Energy from Waste: A Comparison to Coal

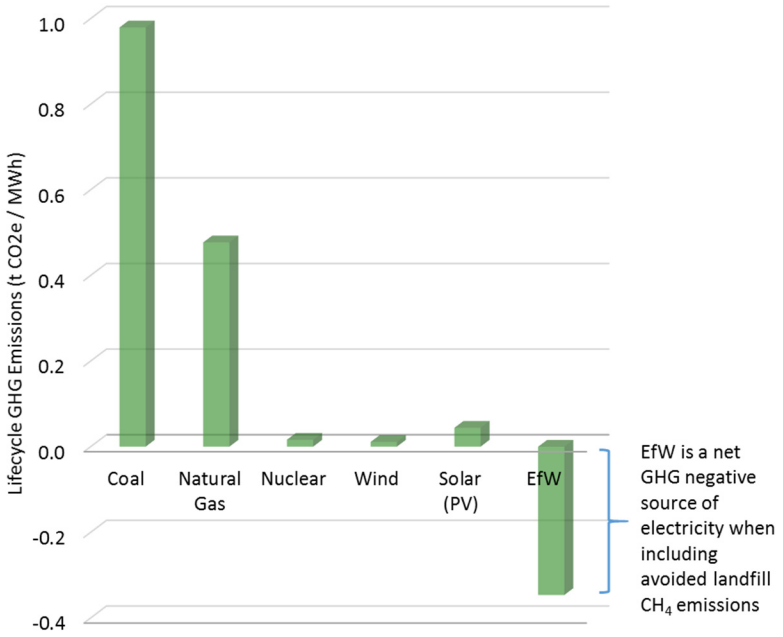
Covanta WHITE PAPER

Opponents of Energy-from-Waste (EfW) facilities sometime make the claim that EfW facility emissions are "worse than coal." Such comparisons miss an important and critical point: EfW facilities are first and foremost solid waste management facilities. EfW facilities do generate electricity and/or steam as a very important product; however, their primary function is to safely manage wastes remaining after recycling. EfW facilities are cleaner than coal on a lifecycle basis and are an important tool in reducing greenhouse gas (GHG) and other emissions from landfills, serving as an important source of carbon mitigation in the process.

EfW is a Source of GHG Mitigation

In 2016, coal generation alone accounted for 23.4 percent of our nation's total CO_2 emissions.[4] In stark contrast, EfW is a widely recognized source of GHG mitigation. EfW facilities reduce lifecycle greenhouse gas emissions by approximately one ton for every ton of municipal solid waste (MSW) diverted from landfills, on average.[5] A prominent peer reviewed study written by U.S. EPA scientists, aptly named "Is It Better to Burn or Bury?" found GHG emissions from EfW to be significantly less than landfills, concluding "if the goal is greenhouse gas reduction, then EfW should be considered as an option under U.S. renewable energy policies."[6]

Figure 1. Lifecycle GHG Emissions – Electricity Sources[1-3]



In addition, many other governmental and nongovernmental organizations have formally recognized EfW for its role in reducing GHG emissions including the World Economic Forum (WEF)[7], the European Union, [8,9] the Center for American Progress,[10] Columbia University scientists,[11] CalRecycle,[12] California Air Resources Board,[13] and the Joint Institute for Strategic Energy Analysis (NREL).[14] The Intergovernmental Panel on Climate Change ("IPCC") called EfW a "key GHG mitigation technology."[15] It is recognized as a source of credits under the United Nations' Clean Development Mechanism (CDM) where over 40 projects have been registered with a combined annual GHG reduction of 5 million metric tonnes of CO_2e a year.[16] On a more local basis, two recent facility expansions in Florida, eligible because they represent new incremental EfW capacity, have been selling carbon offsets into the voluntary market.[17] An additional facility in Honolulu has been successfully validated as an eligible project. EfW was also recognized as a compliance option for reducing GHG emissions from electricity generation in the final version of the U.S. EPA's Clean Power Plan promulgated in 2015.[18]

Those who assert that EfW is worse than coal typically substantiate their claim by looking only at total stack CO_2 emissions on a per MWh basis, without consideration for the difference between biogenic and fossil CO_2 and failing to recognize that EfW facilities are multi-purpose, supplying both electricity and fulfilling a need for solid waste management. By managing solid wastes concurrently with generating energy, EfW facilities avoid significant landfill emissions of methane, a potent GHG 28 – 34 times as strong as CO_2 over 100 years and 84 – 86 times as strong over 20

years.[19] Landfills are the 3rd largest source of anthropogenic methane, a short-lived climate pollutant under increasing scrutiny. In contrast, coal plants, together with all fossil fuel fired electricity generation, do one thing, and one thing only: combust a fossil fuel for electrical generation.

While there is a growing recognition that the use of biogenic sources of carbon should not be universally considered carbon neutral, waste sources of biomass used for energy are widely recognized as being low to zero carbon. Most significantly, the EPA, while recognizing the complexities of biogenic carbon emissions in a 2014 policy memo, outlined its clear intent to recognize the "biogenic CO_2 and climate policy benefits" of waste-derived feedstocks.[20]

Other Emissions

EfW outperforms coal on other emissions as well based on published data in peer-reviewed journals and regulatory agency documents. The aforementioned paper authored by U.S. EPA scientists found lifecycle emissions of EfW facilities per MWh to be lower on average than those for coal-fired facilities for SO_2, NO_x, and PM, even before the benefits of avoided landfill emissions were considered.

With regard to hazardous air pollutants, EfW facilities present a minor source of our overall exposure to these pollutants compared with other man-made and even natural sources. For example, mercury emissions from U.S. EfW facilities are a fraction of those from coal plants. Over the period from 1990 to 2005, municipal waste combustors, as EfW facilities are called by the U.S. EPA, reduced their mercury emissions by 99 percent.[21] The most recent published data reveals that EfW facilities represented only 0.8 percent (0.8%) of the total 2014 U.S. anthropogenic (man-made) mercury emissions.[22]

Figure 2. U.S. Anthropogenic Mercury Emissions

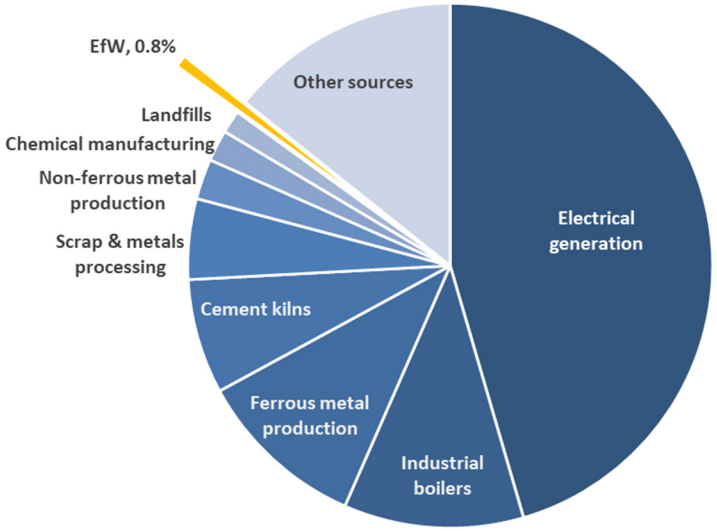
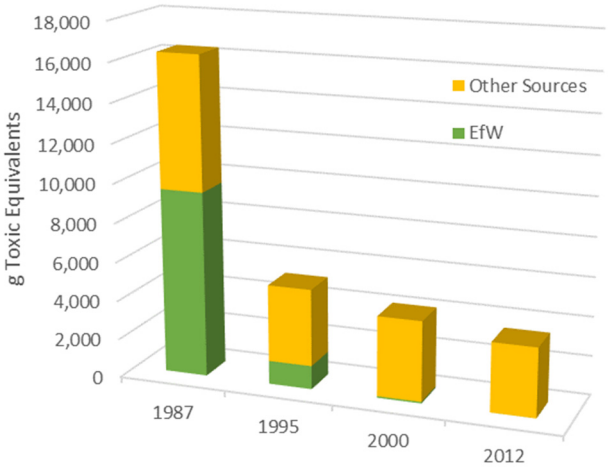


Figure 3. U.S. Total Dioxin & Furan Emissions Over Time



Historically, municipal waste combustors were a leading source of dioxin emissions. However, advancements in boiler design, operations, and air pollution control equipment have drastically reduced the footprint of the industry. In fact, according to recent peer-reviewed research by Columbia University scientists, the total dioxin emissions of all U.S. EfW plants in 2012 represented less than one-tenth of one percent (0.09%) of total dioxin sources in the U.S. Leading sources of dioxin include landfill fires and forest fires.[23]

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