-city wildlife sanctuary.

WTE Carbon Offsets

Carbon offset credits generated by Hillsborough County's Resource Recovery Facility, in Tampa, FL have been approved under the Verified Carbon Standard (VCS), a global standard for the approval of credible voluntary offset credits. The credits represent reductions in net greenhouse gas (GHG) emissions achieved by generating renewable energy from waste at the facility. In addition, for the credits to be approved under the standard, they must also meet strict program requirements and be independently verified by a qualified third party. The Lee County Resource Recovery Facility in Ft. Myers, FL is also qualified to sell carbon offsets under the Verified Carbon Standard, and has sold offsets on the voluntary market.

Energy Recovery Council Membership

The Energy Recovery Council is the national trade association representing companies and local governments engaged in the waste-to-energy sector. ERC is responsible for advocating on waste-to-energy issues before lawmakers and regulators, promoting waste-to-energy to the public, policymakers, and opinion leaders, building coalitions in support of waste-to-energy, publishing articles and educational materials, and working as a clearinghouse for technical information.

Membership is available for WTE owners and operators, local governments, and companies that provides goods and services to WTE owners and operators. Visit www.wte.org for membership information.

ENERGY RECOVERY COUNCIL

Wheelabrator North Andover Inc.

City: North Andover, MA
County: Essex
US Congressional District: 6th
Owner: Wheelabrator North Andover Inc. *(private)*
Operator: Wheelabrator North Andover Inc. *(private)*

Project Startup:	1985
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,500
No. of Boilers:	2
Gross Elec. Capacity (MW):	40
Full-time Employees:	67
Serves Waste Needs of (people):	426,000

Websites: www.wheelabratortechnologies.com

Notes: The facility shares a neighborhood where businesses and residential areas are thriving and continuing to enjoy growth and expansion. The facility also supports the Science Screen Report STEM education package for schools in the Merrimack Valley and beyond.

Wheelabrator Saugus Inc.

City: Saugus, MA
County: Essex
US Congressional District: 6th
Owner: Wheelabrator Saugus Inc. *(private)*
Operator: Wheelabrator Saugus Inc. *(private)*

Project Startup:	1975
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,500
No. of Boilers:	2
Gross Elec. Capacity (MW):	38
Full-time Employees:	65
Serves Waste Needs of (people):	850,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator Saugus created the Bear Creek Wildlife Sanctuary and has spent more than $2.2 million in restoring coastal habitats, capping the landfill with native grassland species and preventing the growth of invasive plants. The sanctuary is certified by the Wildlife Habitat Council as a *Wildlife at Work* and *Corporate Land for Learning* site.

MICHIGAN

WTE Facilities: Three

Total Waste Capacity: 4,125 **tons** per day

Total Electric Capacity: 88.8 **MW**

Total Steam Capacity: 271,118 **Lbs/**Hr

MI Population in 2010: 9,883,640

MSW Managed in MI in 2011: 13,780,212 **tons**

% of MI MSW Managed by WTE in 2011: 7.2 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in MI in 2012: 9.6 **percent**

Energy Produced by WTE in Michigan is Enough to Power: 89,313 **homes**

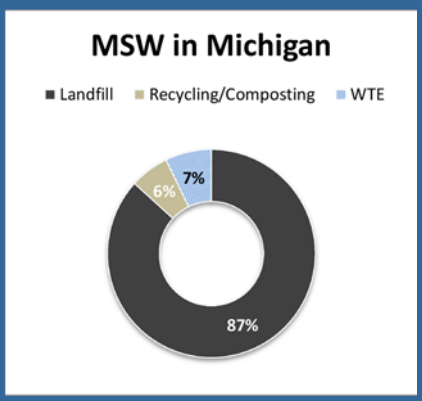
Recycling Rate of WTE Communities in MI: 13.7 **percent**

Jobs at WTE Facilities in MI: 196 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in MI: 735 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Michigan: $185,300,000

State Law Defining WTE as Renewable: MI §460.1011



Detroit Renewable Power

City: Detroit, MI
County: Wayne
US Congressional District: 13th
Owner: Detroit Renewable Energy LLC *(private)*
Operator: Detroit Renewable Energy LLC *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	3,300
No. of Boilers:	3
Gross Elec. Capacity (MW):	68
Gross Steam Capacity (Lbs/Hr):	228,300
Full-time Employees:	157
Serves Waste Needs of (people):	1,000,000

Websites: www.detroitrenewablepower.com
www.gdrra.org

Notes: The Detroit facility provides steam to the Detroit steam loop. It will also export process steam that will be used to heat and cool portions of GM's Detroit-Hamtramck assembly plant, helping GM achieve its renewable energy goals.

Jackson County Resource Recovery Facility

City: Jackson, MI
County: Jackson
US Congressional District: 7th
Owner: Jackson County *(public)*
Operator: n/a

Project Startup:	1987
Operating Status:	Inactive
Technology:	Mass Burn
Design Capacity (TPD):	200
No. of Boilers:	2
Gross Elec. Capacity (MW):	4
Gross Steam Capacity (Lbs/Hr):	42,818
Full-time Employees:	n/a

Websites: www.co.jackson.mi.us

Notes: The Jackson facility became inactive on September 30, 2013. The facility may reopen at a future date.

ASME Facility Recognition Awards Combustion Facility Winners

1994 - Commerce Refuse to Energy
1995 - Camden Resource Recovery Facility
2000 - Montenay Energy Resources of Montgomery County (PA)
2001 - Lee County Solid Waste Resource Recovery Facility (Large WTE Facility)
2001 - Dutchess County Resource Recovery Facility (Small WTE Facility)
2002 - (tie) Huntington Resource Recovery SEMASS
Miami-Dade (Large WTE Facility)
2002 - Sumner County (Small WTE Facility)
2003 - McKay Bay (Large WTE Facility)
2003 - Wallingford (Small WTE Facility)
2004 - Greater Vancouver Regional District (Large WTE Facility)
2004 - Covanta Haverhill, Inc. (Large WTE Facility)
2004 - Pinellas County Resource Recovery Facility (Large WTE Facility)
2004 - Pittsfield Resource Recovery Facility (Small WTE Facility)
2005 - Great River Energy, Elk River Station (Large WTE Facility)
2005 - American Ref-Fuel Company of Hempstead (Large WTE Facility)
2005 - Bay County Resource Management Center (Small WTE Facility)
2006 - Covanta SECONN (Large WTE Facility)
2006 - Union County Resource Recovery Facility, NJ (Large WTE Facility - Honorable Mention)
2007 - York Resource Recovery Center (Large WTE Facility)
2007 - Southeast Resource Recovery Facility (SERRF) (Large WTE Facility)
MacArthur Resource Recovery Facility, NY (Small WTE Facility).
2008- Covanta Onondaga. L.P. (Large WTE Facility)
2008- Pioneer Valley Resource Recovery Facility (Small WTE Facility)
2008- MacArthur Resource Recovery Facility. (Small WTE Facility - Honorable mention)
2008- Covanta Bristol
2009- North County Resources Recovery Facility (Large WTE Facility)
2009– ecomaine WTE Facility (Small WTE Facility)
2010- Covanta Plymouth Renewable Energy, LP, (Large WTE Facility)
2011- Covanta Alexandria/Arlington Inc.
2011- Arnold O. Chantland Resource Recovery System, Ames IA
2012 - Honolulu Program of Waste Energy Recovery (H-Power).
2013 - No Recipient

Kent County Waste-to-Energy Facility

City: Grand Rapids, MI
County: Kent
US Congressional District: 3rd
Owner: Kent County *(public)*
Operator: Covanta Kent, Inc. *(private)*

Project Startup:	1990
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	625
No. of Boilers:	2
Gross Elec. Capacity (MW):	16.8
Full-time Employees:	39
Serves Waste Needs of (people):	605,213
Certifications:	VPP STAR

Websites: www.covanta.com
www.accesskent.com/Departments/DPW/

Notes: The Kent facility was accepted into the Michigan Clean Corporate Citizen (C3) Program in 2006.

WTE as CHP Delivers Green Steam

Under a long-term supply agreement, steam from the Wheelabrator Westchester waste-to-energy plant is being piped directly to White Plains Linen's adjacent 100,000 -square-foot commercial laundry facility via a newly-constructed steam line. White Plains Linen is converting its natural gas-fueled laundry equipment and room heating systems to steam. Now that the conversion is completed, White Plains Linen will significantly reduce the amount of natural gas it uses to make steam and hot water, from 1 million therms per year to less than 90,000 therms per year. This steep reduction in natural gas usage will eliminate 4,775 metric tons of greenhouse gas emissions annually, equivalent to taking 995 passenger vehicles off the road.

"Westchester County is pleased to support this innovative partnership between two of our larger industrial employers," said Westchester County Executive Robert P. Astorino. "It is a great example of how corporate responsibility, especially when it comes to protecting our environment, is also good for business."

White Plains Linen is Peekskill's largest employer and has made a multimillion dollar investment in building a state-of-the-art, green laundry operation to serve the tri-state area's restaurant, catering and hospitality industries.

MINNESOTA

WTE Facilities: Nine

Total Waste Capacity: 4,668 **tons** per day

Total Electric Capacity: 123.2 **MW**

Total Steam Capacity: 183,000 **Lbs/**Hr

MN Population in 2010: 5,303,925

MSW Managed by MN in 2011: 5,710,304 **tons**

% of MN MSW Managed by WTE in 2011: 20.1 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in MN in 2012: 5.7 **percent**

Energy Produced by WTE in Minnesota is Enough to Power: 111,422 **homes**

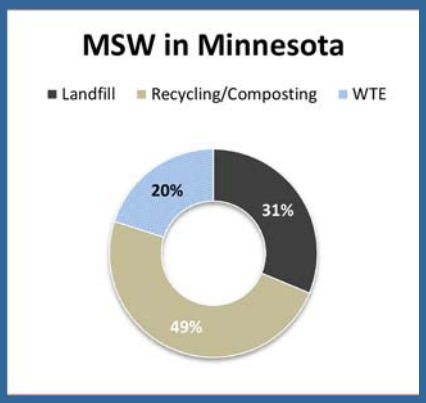
Recycling Rate of WTE Communities in MN: 47.2 **percent**

Jobs at WTE Facilities in MN: 322 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in MN: 888 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Minnesota: $193,100,000

State Law Defining WTE as Renewable: MN §216B.1691



Great River Energy—Elk River Station

City: Elk River, MN
County: Sherburne
US Congressional District: 6th
Owner: Great River Energy *(private)*
Operator: Great River Energy *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	1,000
No. of Boilers:	3
Gross Elec. Capacity (MW):	29
Full-time Employees:	80
Serves Waste Needs of (people):	850,000

Websites: www.greatriverenergy.com

Notes: The facility was retrofitted in 1989 to combust RDF. Since original construction in the early 1950s, the plant has used several fuels, including coal, natural gas, oil, nuclear energy, tire chips and wood chips.

Hennepin Energy Resource Center (HERC)

City: Minneapolis, MN
County: Hennepin
US Congressional District: 5th
Owner: Hennepin County *(public)*
Operator: Covanta Hennepin Energy Resource Co., Inc. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,212
No. of Boilers:	2
Gross Elec. Capacity (MW):	36.7
Gross Steam Capacity (Lbs/Hr):	20,000
Full-time Employees:	48
Serves Waste Needs of (people):	1,156,212

Websites: www.covanta.com
www.hennepin.us/HERC

Notes: Through a steam line, HERC provides steam to buildings in downtown Minneapolis, including Target Field, home of baseball's Minnesota Twins.

Olmsted Waste-to-Energy Facility

City: Rochester, MN
County: Olmsted
US Congressional District: 1st
Owner: Olmsted County *(public)*
Operator: Olmsted County *(public)*

Project Startup:	1987 (Units 1&2) 2010 (Unit 3)
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	400
No. of Boilers:	3
Gross Steam Capacity (Lbs/Hr):	61,000
Gross Elec. Capacity (MW):	9.5
Full-time Employees:	33
Serves Waste Needs of (people):	140,000

Websites: www.co.olmsted.mn.us

Notes: The facility expanded in 2010 by adding a third boiler capable of processing an additional 200 tons per day. The OWEF produces steam and electricity which is provided to 37 buildings in the Olmsted County District Energy System (OCDES). A public education program has been developed and instituted that includes a solid waste education module that is included in many middle school environmental resources curriculums in the County. The curriculum typically includes a tour of the OWEF.

Perham Resource Recovery Facility

City: Perham, MN
County: Otter Tail
US Congressional District: 7th
Owner: Prairie Lakes Municipal Solid Waste Authority *(public)*
Operator: Prairie Lakes Municipal Solid Waste Authority *(public)*

Project Startup:	1986; 2014
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	200
No. of Boilers:	2
Gross Elec. Capacity (MW):	4.5
Gross Steam Capacity (Lbs/Hr):	30,000
Full-time Employees:	15
Serves Waste Needs of (people):	75,000

Websites: www.co.otter-tail.mn.us/prairielakes/

Notes: This facility is operated through a joint powers agreement between Becker, Otter Tail, Todd, and Wadena counties. An expansion project adding a waste heat boiler, additional air pollution control equipment and a material recovery facility is under construction and will be completed in 2014.

Polk County Solid Waste Resource Recovery Facility

City: Fosston, MN
County: Polk
US Congressional District: 7th
Owner: Polk County *(public)*
Operator: Polk County *(public)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Modular
Design Capacity (TPD):	80
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	21,000
Full-time Employees:	23
Serves Waste Needs of (people):	90,000

Websites: http://pcphealth.org/list_departments/incinerator/index.aspx

Notes: Polk County made the decision to utilize waste-to-energy combustor for their solid waste management to comply with the State's mandate for landfill abatement. The facility includes a material recovery facility to pre-process the incoming waste stream.

Pope/Douglas Waste-to-Energy Facility

City: Alexandria, MN
County: Douglas
US Congressional District: 7th
Owner: Pope/Douglas Solid Waste Joint Powers Board *(public)*
Operator: Pope/Douglas Solid Waste Joint Powers Board *(public)*

Project Startup:	1987 (Unit 1&2) 2011 (Unit 3)
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	240
No. of Boilers:	3
Gross Steam Capacity (Lbs/Hr):	36,000
Gross Elec. Capacity (MW):	0.5
Full-time Employees:	43
Serves Waste Needs of (people):	42,000

Websites: www.popedouglasrecycle.com

Notes: In 2011, a third combustion unit was added, doubling the capacity of the facility. Steam from the facility is sold to Alexandria Technical & Community College, the 3M Manufacturing plant, and the Douglas County Hospital. The facility pre-processes waste through a material recovery facility, which helps remove harmful elements that decrease the life of the equipment (such as glass and metals).

Red Wing Resource Recovery Facility

City: Red Wing, MN
County: Goodhue
US Congressional District: 2nd
Owner: City of Red Wing *(public)*
Operator: City of Red Wing *(public)*

Project Startup:	1982
Operating Status:	Inactive
Technology:	Modular
Design Capacity (TPD):	96
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	15,000
Full-time Employees:	n/a
Serves Waste Needs of (people):	44,000

Websites: www.red-wing.org/solidwaste.html

Notes: The Red Wing Resource Recovery Facility stopped combusting waste in June, 2013. The facility accepts waste which is processed into RDF and sent to the Xcel Energy Red Wing Generating Station.

Xcel Energy—Red Wing Steam Plant

City: Red Wing, MN
County: Goodhue
US Congressional District: 2nd
Owner: Xcel Energy *(private)*
Operator: Xcel Energy *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	720
No. of Boilers:	2
Gross Elec. Capacity (MW):	24
Full-time Employees:	28
Serves Waste Needs of (people):	1,280,891

Websites: http://www.xcelenergy.com/About_Us/Our_Company/Power_Generation/Red_Wing_Generating_Station

Notes: The plant located on the Mississippi River burns RDF produced at a resource recovery facilities in Newport, MN.

QRO— Qualification for WTE Operators

Overview
The waste-to-energy sector must meet some of the nation's most stringent standards. In addition to meeting Maximum Achievable Control Technology (MACT) standards for emissions, facility operators are required by regulation to be trained and certified under the American Society of Mechanical Engineers (ASME) QRO Certification Program. It is based on the ASME QRO-1-2005 Standard for the Qualification and Certification of Resource Recovery Facility Operators. This program consist of 3 different levels of certification: Provisional, Site Specific Operator and Combustion System Operator.

ASME QRO Operator Certification provides the means to comply with the requirements of 40CFR60.54b (Standards for municipal waste combustor operator training and certification) when there is no state certification program.

QRO Provisional certification is the first step toward achieving full Operator certification. This level is equally applicable to Shift Supervisors and Chief Facility Operators.

Operator certification (full certification) applies to a specific facility. The applicant is required to be the holder of a valid Provisional certificate and document six months of satisfactory employment in the capacity of Shift Supervisor or Chief Facility Operator at the specific facility and pass an oral examination.

Xcel Energy—Wilmarth Plant

City: Mankato, MN
County: Blue Earth
US Congressional District: 1st
Owner: Xcel Energy *(private)*
Operator: Xcel Energy *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	720
No. of Boilers:	2
Gross Elec. Capacity (MW):	19
Full-time Employees:	20

Websites: http://www.xcelenergy.com/About_Us/Our_Company/Power_Generation/Wilmarth_Generating_Station

Notes: The RDF burned at Wilmarth is produced at resource recovery facilities in Elk River and Newport, MN.

Refuse Derived Fuel Processing

Ramsey/Washington Resource Recovery Facility

City: Newport, MN
County: Washington
US Congressional District: 4th
Owner: Resource Recovery Technologies *(private)*
Operator: Resource Recovery Technologies *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	RDF Processing
Design Capacity (TPD):	1,200
Full-time Employees:	65
Serves Waste Needs of (people):	750,000

Websites: www.rrtmn.com

Notes: The RDF produced at this facility is converted to energy by Xcel Energy at its Red Wing and Wilmarth facilities.

NEW HAMPSHIRE

WTE Facilities: Two

Total Waste Capacity: 700 **tons** per day

Total Electric Capacity: 19 **MW**

NH Population in 2010: 1,316,470

MSW Managed by NH in 2011: 1,144,568 **tons**

% of NH MSW Managed by WTE in 2011: 22.0 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in NH in 2012: 9.3 **percent**

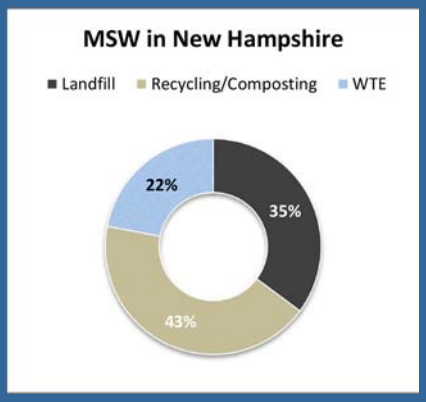
Energy Produced by WTE in New Hampshire is Enough to Power: 15,358 **homes**

Recycling Rate of WTE Communities in NH: 21.2 **percent**

Jobs at WTE Facilities in NH: 38 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in NH: 174 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in New Hampshire: $37,400,000



Wheelabrator Claremont Company, L.P.

City: Claremont, NH
County: Sullivan
US Congressional District: 2nd
Owner: Wheelabrator Claremont, L.P. *(private)*
Operator: Wheelabrator Claremont, L.P. *(private)*

Project Startup:	1987
Operating Status:	Inactive
Technology:	Mass Burn
Design Capacity (TPD):	200
No. of Boilers:	2
Gross Elec. Capacity (MW):	5
Full-time Employees:	n/a
Serves Waste Needs of (people):	73,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: The Claremont facility became inactive on September 30, 2013. The facility may reopen at a future date.

Wheelabrator Concord Company, L.P.

City: Concord, NH
County: Merrimack
US Congressional District: 2nd
Owner: Wheelabrator Concord, L.P. *(private)*
Operator: Wheelabrator Concord, L.P. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	500
No. of Boilers:	2
Gross Elec. Capacity (MW):	14
Full-time Employees:	38
Serves Waste Needs of (people):	169,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: The Concord facility celebrated its 25th anniversary on May 2, 2014 at an event attended by city and state officials. In its first 25 years, the facility processed more than 4 million tons of waste, generating more than 2.5 million megawatts of electricity.

NEW JERSEY

WTE Facilities: Five

Total Waste Capacity: 5,717 **tons** per day

Total Electric Capacity: 169.6 **MW**

NJ Population in 2010: 8,791,894

MSW Managed in NJ in 2011: 10,861,083 **tons**

% of NJ MSW Managed by WTE in 2011: 19.6 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in NJ in 2012: 61.2 **percent**

Energy Produced by WTE in New Jersey is Enough to Power: 137,095 **homes**

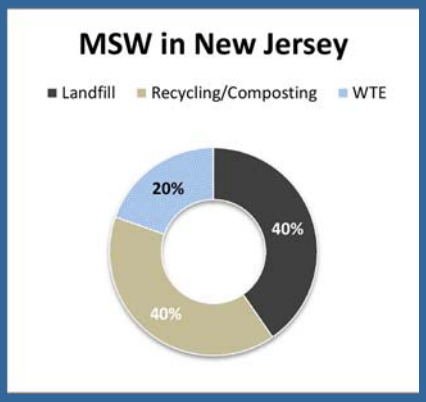
Recycling Rate of WTE Communities in NJ: 40.7 **percent**

Jobs at WTE Facilities in NJ: 274 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in NJ: 822 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in New Jersey: $496,900,000

State Law Defining WTE as Renewable: NJ §14:8-2.6



Covanta Camden Energy Recovery Center

City: Camden, NJ
County: Camden
US Congressional District: 1st
Owner: Covanta Camden GP, LLC *(private)*
Operator: Covanta Camden GP, LLC *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,050
No. of Boilers:	3
Gross Elec. Capacity (MW):	34
Full-time Employees:	52
Serves Waste Needs of (people):	506,420
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: Covanta acquired the Camden facility in August 2013 from Foster Wheeler, which was the original designer, builder, owner and operator of the facility.

Covanta Warren Energy Resource Company Facility

City: Oxford, NJ
County: Warren
US Congressional District: 5th
Owner: Covanta Warren Energy Resource Co., L.P. *(private)*
Operator: Covanta Warren Energy Resource Co., L.P. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	450
No. of Boilers:	2
Gross Elec. Capacity (MW):	13.5
Full-time Employees:	41
Serves Waste Needs of (people):	35,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: An integral part of the solid waste management plan for the county, the facility sells renewable electricity to Jersey Central Power and Light, a First Energy Company.

Essex County Resource Recovery Facility

City: Newark, NJ
County: Essex
US Congressional District: 8th
Owner: Covanta Essex Company *(private)*
Operator: Covanta Essex Company *(private)*

Project Startup:	1990
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,277
No. of Boilers:	3
Gross Elec. Capacity (MW):	66
Full-time Employees:	86
Serves Waste Needs of (people):	1,200,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The Essex County Resource Recovery Facility is New Jersey's largest waste-to-energy facility. The facility serves the refuse disposal needs of 22 municipalities in Essex County and the surrounding region. Covanta Essex has partnered with Clean Energy Fuels to open an on-site compressed natural gas (CNG) fueling station for garbage trucks that utilize the facility.

Union County Resource Recovery Facility

City: Rahway, NJ
County: Union
US Congressional District: 10th
Owner: Union County Utility Authority *(public)*
Operator: Covanta Union, Inc. *(private)*

Project Startup:	1994
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1440
No. of Boilers:	3
Gross Elec. Capacity (MW):	42.1
Full-time Employees:	60
Serves Waste Needs of (people):	500,000
Certifications:	VPP STAR

Websites: www.unioncountyutilitiesauthority.org
www.covanta.com

Notes: The Union County Resource Recovery Facility won Honorable Mention for the 2006 ASME Large Combustion Facility Award.

Wheelabrator Gloucester Company, L.P.

City: Westville, NJ
County: Gloucester
US Congressional District: 1st
Owner: Wheelabrator Gloucester Company, L.P. *(private)*
Operator: Wheelabrator Gloucester Company, L.P. *(private)*

Project Startup:	1990
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	500
No. of Boilers:	2
Gross Elec. Capacity (MW):	14
Full-time Employees:	35
Serves Waste Needs of (people):	263,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator Gloucester has created and maintains a wildlife refuge and nature trail which have been certified by The Wildlife Habitat Council as a "Wildlife at Work" site. In 2014, the NJ Dept. of Environmental Protection honored the facility with an environmental stewardship award for its proactive engagement in sustainability initiatives.

NEW YORK

WTE Facilities: Ten

Total Waste Capacity: 11,131 **tons** per day

Total Electric Capacity: 285.1 **MW**

Total Steam Capacity: 548,000 **Lbs/**Hr

NY Population in 2010: 19,378,102

MSW Managed in NY in 2011: 17,349,855 **tons**

% of NY MSW Managed by WTE in 2011: 21.2 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in NY in 2012: 30.9 **percent**

Energy Produced by WTE in New York is Enough to Power: 265,896 **homes**

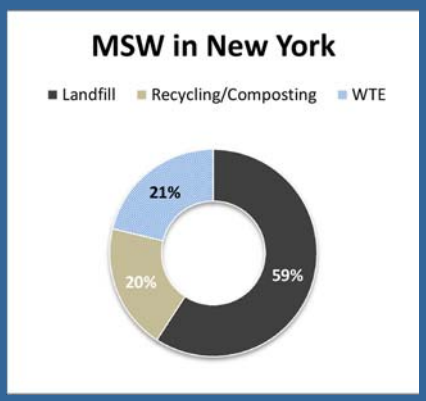
Recycling Rate of WTE Communities in NY: 27.7 **percent**

Jobs at WTE Facilities in NY: 522 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in NY: 1,377 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in New York: $726,800,000

State Law Defining WTE as Renewable: **NY** §1-103



Babylon Resource Recovery Facility

City: West Babylon, NY
County: Suffolk
US Congressional District: 3rd
Owner: Covanta Babylon, Inc. *(private)*
Operator: Covanta Babylon, Inc. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	750
No. of Boilers:	2
Gross Elec. Capacity (MW):	16.8
Full-time Employees:	45
Serves Waste Needs of (people):	430,000

Websites: www.covanta.com

Notes: This facility operates with a "zero discharge" of process water, meaning all wastewater generated on-site is treated and reused.

Covanta Hempstead

City: Westbury, NY
County: Nassau
US Congressional District: 4th
Owner: Covanta Hempstead Co. *(private)*
Operator: Covanta Hempstead Co. *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,505
No. of Boilers:	3
Gross Elec. Capacity (MW):	72
Full-time Employees:	82
Serves Waste Needs of (people):	1,000,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: Covanta Hempstead is Long Island's largest waste-to-energy facility. The facility is the cornerstone of Hempstead's integrated waste service plan that includes an extensive curbside collection system for recyclable materials.

Dutchess County Resource Recovery Facility

City: Poughkeepsie, NY
County: Dutchess
US Congressional District: 18th
Owner: Dutchess County Resource Recovery Agency *(public)*
Operator: Covanta Hudson Valley Renewable Energy LLC *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	450
No. of Boilers:	2
Gross Elec. Capacity (MW):	9.8
Full-time Employees:	44
Serves Waste Needs of (people):	293,562
Certifications:	VPP STAR

Websites: www.dcrra.org
www.covanta.com

Notes: The Dutchess facility can process approximately 160,000 tons of municipal solid waste annually. The facility generates enough electricity to power approximately 10,000 homes per year, which is equivalent to saving about 160,000 barrels of oil per year. The facility recovers and recycles approximately 6,000 tons of ferrous metal per year.

Huntington Resource Recovery Facility

City: East Northport, NY
County: Suffolk
US Congressional District: 3rd
Owner: Covanta Huntington, Inc. *(private)*
Operator: Covanta Huntington, Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	750
No. of Boilers:	3
Gross Elec. Capacity (MW):	24.3
Full-time Employees:	45
Serves Waste Needs of (people):	345,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The facility began commercial operation in December 1991, serving the towns of Huntington and Smithtown. The facility is the cornerstone of an integrated solid waste management system.

MacArthur Waste-to-Energy Facility

City: Ronkonkoma, NY
County: Suffolk
US Congressional District: 2nd
Owner: Islip Resource Recovery Agency *(private)*
Operator: Covanta MacArthur Renewable Energy, Inc. *(private)*

Project Startup:	1990
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	486
No. of Boilers:	2
Gross Elec. Capacity (MW):	12
Full-time Employees:	42
Serves Waste Needs of (people):	301,000
Certifications:	VPP STAR; ISO 14001

Websites: www.covanta.com
www.toirra.com

Notes: The MacArthur Waste-to-Energy Facility won the 2007 ASME Large Combustion Facility Award.

Niagara Resource Recovery Facility

City: Niagara Falls, NY
County: Niagara
US Congressional District: 26th
Owner: Covanta Niagara Company *(private)*
Operator: Covanta Niagara Company *(private)*

Project Startup:	1980
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,250
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	470,000
Gross Elec. Capacity (MW):	32
Full-time Employees:	87
Serves Waste Needs of (people):	900,000
Certifications:	VPP STAR ISO 14001

Websites: www.covanta.com

Notes: The facility sells steam to adjacent chemical facilities and electricity to the New York State power grid. Facility upgrades consisting of a new steam line and a new natural gas steam boiler will provide steam for the new Greenpac paper mill project, as well as enhance steam generating capacity for existing businesses. A new rail spur to be built on remediated land will significantly reduce the number of trucks accessing local roadways reduce associated diesel emissions.

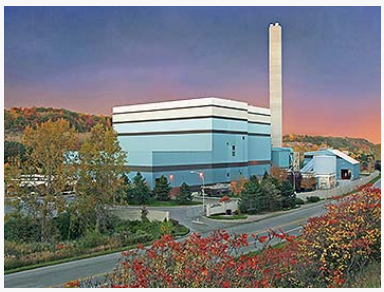
Onondaga County Resource Recovery Facility

City: Jamesville, NY
County: Onondaga
US Congressional District: 24th
Owner: Covanta Onondaga, L.P. *(private)*
Operator: Covanta Onondaga, L.P. *(private)*

Project Startup:	1995
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	990
No. of Boilers:	3
Gross Elec. Capacity (MW):	39.2
Full-time Employees:	44
Serves Waste Needs of (people):	470,000
Certifications:	VPP STAR

Websites: www.covanta.com
www.ocrra.org

Notes: The Onondaga facility was named Top Renewable Plant by POWER Magazine in 2008, won the ASME Large Combustion Facility Award in 2008 and won the SWANA Waste-to-Energy Operations Gold Award in 2012.



Oswego County Energy Recovery Facility

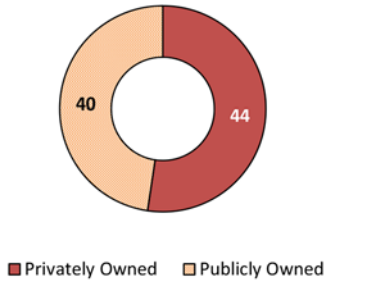
City: Fulton, NY
County: Oswego
US Congressional District: 24th
Owner: Oswego County *(public)*
Operator: Oswego County *(public)*

Project Startup:	1986
Operating Status:	Operating
Technology:	Modular
Design Capacity (TPD):	200
No. of Boilers:	2
Gross Elec. Capacity (MW):	4
Gross Steam Capacity (Lbs/Hr):	60,000
Full-time Employees:	28
Serves Waste Needs of (people):	126,000

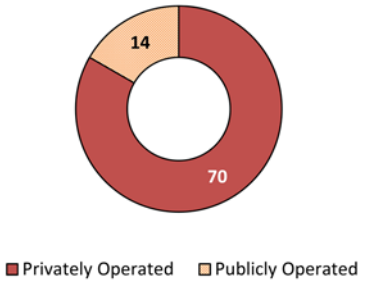
Websites: www.oswegocounty.com/dsw

Notes: The facility was completely retrofitted in 1999-2000. A state-of-the-art emissions control system was put in place. The ERF was upgraded 2009 to recover and recycle ferrous metals.

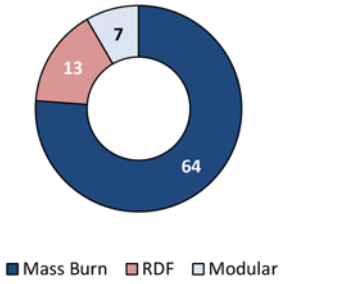
WTE Ownership



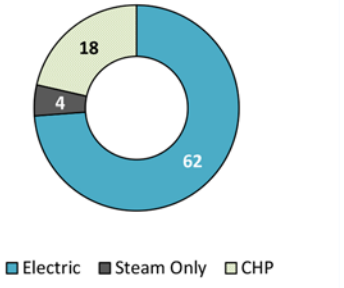
WTE Operators



WTE Technology Type



WTE Energy Offtake



Wheelabrator Hudson Falls L.L.C.

City: Hudson Falls, NY
County: Washington
US Congressional District: 21st
Owner: Wheelabrator Hudson Falls L.L.C *(private)*
Operator: Wheelabrator Hudson Falls L.L.C *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	500
No. of Boilers:	2
Gross Elec. Capacity (MW):	15
Full-time Employees:	37
Serves Waste Needs of (people):	345,966
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: The facility generates clean, renewable energy by processing waste from Washington and Warren counties, while pursuing opportunities to enhance environmental education in the community.

Wheelabrator Westchester, L.P.

City: Peekskill, NY
County: Westchester
US Congressional District: 17th
Owner: Wheelabrator Westchester, L.P. *(private)*
Operator: Wheelabrator Westchester, L.P. *(private)*

Project Startup:	1984
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,250
No. of Boilers:	3
Gross Elec. Capcity (MW):	60
Gross Steam Capacity (Lbs/Hr):	18,000
Full-time Employees:	68
Serves Waste Needs of (people):	855,000
Certifications:	VPP STAR

Websites: wheelabratortechnolgies.com

Notes: Under a long-term supply agreement, steam from the Wheelabrator Westchester facility will be piped directly to White Plains Linen's commercial laundry facility, reducing the laundry's carbon footprint by 90%.

NORTH CAROLINA

WTE Facilities: One *(Inactive)*

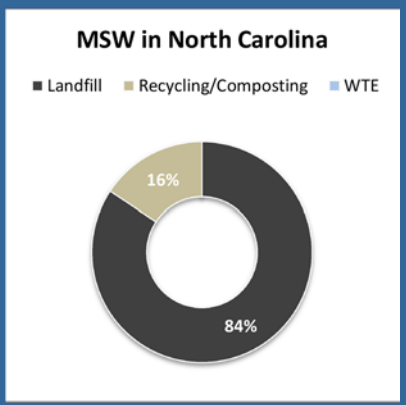
Total Waste Capacity: 500 **tons** per day

Total Electric Capacity: 10.5 **MW**

NC Population in 2010: 9,535,483

MSW Managed in NC in 2011: 9,137,435 **tons**

% of NC MSW Managed by WTE in 2011: 0 **percent**



New Hanover County — WASTEC
City: Wilmington, NC
County: New Hanover
US Congressional District: 3rd
Owner: New Hanover County *(public)*
Operator: New Hanover County *(public)*

Project Startup:	1984(Units 1&2); 1991 (Unit 3)
Operating Status:	Inactive
Technology:	Mass Burn
Design Capacity (TPD):	500
No. of Boilers:	3
Gross Elec. Capacity (MW):	10.5
Full-time Employees:	n/a
Serves Waste Needs of (people):	200,000

Websites: www.nhcgov.com

Notes: The WASTEC facility in New Hanover County became inactive in 2010. Operating permits remain active, and the facility may reopen at a future date.

European WTE Markets

The Amager Bakke waste-to-energy facility, now under construction in Copenhagen, is the most recent high-tech, high profile WTE facility in Europe demonstrating panache. When finished in 2017, it will produce heat for 160,000 households and electricity for 62,500 residences, but will be renowned for its aesthetic design, and the ski slope that descends from its stack. Environmentally progressive cities all around Europe employ state-of-the-art waste-to-energy facilities, convinced that producing megawatts is better than placing trash in landfills.

The value of waste-to-energy was reemphasized in Europe in 1999, with a European Union directive requiring member states to greatly reduce the amount of garbage going to landfills. As of 2010 (the most current year for which statistics are available), there were 451 WTE facilities in Europe, up from 390 in 2001, according to the Confederation of European Waste-to-Energy Plants (CEWEP). The plants annually process 73 million metric tons of waste, producing 44 million megawatt-hours (MWH) of electricity and 61 million MWH of heat, or enough power to keep 13 million people wired and another 13 million warm.

And more waste-to-energy projects are starting up, or are on the way. One market research firm says the EU's tightening standards on waste are a key driver behind world growth in WTE that it says will accelerate in the next five years, with 250 new plants and installed capacity on track to increase 21 percent by 2016.

OKLAHOMA

WTE Facilities: One

Total Waste Capacity: 1,125 tons per day

Total Electric Capacity: 16.8 MW

Total Steam Capacity: 80,000 Lbs/Hr

OK Population in 2010: 3,751,351

MSW Managed in OK in 2011: 4,778,966 tons

% of OK MSW Managed by WTE in 2011: 4.3 percent

WTE as % of Non-Hydro Renewable Elec. Generation in OK in 2012: 0.2 percent

Energy Produced by WTE in Oklahoma is Enough to Power: 18,754 homes

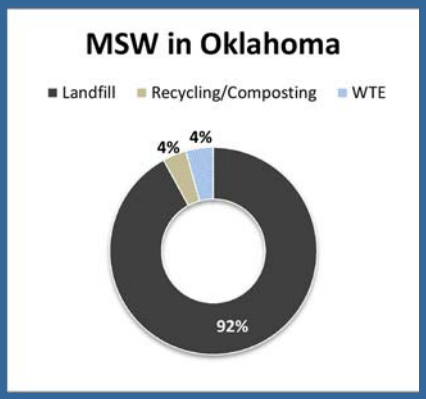
Recycling Rate of WTE Communities in OK: 9.8 percent

Jobs at WTE Facilities in OK: 42 FTE

Total Jobs (Direct, Indirect, & Induced) Created by WTE in OK: 123 FTE

Total Economic Output (Direct, Indirect & Induced) by WTE in Oklahoma: $20,700,000

State Law Defining WTE as Renewable: OK §17-801.4



Walter B. Hall Resource Recovery Facility

City: Tulsa, OK
County: Tulsa
US Congressional District: 1st
Owner: Covanta Tulsa Renewable Energy, LLC *(private)*
Operator: Covanta Tulsa Renewable Energy, LLC *(private)*

Project Startup:	1986; 2011 (CLEERGAS retrofit)
Operating Status:	Operating
Technology:	Mass Burn (Units 1&2); CLEERGAS® (Unit 3)
Design Capacity (TPD):	1,125
No. of Boilers:	3
Gross Elec. Capacity (MW):	16.8
Gross Steam Capacity (Lbs/Hr):	80,000
Full-time Employees:	42
Serves Waste Needs of (people):	388,300

Websites: www.covanta.com

Notes: In 2012, Covanta Tulsa received the Henry Bellmon Sustainability Award. A Covanta CLEERGAS® gasification demonstration unit has operated successfully at the Tulsa facility since 2011.

Prescription for Safety Program (R_x4Safety)

When flushed down the drain or disposed of in landfills, medications enter waterways and contaminate surface waters, having an adverse effect on drinking water and the environment. Typical waste water treatment plants are not designed to remove drugs from drinking water, resulting in a negative impact upon aquatic organisms, fish and other wildlife when these pharmaceuticals are disposed of improperly. In addition, unused medication in the household may contribute to growing rates of prescription drug abuse among Americans, particularly teenagers.

In support of national efforts to alleviate these issues, Covanta developed the Prescription for Safety Program (Rx4Safety) to provide safe, free disposal of medications collected at community sponsored drug take-back programs. Waste-to-energy facilities provide safe, environmentally sound destruction that protects water resources and reduces the risk of drugs reaching unauthorized users.

Since the program's launch in 2010, Covanta's facilities have destroyed more than **one million pounds** of unwanted medications from United States collection events held by municipalities, community groups and law enforcement agencies.

OREGON

WTE Facilities: One

Total Waste Capacity: 550 **tons** per day

Total Electric Capacity: 13.1 **MW**

OR Population in 2010: 3,831,074

MSW Managed in OR in 2011:
3,945,093 **tons**

% of OR MSW Managed by WTE in 2011:
4.6 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in OR in 2012:
1.2 **percent**

Energy Produced by WTE in Oregon is Enough to Power: 10,589 **homes**

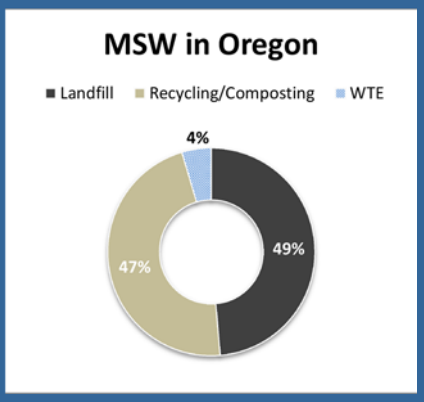
Recycling Rate of WTE Communities in OR:
51.2 **percent**

Jobs at WTE Facilities in OR:
38 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in OR: 116 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Oregon:
$31,800,000

State Law Defining WTE as Renewable:
OR §469A.020



Marion County Solid Waste-to-Energy Facility

City: Brooks, OR
County: Marion
US Congressional District: 5th
Owner: Covanta Marion, Inc. *(private)*
Operator: Covanta Marion, Inc. *(private)*

Project Startup:	1987
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	550
No. of Boilers:	2
Gross Elec. Capacity (MW):	13.1
Full-time Employees:	38
Serves Waste Needs of (people):	314,866
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: SInce its inception and through 2013, the Marion facility has processed approximately 5 million tons of MSW, while recovering and recycling approximately 100,000 tons of metals, the equivalent amount of steel used to build more than 80,000 cars.

PENNSYLVANIA

WTE Facilities: Six

Total Waste Capacity: 8,748 **tons** per day

Total Electric Capacity: 267.9 **MW**

PA Population in 2010: 12,702,379

MSW Managed in PA in 2011: 14,135,701 **tons**

% of PA MSW Managed by WTE in 2011: 21.8 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in PA in 2012: 32.9 **percent**

Energy Produced by WTE in Pennsylvania is Enough to Power: 216,555 **homes**

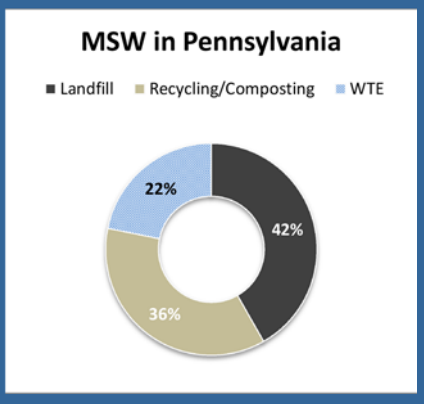
Recycling Rate of WTE Communities in PA: 35.5 **percent**

Jobs at WTE Facilities in PA: 354 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in PA: 1,114 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Pennsylvania: $586,000,000

State Law Defining WTE as Renewable: PA 73 P.S. §1648.2



Covanta Plymouth Renewable Energy

City: Conshohocken, PA
County: Montgomery
US Congressional District: 13th
Owner: Covanta Plymouth Renewable Energy, L.P. *(private)*
Operator: Covanta Plymouth Renewable Energy, L.P. *(private)*

Project Startup:	1992
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,216
No. of Boilers:	2
Gross Elec. Capacity (MW):	32
Full-time Employees:	46
Serves Waste Needs of (people):	421,786
Certifications:	VPP STAR; ISO 14001

Websites: www.covanta.com

Notes: The facility received the 2008 Governor's Award for Safety Excellence and has twice been recognized as the American Society of Mechanical Engineers Solid Waste Processing Division's "Large Waste-to-Energy Facility of the Year." (2000 and 2010).

Delaware Valley Resource Recovery Facility

City: Chester, PA
County: Delaware
US Congressional District: 1st
Owner: Covanta Delaware Valley, L.P. *(private)*
Operator: Covanta Delaware Valley, L.P. *(private)*

Project Startup:	1992
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	2,688
No. of Boilers:	6
Gross Elec. Capacity (MW):	87
Full-time Employees:	106
Serves Waste Needs of (people):	1,000,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The Delaware Valley facility is the largest waste-to-energy facility in Pennsylvania, serving the waste and electrical needs of Delaware County and the greater Delaware Valley region.

Metal Recovery and Recycling

Despite attempts to recycle materials through curbside collection and dropoff programs, many ferrous and non-ferrous metals end up in the trash that is sent to landfills and waste-to-energy facilities. If waste is sent to a landfill, the metals contained within are buried. If waste is sent to a waste-to-energy facility, metals can be recovered post-combustion.

More than 730,000 tons of ferrous and non-ferrous metals are recovered annually from waste-to-energy facilities in the U.S. Today the price levels for metals are good and are likely to increase in the future due to the growing global demand for raw materials.

After energy is recovered from the waste, metals are recovered from the ash. Ferrous metals are extracted magnetically, and non-ferrous metals are sorted using eddy current separators. Recovered metals are sold into the secondary materials market.

Waste-to-energy plants and recycling facilities are the keystones in modern waste management systems. Due to the extra quantities of raw materials recovered from bottom ashes, waste-to-energy plants contribute further to an environmentally sound recycling society and thus help to improve resource efficiency, using unavoidable waste as a valuable resource wherever possible.

Lancaster County Resource Recovery Facility

City: Bainbridge, PA
County: Lancaster
US Congressional District: 16th
Owner: Lancaster County Solid Waste Management Authority *(public)*
Operator: Covanta Lancaster, Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,200
No. of Boilers:	3
Gross Elec. Capacity (MW):	33.1
Full-time Employees:	47
Serves Waste Needs of (people):	420,000
Certifications:	VPP STAR

Websites: www.lcswma.org
www.covanta.com

Notes: The facility is a "zero discharge" facility, meaning that all the wastewater generated on-site is treated and reused in the waste management process. It also uses secondary sewage treatment effluent for all of its process water.

Susquehanna Resource Management Complex

City: Harrisburg, PA
County: Dauphin
US Congressional District: 11th
Owner: Lancaster County Solid Waste Management Authority *(public)*
Operator: Covanta Harrisburg, Inc. *(private)*

Project Startup:	1972; 2006 (retrofit)
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	800
No. of Boilers:	3
Gross Elec. Capacity (MW):	20.8
Full-time Employees:	47
Serves Waste Needs of (people):	100,000

Websites: www.lcswma.org/srmc
www.covanta.com

Notes: In 2009, Covanta Harrisburg was named a Top Plant by *Power Magazine*. The facility was purchased by the LCSWMA on December 23, 2014 to secure future waste processing capacity and initiate a regionalized approach to managing MSW.

WTE By The Numbers

In the U.S.
84
WTE facilities

Operating in
23
States

Recovering more than
730,000
tons of metals

Generating
14,565,467
megawatt hours of renewable electricity in 2012

And exporting steam (thermal energy) at the rate of
2,600,000
pounds per hour

Enough total energy to power
2,250,000
homes

Avoiding
30,211,120
tons of CO_2 equivalents in 2012, based on EPA data that, on average, 1 ton of CO_2e is avoided for every 1 ton of MSW processed by WTE

Wheelabrator Falls Inc.

City: Morrisville, PA
County: Bucks
US Congressional District: 8th
Owner: Wheelabrator Falls Inc. *(private)*
Operator: Wheelabrator Falls Inc. *(private)*

Project Startup:	1994
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,500
No. of Boilers:	2
Gross Elec. Capacity (MW):	53
Full-time Employees:	56
Serves Waste Needs of (people):	550,000
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator Falls is a Wildlife Habitat Council *Wildlife at Work* and *Corporate Lands for Learning* certified facility.

York County Resource Recovery Center

City: York, PA
County: York
US Congressional District: 4th
Owner: York County Solid Waste Authority *(public)*
Operator: Covanta York Renewable Energy LLC *(private)*

Project Startup:	1989
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	1,344
No. of Boilers:	3
Gross Elec. Capacity (MW):	42
Full-time Employees:	52
Serves Waste Needs of (people):	450,000
Certifications:	VPP STAR; ISO 14001

Websites: www.ycswa.org
www.covanta.com

Notes: This publicly owned facility is the cornerstone of the county's integrated waste management campus, which also includes an education center, a yard waste transfer facility, and a recycle drop-off center.

UTAH

WTE Facilities: One

Total Waste Capacity: 420 **tons** per day

Total Steam Capacity: 105,000 **Lbs/**Hr

Total Electric Capacity: 1.6 **MW**

UT Population in 2010: 2,763,885

MSW Managed by UT in 2011: 2,535,552 **tons**

% of UT MSW Managed by WTE in 2011: 5.0 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in UT in 2012: 0.9 **percent**

Energy Produced by WTE in Utah is Enough to Power: 8,083 **homes**

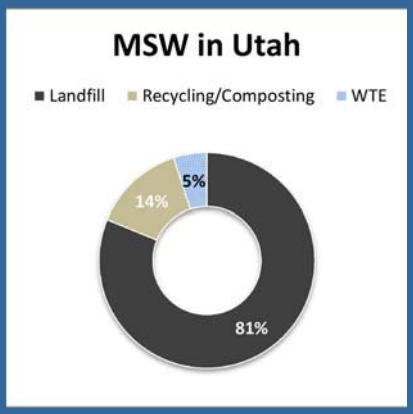
Recycling Rate of WTE Communities in UT: 11.7 **percent**

Jobs at WTE Facilities in UT: 40 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in UT: 159 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Utah: $9,600,000

State Law Defining WTE as Renewable: UT §54-17-601



Davis Energy Recovery Facility
City: Layton, UT
County: Davis
US Congressional District: 1st
Owner: Wasatch Integrated Waste Management District *(public)*
Operator: Wasatch Integrated Waste Management District *(public)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	420
No. of Boilers:	2
Gross Elec. Capacity (MW):	1.6
Gross Steam Capacity (Lbs/Hr):	105,000
Full-time Employees:	40
Serves Waste Needs of (people):	217,000

Websites: www.wiwmd.org

Notes: On Feb. 15, 2013, the Davis Energy Recovery Facility processed its 3 millionth ton of waste. The facility exports approximately 450 million pounds of steam to nearby Hill Air Force Base.

DGA DEMOCRATIC GOVERNORS ASSOCIATION Jobs. Opportunity. Now.

CENTER FOR INNOVATIVE POLICY

Opportunities to Increase and Diversify Domestic Energy Resources: A Path Forward for States to Create and Retain Jobs

September 8, 2012

Waste-to-energy "often brings greenhouse gas mitigating, baseload renewable energy and significant jobs through both the construction and operation of plants," according to the Democratic Governors' Association (DGA). In a paper entitled, "Opportunities to Increase and Diversify Domestic Energy Resources: A Path Forward for States to Create and Retain Jobs", DGA recognizes that trash is converted into energy at facilities throughout the U.S. and serves as a sustainable baseload renewable energy resource, adding to our fuel diversity. The boost to the local economy provided by waste-to-energy is illustrated in the report by the expansion of the HPOWER facility in Hawaii, which "created 400 construction jobs and will employ 34 full-time employees, as well as contribute millions in direct and indirect spending to the local economy."

For the entire report, please go to www.democraticgovernors.org.

VIRGINIA

WTE Facilities: Five

Total Waste Capacity: 6,415 **tons** per day

Total Electric Capacity: 177.5 **MW**

Total Steam Capacity: 445,000 **Lbs/Hr**

VA Population in 2010: 8,001,024

MSW Managed in VA in 2011: 15,359,820 **tons**

% of VA MSW Managed by WTE in 2011: 13.3 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in VA in 2012: 34.9 **percent**

Energy Produced by WTE in Virginia is Enough to Power: 172,258 **homes**

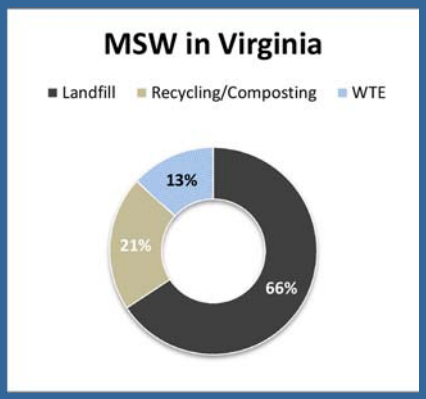
Recycling Rate of WTE Communities in VA: 36.2 **percent**

Jobs at WTE Facilities in VA: 356 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in VA: 1,010 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Virginia: $423,600,000

State Law Defining WTE as Renewable: VA §56.576



Alexandria/Arlington Resource Recovery Facility

City: Alexandria, VA
County: n/a
US Congressional District: 8th
Owner: Covanta Arlington/Alexandria, Inc. *(private)*
Operator: Covanta Arlington/Alexandria, Inc. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	975
No. of Boilers:	3
Gross Elec. Capacity (MW):	22
Full-time Employees:	48
Serves Waste Needs of (people):	600,000
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: The Alexandria facility is situated on a 4 acre site, the smallest footprint of any operated by Covanta. The Alexandria facility processes all the post-recycled waste generated in the U.S. Capitol and House and Senate office buildings.

Hampton-NASA Steam Plant

City: Hampton, VA
County: n/a
US Congressional District: 2nd
Owner: NASA & City of Hampton *(public)*
Operator: City of Hampton *(public)*

Project Startup:	1980
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	240
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	66,000
Full-time Employees:	38
Serves Waste Needs of (people):	180,000

Websites: www.hampton.gov

Notes: The Hampton/NASA Steam Plant generates energy for NASA's Langley Research Center by processing trash from Hampton, NASA Langley, Langley Air Force Base and the Newport News shipyard. The facility won a 2012 Federal Energy and Water Management Award.

Harrisonburg Resource Recovery Facility

City: Harrisonburg, VA
County: n/a
US Congressional District: 6th
Owner: City of Harrisonburg *(public)*
Operator: City of Harrisonburg *(public)*

Project Startup:	1982; 2004 (retrofit)
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	200
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	57,000
Gross Elec. Capacity (MW):	2.5
Full-time Employees:	31
Serves Waste Needs of (people):	122,000

Websites: www.harrisonburgva.gov/resource-recovery-facilty

Notes: The Harrisonburg facility creates steam to heat and cool the James Madison University (JMU) campus. To keep up with the growing trash flow from the area and changing environmental regulation, the City decided to increase the production capacity of the facility from 100 tons a day to 200 tons a day in 2004. This also helped the City keep up with the steam needs of JMU's rapidly expanding campus.

I-95 Energy/Resource Recovery Facility (Fairfax)

City: Lorton, VA
County: Fairfax
US Congressional District: 11th
Owner: Covanta Fairfax, Inc. *(private)*
Operator: Covanta Fairfax, Inc. *(private)*

Project Startup:	1990
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	3,000
No. of Boilers:	4
Gross Elec. Capacity (MW):	93
Full-time Employees:	75
Serves Waste Needs of (people):	1,651,647
Certifications:	VPP STAR

Websites: www.covanta.com

Notes: Fairfax is the largest waste-to-energy facility in Virginia, serving a population of more than one million people in the Washington, D.C. suburbs of Fairfax County. It is the first Covanta facility to have a non-ferrous metal recovery system.

Wheelabrator Portsmouth Inc.

City: Portsmouth, VA
County: n/a
US Congressional District: 3rd
Owner: Wheelabrator Portsmouth Inc. *(private)*
Operator: Wheelabrator Portsmouth Inc. *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	RDF
Design Capacity (TPD):	2,000
No. of Boilers:	4
Gross Elec. Capacity (MW):	60
Gross Steam Capacity (Lbs/Hr):	322,000
Full-time Employees:	164
Serves Waste Needs of (people):	1,127,790

Websites: www.wheelabratortechnologies.com

Notes: Wheelabrator Portsmouth has been an active supporter of and participant in the non-profit Elizabeth River Project (ERP), which has brought industry and government together to restore the river. The facility has received ERP's highest recognition in its voluntary environmental program and has earned ERP's *Sustained Distinguished Performance* award.

WASHINGTON

WTE Facilities: One

Total Waste Capacity: 800 **tons** per day

Total Electric Capacity: 26 **MW**

WA Population in 2010: 6,724,540

WA MSW Managed in 2011: 8,801,350 **tons**

% of WA MSW Managed by WTE in 2011: 3.1 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in WA in 2012: 1.7 **percent**

Energy Produced by WTE in Washington is Enough to Power: 21,017 **homes**

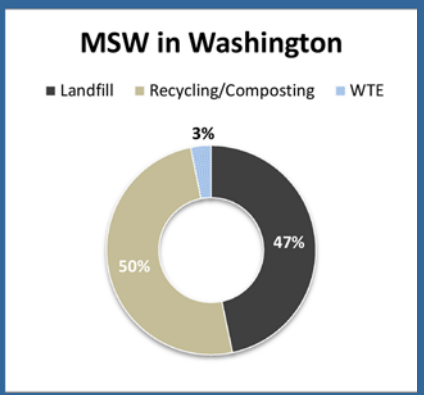
Recycling Rate of WTE Communities in WA: 54.7 **percent**

Jobs at WTE Facilities in WA: 40 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in WA: 119 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Washington: $74,900,000

State Law Defining WTE as Renewable: **WA** §80.28.025



Wheelabrator Spokane Inc.
City: Spokane, WA
County: Spokane
US Congressional District: 5th
Owner: City of Spokane *(public)*
Operator: Wheelabrator Spokane Inc. *(private)*

Project Startup:	1991
Operating Status:	Operating
Technology:	Mass Burn
Design Capacity (TPD):	800
No. of Boilers:	2
Gross Elec. Capacity (MW):	26
Full-time Employees:	40
Serves Waste Needs of (people):	423,347
Certifications:	VPP STAR

Websites: www.wheelabratortechnologies.com

Notes: The Spokane facility won the Solid Waste Association of North America's (SWANA) 2013 Waste-to-Energy Gold Excellence Award.

The Four R's

Solid waste hierarchies adopted by governments around the world recognize the benefits of the four "**R's**" of waste management. After you *reduce*, *reuse*, and *recycle* what you can, you should *recover* energy from waste. BTUs are too valuable to throw away.

WISCONSIN

WTE Facilities: Two

Total Waste Capacity: 490 **tons** per day

Total Electric Capacity: 30 **MW**

Total Steam Capacity: 10,000 **Lbs/**Hr

WI Population in 2010: 5,868,986

MSW Managed in WI in 2011:
5,650,450 **tons**

% of WI MSW Managed by WTE in 2011:
1.3 **percent**

WTE as % of Non-Hydro Renewable Elec. Generation in WI in 2012:
1.1 **percent**

Energy Produced by WTE in Wisconsin is Enough to Power: 24,897 **homes**

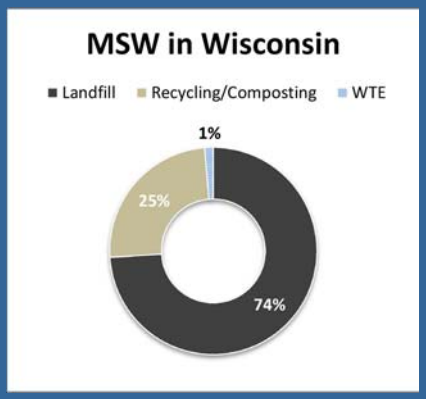
Recycling Rate of WTE Communities in WI:
19.4 **percent**

Jobs at WTE Facilities in WI:
50 **FTE**

Total Jobs (Direct, Indirect, & Induced) Created by WTE in WI: 139 **FTE**

Total Economic Output (Direct, Indirect & Induced) by WTE in Wisconsin:
$15,700,000

State Law Defining WTE as Renewable:
WI §196.378



Barron County Waste-to-Energy & Recycling Facility

City: Almena, WI
County: Barron
US Congressional District: 7th
Owner: Barron County *(public)*
Operator: ZAC, Inc. *(private)*

Project Startup:	1986
Operating Status:	Operating
Technology:	Modular
Design Capacity (TPD):	90
No. of Boilers:	2
Gross Steam Capacity (Lbs/Hr):	10,000
Gross Elec. Capacity (MW):	2
Full-time Employees:	18
Serves Waste Needs of (people):	75,000

Websites: www.barroncountywi.gov
www.zacincorporated.com/home

Notes: The Barron County facility exports steam energy to the Saputo USA Cheese. In 2010, the facility added a condensing steam turbine generator and sells electricity to Xcel Energy.

Xcel Energy—French Island Generating Station

City: LaCrosse, WI
County: LaCrosse
US Congressional District: 3rd
Owner: Xcel Energy *(private)*
Operator: Xcel Energy *(private)*

Project Startup:	1988
Operating Status:	Operating
Technology:	RDF (co-fired 50-50 with coal)
Design Capacity (TPD):	400 (RDF)
No. of Boilers:	2
Gross Elec. Capacity (MW):	28 (attributed to RDF)
Full-time Employees:	32
Serves Waste Needs of (people):	250,000

Websites: www.xcelenergy.com/About_Us/Our_Company/Power_Generation/French_Island_Generating_Station

Notes: Older fossil fuel-fired boilers were converted to fluidized bed boilers to process a blend of wood waste and RDF. These were the first fluidized bed boilers in the US to be used for commercial power production.

The Energy Recovery Council is the national association representing companies, organizations, and local governments engaged in the waste-to-energy sector in the United States. For more information about waste-to-energy, please visit www.eneryrecoverycouncil.org.