

# Generating Electricity from Waste: A Comparison to Coal

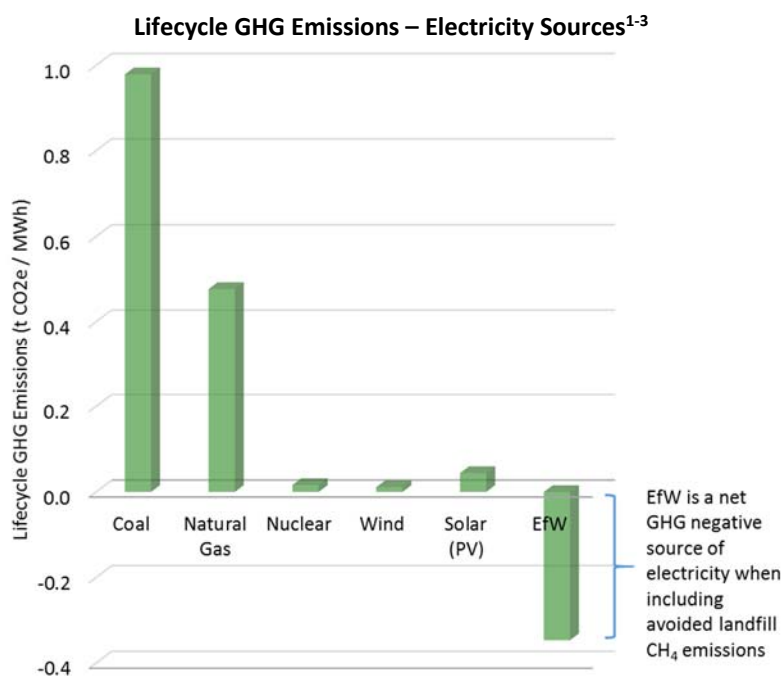


Opponents of Energy-from-Waste (EfW) facilities sometime make the claim that EfW facility emissions are “worse than coal.” However, the reality is that EfW facilities are not only cleaner than coal but represent an important tool in reducing greenhouse gas (GHG) and other emissions from landfills, serving 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<sub>2</sub> emissions.<sup>4</sup> 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.<sup>5</sup> 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.”<sup>6</sup>

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)<sup>7</sup>, the European Union,<sup>8,9</sup> the Center for American Progress,<sup>10</sup> Columbia University scientists,<sup>11</sup> CalRecycle,<sup>12</sup> California Air Resources Board,<sup>13</sup> and the Joint Institute for Strategic Energy Analysis (NREL).<sup>14</sup> The Intergovernmental Panel on Climate Change (“IPCC”) called EfW a “key GHG mitigation technology.”<sup>15</sup> 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<sub>2</sub>e a year.<sup>16</sup> 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.<sup>17</sup> 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.<sup>18</sup>



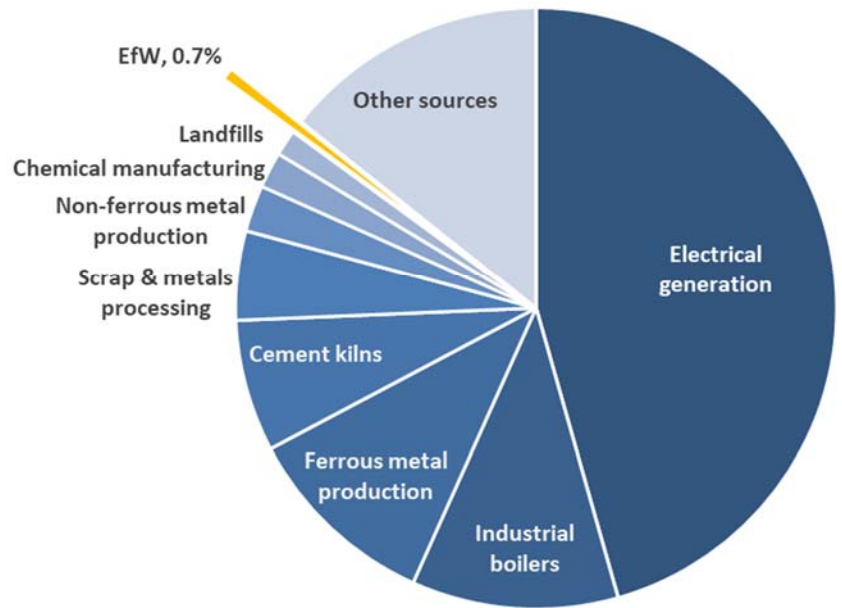
Those who assert that EfW is worse than coal typically substantiate their claim by looking only at total stack CO<sub>2</sub> emissions on a per MWh basis, without consideration for the difference between biogenic and fossil CO<sub>2</sub> and failing to recognize that EfW facilities are multi-purpose, 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<sub>2</sub> over 100 years.<sup>19</sup> Landfills are the 3<sup>rd</sup> 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.

## Other Emissions

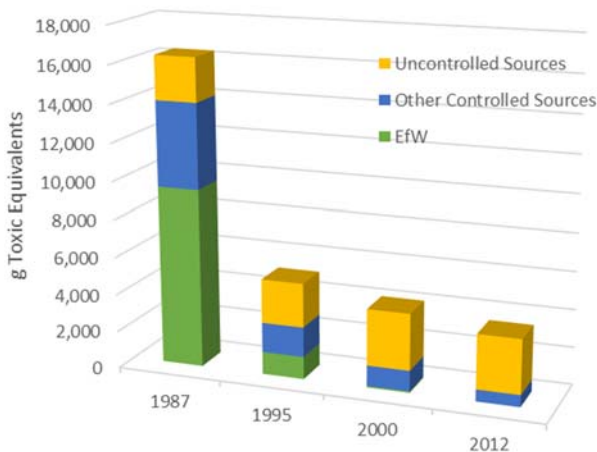
EfW outperforms coal on other emissions as well, based on published data in peer-reviewed journals and regulatory agency documents. The aforementioned paper authored by U.S. EPA scientists found lifecycle emissions of EfW facilities to be lower on average than those for coal-fired facilities for SO<sub>2</sub>, NO<sub>x</sub>, and PM, even before the benefits of avoided landfill emissions were considered.

With regard to hazardous air pollutants, 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.<sup>20</sup> The most recent published data reveals that EfW facilities represented only 0.7 percent of the total 2014 U.S. mercury emissions.<sup>21</sup>

U.S. 2014 Anthropogenic Mercury Emissions



U.S. 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 just 0.54 percent of total controlled combustion sources and less than one-tenth of one percent (0.09%) of total controlled and open burning sources of dioxin.<sup>22</sup>

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- <sup>5</sup> See U.S. EPA Office of Solid Waste, *Air Emissions from MSW Combustion Facilities*, <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/airem.html> and Center for American Progress (2013) *Energy from Waste Can Help Curb Greenhouse Gas Emissions* <https://cdn.americanprogress.org/wp-content/uploads/2013/04/EnergyFromWaste-PDF1.pdf>
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