


1-29-2019

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Hale McAnulty

Boston College Law School, hale.mcanulty@bc.edu

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Recommended Citation

Hale McAnulty, *A Dirty Waste—How Renewable Energy Policies Have Financed the Unsustainable Waste-to-Energy Industry*, 60 B.C.L. Rev. 385 (2019), <https://lawdigitalcommons.bc.edu/bclr/vol60/iss1/9>

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A DIRTY WASTE—HOW RENEWABLE ENERGY POLICIES HAVE FINANCED THE UNSUSTAINABLE WASTE-TO-ENERGY INDUSTRY

Abstract: The end of the 20th Century saw a major shift in the United States' approach to energy policy. After decades focused on fossil fuel production, the country began to realize that renewable sources of energy were the way of the future. Motivated by environmental concerns and a realization that oil is a finite resource, the federal government and local governments began adopting economic policies that rewarded investment in and production of renewable, clean technology. Governments relied on both mandates and tax incentives to encourage the use of energy from sources like solar and wind power. Waste-to-Energy ("WTE") power is another form of energy production that is classified as renewable. Thus, WTE has benefited significantly from renewable energy policies. WTE, however, is a form of energy produced by burning trash and is neither environmentally friendly nor particularly sustainable. Yet, the WTE industry owes its existence to those government programs designed to fund sustainable sources of electricity. With WTE drawing from the same pot of government resources, the policies that were written to stimulate the sustainable energy field and protect the environment have undermined those very goals by subsidizing the WTE industry. This Note summarizes the WTE process and the laws that allowed it to grow, argues that WTE is not economically sound or environmentally sustainable, and proposes legislative changes to prevent more harm from WTE in the future.

INTRODUCTION

On March 17, 2016, the residents of South Baltimore had reason to celebrate.¹ After years of fighting between the citizens and the Energy Answers International power company, the Maryland Department of the Environment announced that the permit allowing the energy company to build a new waste-to-energy ("WTE") power plant in the town of Fairfield had ex-

¹ See Fern Shen, *Maryland Declares Energy Answers' Fairfield Incinerator Permit Expired*, BALT. BREW (Mar. 17, 2016), <https://baltimorebrew.com/2016/03/17/maryland-declares-energy-answers-fairfield-incinerator-permit-expired/> [<https://perma.cc/VM6P-US2K>] (detailing that the parties were involved in a six-year conflict over the plan to build a trash incineration power plant in the southern neighborhood of the Maryland capital city). The Energy Answers International company wanted to build its waste facility on the site of an old chemical plant. *Id.* It was opposed by the citizens of Curtis Bay, Brooklyn, and Brooklyn Park as well as the Environmental Integrity Project and Free Your Voice, a student run human rights organization. *Id.*

pired.² Local advocacy groups shared in triumph and relief that the incinerator would not be built, stating that the decision saved the area from another facility that would emit toxic substances into the air and the surrounding environment.³

The successful effort to block the new incinerator represents a small victory for the city, but Baltimore's problem with pollution from WTE is far from resolved.⁴ The nearby Wheelabrator Baltimore incinerator, which has been in operation since 1985, is still the city's greatest single source of air pollution.⁵ In 2014, this incinerator was the source of eighty-two percent of the city's sulfur dioxide pollution and sixty-four percent of the nitrogen oxides.⁶ Today, it releases around 120 pounds of lead, 99 tons of hydrochloric acid, 60 pounds of mercury, and 2 tons of formaldehyde in a year.⁷ Compared to the state average, the number of deaths from lung cancer are twice as high and the life expectancy is ten years lower for those who live near the facility.⁸ Although correlation is not causation, the residents do believe the incinerator plays a major role in these figures.⁹

² *Id.* (noting that the contest spanned many years). Waste-to-energy ("WTE"), also called energy recovery, is the process of burning trash in an incinerator or converting trash through chemical treatment to create electricity. See *Energy Recovery from the Combustion of Municipal Solid Waste (MSW)*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw> [<https://perma.cc/2G8T-HKP7>] [hereinafter *Energy Recovery*] (describing the WTE process and its role in the field of renewable energy).

³ See Shen, *supra* note 1 (quoting the groups who fought the construction project). Destiny Watford, a representative of Free Your Voice, stated that this development would allow the community to bring clean energy alternatives to the area that could create jobs without posing health risks. *Id.* Free Your Voice is a group made up primarily of students from the Curtis Bay and Brooklyn areas of Baltimore that formed to fight the construction of what would have become the biggest incinerator in the United States. *We Demand Fair Development! Stop the Incinerator!*, STOP THE INCINERATOR, <https://stoptheincinerator.wordpress.com/about-free-your-voice-2/> [<https://perma.cc/QT54-K6Q7>]. Free Your Voice declares on their blog that "Clean Air Is a Human Right." *Id.*

⁴ See Scott Dance, *Power Struggle: How a Trash Incinerator—Baltimore's Biggest Polluter—Became 'Green' Energy*, BALT. SUN (Dec. 15, 2017), <http://www.baltimoresun.com/news/maryland/environment/bs-md-trash-incineration-20171107-story.html> [<https://perma.cc/2FHD-66MH>] (reporting that a WTE trash incinerator is Baltimore's main source of air pollution).

⁵ *Id.* (describing the history of the incinerator in Westport, Baltimore). The incinerator burned about 723,000 tons in 2016 and the facility has a contract with the city to continue its operations through 2021. *Id.*

⁶ *Id.*; see ECO-CYCLE, WASTE OF ENERGY: WHY INCINERATION IS BAD FOR OUR ECONOMY, ENVIRONMENT, AND COMMUNITY 2 (2011), https://www.ecocycle.org/files/pdfs/WTE_wrong_for_environment_economy_community_by_Eco-Cycle.pdf [<https://perma.cc/8SFX-3R7X>] [hereinafter WASTE OF ENERGY] (asserting that these chemicals are known to be very harmful to humans, causing cancer and respiratory disease, respectively).

⁷ Dance, *supra* note 4 (reporting that the Maryland Department of the Environment has stated that the facility is the main source of these toxic chemicals).

⁸ *Id.*

⁹ See *id.* (detailing several health issues found in residents living near the facility). The Chesapeake Bay Foundation estimates that pollution from the WTE plant may be responsible for almost \$22 million in health care costs for residents. *Id.*

Importantly, the Baltimore facility, along with around seventy other active WTE facilities in the United States, appears to comply with the current emission standards under the Clean Air Act (“CAA”).¹⁰ The facility received about \$10 million in state subsidies for renewable energy in the last six years.¹¹ This is because, in 2011, Maryland passed a bill that recognized municipal solid waste (“MSW”) as a renewable source of energy.¹² As such, the Maryland government has been providing the facility with the same financial benefits as wind, solar, and geothermal energy companies.¹³

The situation in Baltimore is not an isolated phenomenon.¹⁴ In 2014, thirty-one states had designated MSW as a renewable source of energy, and twenty-three states had active WTE facilities.¹⁵ At the federal level, MSW is also recognized as a renewable source of energy.¹⁶

¹⁰ *Id.* It is reported that the Maryland waste facility officers meet the permit standards for monitoring and limiting pollution, and that they pass 800 checks per day to make sure they remain in compliance with emission standards. See 42 U.S.C. § 7411 (2018) (codifying the Environmental Protection Agency’s (EPA) duty to promulgate regulations establishing emissions standards for air pollution). Under the Clean Air Act (“CAA”), the EPA must establish national ambient air quality standards (“NAAQS”). *Id.* § 7409. States must then submit a plan to comply with and enforce the NAAQS. *Id.* § 7410; see MD. CODE ANN., ENVIR. § 2-302 (West 2018) (stating that under Maryland law, state NAAQS will mirror those of the federal statute). Following the 1990 amendments, the CAA also requires major polluting entities to obtain and comply with federal permits. 42 U.S.C. § 7661a. The CAA also provides specifically for the regulation of facilities that rely on combustion of solid waste. *Id.* § 7429; see also *The Clean Air Act in a Nutshell: How It Works*, U.S. ENVTL. PROT. AGENCY (2013), https://www.epa.gov/sites/production/files/2015-05/documents/caa_nutshell.pdf [<https://perma.cc/VPW6-NVW5>] (providing a plain text summary and history of the CAA).

¹¹ Dance, *supra* note 4 (describing how Maryland’s energy policy and the federal tax code have allowed WTE facilities to receive large amounts of money with the hope of promoting renewable energy sources).

¹² *Id.* (stating that the WTE industry played a role in drafting and passing legislation that defined trash as a renewable source of energy); see S.B. 690, 2011 Leg., 428th Sess. (Md. 2011) (designating WTE as a Tier I energy source akin to solar or wind energy).

¹³ MD. CODE ANN., PUB. UTIL. § 7-701(r) (West 2017) (classifying WTE as a Tier I renewable energy source in the same category as solar and wind energy); Dance, *supra* note 4 (detailing the state policy that allowed incinerators the same incentives as solar, wind, and geothermal energy). The law in Maryland has a tiered energy policy that, when implemented in 2004, placed WTE in a lower classification than wind, solar, and geothermal. Dance, *supra* note 4. Under this system, subsidies would end for WTE in 2018. *Id.* Industry lobbyists, however, succeeded in having WTE moved up into the top tier for renewable energy in 2011, which means it remains eligible for subsidies beyond 2018. *Id.*

¹⁴ See TED MICHAELS, ENERGY RECOVERY COUNCIL, THE 2014 ERC DIRECTORY OF WASTE-TO-ENERGY FACILITIES 6, 8 (2014), http://energyrecoverycouncil.org/wp-content/uploads/2016/01/ERC_2014_Directory.pdf [<https://perma.cc/68EV-3KAM>] (listing the states that recognize WTE as a renewable form of energy). In 2014, thirty-one states had laws recognizing WTE as a form of renewable energy. *Id.* at 6. There were eighty active WTE facilities in the United States. *Id.* at 4. The average WTE facility processed 96,249 tons of MSW per day. *Id.*

¹⁵ *Id.* at 6, 8.

¹⁶ See I.R.C. § 45(c)(1)(G) (2018) (listing MSW as an energy resource).

The reasoning sounds fair on its face—renewable energy, as its name suggests, comes from sources that renew or replenish themselves quickly relative to other sources.¹⁷ Solar and wind energy are recognizable renewable energy sources.¹⁸ MSW is considered renewable in that consumers create a constant and reliable stream of household trash.¹⁹ The goal of using renewable power is to decrease dependence on finite fossil fuels and utilize sources that have lesser or no negative impact on the environment.²⁰ Therefore, many argue that burning waste plays an important role in working toward those ends.²¹ Government entities claim that financial incentives and tax benefits granted to the WTE industry are in an earnest attempt to reach environmental and sustainability goals.²²

Nevertheless, the very laws written to promote sustainability and protect human health and the environment have actually hindered efforts to reach those goals.²³ By granting financial benefits to the WTE industry, governments are funding activities that are not truly safe for human health or the environment.²⁴ The government has disincentivized true clean practices like solar and wind energy because it is initially more attractive to alter an existing incinerator to meet air standards than it is to invest in an entirely

¹⁷ See 42 U.S.C. § 15852(b)(2) (2018) (providing a definition of renewable energy). Renewable energy is defined as a list of technology types the federal government recognizes as renewable, rather than a more abstract summary of renewable properties. See *id.* (enumerating the recognized renewable technology types). Other government guidance elucidates the properties that renewable energies possess. See *Renewable Energy Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.cfm?page=renewable_home [<https://perma.cc/G3PZ-DAN2>] (stating that renewable energy has the property of replenishing and being infinite over a reasonable amount of time); see also *Nonrenewable Energy Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/?page=nonrenewable_home [<https://perma.cc/RJY6-3AS4>] (listing recognized non-renewable energy sources and stating that they do not replenish quickly).

¹⁸ See *Renewable Energy Explained*, *supra* note 17 (categorizing renewable energy sources).

¹⁹ *Biomass Explained: Waste-to-Energy (Municipal Solid Waste)*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.php?page=biomass_waste_to_energy [<https://perma.cc/F3SG-EDFZ>] (listing the elements of MSW, such as organic waste and other combustible materials, that can be used to create electricity, as well those that cannot, such as inorganic materials like glass).

²⁰ See 42 U.S.C. § 13451(b) (stating that among the goals of the Department of Energy regarding energy efficiency are improvements to technology, increases in the use of renewable energy, and reductions of environmental harm).

²¹ See *Dance*, *supra* note 4 (reporting that the Maryland government had good motives in granting subsidies to WTE plants, and that this was a logical step towards sustainability at the time they passed the bill); *State Renewable Energy Resources*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/statelocalenergy/state-renewable-energy-resources> [<https://perma.cc/V4B4-PYY7>] (describing the benefits of using renewable energy).

²² See *Dance*, *supra* note 4 (stating that Maryland politicians sought to decrease reliance on fossil fuels and stymie climate change).

²³ See *WASTE OF ENERGY*, *supra* note 6, at 2 (arguing that WTE is more expensive, less efficient, and more dangerous to human health and the environment than current alternatives, and that WTE undermines the goals of sustainability legislation).

²⁴ See *id.* (arguing that WTE facilities emit toxic substances).

new plant, purchase the land, and build the facility.²⁵ When renewable credits were made available for WTE, energy companies took the route of retrofitting incinerators.²⁶ Thus, government subsidies are allowing polluting technologies to continue to exist in the same sphere as solar and wind.²⁷ This has left less money to invest in solar, wind, and geothermal plants simply because they must draw money from the same pot as WTE.²⁸ Furthermore, these financial incentives are supporting an industry in WTE that cannot coexist with actual sustainable practices like recycling, composting, or zero waste.²⁹

²⁵ See *Renewable Portfolio Standards*, ENERGY JUSTICE NETWORK, <https://energyjustice.net/RenewablePortfolioStandards> [<https://perma.cc/RN7P-VFDA>] (explaining that companies are more likely to invest in existing renewables than risk investing in new one, given the option).

²⁶ See *id.* (stating that it is less costly for a company to buy an extant incinerator than invest in new technology).

²⁷ See *id.* (reporting that in the early 2000s, clean renewables made up 63% of renewable energy sold in the US, while biomass contributed 24% to that number). Biomass is a closely related field to WTE that relies on organic materials, such as animal and plant waste, rather than trash in the energy conversion process. See I.R.C. § 45 (2018) (defining and differentiating biomass as an energy source derived from MSW). Federal tax law treats biomass as unique from WTE. *Id.* Other government agencies, however, do not always make such a distinction, and at times treat WTE as a subset of biomass. See *Biomass Explained*, U.S. ENERGY INFO. ADMIN., https://www.eia.gov/energyexplained/index.cfm?page=biomass_home [<https://perma.cc/JP5Q-2T8E>] (categorizing MSW as a form of biomass). The article *Renewable Portfolio Standards*, for example, states that biomass contributed to 24% of the renewable energy sold in the U.S. and then clarifies that biomass is mostly referring to gas collected in MSW landfills. *Renewable Portfolio Standards*, *supra* note 25. Under the Internal Revenue Code (“IRC”), gas collected from an MSW landfill is exempt from the definition of biomass, which could thus render the 24% number misleading. See I.R.C. § 45 (excluding gas collected from MSW landfills from the definition of open-loop biomass). For the purposes of this Note, WTE and MSW will follow their statutory definitions. See *id.* Even though biomass is generally targeted in tandem with WTE, a full analysis of biomass is beyond the scope of this Note.

²⁸ See *Renewable Portfolio Standards*, *supra* note 25 (stating that in 2002, 24% of green energy sold came from the biomass, in this case meaning primarily landfill gas). Green power is renewable energy that has the least negative impact on the environment. See U.S. DEP’T OF ENERGY ET AL., GUIDE TO PURCHASING GREEN POWER 2–3 (2018), https://www.epa.gov/sites/production/files/2016-01/documents/purchasing_guide_for_web.pdf [<https://perma.cc/7KNV-JKMD>] [hereinafter GUIDE TO PURCHASING GREEN POWER] (issuing guidance on procedures for, and benefits of, purchasing green energy). The Department of Energy notes that utilization of green power is voluntary and exceeds any current government mandates. *Id.*

²⁹ See Steffen Lehmann, *Resource Recovery and Materials Flow in the City: Zero Waste and Sustainable Consumption as Paradigms in Urban Development*, 11 SUSTAINABLE DEV. L. & POL’Y 28, 33 (2010) (arguing for the benefits of “zero waste,” an approach that relies on recycling, composting, and demand reduction of resources to mitigate the harms to the environment and human health, and phases out unsustainable practices); WASTE OF ENERGY, *supra* note 6, at 11 (contending that the most effective biomass fuel sources are materials that can be composted or recycled, and that for WTE facilities to remain financially productive, they demand a constant stream of those materials). Zero waste is a term used to describe a paradigm shift for resource consumption that eliminates the waste aspect from production cycles. Lehmann, *supra*, at 28. Materials like metal, glass, and plastic can be reused or recycled, used in their original state, or broken down and utilized in different ways, rather than thrown into landfill. *Id.* at 31. For exam-

Part I of this Note begins by describing how the WTE process works.³⁰ Part II provides a history of energy policy in the United States.³¹ Part III examines federal and state laws that promote the renewable energy field, including laws regarding WTE.³² Part IV argues that the United States' renewable energy policy has in part undermined the goals it purports to advance.³³ Specifically, this Part argues that government subsidies and tax preferences for renewable energy have financed an industry that is not environmentally friendly or properly sustainable.³⁴ Part IV also proposes amending these laws to remove WTE eligibility from renewable energy benefits.³⁵

I. TURNING TRASH INTO ENERGY

Federal and state laws provide funding for specifically designated types of renewable energy.³⁶ In addition to renewable energy produced through hydropower, wind, geothermal, and solar technology, WTE is a renewable energy source that involves conversion of trash into energy.³⁷ The

ple, many products are packaged with recyclable plastics that could have countless other uses. *Id.* Zero waste may be achieved by holding manufacturers responsible for the packaging they use and requiring companies to design products and packaging with an eye toward reuse or recycling at the end of their initial cycle of use. *Id.* Third parties also aid zero waste goals by collecting and finding other uses for trash, such as Madewell Inc., who partnered with Cotton Inc.'s Blue Jeans Go Green initiative, which collects and converts old denim jeans into insulation. *See Recycling Denim for a Great Cause*, BLUE JEANS GO GREEN, <http://bluejeansgogreen.org/About-Us/> [<https://perma.cc/8CSJ-MMQ4>] (describing a nationwide initiative to repurpose old pants and make them into insulation for buildings); *see also How We Do Well*, MADEWELL, <https://www.madewell.com/inspo-do-well-denim-recycling-landing.html> [<https://perma.cc/LDB6-GEMZ>] (describing Madewell's Do Well projects to affect positive changes in the world, and the Blue Jean Go Green process).

³⁰ *See infra* notes 36–57 and accompanying text.

³¹ *See infra* notes 58–81 and accompanying text.

³² *See infra* notes 82–137 and accompanying text.

³³ *See infra* notes 138–209 and accompanying text.

³⁴ *See infra* notes 146–183 and accompanying text.

³⁵ *See infra* notes 184–209 and accompanying text.

³⁶ *See* I.R.C. § 45 (2018) (providing an example of one federal statute aimed at providing financial assistance to renewable energy production); 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (West 2007) (demonstrating a state level approach).

³⁷ *Renewable Energy Explained*, *supra* note 17 (defining different renewable energy sources in the United States). By definition, renewable energy must have a source that quickly redevelops and will not run out from use. *What Is Green Power?*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/greenpower/what-green-power> [<https://perma.cc/R9N2-4JHT>]. WTE is considered renewable, but not a “green power” source, like solar, wind, and geothermal, which is a subset of renewable resources that has less or no negative environmental impact. *See id.* (describing different categories of renewable power and differentiating green power). Solar power is the process of harnessing energy or heat from sunlight and turning it into electricity or using it directly to heat a building. *Solar Energy Basics*, NAT'L RENEWABLE ENERGY LAB., <https://www.nrel.gov/workingwithus/re-solar.html> [<https://perma.cc/V38T-CXPV>]. Wind power is the process where wind moves a turbine to create electricity. *Wind Energy Basics*, WIND ENERGY DEV. PROGRAMMATIC EIS, <http://windeis.anl.gov/guide/basics/> [<https://perma.cc/WM7X-ZKZC>]. Geothermal harnesses the natural

EPA recognizes WTE as central to the U.S. strategy for sustainable waste management.³⁸ It is thus important to understand how WTE actually works.³⁹

A prominent method of energy conversion is combustion.⁴⁰ In WTE, MSW is the material that is used in the conversion process.⁴¹ MSW is essentially garbage thrown out in homes and businesses.⁴² The process begins when trash vehicles pick up MSW and deliver it to the WTE facilities, where it is dumped.⁴³ From there, waste is systematically collected and transferred into an incinerator, where it is burned at very high temperatures.⁴⁴ The burning MSW creates heat which converts water into steam, which then moves a turbine and generates electricity.⁴⁵

The waste is converted into ash as it burns, most of which settles at the bottom of the combustion chamber as “bottom ash,” though small particles also rise throughout the process, creating “fly ash.”⁴⁶ The bottom ash is estimated to be a 90% reduction in volume of waste.⁴⁷ A filtration system, called a “baghouse,” captures an estimated 96% of the fly ash.⁴⁸ The ash is subsequently collected and dumped in a landfill.⁴⁹

heat from within the planet. *What Is Geothermal Energy*, GEOTHERMAL ENERGY ASSOC., <http://geo-energy.org/Basics.aspx> [<https://perma.cc/YL3C-PFBJ>].

³⁸ *Energy Recovery*, *supra* note 2 (detailing the role of “Energy Recovery” in the EPA’s “non-hazardous waste management hierarchy”). The EPA has established a hierarchy for waste management, ranking from most to least preferred practices, with “Source Reduction and Reuse” being the most preferred, and “Energy Recovery” ranking only higher than traditional “Treatment and Disposal.” See *Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy> [<https://perma.cc/KH5R-E5PS>] (presenting the EPA’s waste management hierarchy).

³⁹ See *infra* notes 40–57 and accompanying text.

⁴⁰ *Energy Recovery*, *supra* note 2.

⁴¹ *Id.* (describing the WTE process).

⁴² *Municipal Solid Waste*, U.S. ENVTL. PROT. AGENCY, <https://archive.epa.gov/epawaste/nonhaz/municipal/web/html/> [<https://perma.cc/VE3R-MKQE>] (defining municipal solid waste).

⁴³ *Energy Recovery*, *supra* note 2.

⁴⁴ *Waste-to-Energy: How It Works*, DELTAWAY ENERGY, <http://www.deltawayenergy.com/wte-tools/wte-anatomy/> [<https://perma.cc/AFU5-2ZVQ>] (describing how WTE plants operate).

⁴⁵ *Id.* The incinerator creates heat that dissolves water in a connected boiler which becomes steam and powers a turbine. See *id.* It is not the fly ash that turns the turbine. See *id.* (illustrating the biomass process). The emissions from the steam stack, however, are not the benign and uncontaminated steam from the turbine, but rather the treated ash that remains after the filtration process. See *id.* (presenting the process that carries the particulate fly ash from the combustion to the filtration room and then to the stack).

⁴⁶ *Id.* Fly ash is particulate waste, too fine and light to settle at the bottom, that the facility attempts to capture through various filtration processes. *Id.*

⁴⁷ *Id.* Bottom ash is captured and separated by magnets and other metal separators. *Id.*

⁴⁸ *Id.*

⁴⁹ *Energy Recovery*, *supra* note 2; see E. Kalogirou et al., *Fly Ash Characteristics from Waste-to-Energy Facilities and Processes for Ash Stabilization* (2010), https://www.iswa.org/uploads/tx_iswaknowledgebase/Kalogirou.pdf [<https://perma.cc/CW45-E9EK>] (describing the composition and

Sometimes, MSW is sent to a landfill instead of an incinerator.⁵⁰ Here, the WTE scheme uses anaerobic digestion, another form of energy conversion, where material is placed in an oxygen deficient environment to decompose.⁵¹ Once entombed in a landfill, the organic elements of MSW break down and release methane gas.⁵² That gas is collected and combusted to produce electricity.⁵³

Energy creation from MSW may take a number of other forms, such as co-firing, pyrolysis, or gasification.⁵⁴ Co-firing is a process in which organic waste is mixed with traditional fossil fuels like coal to lower the carbon dioxide (“CO₂”) production in a furnace and lessen the demand for those traditional fuel sources.⁵⁵ Pyrolysis and gasification are techniques in which the organic waste is superheated, but not exposed to oxygen so it does not combust, and instead undergoes a chemical change into a gas or oil.⁵⁶ Whatever the process, those who support WTE argue it leads to significantly less waste going into landfills, less CO₂ released into the air, and energy collection from sources that would have traditionally been discarded.⁵⁷

dangers of fly ash). A concern with fly ash is that it contains heavy metals and compounds that are hazardous to human health. See Kalogirous, *supra*, at 4 (listing the dangerous elements that have high concentrations in ash). Because of these dangers, the report also looks at methods to decrease the reliance on ash landfills. See *id.* at 1. (summarizing the purpose of the study).

⁵⁰ See *Basic Information About Landfill Gas*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/lmop/basic-information-about-landfill-gas> [<https://perma.cc/5BVC-ZTMS>] (describing the Landfill Gas energy recovery process).

⁵¹ *Id.*

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Energy Recovery*, *supra* note 2 (listing other WTE processes); see *Benefits of Landfill Gas Energy Projects*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/lmop/benefits-landfill-gas-energy-projects> [<https://perma.cc/PJC7-9QDB>] (describing the collection of methane gas created by landfills, and how to utilize that gas); *Waste to Energy Gasification*, GLOB. SYNGAS TECH. COUNCIL, <https://www.globalsyngas.org/syngas-production/waste-to-energy-gasification/> [<https://perma.cc/K4RX-6RLM>] (describing gasification as a process that, instead of using the waste as fuel for heat, creates usable gas at the output of the process).

⁵⁵ *Biomass Energy*, NAT’L GEOGRAPHIC, <https://www.nationalgeographic.org/encyclopedia/biomass-energy/> [<https://perma.cc/2G4K-4YZM>] (defining the different energy recovery processes).

⁵⁶ *Id.* During pyrolysis, the biomass fuel is heated to around 390–570 degrees Fahrenheit, without the presence of oxygen, to prevent the biomass from combusting. *Id.* This produces an oil-like substance that can be burned as a fuel. *Id.* Similarly, in gasification, the biomass is heated to 1,300 degrees Fahrenheit, with limited oxygen, which produces a gas that can also be used as a fuel source. *Id.*

⁵⁷ See *Waste-to-Energy: How It Works*, *supra* note 44 (presenting the benefits of WTE as opposed to fossil fuels). This report estimates that WTE reduces landfill volume by 90%, significantly lowers CO₂ emissions, and produces enough energy per day to power 15,000 houses. *Id.*; see Christopher Dann et al., *Reconsidering Waste-to-Energy: Technology and Regulation Changes the Outlook for Garbage Burners*, 150 PUB. UTIL. FORTNIGHTLY 44, 45 (2012) (arguing that WTE presents a good fuel alternative for utilities seeking security in the case of legislation that limits carbon emissions).

II. A SUMMARY OF ENERGY POLICY AND RENEWABLE ENERGY LAW IN THE UNITED STATES

To understand how the current renewable energy laws developed, it is instructive to examine the recent history of U.S. energy policy.⁵⁸ From 1916 to 1970, U.S. energy policy was designed to stimulate and promote the domestic fossil fuel industry.⁵⁹ The federal government took this approach to shore up oil reserves in an era where global conflicts could cut off U.S. access to imported fuel.⁶⁰ Federal tax law allowed taxpayers involved in oil production to deduct numerous costs at values higher than would have been generally permitted.⁶¹ This in turn led to lower costs and fewer risks for investors and operators in the energy industry and lower prices for consumers but discouraged growth in alternative energy.⁶²

In the 1970s, people in the United States started to grow aware of environmental harm caused by human actions.⁶³ Significantly, the United States also experienced a pair of energy crises due to the 1973 oil embargo and the Iranian Revolution in 1978.⁶⁴ Again, the United States shaped its energy

⁵⁸ SALVATORE LAZZARI, CONG. RESEARCH SERV., RL33578, ENERGY TAX POLICY: HISTORY AND CURRENT ISSUES 1 (2008), <https://fas.org/sgp/crs/misc/RL33578.pdf> [<https://perma.cc/W44Y-V7S3>] (discussing the context that led to legislation on energy sustainability and environmental responsibility in the 1970s)

⁵⁹ *Id.* at 2.

⁶⁰ *See id.* at 1 (stating that oil embargoes and price fluctuations are among the factors that have shaped renewable energy policy); James A. Duffield et al., *Ethanol Policy: Past, Present, and Future*, 53 S.D. L. REV. 425, 427 (2008) (stating that conflicts such as World War II disrupted oil importation, leading to a national policy shift toward renewable energy). One analysis centers on the bio-fuel industry, which relates to gasoline burned by vehicles rather than wide scale energy production. *See* Duffield et al., *supra*, at 430 (discussing modern laws requiring gasoline to be blended with ethanol). Nevertheless, the study provides a robust analysis of the factors that informed modern renewable energy policy. *See id.* at 427.

⁶¹ LAZZARI, *supra* note 58, at 2, 3. Costs such as labor, equipment, and supplies must generally be capitalized, meaning deductions would be taken yearly over the lifetime of the operation. *Id.* at 2. Instead, the federal government allowed for those expenses to be deducted in the first year of operation. *Id.* at 3. The “percentage depletion allowance” allowed taxpayers to claim a deduction at 27.5% of their revenue, which was much higher than the deduction for the general rate of depletion. *Id.*

⁶² *See id.* at 3 (detailing the effects of the tax policy favoring fossil fuels prior to 1970). Fossil fuels were traditionally favored because they were easy to transport, and contained significant energy producing power in reasonable volumes. Archana Dayalu, *Why We Need Sustainable Energy*, HARVARD UNIV. GRADUATE SCH. OF ARTS & SCI. BLOG (Dec. 15, 2012), <http://sitn.hms.harvard.edu/flash/2012/why-sustainable/> [<https://perma.cc/LN2C-LPV2>]. Fossil fuels are finite, however, in that they are made of organic material from millions of years in the past and have a negative impact on the environment by creating particulate matter and chemicals that have adverse effects on organic life. *Id.*

⁶³ LAZZARI, *supra* note 58, at 2.

⁶⁴ Duffield et al., *supra* note 60, at 427–28 (discussing the factors that led the United States to seek alternative to reliance on foreign gasoline). In the early 1970s, the demand for oil was much greater than the production, leading the Organization of Petroleum Exporting Countries to increase oil prices. *Id.* Due to political tensions, Arab countries enacted an oil embargo on the Unit-

policy in response to a disruption in the oil trade, although this time the policy was crafted to decrease the dependence on foreign oil sources and look for energy alternatives.⁶⁵ This led the federal government to offer fewer tax incentives for oil producers and to create new tax repercussions to discourage fossil fuel use and punish polluters.⁶⁶ The legislature also enacted a tax plan that created preferences for conservation, sustainability, and alternative energy sources and technology.⁶⁷ The Public Utility Regulatory Policies Act ("PURPA"), a part of the National Energy Act of 1978 ("NEA"), created early mandates to energy suppliers to include electricity generated from renewable sources.⁶⁸

The preferences offered by the United States took the form of government subsidies, including special exclusions, deductions, and tax credits for taxpayers operating within renewable energy fields.⁶⁹ For the first time, the government allowed taxpayer companies relief from tax liability for activities relating to renewable energy, alleviating the financial burden and risk of in-

ed States in 1973, causing major shortages in the United States and forcing the country to look to other forms of energy and oil sources. *Id.* Although the embargo was lifted in 1974, another crisis arose in 1978, when a revolution in the major oil exporting country Iran caused laborers to cease production. *Id.*

⁶⁵ See *id.* (describing the disruptive effect WWII had on oil importation in the United States and how that informed policy making).

⁶⁶ LAZZARI, *supra* note 58, at 3 (detailing the factors that led to energy tax policy changes).

⁶⁷ *Id.* at 4, 5 (describing new tax incentives and subsidies created by the Energy Tax Act of 1978 and subsequent additional subsidies). The Energy Tax Act was one of five acts that together made up the Nation Energy Act of 1978. James W. Moeller, *Electric Demand-Side Management Under Federal Law*, 13 VA. ENVTL. L.J. 57, 57 (1993); see Energy Tax Act of 1978, Pub. L. No. 95-618, 92 Stat. 3174 (1978). The other acts were: the Public Utility Regulatory Policies Act of 1978 (PURPA), Pub. L. No. 95-617, 92 Stat. 3117 (1978); the National Energy Conservation Policy Act of 1978, Pub. L. No. 95-619, 92 Stat. 3206 (1978); the Powerplant and Industrial Fuel Use Act of 1978, Pub. L. No. 95-620, 92 Stat. 3289 (1978); and the Natural Gas Policy Act of 1978, Pub. L. No. 95-621, 92 Stat. 3350 (1978). The Energy Tax Act rolled back benefits to the oil industry, reducing preferences that subsidized the cost of developing an oil well and benefits that allowed oil producers to reduce their taxable income by a certain percentage. LAZZARI, *supra* note 58, at 4. The new law also created tariffs on traditional fossil fuels like oil. *Id.* Finally, the Act introduced subsidies for renewable energy and conservation initiatives. *Id.*

⁶⁸ PURPA, Pub. L. No. 95-617, 92 Stat. 3117 (current version at 16 U.S.C. § 2601 (1978)); see James A. Duffield & Keith Collins, *Evolution of Renewable Energy Policy*, 21 CHOICES, no. 1, 2006, at 9 (summarizing the history of federal policy regarding renewable energy).

⁶⁹ See LAZZARI, *supra* note 58, at 4-5 (listing examples, including subsidies for taxpayers who invested in alternative and renewable fuels sources, such as wind or solar, and preferable depletion deduction rates for geothermal energy). Another tax preference at this time made producers of energy from solid waste, including early WTE facilities, exempt from taxation on the interest from industrial development bonds. *Id.* at 5.

vesting into renewable technology.⁷⁰ These subsidies are the earliest examples of the tax incentives that still apply to current renewable energy producers.⁷¹

By the end of the twentieth century, the focus of U.S. energy policy shifted away from traditional fossil fuels and focused primarily on renewable energy.⁷² Concerns about greenhouse gases and climate change began to inform policy making under Presidents George H. W. Bush and Bill Clinton.⁷³ The Energy Policy Act of 1992 (“EPAAct”) rewarded energy supply companies that sourced a percentage of their electricity from renewable sources.⁷⁴ The updated EPAAct of 2005, under President George W. Bush, marked an even greater shift, gearing policy toward energy created by wind power.⁷⁵ By 2008, the cost of preferences for energy efficiency, alternative fuel sources, and renewable energy was twice that for fossil fuels.⁷⁶ Today, the goals enacted by

⁷⁰ See *id.* at 4 (stating that the Energy Tax Act implemented credits, deductions, and exclusions for taxpayers working with renewable energy or in conservation).

⁷¹ See *id.* at 4–5 (describing how certain incentives like tax credits for residents have expired but have led to many other current and active tax credits). Renewable electricity tax credits, for example, were first introduced in 1992 and were continually renewed to subsidize renewable energy activities. *Id.* at 5 (stating that the renewable electricity tax credit first introduced in 1992 was expanded under the American Jobs Creation Act of 2004).

⁷² See *id.* at Summary (suggesting that while economics played a role in Presidents Bush Sr. and Clinton’s energy policy, the policy was also influenced by environmental concerns about climate change and greenhouse gases).

⁷³ *Id.*

⁷⁴ Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (1992) (amending and updating PURPA, in part); see Duffield & Collins, *supra* note 68, at 10 (describing components of the Energy Policy Act (“EPAAct”)); Moeller, *supra* note 67, at 57 (stating that the amendments focused partially on promoting sustainability on the demand side). EPAAct also extended tax credits to fuels that incorporated a percentage of ethanol, a fuel derived from corn, with traditional fossil fuels. Duffield & Collins, *supra* note 68, at 10. Similarly, the vehicle industry was encouraged to introduce vehicles that could run on alternative fuels sources. *Id.*

⁷⁵ Energy Policy Act of 2005, Pub. L. No. 109-58, 119 Stat. 594 (2005); see *Federal Support for Developing, Producing, and Using Fuels and Energy Technologies: Hearing Before the H. Subcomm. on Energy & Commerce*, 115th Cong. 3 (2017), <https://www.cbo.gov/system/files?file=115th-congress-2017-2018/reports/52521-energytestimony.pdf> [<https://perma.cc/2UGV-SE7N>] [hereinafter *Hearing Before the H. Subcomm. on Energy & Commerce*] (testimony of Terry Dinan, Senior Advisor, Microeconomic Studies Division, Congressional Budget Office stating that energy policy shifted toward efficiency and alternative fuel sources, leading to spending increases on energy-related tax incentives and decreases in that spending being fossil fuel related); Duffield & Collins, *supra* note 68, at 10 (stating that this Act led to significant growth of the wind power field by offering production credits, which are tax credits with value based on a relationship to electricity produced by specific means). These production credits for wind were extended by the 2005 Energy Policy Act into the year 2007. Duffield & Collins, *supra* note 68, at 10.

⁷⁶ *Hearing Before the H. Subcomm. on Energy & Commerce*, *supra* note 75, at 3 (describing the effects of EPAAct of 2005 and subsequent legislation). The American Recovery and Reinvestment Act (“ARRA”) in 2009 expanded tax preferences and created new programs like the Section 1603 grant, which allowed renewable production companies a onetime cash payout instead of tax credits. American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115 (2009); see *Hearing Before the H. Subcomm. on Energy & Commerce*, *supra* note 75, at 3 (stating

the EAct of 1992 still stand, declaring that through energy conservation research and development, the United States should seek to improve economic efficiency and strength while still considering environmental costs and strive to reduce harmful environmental impacts related to the energy industry.⁷⁷

During the early 2000s, state lawmakers also began crafting policies to promote renewable energy.⁷⁸ States have often encouraged a more direct approach to renewable energy through government mandates.⁷⁹ This was accomplished by instituting Renewable Portfolio Standards (RPSs), which required energy supply companies obtain a percentage of their electricity from renewable generators.⁸⁰ By 2015, twenty-nine states and Washington D.C. had adopted mandatory RPSs.⁸¹

III. RENEWABLE ENERGY INCENTIVES ARE THE LIFEBLOOD OF THE WTE INDUSTRY

The federal and state governments currently take different approaches to renewable energy law.⁸² The federal government generally utilizes tax preferences to implement energy related goals.⁸³ States tend to adopt RPSs to either encourage or mandate that a certain percentage of energy sold in the state comes from renewable sources.⁸⁴ In order to understand what approach should be taken in the future, one must first examine the current laws.⁸⁵ Sec-

that ARRA amended parts of the EAct as part of President Obama's stimulus package in response to the 2008 recession).

⁷⁷ See 42 U.S.C. § 13041 (2018) (enumerating the goals of for future research and development of sustainable technologies).

⁷⁸ Duffield et al., *supra* note 60, at 437 (reporting that at least eight states have implemented standards that require gasoline to contain a percentage of ethanol). Ethanol is a form of fuel that is derived from corn, and can be produced in the United States, thus relying on a renewable source, unlike fossil fuels, and stimulating local economies. *Id.* at 426.

⁷⁹ *Id.* at 437. State programs rely on tax preferences, incentives for renewable energy generators, and mandates to promote their goals. *Id.*

⁸⁰ U.S. ENVTL. PROT. AGENCY, ENERGY AND ENVIRONMENT GUIDE TO ACTION, at ES-5 (2015). States goals include reducing overall energy consumption, deriving a certain amount of energy from renewable resources, lowering pollution, and achieving better energy efficiency. *Id.*

⁸¹ *Id.* at 1–6.

⁸² Compare I.R.C. § 45 (2018) (detailing the PTC approach that relies on tax incentives to effectuate renewable energy goals), with *Renewable Portfolio Standards*, *supra* note 25 (detailing the RPS strategy that often relies upon government mandates).

⁸³ I.R.C. § 45 (codifying the current federal tax credit for renewable energy production). One of the most common tax preferences is the tax credit, a government subsidy that allows a taxpayer to subtract a specific amount of money from total taxes owed. *What Is a Tax Credit?*, INTERNAL REVENUE SERV. (Oct. 11, 2018), <https://www.irs.gov/credits-deductions-for-individuals> [<https://perma.cc/R2HX-F5JC>].

⁸⁴ See IND. CODE § 8-1-37-10 (2018) (providing an example of an incentive based RPS); 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (West 2007) (demonstrating a mandate-based standard).

⁸⁵ See *infra* notes 88–137 and accompanying text.

tion A analyzes the federal tax credit regime.⁸⁶ Section B lays out the state RPS approach.⁸⁷

A. Federal Incentives for Renewable Energy

The main vehicle by which the federal government has effectuated its renewable energy goals is through tax credits, specifically Renewable Electricity Production Tax Credits (PTC) and the Business Energy Investment Tax Credits (ITC).⁸⁸ The PTC, originally enacted under the EPAct of 1992, currently allows taxpayer businesses in the renewable energy field to deduct \$0.023 for every kilowatt hour (kWh) of electricity produced from their taxes owed.⁸⁹ This credit, however, is only available for wind, geothermal, closed-loop biomass, and solar energy.⁹⁰ WTE is situated, with open-loop biomass and coal, among others, in a group that only qualifies for fifty-percent of the PTC, or about \$0.012/kWh.⁹¹ The credit applies to the first ten years of the operation of an energy facility.⁹² Additionally, the credit has been slowly phased out.⁹³ For a WTE facility to be eligible for this credit, the facility had to have begun construction before January 1, 2018.⁹⁴ Wind facilities, on the other hand, will remain eligible for the credit until 2020, although the value will be decreased by 20% each year.⁹⁵

⁸⁶ See *infra* notes 88–115 and accompanying text.

⁸⁷ See *infra* notes 116–137 and accompanying text.

⁸⁸ See I.R.C. §§ 45, 48 (2018) (codifying the PTC and IRC, respectively).

⁸⁹ See *id.* §§ 45(a) (stating that the PTC allows a credit of \$0.015 for every kilowatt hour (kWh) of electricity), 45(b)(2) (stating that the \$0.015 credit will be based on its value in 2002, and thus subject to inflation); Energy Policy Act of 1992, Pub. L. No. 102-486, 106 Stat. 2776 (1992) (instituting the PTC); *Renewable Electricity Production Tax Credit (PTC)*, U.S. DEP'T OF ENERGY, <https://www.energy.gov/savings/renewable-electricity-production-tax-credit-ptc> [<https://perma.cc/L4B9-Z268>] (estimating that the current value of the PTC is approximately \$0.023 and stating that the first PTC was enacted in the EPAct of 1992).

⁹⁰ See I.R.C. §§ 45(a)(2)(A)(i) (stating that the credit is available to qualified energy resources), 45(b)(4)(a) (exempting certain types of technology from the full credit, and instead granting only a fifty percent credit to those technologies including MSW), 45(c) (defining qualified energy resources).

⁹¹ See *id.* §§ 45(b)(2) (explaining how the credit adjusts based upon inflation), 45(b)(4)(a) (listing the technologies that are eligible for only half the value of the full credit).

⁹² See *id.* § 45(a)(2)(A)(ii) (stating that the general rule applies the credit for ten years after the day the facility is put into operation).

⁹³ See *id.* § 45(b)(5) (detailing the gradual step down in value for wind facilities). The PTC steps down in value by 20% if the facility began construction after December 31, 2016, but before January 1, 2018, then again to 40% of the original value if the facility began construction after December 31, 2017, but before January 1, 2019; and finally, to 60% if the facility began construction after December 31, 2018, and before January 1, 2020. *Id.*

⁹⁴ See *id.* § 45(d)(6)–(7) (defining the deadline for construction to begin on a landfill gas facility and a trash facility, respectively). Under the Code, a landfill gas facility is one that produces electricity from gas created by MSW breaking down. *Id.* § 45(d)(6). “Trash facilities” is the term used by the Code to describe WTE, a facility that burns MSW. *Id.* § 45(d)(7).

⁹⁵ *Id.* § 45(b)(5).

The ITC is closely related to the PTC, though it focuses primarily on solar energy.⁹⁶ In general, the ITC is worth 30% of the basis of a facility that relies on enumerated solar energy technologies placed in service during the taxable year.⁹⁷ In other words, a company can apply a 30% credit to the cost of their investment in a facility.⁹⁸ The ITC, however, also provided a 10% tax credit for facilities that are eligible for the PTC, but opt not to utilize that credit.⁹⁹ In short, a company constructing a WTE facility could utilize the ITC against their investment in the facility.¹⁰⁰ This was limited by the requirement that the facility be under construction by January 1, 2018, and as such the ITC is no longer available to WTE.¹⁰¹

There are several aspects of the PTC worth examination.¹⁰² First, it is important to note that new WTE facilities, those that began construction after January 1, 2018, will not be eligible for this credit.¹⁰³ When compared to the fact that wind energy remains eligible until 2020, it seems the law may recognize that wind should be treated as unique from other energy production technologies.¹⁰⁴ Furthermore, WTE was not eligible for the full value of the credit; indeed the credit for WTE was only half of what was available to wind energy.¹⁰⁵

Nevertheless, it is notable that even though WTE is not eligible for new credits, any facility that had begun construction before January 1, 2018 will continue to enjoy that credit for the following ten years.¹⁰⁶ Thus the

⁹⁶ *Id.* § 48(a)(2) (describing the energy property for which the entire 30% credit is available). The Code defines energy property to include primarily solar energies. *Id.* § 48(a)(3). The Code also allows for utilization for this credit in the case that a taxpayer does not or has not previously utilized the PTC. *Id.* § 48(a)(5)(B).

⁹⁷ *Id.* § 48(a)(2)(A)(i); see 26 U.S.C. § 1012 (2018) (defining basis generally as the cost of real property).

⁹⁸ I.R.C. § 48(a)(2)(A)(i); *Business Energy Investment Tax Credit (ITC)*, U.S. DEP'T OF ENERGY, <https://www.energy.gov/savings/business-energy-investment-tax-credit-itc> [<https://perma.cc/35T5-ST7Y>] (summarizing the Investment Tax Credit ("ITC") in plain language).

⁹⁹ See I.R.C. §§ 48(a)(2)(A)(ii) (stating that any energy property not specified under subsection 48(a)(2)(A)(i) is eligible for a 10% tax credit), 48(a)(5)(C) (stating that certain energies from section 45 may be treated as energy properties for the purposes of this section).

¹⁰⁰ See *id.* § 48(a)(3) (describing the property and activity to which the ITC applies). The ITC is a credit related to a taxpayer's investment in an energy property, so it arises when a taxpayer is building or purchasing a facility. *Id.*

¹⁰¹ *Id.* § 48(a)(5)(C).

¹⁰² See *id.* § 45.

¹⁰³ *Id.* § 45(d)(6)–(d)(7).

¹⁰⁴ See *id.* § 45(b)(5) (detailing that the PTC is still available to new wind facilities until 2020).

¹⁰⁵ See *id.* § 45(b)(4) (detailing the technologies for which only half the credit is available).

¹⁰⁶ See *id.* § 45(a)(2)(A)(ii) (stating that the ten-year period to utilize the PTC begins when the facility is placed in service). It is important to consider that the ten-year period begins running later than the cutoff date for credit eligibility under subsection (d)(7), which is attached to when the facility begins construction. *Id.*

WTE industry may continue to enjoy considerable tax benefits until the year 2028.¹⁰⁷ It is important to reiterate that that WTE will be drawing funds from the same source as wind energy.¹⁰⁸

The ITC gives rise to effectively the same analysis.¹⁰⁹ It is apparent that the ITC is designed to favor solar credits, but in the process it did allow resources to flow toward the WTE industry.¹¹⁰ Although the ITC is no longer available to WTE projects, it does demonstrate that for over a decade, resources that are primarily allocated toward solar energy have been available to the WTE field.¹¹¹ Additionally, past energy tax credits have expired only to be renewed again later under new legislation.¹¹² At the end of 2017, the Trump administration unveiled its tax reform bill.¹¹³ The bill did not renew the tax credits for renewables, which were last extended in 2015, but it also did not repeal the current phasing out process that allows eligible renewable energy producers to enjoy production credits.¹¹⁴ Nevertheless, it is reasonable to posit that a future administration could reestablish or institute new tax credits.¹¹⁵

¹⁰⁷ See *id.*

¹⁰⁸ *Id.* § 45.

¹⁰⁹ Compare *id.* (giving superior tax credits to wind power), with *id.* § 48 (granting favorable credits to solar energy, primarily).

¹¹⁰ See *id.* §§ 48(a)(2) (granting a 30% credit to primarily solar properties), 48(a)(5)(C) (allowing a 10% credit for other technologies as enumerated under section 45).

¹¹¹ See *id.* § 48(a)(5)(C) (stating that qualified facilities as defined under section 45 are only eligible for such credits if they began construction before January 1, 2018). The type of energy property that qualifies for the 30% credit also has a deadline to begin construction before January 1, 2022, under the current statute. *Id.* § 48(a)(3).

¹¹² See Duffield & Collins, *supra* note 68, at 10 (stating that the EPAct of 2005 reestablished credits for wind energy that had expired in 2003).

¹¹³ Joseph Bebon, *President Trump Signs Tax Bill with Solar ITC Intact*, SOLAR INDUS. (Dec. 26, 2017), <https://solarindustrymag.com/president-trump-signs-tax-bill-solar-itc-intact> [<https://perma.cc/N9BA-MWNX>] (commenting on the effects of the new tax plan on solar tax credits). The bill keeps in place the ramping down process that allows subsidies to decrease gradually through the year 2021. *Id.*

¹¹⁴ *Id.* The PTC remains intact for wind energy, meaning that wind facilities that started construction after December 31, 2019, have a three-year scale down process where the tax credit is still available to new facilities, but decreasing by 20% more each year. I.R.C. § 45. Wind facilities that began construction in 2017 are eligible for a credit reduced by 20% of the original amount, which was \$.019/kilowatt hour, then by 40% in 2018, and 60% in 2019. *Id.* For non-wind technologies, including WTE, new ITCs ceased to be available at the end of 2016, but the rule still allows any facility that began construction before that date to use the credit for a period of 10 years. *Id.*

¹¹⁵ See Duffield & Collins, *supra* note 68, at 10 (stating that credits had expired in the past only to be renewed years later).

B: Renewable Portfolio Standards—The State Approach

States often rely on a different approach to renewable energy, the RPS.¹¹⁶ An RPS is a regulation requiring energy suppliers to obtain a certain amount of the electricity from a renewable source.¹¹⁷ These can range from aspirational financial incentives to firm mandates.¹¹⁸ Currently twenty-nine states have some version of an RPS, and more have renewable energy goals.¹¹⁹ Consider first Indiana's Voluntary Clean Energy Portfolio Standard Program.¹²⁰ This system encourages, but does not require participation.¹²¹ In brief, an energy supplier is incentivized to obtain four percent of its energy from a renewable source by December 31, 2018, seven percent by December 31, 2024, and at least ten percent by December 25, 2025.¹²² Should a company meet these goals, the state will compensate the company, allowing favorable recovery of costs incurred by the company.¹²³ Indiana does not differentiate between the sources of clean energy, meaning a company could meet the RPS goals while relying solely on energy derived from WTE.¹²⁴

Alternatively, Pennsylvania's Alternative Energy Portfolio Act is a government mandate, where suppliers must comply with state regulations or pay additional fees.¹²⁵ This regulation has a two tiered system, where tier I technology includes, but is not limited to, wind, solar, and geothermal ener-

¹¹⁶ *Renewable Portfolio Standards*, *supra* note 25 (describing the RPS as a public policy based approach, unique from a market-based approach).

¹¹⁷ *Id.*

¹¹⁸ *See id.* (clarifying that some states have legal standards that must be met, while others merely have energy goals).

¹¹⁹ *Id.* Iowa established the first RPS in the United States in 1983. *Id.* Hawaii has the most robust RPS, with the goal of 30% of energy coming from renewables in 2020, and 100% by 2024. *Id.*

¹²⁰ *See* IND. CODE § 8-1-37-10 (2018) (authorizing the creation of Indiana's RPS, titled the Voluntary Clean Energy Portfolio Standard Program).

¹²¹ *See id.* § 8-1-37-11 (describing the process for an energy supplier to opt into this voluntary program).

¹²² *Id.* § 8-1-37-12.

¹²³ *See id.* § 8-1-37-13 (laying out Indiana's recovery system). The statute allows the state to "establish a shareholder incentive consisting of authorization of an increased overall rate of return on equity, not to exceed fifty (50) basis points over a participating electricity supplier's authorized rate of return . . ." *Id.* An analysis of companies' return on equity is beyond the scope of this Note.

¹²⁴ *See id.* § 8-1-37-4 (enumerating the types of energy technology from which a supplier may obtain their energy under the program, including but not limited to wind, solar, and WTE). The statute does, however, exempt incineration of MSW, allowing only WTE that relies on "advanced" solid waste technologies. *Id.* § 8-1-37-4(a)(9), (b). The statute does not positively define what "advanced" technologies are, but implies by omission that it is technology that does not rely combustion of MSW. *Id.* § 8-1-37-4(b).

¹²⁵ *See* 73 PA. STAT. & CONS. STAT. ANN. § 1648.3(f) (West 2007) (authorizing the state to extract a fee if a facility is found not in compliance).

gy, while tier II includes coal and MSW.¹²⁶ Under this system, energy companies must derive at least eight percent of their electricity from tier I resources, and ten percent from tier II resources by May 31, 2021.¹²⁷ There are also additional requirements for the use of solar energy.¹²⁸

To help effectuate this goal, Pennsylvania has implemented a tax credit system.¹²⁹ These alternative energy credits (“AECs”) are equal to the number of megawatt-hours of energy created using renewable means.¹³⁰ Credits are tracked to measure the compliance of an energy company.¹³¹ If an energy company satisfies its energy goals, it can transfer its additional credits to aid companies struggling to reach the state standards.¹³²

The difference between these two approaches is fairly stark.¹³³ The Indiana statute offers financial incentives to companies that sell energy provided by renewable sources.¹³⁴ The Indiana statute does not make a distinction between the sources of renewable energy—wind and solar are treated as equal to WTE.¹³⁵ The Pennsylvania approach is substantially different as, instead of tax incentives, it issues mandates.¹³⁶ Furthermore, the Pennsylvania model differentiates between types of energy, stating that a certain percentage of energy must come from tier I renewables, which consists of types energy considered generally less polluting than those in tier II.¹³⁷

¹²⁶ *Id.* § 1648.2. Tier I consists of energy from (1) solar, (2) wind, (3) low-impact hydropower, (4) geothermal, (5) biologically derived methane gas, (6) fuel cells, (7) biomass, and (8) coal mine methane gas. *Id.* Tier II relies on (1) waste coal, (2) distributed generation systems, (3) demand-side management, (4) large-scale hydropower, (5) MSW, (6) wood related waste, (7) coal gasification technology. *Id.*

¹²⁷ *Id.* § 1648.3(b), (c).

¹²⁸ *Id.* § 1648.3(b)(2).

¹²⁹ *Id.* § 1648.3(e).

¹³⁰ *Id.* § 1648.3(e)(4).

¹³¹ *Id.* § 1648.3(e)(2) (requiring the state to establish an administrative entity whose duties are the creation, overseeing, tracking, and reporting of the AEC program).

¹³² *Id.* § 1648.3(e)(8) (requiring the state to establish a registry relating to transfers of energy credits between entities).

¹³³ Compare IND. CODE § 8-1-37-13 (allowing participating entities to recovery on their investment costs), with 73 PA. STAT. & CONS. STAT. ANN. § 1648.3(f) (authorizing the state of Pennsylvania to impose additional payment costs on any entity that fails to comply with the statute).

¹³⁴ See IND. CODE § 8-1-37-13 (establishing the Indiana goal based RPS where a taxpayer who chooses to derive energy from renewable sources may be entitled to recovery on their investment).

¹³⁵ See *id.* § 8-1-37-4 (including certain types of WTE in its definition of a “clean energy resource” eligible for the incentive).

¹³⁶ 73 PA. STAT. & CONS. STAT. ANN. § 1648.3(a).

¹³⁷ *Id.* § 1648.3(b), (c).

IV. WTE IS NOT ENVIRONMENTALLY FRIENDLY, TRULY SUSTAINABLE, OR ECONOMICALLY SOUND

There is reason to believe WTE power is an elegant solution for a society with a serious waste problem.¹³⁸ For example, research suggests that in 2013, the waste sent to landfills could have been used to power 14 million homes, which equals roughly 240 million barrels of oil.¹³⁹ Furthermore, there is evidence that diverting waste could reduce environmental harms created by landfills, in terms of both greenhouse gases emitted and toxins seeping into the land and groundwater.¹⁴⁰ These forms of energy production, however, have a number of consequences that have an adverse impact on human health and the environment that do not arise in other renewable energy sources.¹⁴¹ Moreover, given a critical examination, recovering energy from WTE is a process that is not truly sustainable.¹⁴² Section A synthesizes research suggesting that WTE is a harmful technology.¹⁴³ Section B presents the position that WTE is not economically sustainable either.¹⁴⁴ Section C proposes that laws tailored to benefiting renewable energy should be renewed but altered to prevent WTE from continuing to thrive.¹⁴⁵

A. Too Dirty to Be Clean Energy—WTE Expels Numerous Toxins into the Air, Land, and Water

Even though the EPA classifies WTE power as renewable energy along with solar, wind, and others, it does not generally consider it a source of

¹³⁸ Dann et al., *supra* note 57, at 45 (stating that in 2012, the United States was generating around 243 million tons of municipal solid waste and spending around \$18 billion on landfills in conjunction with that waste).

¹³⁹ Emilio Lamanna, Note, *The Wealth in Waste: America's Ability to Enter the Waste to Energy Market by Embracing European Landfill Diversion, Waste Framework, and Renewable Energy Laws and Waste to Energy Initiatives*, 25 CARDOZO J. INT'L & COMP. L. 347, 353 (2017) (quoting the estimates of James Stewart, the Chair of California's BioEnergy Producers Association). The fourteen million homes represent about 12% of the total United States. *Id.*

¹⁴⁰ *Id.* at 353–54 (quoting Stewart, who states that gas created in landfills is about 25%–50% CO₂ and 50%–75% methane, two major greenhouse gases). Stewart goes on to explain that the United States sends around 60% of its waste to landfills, compared to Europe's two percent, and that as a result, there is significant toxic runoff in the form of leachate getting into the U.S. water. *Id.* at 354. Leachate is the liquid byproduct of the landfilling process that can potentially leak into the environment if not contained. *Id.*

¹⁴¹ See *Renewable Portfolio Standards*, *supra* note 25 (distinguishing broadly biomass from wind, solar, geothermal, and others, because it is much dirtier).

¹⁴² WASTE OF ENERGY, *supra* note 6, at 13 (arguing that MSW should not be considered renewable because it is composed of many non-renewable materials like plastics). Plastics and packaging, which make up a significant amount of general household waste, are petroleum-based products. *Id.*

¹⁴³ See *infra* notes 146–166 and accompanying text.

¹⁴⁴ See *infra* notes 167–183 and accompanying text.

¹⁴⁵ See *infra* notes 184–209 and accompanying text.

“green power.”¹⁴⁶ Green power, sometimes called clean renewable energy, describes production processes that do not create any significant pollution or harm the environment.¹⁴⁷ This does not apply for WTE, as these processes emit numerous toxins and chemicals into the environment.¹⁴⁸

WTE incinerators emit a vast array of chemicals through the facility’s steam stack.¹⁴⁹ Even though there are a number of filtration systems in place at these facilities, even a state-of-the-art incinerator allows some percentage of fly ash to escape.¹⁵⁰ This is problematic, even at those low amounts, because those pollutants have qualities that make them especially hazardous in that they degrade slowly, accumulate in organic tissue, and are highly toxic.¹⁵¹

Chemicals with these qualities are known as Persistent Bioaccumulative Toxic (“PBT”) chemicals.¹⁵² These chemicals are specifically defined by the EPA under the Toxic Release Inventory (“TRI”) Program.¹⁵³ The EPA created the TRI program as part of the Emergency Planning and Community Right-to-Know Act, a regulation requiring, among other things, state governments to have an emergency response plan for chemical accidents and pollution-creating facilities to report emission numbers of dangerous toxins.¹⁵⁴ The EPA

¹⁴⁶ See GUIDE TO PURCHASING GREEN POWER, *supra* note 28, at 2–3 (providing guidance that states that green energy has more environmental benefits than standard renewable energy but is not mandatory under federal law).

¹⁴⁷ See *Renewable Portfolio Standards*, *supra* note 25 (stating that clean renewables are best limited to solar and wind power, with the possibility of some exceptions for geothermal and types of hydroelectric).

¹⁴⁸ See WASTE OF ENERGY, *supra* note 6, at 8 (presenting evidence that WTE causes pollution).

¹⁴⁹ See *id.* at 9 (claiming that inspectors often only inspect stack emissions when they are operating at optimum levels).

¹⁵⁰ See *id.* at 8 (stating that facilities “emit particulate matter, volatile organic compounds, heavy metals, dioxins, sulfur dioxide, carbon monoxide, mercury, carbon dioxide, and furans”).

¹⁵¹ *Id.* (describing the chemicals as persistent, bioaccumulative, and toxic). Persistent chemicals are resistant to degradation both in the environment and can be absorbed or consumed by humans. *Persistent, Bioaccumulative, Toxicants*, SCI. & ENVTL. HEALTH NETWORK, <http://saferchemicals.org/wp-content/uploads/sites/3/2014/07/PBT-Factsheet.pdf?x38790> [<https://perma.cc/AGB6-PNHA>]. Bioaccumulative chemicals build up within organic matter and can be stored in high concentrations inside animals and humans. *Id.* Toxic chemicals cause health and environmental damages when consumed or absorbed. *Id.*

¹⁵² *Persistent, Bioaccumulative Toxic (PBT) Chemicals Covered by the TRI Program*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/toxics-release-inventory-tri-program/persistent-bioaccumulative-toxic-pbt-chemicals-covered-tri> [<https://perma.cc/8JSB-YGVS>] (listing chemicals and compounds that the EPA has categorized as uniquely threatening to human health and the environment due to their persistent, bioaccumulative, and toxic nature).

¹⁵³ *Id.* TRI reporting is part of the Emergency Planning and Community Right-to-Know Act (EPCRA). See 42 U.S.C. § 11023 (2018).

¹⁵⁴ 42 U.S.C. § 11023; see *What Is EPCRA?*, U.S. ENVTL. PROT. AGENCY, <https://www.epa.gov/epcra/what-epcra> [<https://perma.cc/LC9B-MZB9>] (summarizing the basics of EPCRA).

requires WTE facilities to monitor and report on emissions, as they are known to carry specifically dangerous chemicals.¹⁵⁵

Evidence supports the assertion that WTE facilities are dangerous as well.¹⁵⁶ Baltimore reported that life expectancy near their WTE facility was ten years less than the rest of the state, with higher cancer rates.¹⁵⁷ Studies suggest a correlation between proximity to a WTE facility and a likelihood of developing a number of diseases.¹⁵⁸ Reports link WTE pollution to increased mortality rates from childhood cancers, as well as throat, liver, stomach, rectum, and lung cancer.¹⁵⁹ Other reports evidence the connection between WTE pollution and developmental ailments, such as abnormal puberty and sexual maturation in children.¹⁶⁰

Proponents of WTE argue that diverting waste from landfills means there is an aggregate environmental good from incineration.¹⁶¹ The core of the argument is that landfills create both greenhouse gases and leachate, a toxic liquid byproduct of landfilling that can seep into the ground should it breach the landfill's liner.¹⁶² Although that argument is fundamentally sound, WTE does not get rid of the need for landfills.¹⁶³ Even though incinerators

¹⁵⁵ *Toxic Chemicals in Wastes*, U.S. ENVTL. PROT. AGENCY (2014), https://cfpub.epa.gov/ro/indicator_pdf.cfm?i=58 [<https://perma.cc/2G9H-ML76>] (explaining that toxic chemicals may be produced by private waste treatment activities, and the producer must report those chemicals according to the TRI program).

¹⁵⁶ See WASTE OF ENERGY, *supra* note 6, at 9 (detailing studies that suggest several illnesses connected with those living in close proximity to biomass facilities).

¹⁵⁷ See Dance, *supra* note 4 (describing the mortality statistics around the facility). Statistics can be difficult to attribute to any one source. See *id.* (reporting that the residents around the incinerator believe it to be the cause of the poor health in the community). Further, there is the problem of environmental justice, which is the idea that environmental harms are not bore equally by the entire population, specifically, poor people and people of color are much more negatively impacted due to factors such as exclusion from policymaking. Jeanne Marie Zokovitch Paben, *Green Power & Environmental Justice—Does Green Power Discriminate?*, 46 TEX. TECH. L. REV. 1067, 1071 (2014). Marginalized groups shoulder the costs of environmental progress disproportionately. *Id.* at 1071–72. For example, residents of the only county in Florida that is predominately black had to fight the construction of a biomass facility, as did the citizens of a predominately black neighborhood in Tallahassee. *Id.* at 1095.

¹⁵⁸ PEMBINA INST., INCINERATION OF MUNICIPAL SOLID WASTE: AN UPDATE ON POLLUTION 2–3 (2007), http://www.pembina.org/reports/Incineration_FS_Pollution.pdf [<https://perma.cc/9A3D-G9RE>]. In addition to cancer, the study shows that children living near a waste facility may not properly go through puberty or reach sexual maturity. *Id.* at 2.

¹⁵⁹ *Id.* at 2.

¹⁶⁰ *Id.* WTE facilities generate dioxins that are among the most harmful to humans, as well as particulate matter that is a known contributor to cardiovascular diseases, pulmonary diseases, and cancer. *Id.*

¹⁶¹ See Lamanna, *supra* note 139, at 353–54 (arguing that because WTE diverts trash from landfills, it contributes to decreasing greenhouse gases).

¹⁶² *Id.* at 354 (describing leachate as “hazardous sludge that poisons freshwater sources” that can leak from a landfill).

¹⁶³ See WASTE OF ENERGY, *supra* note 6, at 10 (arguing that incinerators create significant amounts of waste ash, that must still be disposed of in a landfill).

reduce waste volume by around 90 percent, there is still plenty of leftover toxic ash, which will have to be buried in designated landfills.¹⁶⁴ Landfill liners are designed to entomb unwanted wastes, but in reality they have a limited effective life before substances begin to pass through into the environment.¹⁶⁵ Even in the case where a landfill is constructed in full compliance with the law, there is the eventuality that the toxic ash will contaminate the environment.¹⁶⁶

*B. WTE Is Too Wasteful to Be Sustainable as It Relies on
Waste and Finite Materials as Fuels Sources*

Environmental concerns notwithstanding, there is also the belief that WTE is not sustainable.¹⁶⁷ Much of what ends up in MSW comes from non-renewable sources, such as plastics that were not properly recycled.¹⁶⁸ An incinerator company wants the most reliable fuel sources to optimize their equipment.¹⁶⁹ Paper and plastics, which could be recycled, happen to also be the materials that burn the most efficiently.¹⁷⁰ As a for-profit endeavor, WTE

¹⁶⁴ *Id.* (arguing that incinerators create harmful byproducts in significant numbers).

¹⁶⁵ G. FRED LEE & ANNE JONES-LEE, *FLAWED TECHNOLOGY OF SUBTITLE D LANDFILLING OF MUNICIPAL SOLID WASTE* 10 (2015), <http://www.gfredlee.com/Landfills/SubtitleDFlawedTechnPap.pdf> [<https://perma.cc/ELG7-9PUA>] (stating that the plastic landfill liner will eventually fail and allow substances to leak out); see *Criteria for Municipal Solid Waste Landfills*, 40 C.F.R. § 258.40 (2018) (specifying the construction standards an MSW landfill must satisfy). A landfill must be built with a composite liner, a two-layer system that has a plastic layer encased in a densely packed soil layer. 40 C.F.R. § 258.50(b).

¹⁶⁶ See Letter from Heather A. Murray, Staff Attorney, Conservation Law Foundation, to Robert Boucher Jr., President & CEO, Wheelabrator Saugus, Inc., and Wheelabrator Technologies, Inc., at 3 (May 22, 2017), <https://www.clf.org/wp-content/uploads/2017/05/2017-05-22-FINAL-Wheelabrator-Saugus-Notice-Letter.pdf> [<https://perma.cc/V5AA-MQUC>] (providing notice to Wheelabrator of the intended action by the Conservation Law Foundation for violations of the RCRA). The claims brought by CLF relate to violations of RCRA arising from failure to monitor groundwater for contamination, creating risks of toxins leaching into the ecosystem. See *id.* See generally 40 C.F.R. § 258 (laying out the regulatory requirements for operation of an MSW landfill). The Saugus landfill has been operating since well before the construction requirements imposed by the regulations associated with RCRA, and thus demonstrates a way a landfill may operate without the protections of current law. See 40 U.S.C. §§ 6907, 6912 (2018) (providing the authority for the EPA to promulgate rules and issue guidelines to carry out the statutory purpose of RCRA); 57 Fed. Reg. 28628 (June 26, 1992) (demonstrating that the EPA provided notice in the year 1992 for the rulemaking that would be codified at C.F.R. § 258.40); Greta Jochem, *An Incinerator Divides a Town Near Boston*, CITYLAB (Feb. 1, 2018), <https://www.citylab.com/environment/2018/02/an-incinerator-divides-a-town-near-boston/552053/> [<https://perma.cc/L98F-MVDT?type=image>] (stating that the Saugus Incinerator began operation in the 1970s).

¹⁶⁷ See WASTE OF ENERGY, *supra* note 6, at 13 (declaring that, due to the presence of non-renewable materials in biomass waste, WTE is not a sustainable practice).

¹⁶⁸ *Id.* (using the example of plastic packaging that may be thrown out, which is derived from fossil fuel-based petroleum).

¹⁶⁹ See *id.* at 11 (arguing that, because plastics and paper burn more efficiently, true organic materials are made up of higher percentages of water).

¹⁷⁰ *Id.*

facilities have little incentive to sort out best fuel sources, and indeed are more likely to sort other materials, while leaving plastics in.¹⁷¹ Thus, WTE only appears to be sustainable, when in actuality, the fuel source, trash, is made up of numerous nonrenewable components.¹⁷²

This is exacerbated by the fact that many incinerators have contracts, which creates a demand for waste.¹⁷³ The contracts create a relationship where a municipality either supplies enough waste to keep the incinerator profitable, or the municipality pays money to make up the loss.¹⁷⁴ The other arm of this relationship is between the incinerator and the bank.¹⁷⁵ The cost of building and operating a WTE facility means that it can never downscale operations as long as it needs to pay off loans.¹⁷⁶ In 2009, in Lake County, Florida, a predictable conflict arose under these circumstances.¹⁷⁷ The city was not producing enough trash due to the economic crash hurting the local tourism industry, and the city made the choice to stop encouraging recycling in an effort to avoid spending millions supporting the incinerator contract.¹⁷⁸

Additionally, it is probable that WTE would not have thrived without government subsidies because WTE power production is costly.¹⁷⁹ A 2011 report by the Energy Information Administration stated that the cost of having a hauling company bring its waste to a WTE facility was about fifty percent more expensive than simply taking it to a landfill.¹⁸⁰ The report goes on to claim that the WTE incineration process itself is ultimately more costly than

¹⁷¹ See *id.* (discussing the financial structure of a WTE facility).

¹⁷² See *id.* at 13 (stating that trash tends to be made up of non-renewable products like plastics, and thus burning trash cannot be considered renewable energy).

¹⁷³ *Id.* at 11 (observing that many WTE facilities have decade long contracts with municipalities to produce the waste-fuel for the incinerator).

¹⁷⁴ *Id.* (describing these contracts as “put or pay,” a process whereby the community must financially compensate the waste company if it does not generate an agreed upon tonnage, resulting in the waste company losing earning).

¹⁷⁵ *Id.* at 12.

¹⁷⁶ See *id.* (describing that the operation demands fuel to make money, rather than burn based on the rate of fuel being brought in).

¹⁷⁷ *Id.*

¹⁷⁸ *Id.*

¹⁷⁹ See *id.* at 5–8 (describing the numerous economic issues that WTE raises). In broad terms, WTE is not economically viable, especially when compared to a system built around recycling and composting. See *id.* (analyzing the costs of operating a biomass facility). WTE facilities are a major investment up front and have many secondary costs related to operation, and thus is the least efficient way to generate energy relative to its cost. *Id.* at 6.

¹⁸⁰ *Id.* at 5. The process of having a hauler deliver trash to a facility is called a gate fee or a tipping fee. *Id.* The fee to deposit waste in a landfill in 2011 was sixty-one dollars, while at an incinerator it was ninety-two dollars on average. See *id.* (charting the tipping fees for incinerators, landfills, and composting facilities).

alternatives.¹⁸¹ Although exact costs vary based on the size of the facility, some estimates put the operating costs at around \$600–\$1000 per ton of waste incinerated, which ranges from around \$41 million to \$169 million per year.¹⁸² In context, it becomes clear that WTE is not an environmentally efficient approach to creating energy.¹⁸³

C. A Clean Slate—Changing the Future of Energy Policy

As part of the EPAct of 1992, the legislature articulated a set of goals for the development of energy conservation technologies focused on increasing energy security and economic efficiency, while decreasing environmental harms.¹⁸⁴ The growth of WTE technology has undermined this goal.¹⁸⁵ Thus, Congress must amend its approach to renewable technologies in the future.¹⁸⁶

There is an open question as to whether the expiration of federal tax credits will resolve the problems created by WTE.¹⁸⁷ Although this does end funding for WTE, benefits for other renewables fields will also be cut off.¹⁸⁸ The legislature must look to the future by reestablishing the credits as they have before.¹⁸⁹ Congress should, however, redefine what types of energy technologies are eligible for credits, based upon recent studies on the social and economic consequences of WTE power.¹⁹⁰ Congress should allow credits

¹⁸¹ *Id.* at 7. The initial investment costs were significantly higher for WTE than for conventional natural gas, wind, conventional coal, photovoltaic, nuclear, and coal with carbon capture. *See id.*

¹⁸² *Cost of Incineration Plant*, WASTE TO ENERGY INT’L (Sept. 14, 2015), <https://wteinternational.com/cost-of-incineration-plant/> [<https://perma.cc/2U9D-R8Y5>] (calculating the possible costs for small to medium sized facilities). Waste to Energy International states that operating a WTE facility is expensive and there is no way around it. *Id.*

¹⁸³ *See* Paul Connett, *Why Incineration Is a Very Bad Idea in the Twenty First Century*, GLOB. ALL. FOR INCINERATOR ALTS. (2010), <http://www.no-burn.org/why-incineration-is-a-very-bad-idea-in-the-twenty-first-century/> [<https://perma.cc/58AK-X38E>] (arguing that there are very reasonable alternatives to incineration). San Francisco, despite its large population, has successfully implemented a strategy that is diverting 72% of its waste, with an eye to reaching 75% in 2020. *Id.*

¹⁸⁴ *See* 42 U.S.C. § 13401 (2018) (articulating the policy goals the United States should strive for in researching and developing conservation technologies).

¹⁸⁵ *See* WASTE OF ENERGY, *supra* note 6, at 8, 13 (arguing that WTE is not environmentally sustainable or economically sound).

¹⁸⁶ *See* I.R.C. § 45(d)(7) (2018) (demonstrating that under the current regime, WTE can still enjoy ten years of benefits if the facility began construction after January 1, 2018).

¹⁸⁷ *See id.* §§ 45(b)(5) (providing that the PTC only remains available for new wind facilities past 2018, and that it has expired for all other technologies), 48(a)(5) (stating that the ITC is no longer eligible for any WTE facility seeking to claim the credit after January 1, 2018).

¹⁸⁸ *Id.* § 45(d)(7).

¹⁸⁹ *See* Duffield & Collins, *supra* note 68, at 10 (stating that federal incentives for renewable energy have expired and been renewed in the past).

¹⁹⁰ *See* I.R.C. § 45 (detailing the different types of energy that have been eligible to receive the PTC); WASTE OF ENERGY, *supra* note 6, at 8, 13 (presenting research suggesting that WTE has adverse environmental and economic effects).

only for energy types that have minimal negative environmental impact, and in the very least, exclude WTE.¹⁹¹

Congress should also consider following the lead of the states and adopt a federal RPS.¹⁹² The legislature drafted such a bill in the past, the American Clean Energy and Securities Act (“ACESA”), but ultimately the bill did not pass.¹⁹³ Congress ought to reconsider that choice.¹⁹⁴ The ACESA looks substantially similar to the Pennsylvania RPS.¹⁹⁵ Specifically, it mandated that energy be derived from renewable sources and did not merely rely on an incentive system.¹⁹⁶ It also employed a two tier system.¹⁹⁷ This could be used to prevent an energy supplier from relying completely on WTE as the renewable resource.¹⁹⁸ One noticeable way in which the failed bill surpassed the current Pennsylvania statute was that landfill gas would be categorized alongside WTE.¹⁹⁹ Congress could go further, however, and develop a system whereby WTE is completely phased out over a number of years.²⁰⁰ In the extreme, Congress could simply develop a new proposed federal RPS to focus only on green technologies.²⁰¹

¹⁹¹ See GUIDE TO PURCHASING GREEN POWER, *supra* note 28, at 2–3 (demonstrating that federal agencies have issued guidance instructing and encouraging the use of green technologies).

¹⁹² See 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (West 2007) (demonstrating a mandate based RPS standard, which requires the state to acquire a certain amount of energy from renewable sources).

¹⁹³ American Clean Energy and Security Act (“ACESA”), H.R. 2454, 111th Cong. (2009). The American Clean Energy and Security Act required that energy retailers acquire at least 20% of their electricity from renewable source by 2020. *Id.*

¹⁹⁴ See *id.*

¹⁹⁵ See *id.* (revealing that the proposed American Clean Energy and Security Act is very similar to the current Pennsylvania RPS). Like the Pennsylvania statute, the ACESA places energy resources into two categories, with wind, solar, and geothermal energy, among others, into one category and WTE into a separate category. See *id.*; 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (demonstrating that ACESA distinguished between “qualifying energy resources” and “renewable energy sources” in much the same way the Pennsylvania statute separates tier I and tier II sources of renewable energy).

¹⁹⁶ See H.R. 2454, 111th Cong. (proposing a plan to gradually grow from requiring 6% of energy to be acquired from a renewable source in 2012 to 20% in 2020).

¹⁹⁷ *Id.*

¹⁹⁸ See 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (requiring that energy be derived from both tiers of renewable resources).

¹⁹⁹ Compare H.R. 2454, 111th Cong. (categorizing landfill gas as a “qualifying energy resource” along with WTE, instead of a “renewable energy resource”), with 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (defining landfill gas as a subset of biomass, under Tier I).

²⁰⁰ See I.R.C. § 45 (giving an example of a statute where a type of technology, in this case wind, is gradually phased out without immediately terminating the credit).

²⁰¹ See GUIDE TO PURCHASING GREEN POWER, *supra* note 28, at 2–3 (acknowledging that green energy use is currently voluntary).

There is significant room at the state level to dictate future renewable energy policy as well.²⁰² Twenty-nine states already have some form of an RPS, and more have renewable energy goals.²⁰³ Not all states, however, treat WTE the same under RPS laws.²⁰⁴ It is crucial to long term energy sustainability that the remaining states adopt mandatory RPS laws.²⁰⁵ States too could follow Pennsylvania's model.²⁰⁶ Again, states should consider limiting or even blocking WTE from being considered a valid source of energy for the purposes of an RPS.²⁰⁷ Although it can be argued that this would be unfairly harsh for the WTE industry, it can also be argued that the industry would not have even existed without leeching benefits from other renewables, making this a course correction.²⁰⁸ Finally, it seems that having lower benefits, such as being allowed on half the entire PTC credit, did not prevent WTE from thriving historically, and therefore any regime that does not completely eliminate benefits to WTE will not truly dissuade its use.²⁰⁹

CONCLUSION

Energy policy in the last fifty years in the United States has seen massive strides. While the previous century was mostly focused on ensuring the country had enough oil to power through world wars, the 1970s marked a major shift, wherein lawmakers began to seek alternative fuel sources. This was at first spurred by concerns about energy security, but toward the start of the 2000s, laws began to reflect growing concerns of waste, sustainability, and environmental harm. To those ends, the federal and state governments

²⁰² See *State Renewable Portfolio Standards and Goals*, NAT'L CONFERENCE OF STATE LEGISLATURES (2017), <http://www.ncsl.org/research/energy/renewable-portfolio-standards.aspx> [<https://perma.cc/BVP3-MFLP>] (describing the increase in states adopting RPSs).

²⁰³ *Id.* Iowa established the first RPS in the United States in 1983. *Id.* Hawaii has the most robust RPS, with the goal of 30% of energy coming from renewables in 2020, and 100% by 2024. *Id.*

²⁰⁴ SAMANTHA DONALDS, CLEAN ENERGY STATES ALL., RENEWABLE THERMAL IN STATE RENEWABLE PORTFOLIO STANDARDS 5 (2015), <https://www.cesa.org/assets/Uploads/Renewable-Thermal-in-State-RPS-April-2015.pdf> [<https://perma.cc/5JYK-4GX3>] (comparing the RPS laws across the United States that include thermal energy). Thermal power can take several forms, and here, is categorized as solar thermal, biomass, and geothermal technology. *Id.* In 2015, Arizona, Indiana, Massachusetts, Maryland, New Hampshire, Texas, and Wisconsin included all three of these types of thermal in their RPS. *Id.*

²⁰⁵ See *Renewable Portfolio Standards*, *supra* note 25 (lauding Pennsylvania's early adoption of a robust, clean focused RPS).

²⁰⁶ See *id.* (examining the shortcomings of relying solely on market forces to drive green solutions, even when it is trendy to be "green").

²⁰⁷ See 73 PA. STAT. & CONS. STAT. ANN. § 1648.3 (categorizing MSW as a Tier II source of energy).

²⁰⁸ See WASTE OF ENERGY, *supra* note 6, at 2 (positing that the PTC effectively created to the WTE industry).

²⁰⁹ See *id.*

implemented incentives through the tax code and mandates, using both stick and carrot approaches to meet new energy needs.

WTE, however, was also able to benefit by those policies. Because WTE superficially appears to be renewable, it was able to become a thriving industry by taking government subsidies that should have been reserved for wind, solar, and geothermal energy. Thus this “dirty” industry has continued to benefit under federal and state programs, while they simultaneously expelling persistent, bioaccumulative toxins into the environment.

Energy and environmental policies thus actively undermined many of the goals they were written to achieve, most specifically energy and environmental sustainability. Times are changing, however, and there is a movement in the United States away from these polluting renewables. Federal and state governments should continue to promote renewable technologies. They should, however, take steps to ensure the WTE does not continue to enjoy benefits at the expense of truly clean renewable technology.

HALE MCANULTY