



FAQs

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FREQUENTLY ASKED QUESTIONS ON PLASTICS AND WASTE-TO-ENERGY (OR ENERGY RECOVERY)

What is Energy Recovery?

The terms energy recovery, energy-from-waste (EFW) and waste-to-energy (WTE) encompass a broad range of technologies that can convert solid waste into energy to power homes, businesses and transportation or feedstock materials (sometimes called chemical intermediates) that can be used to manufacture new products. Most energy recovery facilities convert waste to energy or feedstock materials after readily recyclable materials have been removed. Some emerging waste-to-energy processes can yield innovative fuel products, such as solid pellets, synthetic or liquid fuels. Non-recycled plastics can be an important component of energy recovery systems because of their high energy value.

Is energy recovery a viable option in the United States?

Yes, it's real and it's growing. In the United States, 86 WTE plants operating in 25 states process approximately 30 million tons of municipal solid waste (MSW) per year, or enough alternative energy to power the equivalent of two million homes annually.* These facilities generate approximately 17 million kWh of electricity per year. In addition, several emerging energy recovery technologies that can convert mixed solid waste or solely waste plastics to products like syngas, ethanol, low grade fuels, and feedstocks are now being demonstrated in the United States. These hold much promise for smaller, scalable solutions to our waste problems.

Source: Energy Recovery Council, The 2010 ERC Directory of Waste to Energy Plants, page 1, 2011

What technologies are used in energy recovery?

Energy recovery includes a range of processes capable of turning waste into a useable form of energy or feedstock materials by thermal treatment (e.g., combustion, gasification or pyrolysis). All of these technologies involve heat, and new advancements involve higher heat treatments, which can be cleaner, result in less residual ash, and enable the processing of larger amounts of municipal solid waste.

- Combustion uses heat to convert waste materials into steam or electricity
- Gasification breaks down organic material using a combination of high heat and combustion to produce syngas which is useable as fuel

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- Pyrolysis thermally decomposes organic material either in the complete absence of air or with a very small amount of it.
- Modern combustion and gasification facilities yield a hot gas and an inorganic solid material while pyrolysis generates three main products; char, oil, and gas.
- Refuse-derived fuel (RDF) or solid recovered fuel (SRF) is a fuel produced by mechanically shredding or pressure treating solid waste after the removal of the non-combustible materials. To recover energy, the RDF or SRF is then typically thermally treated.

Non-recycled plastics are an important component of each process because of their high energy content.*

Source: Michael M. Fisher, Processed Engineered Fuels Derived From Paper and Plastics -- Techno-Economic Factors and Regulatory Issues in a Competitive Market, page 476, 1997

Are energy-from-waste facilities safe for people and the environment?

Energy recovery facilities in operation today meet some of the most stringent environmental standards and employ the most advanced emission control equipment features available. These facilities are heavily regulated for air emissions under the U.S. Clean Air Act.

What are the economic impacts of an energy recovery plant?

Existing energy recovery facilities in the United States average 58 fulltime staff positions. The average pay for these positions is roughly \$10,000 more than the average compensation for U.S. workers. In the United States, each energy recovery facility paid an average of over \$1 million in property taxes and spent an estimated \$4.3 million on local goods and services in 2008.

Source: Veris Consulting Inc., Plastics Energy Recovery Team Economic Study, 2010,

Where are existing energy recovery facilities located?

Globally, about 140 million ton of municipal solid waste (MSW) is processed in almost 800 WTE facilities. Japan presently utilizes this technology to treat more than 75% of its waste. Approximately 400 WTE facilities operate in Europe, with some 25 EU countries processing in excess of 40% of their waste in EFW facilities.* Most U.S. energy recovery facilities are located in the West, Northeast and Southeast. The most recently developed U.S. mass burn WTE unit became operational in 2007 in Lee County, Florida. Alternative technology energy recovery facilities are in operation in the U.S., Canada, Europe and Asia.

Source: Canadian Energy from Waste Coalition, website
<http://www.energyfromwaste.ca/resources/FAQs>, downloaded February, 2011

Is energy recovery technology proven?



Energy recovery is established around the world as a commercially viable means of managing waste and producing alternative energy. It is a proven solution to municipal and industrial waste and energy challenges. In addition to traditional combustion technologies, there are many newer conversion technologies in development and commercialization around the world, including: gasification and/or pyrolysis facilities. There are more than 150 companies around the world developing, producing and marketing these systems with a wide range of capacities. Nonrecycled plastics are an attractive feedstock for both traditional and emerging energy recovery facilities.

Source: Canadian Energy from Waste Coalition, website

<http://www.energyfromwaste.ca/resources/FAQs>, downloaded February, 2011

Why are discussions about energy recovery being re-energized in North America?

Energy recovery facilities provide a waste disposal service, and they produce energy. Currently several factors have re-energized the waste-to-energy discussion. These are: The increasing costs of electricity and fuel, the environmental impacts of hauling trash, and concerns about exhausted landfills. Newer technologies like gasification and pyrolysis are giving communities more choices for recovering their waste.

Is energy recovery considered a renewable energy source?

America's plastics makers believe that definitions of "renewable energy" should be based on available supply, not narrow definitions of biomass sourcing. Many governmental bodies, laws and regulations already recognize energy recovery as a source of renewable energy, including the U.S. Environmental Protection Agency, the Energy Policy Act of 2005, twenty-four states and the District of Columbia.

Is energy recovery a significant source of air emissions?

The U.S. EPA reports that since 1987 the emissions of dioxin from MSW combustion facilities has been reduced by more than 99%.¹ While dioxins exist naturally in the environment, the manmade emissions come from a variety of combustion processes including power plants, diesel vehicles, buses, open fires in the home, bonfires, barbeques, jet engines and forest fires. According to the UK Environment Agency, 15 minutes of millennial fireworks celebrations in London produced more dioxin than a century of operation at the South East London Combined Heat and Power WTE plant.²

Sources:

1. U.S. EPA, An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the United States for the Years 1987, 1995 and 2000
2. Professor James Bridges, Chair of European Unions Science Committee, University of Surrey, APSWG briefing on Energy from Waste; UK Environment Agency, 2000

What happens to the waste ash that energy recovery creates?



The ash, which resembles wet cement, is re-used as roadbed material, daily and final landfill cover, road aggregate, asphalt mixture and even in the construction of artificial reefs and cement blocks. Recent research has created a process that allows the use of fly ash instead of road salt. *

Source: Waste-to-Energy Research and Technology Council, Answers to FAQ, <http://www.seas.columbia.edu/earth/wtert/faq>, downloaded February 2011

Is energy recovery compatible with recycling?

Yes, communities typically extract recyclable materials like plastics, paper and glass before sending nonrecycled wastes to waste-to-energy (or energy recovery) facilities. In areas where waste-to-energy facilities exist, communities actually have higher recycling rates. For example, U.S. communities with waste-to-energy facilities have a higher average recycling rate (33%) than the national average (28%).*

Source: Eileen Berenyi, Recycling and Waste-to-Energy: Are They Compatible 2009 Update, page 1

How does energy recovery impact greenhouse gas emissions?

U.S. waste-to-energy plants prevent the release of forty million metric tons of greenhouse gasses in the form of carbon dioxide equivalents that otherwise would be released into the atmosphere on an annual basis. Greenhouse gas emissions are reduced in three ways: avoiding emissions from fossil fuel based power production, avoiding methane emissions from landfills and recycling ferrous metals with lower emissions than production from raw materials.¹ In 2007, the Global Roundtable on Climate Change (GROCC) unveiled a joint statement identifying waste-to-energy as a means of reducing carbon dioxide emissions from the electric generating sector.²

Source: Ted Michaels, Waste Not Want Not: The Facts Behind Waste-to-Energy page 3¹ and page 4²

Where do plastics makers stand on energy recovery?

Plastics makers support the EPA's waste management hierarchy (reduce, reuse, recycle, and recover) and are committed to working with stakeholders to increase the diversion of plastics from landfill through source reduction, recycling and energy recovery. Modern energy recovery technologies are environmentally sound, are helping to reduce the amount of solid waste sent to landfill and are producing domestic alternative energy.

Plastics remain a valuable resource even after their use phase and should be mechanically recycled whenever practical. We agree with EPA that the energy value of nonrecycled plastics should be recovered before landfilling is considered. Energy recovery complements recycling.



What are some key points about energy recovery?

- Through energy recovery, 7 billion pounds of plastics that otherwise would not be recycled are recovered and converted into electricity annually in the United States.¹
- In waste-to-energy processes, trash volume is reduced by 90% and the remaining byproducts are disposed of in landfills.²
- Communities that have access to both recycling programs and energy recovery typically have higher recycling rates than communities with only recycling.³
- Landfills give off methane gas, which is 20 times more potent than carbon dioxide as a greenhouse gas. Energy recovery reduces the amount of methane gas produced⁴
- Energy recovery plants produce lower levels of pollutants than the best landfills do, and nine times the energy.⁵
- 55% of municipal solid waste ends up in landfills; this is an energy source we are just throwing away, despite the fact that it has a higher average BTU content than wood.⁶
- Currently, the 86 WTE plants operating in 25 states can process up to 3,000 tons of trash per day and generate enough electricity to power the equivalent of 2 million homes.⁷

Source:1. Jawad A. Bhatti - *Trends in recycling of plastic wastes and means for increasing recovery – 2010*, Waste to Energy Research and Technology, Columbia University

2. Waste-to-Energy Research and Technology Council, Answers to FAQ,

<http://www.seas.columbia.edu/earth/wtert/faq> , downloaded February 2011

3. Eileen Berenyi, Recycling and Waste-to-Energy: Are They Compatible 2009 Update, page 1

4. U.S. Climate Change Science Program, , website,

<http://www.climatechange.gov/infosheets/highlight1/default.htm>, downloaded February 2011

5. P. Ozge Kaplan, Joseph Decarolis and Susan Thorneloe, Is It Better To Burn or Bury Waste for Clean Electricity Generation? National Risk Management Research Laboratory, United States Environmental Protection Agency (U.S. EPA), Research Triangle Park, North Carolina 27711, and Department of Civil Engineering, North Carolina State University, Table 3, 2008

6. U.S. Environmental Protection Agency, Municipal Solid Waste Generation, Recycling, and Disposal in the United States: Facts and Figures for 2009 , Table 3, 2009

7. Energy Recovery Council, The 2010 ERC Directory of Waste to Energy Plants, page 1, 2011

U.S. Energy Information Administration, *Methodology for Allocating Municipal Solid Waste to Biogenic/Non-Biogenic Energy*, 2007

About the Plastics Division

The American Chemistry Council's Plastics Department represents leading companies dedicated to providing innovative solutions to the challenges of today and tomorrow through plastics. Ongoing innovations in plastics have led to medical advances and safety equipment that make our lives better, healthier and safer every day. ACC members are finding innovative ways for plastics to help save energy, reduce greenhouse gas emissions and decrease waste. Since plastics are a valuable resource, too valuable to waste, the Plastics Department is at the forefront of efforts to reduce litter through increased access to recycling, advancements in recycling technology, and public education. www.americanchemistry.com/plastics



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