Correcting the Record:
Scientific Findings on Trash Incinerator Health Impacts

A Critical Review of the White Paper, "Waste-to-Energy Health Impacts Publications Resources" Commissioned by the Solid Waste Authority of Broward County, Florida

July 11, 2025

South Broward Waste-to-Energy Facility Trash Incinerator
(formerly known as Wheelabrator South Broward; purchased in April 2025 by FCC Environmental Services)

Commissioned by The Goldstein Environmental Law Firm, P.A.,
on behalf of the City of Miramar, Florida

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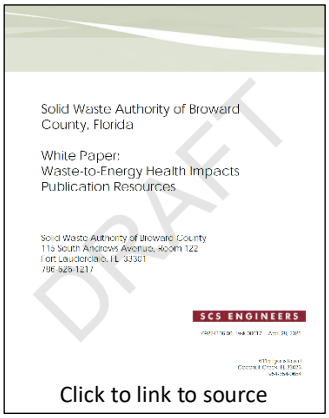
www.energyjustice.net/fl/health.pdf

Executive Summary



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Trash incinerators[1] are the most polluting way to manage waste or to make energy.[2] Contrary to assertions by the authors of the "Waste-to-Energy Health Impacts Publications Resources" White Paper commissioned by the Broward County Solid Waste Authority,[3] there are numerous health studies that establish scientific, data-based relationships between exposure to emissions from incinerators and serious illnesses such as cancers, heart disease, birth defects, respiratory problems, and other health impacts. This report cites to, and discusses, a number of them.

In aggressively screening out sources that the authors did not find credible, White Paper authors SCS Engineers and Arcadis failed to directly cite a single peer-reviewed academic journal article. The authors claim to have conducted an extensive literature review of 432 publications, but could not find a single primary source to cite.

Of the 22 sources cited, half are notable for the following reasons:

- one links to the wrong source (a source that makes the opposite case, opposing incineration) and the quoted material cannot be found in the cited source, nor anywhere on the Internet
- four are specific to climate impacts, which are global in nature and irrelevant to the topic of localized health impacts from other pollutants released by incinerators
- four all echo the same source, the England's Health Protection Agency's report dismissing incinerator health impacts
- two come from authors with undisclosed conflicts of interest: both are funded by incinerator corporations, and one cites to an organization whose president is also a Vice President of SCS Engineers, the consultant authoring the White Paper

The White Paper's (secondary) sources misrepresent their sources,[4] cite irrelevant materials, or use unsupported statements that read like incinerator industry public relations materials.

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[1] This report uses the common term "trash incinerator" for what is often described with public relations terms such as "waste-to-energy" (WTE or W2E), "energy from waste" (EfW), "resource recovery facility" (RRF), or "thermomechanical treatment facility" (TTF). These all describe the burning of trash for disposal and are defined and regulated by the U.S. Environmental Protection Agency and Florida Department of Environmental Protection as "municipal waste combustors," whether or not they produce some energy as a byproduct, which all in Florida (and nearly all in the nation) do.

[2] "Waste Incineration." Energy Justice Network. www.energyjustice.net/incineration/

[3] SCS Engineers. "Appendix P – Task 17 White Paper: Waste-to-Energy Health Impacts Publication Resources (Draft)." Solid Waste Authority of Broward County, Florida, 5/13/2025. www.browardswa.org/wp-content/uploads/2025/05/APPENDICES-O-to-Q-May-13-2025.pdf#page=390

[4] The sources cited – if they evaluate incinerator health impacts at all – generally acknowledge that studies *have* found health impacts among residents living near incinerators. However, most of the sources claim this is true only of older "first or second generation" incinerators, not "modern" or "third generation" incinerators. To find the misrepresentation, one must dig four levels deep into the authors' sources. The World Health Organization (WHO) misrepresents their sources by claiming that no studies found health impacts around "modern" incinerators. In the one literature review that WHO cites which actually defines what a "modern" incinerator is, there are six relevant studies, and half of them *did* find health impacts around these incinerators, but the message from WHO, cited in the White Paper, claims no impacts. These studies found increases in pre-term births and birth defects (congenital heart defects and genital anomalies).

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Studies Finding Adverse Health Impacts from Waste Incinerators

Do trash incinerators endanger public health?

Several health studies say yes.

There are health studies that find connections to cancers, heart disease, birth defects, respiratory problems, and other health impacts. A 2024 study published in the *Eco-Environment & Health* Journal found the following (each number references a study):

> "However, the operation of WtE plants [trash incinerators] generates a substantial amount of air pollutants, including sulfur dioxide (SO_2), nitrogen oxides (NO_x), heavy metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated dibenzo-p-dioxins, and polychlorinated dibenzofurans (PCDD/Fs). Exposure to these pollutants via inhalation can result in a wide range of adverse health effects, such as **respiratory problems, cardiovascular disease, and even cancer** [8,9,10,11,12,13,14,15,16,17]. For instance, studies have linked exposure to PAHs and PCDD/Fs, which are byproducts of incomplete combustion, to **immune system suppression, thyroid disruption, and other serious health issues** [16,17,18,19,20,21]."[5]

A 2019 study published in the *International Journal of Environmental Research and Public Health* sums up the research this way:

> "Although various uncertainties limit the overall interpretation of the findings, there is evidence that **people living in proximity to an incinerator have an increased risk of all types of cancer** [12,13], **including stomach, colorectal, liver, renal, pleural and lung cancer, gallbladder and bladder for men, non-Hodgkin lymphoma and leukemia, and childhood-cancer/leukemia** [13,14]. Studies on incinerators in France and in Italy have suggested an **increased risk of non-Hodgkin lymphoma** (NHL) [15], **soft-tissue sarcoma** [16,17], **lung cancer** [18], **and neoplasia of the nervous system and liver** [12]. Although the studies conducted by Shy et al. [19] and Lee and Shy [20] did not show respiratory effects. Other studies have reported **increases in respiratory diseases or symptoms in populations residing near incinerators** [21–24] **and in children** [25,26]. Other epidemiological studies on incinerators have shown an **excess risk of cardiovascular diseases** [21,23,24,27,28] **and urinary diseases** [21]."[6]

The study found that that men with higher exposures to incinerator pollution had statistically significant increases in death from **lymphohematopoietic cancers** (leukemia, non-Hodgkin lymphoma, multiple myeloma, etc.), **cardiovascular diseases**, and "natural causes;" and in women, increased death from **acute respiratory disease**.

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[5] Zhuoshi Huang, et al., "Health risk assessment of municipal solid waste incineration emissions based on regression analysis," 3 Eco-Env't. and Health 338 (2024). www.sciencedirect.com/science/article/pii/S2772985024000103

[6] Romanelli, et al. (2019). "Mortality and Morbidity in a Population Exposed to Emission from a Municipal Waste Incinerator. A Retrospective Cohort Study." *International Journal of Environmental Research and Public Health*. 16. 2863. doi.org/10.3390/ijerph16162863

An extensive literature review published in 2013 found the research inconclusive for many diseases, with some studies finding significant health impacts, but more studies unable to do so. However, some of the stronger trends that emerged were for **larynx cancer** ("three ecological studies and one cohort study found convincing associations"), **birth defects and reproductive disorders** (including cleft palate, urinary tract defects, spina bifida, and cardiac defects), a **decrease in respiratory function and an increase in respiratory wheezing in children**.[7]

A 2016 cross-sectional study of 3,153 births from 2001 to 2010 near a small trash incinerator in Central Italy found an increased risk of **preterm births**. The modern incinerator started operation in 2000 using "Best Available Techniques" for waste incineration. Dispersion modeling was used to control for confounding from other area industrial facilities.[8]

A 2013 study of women living within 4 km of eight small trash incinerators in Northern Italy found that "maternal exposure to incinerator emissions, even at very low levels, was associated with **preterm delivery**."[9] The incinerators vary in their starting date (from 1968 to 2002), their technical characteristics, and capacity (from 56,000 to 180,000 tons per year). Half were built after the South Broward incinerator came online in 1991, and all were built or renovated between 1999 and 2008. All are substantially smaller than the South Broward incinerator, which is nearly seven times larger than the average incinerator in this study.

A 2015 study around seven of the same Northern Italy trash incinerators, evaluated women aged 15 to 49 who resided during the first three months of their pregnancy at the same address within a 4 km radius of the incinerators. Using public health statistics from 2002 through 2006, the researchers found an increased risk of hospitalization for **miscarriage** among women without previous miscarriages associated with higher exposure to incinerator emissions.[10]

A 2020 study of 219,486 births, stillbirths and terminations of pregnancy for fetal anomaly within 10 km of ten trash incinerators operating between 2003 and 2010 in England and Scotland found small increases of **congenital heart defects, genital system defects and hypospadias** (a rare condition in which the opening of the penis is on the underside rather than the tip).[11]

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[7] Mattiello, et al. (2013). "Health effects associated with the disposal of solid waste in landfills and incinerators in populations living in surrounding areas: A systematic review." *International Journal of Public Health*. doi.org/10.1007/s00038-013-0496-8

[8] Santoro M, Minichilli F, Linzalone N, Coi A, Maurello MT, Sallese D, et al. "Adverse reproductive outcomes associated with exposure to a municipal solid waste incinerator." *Ann Ist Super Sanita*. 2016; 52(4):576–81. doi.org/10.4415/ann_16_04_19

[9] Candela, S.; Ranzi, A.; Bonvicini, L.; Baldacchini, F.; Marzaroli, P.; Evangelista, A.; Luberto, F.; Carretta, E.; Angelini, P.; Sterrantino, A.F.; et al. (2013). "Air pollution from incinerators and reproductive outcomes: A multisite study." *Epidemiology* (Cambridge, Mass.). 24. 863-70. doi.org/10.1097/ede.0b013e3182a712f1; Details on the incinerators are in eTable 1: cdn-links.lww.com/permalink/ede/a/ede_24_6_2013_08_01_candela_201462_sdc1.pdf

[10] Candela S, Bonvicini L, Ranzi A, Baldacchini F, Broccoli S, Cordioli M, et al. "Exposure to emissions from municipal solid waste incinerators and miscarriages: A multisite study of the MONITER project." *Environment International* 2015; 78:51–60. doi.org/10.1016/j.envint.2014.12.008

[11] Parkes, B.; Hansell, A.L.; Ghosh, R.E.; Douglas, P.; Fecht, D.; Wellesley, D.; Kurinczuk, J.J.; ì Rankin, J.; de Hoogh, K.; Fuller, G.W.; et al. "Risk of congenital anomalies near municipal waste incinerators in England and Scotland: Retrospective population-based cohort study." *Environment International* 2020, 134, 104845. doi.org/10.1016/j.envint.2019.05.039

A 2010 case-controlled study around 21 trash incinerators operating in France from 2001 through 2003 found significant increased risk of **renal/urinary tract birth defects** linked to higher exposure from incinerator-produced atmospheric dioxins and dioxin deposits. This study controlled extensively for environmental, social and individual confounding variables. The effect size and more rigorous study design provides stronger evidence for an association between exposure to incinerators and renal/urinary tract congenital anomalies (birth defects).[12]

A 2019 Chinese study found **blood levels of dioxins in school-age children** living near a 10-year-old trash incinerator to be 43% higher than in a control group away from such sources, and that dioxin levels in eggs, rice, and soil were much higher in the exposed area than in the control area. There were no other local industries emitting dioxins in the exposure area (near the incinerator). The incinerator was burning only 800 to 1,000 tons per day. By comparison, the South Broward incinerator burned an average of 2,162 tons per day in 2024.[13]

A 2005 study from Japan analyzed residential proximity to a waste incinerator and parent-reported illness and symptoms in elementary school children. Living in proximity to a municipal waste incinerator was independently associated with increased prevalence of **wheezing, headache, stomach ache, and fatigue**.[14]

A 2013 birth cohort study from Taiwan identified an increased risk of mild-to-moderate **developmental delay** at ages six months and 36 months in Taiwanese children living near incinerators compared to control populations with adjustment for socioeconomic status.[15]

After noting the challenging nature of different health study methods, a 2004 review of incinerator health studies found that, "analysis by specific cause, notwithstanding the poor evidence for each disease, has **found nevertheless significant results for lung cancer, non-Hodgkin lymphoma, soft tissue sarcomas and childhood cancers**."[16]

A 2000 study from China concluded that incineration (and landfilling ash) has the **highest cancer risk** compared to landfilling or to recycling/composting before landfilling.[17]

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[12] Cordier, S.; Lehébel, A.; Amar, E.; Anzivino-Viricel, L.; Hours, M.; Monfort, C.; Chevrier, C.; Chiron, M.; Robert-Gnansia, E. "Maternal residence near municipal waste incinerators and the risk of urinary tract birth defects." *Occup. Environ. Med.* 2010, 67, 493–499. doi.org/10.1136/oem.2009.052456

[13] Xu, P.; Chen, Z.; Wu, L.; Chen, Y.; Xu, D.; Shen, H.; Han, J.; Wang, X.; Lou, X. "Health risk of childhood exposure to PCDD/Fs emitted from a municipal waste incinerator in Zhejiang, China." *Sci. Total Environ.* 2019, 689, 937–944. doi.org/10.1016/j.scitotenv.2019.06.425

[14] Miyake Y, Yura A, Misaki H, Ikeda Y, Usui T, Iki M, et al. "Relationship between distance of schools from the nearest municipal waste incineration plant and child health in Japan." *Eur J Epidemiol*. 2005;20(12):1023–9. doi.org/10.1007/s10654-005-4116-7

[15] Lung FW, Chiang TL, Lin SJ, Shu BC. "Incinerator pollution and child development in the Taiwan birth cohort study." *Int J Environ Res Public Health*. 2013;10(6):2241–57. doi.org/10.3390/ijerph10062241

[16] Franchini, et al. (2004). "Health effects of exposure to waste incinerator emissions: A review of epidemiological studies." *Annali Dell'Istituto Superiore di Sanità*. 40. 101-15. pubmed.ncbi.nlm.nih.gov/15269458/

[17] Li H, Nitivattananon V, Li P. "Municipal solid waste management health risk assessment from air emissions for China by applying life cycle analysis." *Waste Manag Res.* 2015;33(5):401–9. doi.org/10.1177/0734242x15580191

A 2013 study of incinerators in Spain is very clear when discussing their findings. The conclusion states: "**Our results support the hypothesis of a statistically significant increase in the risk of dying from cancer in towns near incinerators** and installations for the recovery or disposal of hazardous waste."[18]

A 2011 study of a community in Italy near two small incinerators (one burning trash, the other burning medical waste) found that women with the highest levels of exposure to heavy metals from incinerator pollution suffered **increased death from various health outcomes, including heart diseases and cancers of the stomach, colon, liver and breast (and cancer generally).** In men, they found increased **colon cancer** mortality.[19]

A 2024 U.S. study evaluated the associations between residential proximity to facilities emitting dioxins and furans and **non-Hodgkin's lymphoma**. 21.5% of those studied were in Florida. The study found that participants with a higher exposure to modeled emissions from a facility had elevated risk of non-Hodgkin's lymphoma compared to those unexposed at 3, 5, and 10 km. A positive association was observed at 5 km with **follicular lymphoma** and a suggestive association was noted for **diffuse large B-cell lymphoma**. Health impacts for those living near trash incinerators were found for the highest categories of exposure at 3 and 5 km, but not at 10 km.[20]

A 2000 study of a small trash incinerator in France with high dioxin emissions was found to be associated with increased incidence of **soft-tissue sarcomas and non-Hodgkin's lymphomas**.[21] The high dioxin emissions are based on the concentration in the incinerator exhaust, not a total amount released. Since this incinerator only burned an average of 202 tons of waste per day, it should be understood that a large incinerator like the South Broward facility, which burns more than ten times as much waste, would release more than ten times as much dioxin as a 200 ton/day incinerator with the same stack test result. In other words, a comparison to a "high" dioxin emitting small incinerator may be relevant to a much larger incinerator releasing a lower *concentration* of dioxin in its exhaust, as the total amounts released could be comparable.

A 2010 study of cancer incidence between 1991 and 2005 in Modena, Italy, where a trash incinerator has operated since 1980, found **stomach, gallbladder, lung and pleural (lung) cancer mortality** to be correlated with distance from incinerators.[22] Despite its older age, the incinerator is equipped with the modern pollution controls used for toxic pollutants at most U.S. incinerators.

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[18] Garcia-Perez, et al. (2012). "Cancer mortality in towns in the vicinity of incinerators and installations for the recovery or disposal of hazardous waste." *Environment International*. doi.org/10.1016/j.envint.2012.10.003

[19] Ranzi, A., Fano, V., Erspamer, L. et al. "Mortality and morbidity among people living close to incinerators: a cohort study based on dispersion modeling for exposure assessment." *Environ Health* 10, 22 (2011). doi.org/10.1186/1476-069X-10-22

[20] Fisher JA, Medgyesi DN, Deziel NC, Nuckols JR, Ward MH, Jones RR. "Residential proximity to dioxin-emitting facilities and risk of non-Hodgkin lymphoma in the NIH-AARP Diet and Health Study." *Environment International* 2024 Jun;188:108767. doi.org/10.1016/j.envint.2024.108767

[21] Jean-François Viel, Patrick Arveux, Josette Baverel, Jean-Yves Cahn. "Soft-Tissue Sarcoma and Non-Hodgkin's Lymphoma Clusters around a Municipal Solid Waste Incinerator with High Dioxin Emission Levels." *American Journal of Epidemiology*, Volume 152, Issue 1, 1 July 2000, Pages 13–19, doi.org/10.1093/aje/152.1.13

[22] Massimo Federico, Monica Pirani, Ivan Rashid, Nicola Caranci, Claudia Cirilli. "Cancer incidence in people with residential exposure to a municipal waste incinerator: An ecological study in Modena (Italy), 1991–2005." *Waste Management*. Volume 30, Issue 7, 2010, Pages 1362-1370, ISSN 0956-053X, doi.org/10.1016/j.wasman.2009.06.032

The same study notes several other studies finding links between incinerators and cancers, stating:

> **With respect to possible carcinogenic effects, exposure to incinerator fumes has been associated with a higher risk of non-Hodgkin's lymphoma** (Viel et al., 2000, 2008; Floret et al., 2003; Biggeri and Catelan, 2005; Zambon et al., 2007), **soft tissue sarcoma** (Viel et al., 2000; Comba et al., 2003; Tessari et al., 2006), **leukaemia** (Knox, 2000), **stomach cancer** (Elliott et al., 1996), **colon and rectal cancer** (Elliott et al., 1996) **and also laryngeal** (Michelozzi et al., 1998), **lung** (Barbone et al., 1995; Elliott et al., 1996; Biggeri et al., 1996) **and liver cancer** (Elliott et al., 1996, 2000).[23]

A large national 2020 U.S. study of **invasive breast cancer** near incinerators and other industrial sources of dioxins/furans found "[W]omen who resided within 10 km of any municipal solid waste incinerator (MSWI) had an increased breast cancer risk compared to those who did not, with stronger associations noted for women who lived within 5 km. Positive associations were also observed for longer duration of residence and higher dioxin emissions from MSWIs within 3, 5, and 10 km."[24]

Trash incinerators, as the largest dioxin-emitting industry, were the only industry linked to breast cancer in this study. The study looked at the top ten types of dioxin-emitting facilities, accounting for over 85% of dioxin and furan air emissions in the United States: cement kilns (burning hazardous waste), cement kilns (not burning hazardous waste), coal-fired power plants, hazardous waste incinerators, industrial boilers, iron ore sintering plants, medical waste incinerators, municipal solid waste (trash) incinerators, secondary copper smelters, and sewage sludge incinerators. Researchers "did not observe an association between proximity-, duration-, and emissions-based metrics for exposures to any dioxin-emitting facilities (all facilities combined) and risk of invasive breast cancer." However, they found a statistically significant association between invasive breast cancer risk and dioxin emissions from trash incinerators located within 3, 5, and 10 km of residences.

Data for the study came from inventories compiled of dioxin emissions specific to each facility for 1987, 1995, 2000, and 2012. The incinerator industry is quick to argue that dioxin emissions at incinerators have fallen dramatically since 1990. However, dioxin emissions data for the South Broward trash incinerator, as reported to Florida Department of Environmental Protection averaged about 15 grams per year between 2014 and 2023, which is twice as high as the value in EPA's 2000 inventory for the same incinerator – a value used in the breast cancer study.

Another large U.S. study, in 2023, investigated the link between residential exposure to industrial emissions of dioxins/furans and **breast cancer** risk. It followed 35,908 participants, identifying 2,670 breast cancer cases. Higher exposure to airborne dioxins/furans within 3 km increased breast cancer risk, with the highest quartile showing an 18% higher risk. The association was stronger for emissions from trash incinerators than from other industries.[25]

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[23] *Id.* doi.org/10.1016/j.wasman.2009.06.032

[24] VoPham, T., Bertrand, K. A., Jones, R. R., Deziel, N. C., DuPré, N. C., James, P., Liu, Y., Vieira, V. M., Tamimi, R. M., Hart, J. E., Ward, M. H., & Laden, F. (2020). "Dioxin exposure and breast cancer risk in a prospective cohort study." *Environmental Research*, *186*, 109516. doi.org/10.1016/j.envres.2020.109516

[25] Rhee J, Medgyesi DN, Fisher JA, White AJ, Sampson JN, Sandler DP, Ward MH, Jones RR. "Residential proximity to dioxin emissions and risk of breast cancer in the sister study cohort." *Environ Res.* 2023 Apr 1;222:115297. doi.org/10.1016/j.envres.2023.115297

A 2003 study of incinerator workers in Japan found that urinary 8-hydroxy-2'-deoxyguanosine, a marker of **oxidative DNA damage**, had a positive correlation with length of employment, after adjustment for alcohol consumption, smoking and age. Chronic oxidative stress has been **implicated in ischemic heart disease, carcinogenesis and respiratory disease**.[26]

The study also noted that extracts from bottom ash and fly ash collected from incinerators in the USA and Japan were mutagenic to Salmonella typhimurium strains TA98 and TA100, and that these substances were present in the urine of incinerator workers. The mutagenic potency of a urinary component from incinerator workers without safety clothing was higher than that from workers who used safety clothing. Therefore, concern was raised that mutagenic and toxic chemicals were absorbed systemically upon exposure to bottom ash and fly ash at MSWIs, thereby increasing the risk of diseases such as cancer. U.S. incinerator workers, even those in ash handling areas where ash dust is prevalent, do not generally wear respiratory masks to avoid inhaling fine particles because it gets hot and incinerator owners do not require their workers to use respiratory protection.[27]

A 2017 study of just one pollutant (particulate matter) from the Wheelabrator Baltimore trash incinerator found that this pollution causes an estimated $55 million in annual damage to health in people across several states, primarily from **premature death**.[28] The analysis was conducted by a Professor of Environmental Medicine at New York University using a U.S. EPA model that calculates the economic benefits to public health of specific amounts of pollution reductions.

A 2011 study looked at six major pollutants from 17 U.S. industries and found that, **more than any other industry, the economic health damage from trash incinerators outweighed the industry's economic benefits**.[29] Even oil refineries and fossil fuel power plants were less harmful.

In 2024, scientists collected moss samples at varying distances out to 20 miles downwind of the trash and medical waste incinerator in rural Marion County, Oregon. Testing for 40 elements, including toxic metals and 14 rare earth metals that have not previously been examined in relation to incinerator emissions, they found elevated levels of nearly all of the elements closer to the incinerator, including strong relationships with mercury, cadmium, and lead.[30]

A 2024 study of a small (676 ton/day) "state-of-the-art" (2011) trash incinerator in Harlingen, Netherlands sampled moss, fruits and vegetables, and eggs of backyard chickens for dioxins, dioxin-like PCBs, and PFAS. Dioxins in the eggs tested in a community 2 km from the incinerator exceeded the EU

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[26] Yoshida R, Ogawa Y, Mori I, Nakata A, Wang R, Ueno S, et al. "Associations between oxidative stress levels and total duration of engagement in jobs with exposure to fly ash among workers at municipal solid waste incinerators." *Mutagenesis*. 2003;18(6):533–7. doi.org/10.1093/mutage/geg031

[27] *Id.*

[28] "Written Report of Dr. George D. Thurston Regarding the Public Health Impacts of Air Emissions from the Wheelabrator Facility, Nov. 20, 2017." www.cleanairbmore.org/uploads/wheelabrator-health-impacts.pdf

[29] Muller, Nicholas Z., Robert Mendelsohn, and William Nordhaus. 2011. "Environmental Accounting for Pollution in the United States Economy." *American Economic Review*, 101 (5): 1649-75. doi.org/ 10.1257/aer.101.5.1649

[30] Jovan, Sarah; Jacobson, Eleonore; Unrine, Jason M.; Jalili-Jahani, Nasser; McCune, Bruce. 2024. "Putting biomonitors to work: native moss as a screening tool for solid waste incineration." *Environmental Monitoring and Assessment.* 196 (1177). doi.org/10.1007/s10661-024-13354-y See related materials at research.fs.usda.gov/pnw/projects/native-moss-screening-tool-solid-waste-incineration

limit by a factor of nearly 300% and were twice as high as similar testing in 2013. Dioxin-like PCBs also exceeded the EU action limit in these eggs. PFOS (related to the PFAS "forever chemicals") in the eggs were 38 times the acceptable EU limit and were found in levels higher than eggs tested in 64 locations across the Netherlands. 11 types of PFAS were detected as well, though PFAS testing of eggs in a control area of the country, with no incinerators in the vicinity, had no detectable PFAS. Dioxins and PFAS were not detectable in the fruits and vegetables tested. [31] This result is not surprising for dioxins, since they are fat-soluble and climb the food chain in animal products.

In 2021 and 2022, biomonitoring was conducted around three trash incinerators in Lithuania, Spain, and the Czech Republic, measuring dioxins, PFAS, and Polycyclic Aromatic Hydrocarbons (PAHs) in mosses, pine needles, and the eggs of backyard chickens. Elevated levels of dioxins were found in vegetation, pine needles and mosses, around the waste incinerators in all three countries, and most eggs of backyard chickens in the vicinity of the three incinerators exceeded EU limits for dioxins. High levels of PFAS were found in mosses, pine needles and eggs of backyard chickens around all three waste incinerators. High levels of PAHs were found in mosses, and pine needles around all three waste incinerators as well.[32]

Life Cycle Assessment (LCA) studies commissioned by other counties have documented that incineration (and landfilling of the incinerator ash) is 2-3 times more harmful to human health and our environment than going directly to the landfill,[33] contradicting more limited studies such as one cited by the authors, stating that "[w]e find that MSW combustion is a better alternative than landfill disposal in terms of net energy impacts and carbon dioxide (CO_2)-equivalent GHG emissions."

[31] Arkenbout A., Bouman KJAM. (2024). "Biomonitoring research on persistent organic pollutants in the environment of the Waste Incinerator REC, Harlingen, The Netherlands."
www.toxicowatch.org/_files/ugd/8b2c54_411d66b67783432eb0b96d3d7ef3a70c.pdf

[32] Arkenbout A., Bouman KJAM. (2022) "Biomonitoring research dioxins (PCDD/F/dl-PCB), PFAS and PAH in relation to waste incineration in Kaunas, Madrid, and Pilsen, Zero Waste Europe."
www.toxicowatch.org/_files/ugd/8b2c54_2478adf6f6ef40ea9159ac0aab5732ea.pdf Further materials available on this study at www.zerowasteeurope.eu/library/the-true-toxic-toll-biomonitoring-research-2022/ Further reports on biomonitoring of toxic chemicals near incinerators in Europe can be found at www.toxicowatch.org/blank-1

[33] Morris, Jeffrey. "Life Cycle Assessment (LCA) and Monetization for Nine Human and Environmental Health Impacts from Delaware County, Pennsylvania MSW Diversion & Disposal - 2020 Baseline and Recommended Zero Waste Plan." Sound Resource Management Group. June 2023. www.energyjustice.net/incineration/DelcoLCA.pdf This analysis uses the most comprehensive LCA tool for waste systems, the Measuring Environmental Benefits Calculator (MEBCalc™): srmginc.com/mebcalc/ Unlike other LCA tools that only look at climate impacts, this tool looks at nine different health and environmental criteria, including climate impacts, but also cancer and non-cancer effects of toxic chemicals, impacts on respiratory health from pollutants like nitrogen oxides, and impacts of particulate matter, such as heart attacks and strokes. The model can also monetize these impacts using accepted standard economic values for the social cost of carbon and other pollutant impacts. This enables the model to present a single chart that can sum up the diverse impacts into a dollar value representing externalized health and environmental costs. These are costs that people pay in medical bills and that society pays in climate change impacts, premature deaths, and other harms.

Poor Methodology in SCS White Paper

While numerous studies described above have found harm to human health around trash incinerators – even the "modern" ones – much of that body of knowledge did not make it into the "Waste-to-Energy Health Impacts Publications Resources" White Paper drafted as Task 11 by consultants, SCS Engineers and Arcadis (hereinafter "SCS"). This White Paper is now Appendix P of the Draft Solid Waste Master Plan commissioned by the Broward Solid Waste Authority and publicly released on May 13, 2025.[34]

The SCS White Paper sets an unrealistic standard for academic research, then rejects all 432 peer-reviewed publications in favor of 22 secondary and tertiary sources. SCS states that it is "the intent of this White Paper to provide a review of the primary epidemiology literature," yet no primary literature, or even a published literature review, was cited.

Other literature reviews of incinerator health impacts managed to find credible studies, and some of them are cited in the tertiary sources SCS cites. These reviews, in the following chart and footnotes, were published in five different peer-reviewed academic journals.

Papers considered	Papers Accepted for Review	Review
432	0	SCS Engineers (2025)
3,273	51	Bottini (2025)[35]
122	11	Baek (2022)[36]
236	29	Vinti (2021)[37]
681	93	Tait (2020)[38]
24,033	63	Negri (2020)[39]
269	19	Cole-Hunter (2020)[40]

[34] SCS Engineers. White Paper. www.browardswa.org/wp-content/uploads/2025/05/APPENDICES-O-to-Q-May-13-2025.pdf#page=390

[35] Bottini, I., Vecchi, S., De Sario, M. et al. "Residential exposure to municipal solid waste incinerators and health effects: a systematic review with meta-analysis." *BMC Public Health* **2025**, 1989 (2025). doi.org/10.1186/s12889-025-23150-z

[36] Baek K, Park JT, Kwak K. "Systematic review and meta-analysis of cancer risks in relation to environmental waste incinerator emissions: a meta-analysis of case-control and cohort studies." *Epidemiol Health.* 2022;1(44):e2022070. doi.org/10.4178/epih.e2022070

[37] Vinti G, Bauza V, Clasen T, Medlicott K, Tudor T, Zurbrügg C, et al. "Municipal Solid Waste Management and Adverse Health Outcomes: A Systematic Review." *Int J Environ Res Public Health.* 2021;18(8):4331. doi.org/10.3390/ijerph18084331

[38] Tait PW, Brew J, Che A, Costanzo A, Danyluk A, Davis M, et al. (2020) "The health impacts of waste incineration: a systematic review." *Aust. N. Z. J. Public Health* 44 40–48. doi.org/10.1111/1753-6405.12939

[39] Negri E, Bravi F, Catalani S, Guercio V, Metruccio F, Moretto A, et al. "Health effects of living near an incinerator: A systematic review of epidemiological studies, with focus on last generation plants." *Environ Res.* 2020;184:109305. doi.org/10.1016/j.envres.2020.109305

[40] Cole-Hunter T, Johnston FH, Marks GB, Morawska L, Morgan GG, Overs M et al. (2020). "The health impacts of waste-to-energy emissions: a systematic review of the literature." *Environ. Res. Lett.* 15(12). doi.org/10.1088/1748-9326/abae9f

SCS's effort was admittedly limited. They write:

> The documents listed below are not summarized or critically evaluated beyond confirming their consistency with the inclusion criteria as such evaluations are beyond the scope of this task. This White Paper is not intended to be exhaustive; rather, it includes relevant documents that were identified in the time allotted…. It was out of scope to identify and assess all of the individual studies that claimed to assess the health status of people living around MSW combustors because there are hundreds of such studies.

SCS mentioned a "vast literature on WtE epidemiology studies," then quotes a report claiming that there is "a dearth of health studies related to the impacts of exposure to WtE emissions."

The SCS effort involved having a "Ph.D. level toxicologist" (an epidemiologist would have been far more relevant) read abstracts of 432 papers, finding only 19 worth further consideration. All 19 publications were rejected. Some were systematic reviews which were eliminated "because they included publications that were off topic." Others were eliminated because there were other polluting industries nearby, or because they looked at other potential sources of chemical exposures such as incinerators burning other waste streams like medical waste, sewage sludge, industrial waste, or hazardous waste. Rather than cite a single primary source from a peer-reviewed academic journal, SCS provided 22 secondary and tertiary sources, some of which cited to the reviews or primary epidemiological studies that SCS rejected. The White Paper is largely a collection of quotes copied and pasted from Executive Summaries of reports.

The SCS White Paper did not evaluate the credibility of the information, or whether it was pertinent to the issue of local health impacts. It also did not disclose conflicts of interest.

Waste Composition

One reason given for excluding studies is that some included the burning of wastes other than municipal solid waste, such as "hazardous waste, industrial waste, medical/clinical waste, commercial waste, mixed waste, sewage, sludge, solvents, oils, etc." However, some amount of these wastes are also present in what municipal waste incinerators burn.

The SCS Draft Solid Waste Master Plan recommends the continued use of the 34-year-old South Broward incinerator. That incinerator burns 1,000 to 2,000 tons per month of "special waste" (drugs, USDA waste, tires, oily rags and absorbents, used oil filters, and pharmaceuticals).[41] Hazardous waste is also present in municipal solid waste, in the form of household hazardous waste that is not separated and brought to a special collection for those materials. Dismissing studies of incinerators burning other sorts of wastes is only somewhat appropriate, since much of the same material is burned at the facility that SCS recommends the county keep using.

[41] Wheelabrator South Broward, "Amounts and Types of Materials Processed," July 17, 2024. prodenv.dep.state.fl.us/DepStaging/api/dms/8.377358.1

Old vs. New

Another reason given for excluding studies is the age ("many studies that continue to be cited today are out-of-date and would have little relevance to decision making in 2025"). This dismissed the vast majority of studies, as even some of the newest studies are looking at older data. The South Broward incinerator that SCS recommends using was put online in 1991, making these "old" studies quite relevant.

Of the 22 reports cited, 14 of them claim that there are no health impacts with "modern" incinerators, with most of the reports admitting the older "first and second generation" incinerators *have* been associated with health impacts in a significant number of studies. See more on why these studies are relevant in the "What is a 'Modern' Incinerator?" section below.

Off-Topic

The remaining eight reports cited are largely off-topic. Four focus on climate impacts, which are not relevant to local health impacts. See more on this in the following section on climate. One reference (U.S. EPA) does not even discuss health impacts. Another source (#11 under Government Agencies) discusses the reduction in dioxin emissions from incinerators in Germany since the 1990s, but does not study health impacts beyond merely dismissing them as a possibility because, in Germany, other sources are now worse. Another source (#13 under Government Agencies, a 1999 report from Ontario's environmental agency) makes sweeping health claims that effects would be "negligible" from "facilities that meet stringent requirements and standards for design, operation and pollution control" – an interesting choice of argument placed within the SCS White Paper that argues that incinerators from that generation (1990s) have documented health impacts, but newer ones do not. Finally, the International Solid Waste Association paper does not actually evaluate health impacts, but makes broad claims that EU has strict standards that protect health.

One source (#10 under Government Agencies) is misattributed. It links to the wrong source, from Durham Environment Watch, a grassroots environmental group in Durham Region, Ontario, Canada that fought against the construction of the newest trash incinerator in Canada, the Durham York Energy Centre. That incinerator was the first to be built in many years in Canada and came online in 2015, the same year that Palm Beach County started operating the first new trash incineration facility in the U.S. since 1995. In a mistake that looks like it could have been the result of using AI, the White Paper links to the 208-page environmental group's report against the incinerator, and cites the year correctly (2007), but cites a person and governmental body mentioned in the paper as if they were the authors, and presents a two-paragraph quote that cannot be found in the group's report, nor anywhere on the Internet.

Four of the sources (#6, 8 and 9 in the Government Agencies, and #3 under interest groups) all echo the same source: the England's Health Protection Agency's report which dismisses incinerator health impacts, making the argument that "modern, well-managed incinerators" are small contributors to local air pollution levels, and that any harm to health is negligible.

Misrepresentation

While SCS relies entirely on documents that are not published in the academic literature, it claims to only include sources that are backed up by references to such literature, or other scientific data:

> Many white papers and position papers from various groups and associations provide conclusions about the health impacts of WtE facilities but present limited to no scientific data or citations to peer-reviewed published literature to support their claims; those documents were excluded from this White Paper. Only documents that provide a supporting scientific rationale for their conclusions are included in this White Paper. …statements made by interest groups or private citizens at public meetings or during litigation or submitted during public comments on proposed regulations or proposed facility operating permits are excluded.

However, several reports by environmental organizations and consultants, as well as public comments on federal rulemaking processes have relevant and credible materials that point to scientific data and cite to peer-reviewed published literature, but they were not mentioned by SCS, perhaps because they do not fit the desired narrative.

After writing that some systematic reviews "were eliminated because they included publications that were off topic," and claiming that they only included documents that have a supporting scientific rationale, SCS included a 2019 paper by the Greater London Authority (Source #3 under Governmental Agencies) which screened 726 papers and reviewed 35 of them. Of those 35, the only source from the U.S. was a "case study" where an international group of professors and students came to a waste conference in Philadelphia, PA and wrote up what they heard on a company tour of the nation's largest trash incinerator, in the nearby City of Chester, PA. Repeating the public relations pitch from the incinerator company (Covanta, now Reworld), there was no investigation of actual emissions, the facility's compliance history, no disclosure of how the facility was lacking two of the four major pollution control systems most incinerators have, and no discussion of health impacts even though the incinerator is the largest industrial air polluter in the Philadelphia region and is a major controversy given the notoriously bad health statistics in the City of Chester. The guests on the tour simply called the incinerator "an effective and environmentally safe solution to the county's solid waste disposal needs" – and this is what passed for a screened information source in a (non-peer-reviewed) report SCS saw fit to cite. As far as it being a safe solution to the county's waste disposal needs, this is the same incinerator in Delaware County, Pennsylvania described in the life cycle assessment charts above. Because of the extreme pollution, history of violations, health consequences, community impacts, and controversy over environmental racism, Delaware County is in the process of ending its use of this privately-owned incinerator within its borders, and Philadelphia officials are talking about following suit and ending their use of the incinerator as well.

Conflict of Interest

SCS also saw fit to include reports from two sources funded by the waste incineration industry, without disclosing the conflicts of interest.

Under "Interest Groups / Trade Groups," SCS did not include any *public* interest groups such as environmental organizations that document the health and environmental problems with incineration. However, they describe the following two groups as an "American university" and an "international non-governmental association."

Source #2 in this category is the 2021 "Scientific Truth About Waste-To-Energy" report by Marco J. Castaldi of City College of New York. Dr. Castaldi is very well known in the industry, as he is a leading academic promoter of incineration, and as such, not a source of objective analysis. After ten years in the combustion research field, he joined Columbia University in 2004 and then City University of New York in 2012. He leads the Waste-to-Energy Research and Technology Council (WtERT), which is an academic research arm of the incinerator industry, operating out of Columbia University, then the City College of New York. WtERT is funded by entities heavily involved in the incinerator industry, including the two largest trash incinerator corporations in the U.S., the incinerator industry's trade association, and some of the leading pro-incinerator solid waste consultants.[42] WtERT has become global through the Global WtERT Council.[43] Dr. Castaldi served as Editor of the trash incinerator industry's North American Waste to Energy Conference (NAWTEC) conference series, and runs his own WtERT conference every two years, bringing together incinerator companies and others to advance the industry's interests, even hosting presenters such as one presenting about how they're using AI to monitor anti-incinerator groups on social media in order to counter them. He is the lead author of the "Scientific Truth About Waste-to-Energy" report, cited by the White Paper's authors, a report which does not mention his role as the Chair of WtERT USA or his funding sources.

Source #1 under "Interest Groups / Trade Groups" in the White Paper is a position paper by the International Solid Waste Association (ISWA). ISWA is a member of WtERT and is, in part, funded and led by incinerator companies and related consultants. Veolia is in the hazardous waste incineration industry and is a platinum member of ISWA.[44] Gold members of ISWA include other incinerator companies such as Suez, MARTIN GmbH, Ramboll, and the authors, SCS Engineers.[45] The President of ISWA's board is James Law, Vice President at SCS Engineers, USA.[46] In essence, SCS is almost citing their own pro-incinerator paper. Other ISWA board members include a Senior Vice President of MARTIN GmbH, "one of the worldwide suppliers of Waste to Energy technologies," and Doron Sapir, who established the largest recycling plant in Israel, turning 1,500 tons of trash per day into fuel to burn in a cement plant.

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[42] The Global Waste-to-Energy Research and Technology Council. "WtERT's Global Memberships and Affiliations." www.wtert.org/partners/

[43] The Global Waste-to-Energy Research and Technology Council. www.wtert.org

[44] International Solid Waste Association. "Platinum Members." www.iswa.org/platinum-members/

[45] International Solid Waste Association. "Gold Members." www.iswa.org/gold-members/

[46] International Solid Waste Association. "About ISWA." www.iswa.org/about-iswa/

Climate Impacts: Off-topic and Mischaracterized

Three of the sources in the SCS White Paper only discuss climate change impacts and a fourth mainly focuses on climate impacts and does not cover local health impacts. Climate impacts are important and are the largest single health / environmental impact according to life cycle assessments such as the one shared in the two charts earlier in this report. However, the impacts of incinerators on public health are mainly a local matter. To the extent that the point of the White Paper is to look at local health impacts that can be correlated with incinerator emissions, climate change papers are off-topic and irrelevant.

The first climate-only report is the one by the United Nations Environment Programme (#2 under International Organizations). That report advocates for waste to be "treated with energy recovery" in the context of organic waste and avoiding methane production in landfills. It is more likely, given the international context, that this is describing anaerobic digestion, not trash combustion. There is no discussion or detail in the report on this topic to even clarify.

Similarly, the European Environment Agency report (source #1 under Government Agencies) has just a passing mention of "waste energy recovery" as an example of how Europe has reduced methane emissions. In this context, it most certainly means trash incinerators, as it is preceded by a separate reference to "biological treatment" – meaning the use of anaerobic digesters to stabilize the organic fraction of the waste stream.

This notion that trash incineration reducing methane emissions (from landfills) is rooted in the false belief that incinerators are preferable to landfills in terms of greenhouse gas emissions. Despite there being significant methane and carbon dioxide emissions from landfills, incinerator release more greenhouse gases, and do so immediately rather than over a span of decades.

A 2023 life cycle assessment study showed that climate impacts from incineration will be worse than those from landfills so long as the landfill gas capture rate is greater than about 30%.[47] In our experience, landfills typically project that their gas capture rate is around 75%, though the reality is likely somewhere in the middle.

There are two other important observations from the life cycle assessment. First, landfill impacts are primarily due to greenhouse gas releases due to rotting organic matter, mainly food scraps and yard waste. These emissions can be avoided with a strong composting program to divert these materials from the waste stream to aerobic composting. Second, even if landfill gas capture rates were below 30%, incineration is still worse overall, when factoring in other health and environmental impacts. Even where there is no landfill gas capture at all, and gas is leaking

[47] Morris, Jeffrey. "Life Cycle Assessment (LCA) and Monetization for Nine Human and Environmental Health Impacts from Delaware County, Pennsylvania MSW Diversion & Disposal - 2020 Baseline and Recommended Zero Waste Plan." Sound Resource Management Group. June 2023. www.energyjustice.net/incineration/DelcoLCA.pdf See "Transportation Impacts Insignificant" slide summarizing Dr. Morris' comparison on page 7 here: www.energyjustice.net/incineration/LCA.pdf#page=7

out readily, there is not enough organic matter that can degrade in the waste stream to make landfill impacts greater than the sum of all impacts (climate, asthma, cancer, heart attacks, etc.) from incinerator emissions.[48]

The third source focused on climate impacts is the National Renewable Energy Laboratory (NREL) report (#5 under Government Agencies). This compares incineration to landfilling using inappropriate metrics. When evaluating different waste management methods, one must look at the impacts per ton of waste, as the life cycle assessment above does. NREL, perhaps because they are an energy agency, looked at it per kilowatthour (kWh) generated and also by the amount of greenhouse gas emissions per year. The "pollution per unit of energy generated" method is appropriate when comparing incineration to other power generating facilities, as other government agencies have done. However, it makes no sense when comparing incinerators to landfills since both are small energy producers and they are not designed to be power plants, but as waste facilities with some energy generation on the side.

Since landfills burning their gas for energy produce much less energy than incinerators do, incinerators come out looking better once assumptions are added about how much fossil fuel power is being displaced on the electric grid (an assumption that often overestimates displacement by using outdated grid data and/or by ignoring where incinerators compete within renewable energy mandates and are not displacing fossil fuels at all). The "per year" method is also misguided as incinerators put out all of their emissions at once, while landfills do so over a period of many years. Due to the use of the wrong metrics, this source is simply not credible for a comparison of incinerators to landfills on climate impacts. The report also uses an outdated global warming potential for methane that assumes it is only 21 times worse than CO_2 for the climate, which is science that is more than two decades out-of-date. The latest science shows that methane is about 29 times as potent as CO_2 over a 100-year time frame and about 82 times as potent over a (more relevant) 20-year time frame.[49]

The final study focused on climate impacts is from CalRecycle, where they erase at least half of the incinerator's emissions by assuming that the portion of CO_2 released that came from organic materials (food scraps, yard waste, paper, wood, leather, etc.) are zero because of outdated assumptions of biomass "carbon neutrality." Climate scientists have been debunking that notion since at least 2009. See Chapter 3 in the Beyond Incineration report for details on the creative accounting that allows incinerator greenhouse gas emissions to be discounted.[50]

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[48] *Id.*

[49] International Panel on Climate Change "Sixth Assessment Report". 2021. www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport_small.pdf#page=1034

[50] Ewall, M. "Beyond Incineration: Best Waste Management Strategies for Montgomery County, Maryland." Ch 3. 2021. www.energyjustice.net/md/beyond.pdf

What is a "Modern" Incinerator?

Most of the sources cited by SCS (14 of the 22) make the same general argument: *yes, older generation incinerators had some problems and several studies documented health impacts from them, but the "modern" kind is just fine, and no studies show any harm from them.*

Some of the sources also qualify that these "modern" ones must be well-designed, well-managed, and/or well-regulated. These qualifiers do not reflect the reality of the incinerators throughout the United States, "modern" or not.

In most cases, these terms are not defined. Since most studies are from Europe or Asia, and the U.S. has a different regulatory environment, what is considered "state-of-the-art" or "well-regulated" in the EU is quite different from the reality in the U.S.

The sources SCS cites generally do not define what makes an incinerator "modern." However, the first source they cite – World Health Organization (WHO) – breaks them up into three "generations," and only the third generation is considered "modern."

First generation are plants active until 1989 (the first EU Directive on waste incineration, 89/429/EEC); second generation are plants active between 1989 and 2006 (transition period: revamping or closing of old plants and building of new plants); and third generation are plants active after 2006 (publication of BAT REF Waste incineration). These are all based on European Union regulations. U.S. regulations are far behind and about 20 years out of date.

The WHO report misrepresents the data on these incinerators when claiming that "[f]or modern, well-designed and operated third-generation facilities, **none** of the four systematic reviews relating to health impacts of waste incineration analysed identified any statistically significant health risks." (emphasis added)

In fact, only one of these four systematic literature reviews defined which studies in their review are about "modern" or "third generation" incinerators.[51] That literature review found only six peer-reviewed academic studies of these "third generation" incinerators. Of those six studies, three of them actually *did* find adverse health impacts, yet the summary report cited by SCS claims that no significant health risks were found for these "modern" incinerators.[52] Two of the studies found increases in pre-term births and the third found a slight increase in birth defects (congenital heart defects and genital anomalies).

[51] Negri E, Bravi F, Catalani S, Guercio V, Metruccio F, Moretto A, et al. "Health effects of living near an incinerator: A systematic review of epidemiological studies, with focus on last generation plants." *Environ Res.* 2020;184:109305. doi.org/10.1016/j.envres.2020.109305

[52] The three that found impacts from third generation incinerators are Candela (2013), Santoro (2016), and Parkes (2020), all cited above.

One need not be confined to "third generation" incinerator studies to find relevance to Broward County's current situation. In the Draft Solid Waste Master Plan, SCS recommends continued use of the 34-year-old South Broward trash incinerator, which came online in 1991. This incinerator most approximates "second generation" incinerators, the kind that studies admit have been associated with community health impacts.[53]

Dismissing studies of older incinerators fails to recognize how they are still quite relevant.

New incinerators aren't necessarily "well-managed"

The only "new" and "modern" trash incinerator in the U.S. is the second incinerator in West Palm Beach, Florida – named Palm Beach Renewable Energy Facility 2. That incinerator has been operating since 2015. Within its first decade of operation, it had at least 176 incidents (emissions limit exceedances, emissions equipment malfunctions, lost emissions data, and more). This is based on an initial review of the facility's thousands of public records and does not even cover the inspection files.[54]

U.S. trash incinerators are not "well-regulated" and will not be for at least five years

European Union incinerator regulations for emissions monitoring and emissions limits are much more strict than standards in the United States.

In the U.S., state environmental agencies like Florida's Department of Environmental Protection (DEP) issue air permits with emissions limits for nine select pollutants as required in federal regulations. State agencies (and local governments) are empowered by the federal Clean Air Act to adopt more protective standards than the federal minimums and can regulate additional pollutants, but rarely do.[55] State agencies and permit limits are typically set to the minimum standards in federal regulations.

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[53] In the *Negri* study, "Incinerators were classified according to 3 generations: first generation, plants active until 1989, (first European directive on waste incineration, 89/429/EEC); second generation, plants active between 1989 and 2006 (transition period: revamping or closing of old plants and building of new plants); third generation, plants active after 2006 (publication of BAT REF Waste incineration)." The South Broward incinerator came online in 1991 and, as of 2025, is still subject to 2006 federal incinerator regulations. The South Broward incinerator falls within the second generation vintage, and EU incinerator regulations are stricter than U.S. regulations.

[54] Ewall, M. "Operating Track Record of the "Cleanest and Greenest" Trash Incinerator in the United States." 2025. www.energyjustice.net/fl/wpb2history.pdf

[55] The Clean Air Act, at 42 U.S.C. § 7416, states: "Retention of State authority – Except as otherwise provided in sections 119(c), (e), and (f) (as in effect before the date of the enactment of the Clean Air Act Amendments of 1977), 209, 211(c)(4), and 233 (preempting certain State regulation of moving sources) **nothing in this Act shall preclude or deny the right of any State or political subdivision thereof** to adopt or enforce (1) any standard or limitation respecting emissions of air pollutants or (2) any requirement respecting control or abatement of air pollution; except that if an emission standard or limitation is in effect under an applicable implementation plan or under section 111 or 112, such State or political subdivision may not adopt or enforce any emission standard or limitation which is less stringent than the standard or limitation under such plan or section." www.govinfo.gov/content/pkg/USCODE-2013-title42/html/USCODE-2013-title42-chap85-subchapI-partA-sec7416.htm

The federal regulations for large municipal waste combustors[56] (trash incinerators with burners over 250 tons/day capacity) were adopted in 2006 and are required by federal law to be updated every five years. However, EPA had to be sued in federal court to enforce this requirement, and finally proposed a new rule in January 2024. That rule was to be finalized by December 2024, but that deadline was extended to December 2025 with the reopening of a comment period that expired on May 30th, 2025. It is unclear whether the rule will be finalized and implemented under the Trump administration. If finalized in December 2025, the new regulations would not be in effect until around 2030.

When EPA first proposed these overdue new regulations, during a presentation in early 2023, the agency suggested low, medium, and high levels of emissions reductions for nine pollutants. When EPA's draft rule came out, it became clear that EPA chose the weakest of the three options for eight of the nine regulated pollutants, and the middle option for nitrogen oxides.

Regulations are different for new vs. existing incinerators. In the proposed regulations, there will also be different emissions limits for new vs. existing incinerators, with very little change being required of existing incinerators to comply with the proposed regulations. Even the proposed regulations for new incinerators will be weak enough that they might be closer to "second generation" incinerators in Europe than the "modern" third generation that the studies speak of. Of nine regulated pollutants, a new trash incinerator built under the proposed EPA regulations would only have to further reduce two pollutants by 40% below the levels released by the Palm Beach Renewable Energy Facility 2 trash incinerator built in 2015.[57,58]

Incinerator size compensates for whether it's "modern" or not

Most of the incinerator health studies are from Europe, specifically Italy, France, Spain, and England/Scotland. The average size of the incinerators in these countries is about 430 tons/day – far smaller than those in the U.S., and about five times smaller than the "second generation" South Broward incinerator, which is the ninth largest trash incinerator in the U.S. Emissions from one of these European incinerators could be five times dirtier than the South Broward incinerator currently is and, due to the size difference alone, the emissions released would be comparable. This is because "dirtiness" is measured in concentrations like parts per million (ppm), so larger plants get to pollute more just because they're bigger. In other words, if a small European incinerator is releasing 500 ppm of a pollutant, it could be emitting the same total amount of that pollutant in a given day or year as the South Broward incinerator would if the South Broward plant had an emissions rate for that pollutant of just 100 ppm.

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[56] Large Municipal Waste Combustors are trash incinerators where each burner can burn more than 250 tons/day – a size which pertains to all of the incinerators discussed here. See: www.epa.gov/stationary-sources-air-pollution/large-municipal-waste-combustors-lmwc-new-source-performance

[57] Ewall, M. "Quantitative Analysis of Projected Emissions from Proposed Miami-Dade County Trash Incinerator." 2025. www.energyjustice.net/fl/mdcincin.pdf

[58] Ewall, M. "It's Not Green: New Trash Incinerators in Palm Beach County are Expensive Major Air Polluters." 2025. www.energyjustice.net/fl/pbcincin.pdf

As a real-world example of how facility size can matter more than regulations, the 2,000 ton/day refuse-derived fuel (RDF) trash incinerator in Palm Beach County ("Palm Beach Renewable Energy Facility 1") was built in 1989 and falls under the 2006 federal standards for existing RDF incinerators, which are weaker for nitrogen oxides and carbon monoxide than normal "mass burn" type of trash incinerators of the same vintage. The county aims to replace that older incinerator with a new one sized between 3,000 and 4,000 tons/day. This would represent a change from the weakest regulations (2006 standards for existing RDF incinerators) to the strictest (potential 2025 standards for new mass burn incinerators), but would represent a 50-100% increase in facility size. This change would result in five pollutants decreasing (cadmium, lead, nitrogen oxides, carbon monoxide, and particulate matter), but would also result in five pollutants increasing (greenhouse gases, ammonia, hydrochloric acid, mercury, and sulfur dioxide).[59]

New studies limited by old data

Of the rare studies of incinerator health impacts conducted in the U.S., two of them looked at dioxin emissions for all facilities across the nation. This relies on having a national dataset. The only public ones compiled by EPA are from 1987, 1995, and 2000. A privately-held 2012 dataset in WtERT's possession was obtained for one of the studies. Newer data on dioxins, the most toxic chemicals known to science, largely released from incinerators, remains uncompiled in subsequent years, limiting the ability to do newer large-scale studies.

New studies don't have time for certain health impacts to show up

As one incinerator health impacts literature review observed, "regarding carcinogenic effects of PCCD/Fs, some heavy metals, their possible interactions, as well as of those substances that currently are not being analyzed, those papers published more than 20 years ago are of especial interest, because carcinogenic effects appear many years after a continuous exposure to carcinogens."[60] With some cancer latency periods (the time between exposure to a carcinogen and development of cancer) spanning a decade or more, new studies of older incinerators could be the only way to study them comprehensively. Otherwise, studies could show a lack of cancer that just hasn't shown up yet. Transverse colon cancer is now understood to have a latency period of 6.6 up to 57 years. Lymphoproliferative and hematopoietic cancers have a latency period of 2.2 to 35.7 years.[61]

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[59] *Id.*

[60] Domingo JL, Marquès M, Mari M, Schuhmacher M. "Adverse health effects for populations living near waste incinerators with special attention to hazardous waste incinerators. A review of the scientific literature." *Environ Res.* 2020 Aug;187:109631. doi.org/10.1016/j.envres.2020.109631

[61] Centers for Disease Control. "Minimum Latency & Types or Categories of Cancer." 2015. www.cdc.gov/wtc/pdfs/policies/WTCHP-Minimum-Cancer-Latency-PP-01062015-508.pdf

Specific Issues with Cited Sources

INTERNATIONAL ORGANIZATIONS

1. World Health Organization, 2023. Assessing the health impacts of waste management in the context of the circular economy [CE]. In Assessing the health impacts of waste management in the context of the circular economy. https://iris.who.int/handle/10665/366667

This is the study claiming that, *"for modern, well-designed and operated third-generation facilities, none of the four systematic reviews relating to health impacts of waste incineration analysed identified any statistically significant health risks."*

However, in the one systematic review that actually distinguished which studies were of modern, "third generation" incinerators, that review found just six studies of such facilities – and half of these six studies found relationships to health impacts. The European Environment Agency therefore misrepresented the review they cited.

The misrepresentation did not take place in the review cited (Negri 2020). Of the six studies of "third generation" incinerators in the Negri review, three found no impacts: Ghosh (2019), Freni-Sterrantino (2019), and Vinceti (2018). However, the remaining three did: Parkes (2020), Santoro (2016), and Candela (2013).

Parkes (2020) stated: "We found no increased risk of congenital anomalies in relation to modelled PM10 emissions, but there were small excess risks associated with congenital heart defects and genital anomalies in proximity to MWIs. These latter findings may well reflect incomplete control for confounding, but a possible causal effect cannot be excluded."

Santoro (2016) stated: "The study detected a slight association between exposure at MSWI and preterm births. The results are in agreement with those of a previous multi-site study with similar design, and they strengthen the recommendation to consider gestational age in studies and surveillance in areas with MSWIs and similar sources of pollution." This Italian study was of an incinerator that uses the "Best Available Techniques" for waste incineration, has been active since 2000, and burns about 40,000 tons/year of urban solid waste.

Candela (2013) stated: "Maternal exposure to incinerator emissions, even at very low levels, was associated with preterm delivery."

It's also worth noting that one of the other four reviews cited by this WHO report SCS selected (de Titto & Savino 2019) was authored by Argentinian waste agency staff who express themselves in a clearly biased way. The bias comes out in their article's discussion of how they denigrate members of the public who oppose incinerators as if their concerns are fears not based in science or fact, but driven by need for social approval. This is how one insults people with environmental concerns in academic language:

> The community perception of the risk associated with WI plants has a dual character that integrates individual and sociocultural factors, which in their interaction build the notion of risk of each individual. This notion is strongly tainted by its media visibility, beyond the specific probabilities that it will become an event, driven by "social cascades," informative – when the individual perception of risk is constituted through the perception of third parties, without independent sources of information that verify their veracity – and reputation – when the belief is based on social approval. As a result, the individual perception of risk and the likelihood of that risk being concrete for any individual do not have to agree.

The bias further comes out in the conclusions, where they claim there is no scientific evidence of harm from waste incineration (WI) plants if they're designed to comply with standards, calling it a "virtuous step" to build incinerators:

> In summary, there is no known scientific evidence that WI plants designed and operated in order to comply with the emission standards in force in developed countries have a significative impact on the environment and the health of people living in their environment. Therefore, the establishment and compliance of emission standards should be sufficient to ensure their safety for the environment. The realization of a previous socioenvironmental impact assessment and a participatory follow-up process of their operation are sufficient guarantees for the authorities and the community that the operation of the WI plant is a virtuous step in the management of waste with the added value of contributing to the reduction of greenhouse gas emissions.

Of all of the literature reviews available, the World Health Organization chose to cite a source this biased as one of the top four, and used this to claim no harm from "modern" incinerators when mischaracterizing the Negri review by ignoring half of the studies of "modern" incinerators where harm *was* found.

2. United Nations Environment Programme and Climate and Clean Air Coalition. 2021. Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions. Nairobi: United Nations Environment Programme. https://www.unep.org/resources/report/global-methane- assessment-benefits-and-costs-mitigating-methane-emissions

Climate-only and no real substance. May have been recommending anaerobic digestion, not trash incineration. See discussion in climate chapter above.

3. United Nations Environment Programme (UNEP). 2019. Waste to Energy: Considerations for Informed Decision-making. Summary for Policymakers. https://www.unep.org/ietc/resources/publication/waste-energy-considerations-informed-decision-making

"A shift to thermal WtE could improve hygiene and environmental conditions."

Trash incinerators ("WtE") are not typically used for thermal (steam heating) purposes in the U.S. This is more common in Scandinavia. There is no need to burn fuels to heat buildings. Heat pumps are better options.

SCS apparently did not read the "SCOPE OF REPORT" section on the same page right below the Executive Summary, where it explains that the report is for developing countries:

> "The scope of this report is exclusively on **thermal WtE** in developing countries. The overall objective of this report is to provide key considerations to assist **decision makers in developing countries** when scrutinizing thermal WtE as a waste management option." (emphasis in original)

"There have been significant improvements in emissions control for modern thermal WtE technologies compared to WtE technologies from the 1970s to the 1990s."

True. And more true in Europe where much of the "thermal WtE" in the world exists. However, in Broward County, SCS is recommending that 1990s technology continue to be used.

4. World Health Organization, 2015. Waste and human health: evidence and needs: WHO meeting report 5–6 November 2015: Bonn, Germany. In Waste and human health: evidence and needs: WHO meeting report 5–6 November 2015: Bonn, Germany. https://iris.who.int/handle/10665/354227

While dismissing studies of older incinerators, this paper still acknowledged studies finding health impacts:

> *Papers dealing with the health effects of incinerators active in the years 1969–1996 consistently report a detectable risk of some cancers in the populations living nearby, through high quality studies, as reported in different reviews.*
>
> *Quantitative estimates of excess risks of specific cancers in populations living near solid waste incinerator plants were provided (Elliott et al.,1996) for all cancers, stomach, colon, liver, and lung cancer. Other studies performed in Italy, France and the United Kingdom indicate some suggestive but not consistent results for nonHodgkin lymphomas and soft tissue sarcomas (Elliott et al., 1996;*

Viel et al., 2000, 2008; Comba et al., 2003; Floret et al., 2004; Zambon et al., 2007; Ranzi et al., 2011).

As SCS points out, it's true that many of these studies are of older incinerators, some with higher emissions concentrations, some burning different types of wastes, and some with other nearby industries. However, as discussed in the "What is a 'Modern' Incinerator?" section above, these studies can still be relevant because their emissions aren't necessarily lower than what a large incinerator like the (much larger) South Broward plant release, and the different waste streams aren't necessarily that different. Where there was other nearby industry, study authors were careful to do emissions modeling to deal with that confounding variable.

GOVERNMENT AGENCIES

1. European Environment Agency. 2025. Methane, climate change and air quality in Europe: exploring the connections. http://www.eea.europa.eu/en/analysis/publications/methane-climate-change-and-air-quality-in-europe-exploring-the-connections

Climate-only and only has a passing mention of "waste energy recovery" as a rationale for European greenhouse gas reductions. See discussion in climate chapter above.

2. U.S. EPA. 2024. Energy Recovery from the Combustion of Municipal Solid Waste (MSW) https://www.epa.gov/smm/energy-recovery-combustion-municipal-solid-waste-msw

> *Energy recovery from the combustion of municipal solid waste is a key part of the non-hazardous waste management hierarchy, which ranks various management strategies from most to least environmentally preferred. Energy recovery ranks below source reduction and recycling/reuse but above treatment and disposal.*

This old pro-incinerator page from EPA has had minor updates over time, but is largely unchanged in many years. Most of the content is not from 2024. In March 2022, EPA's Office of Land and Emergency Management staff admitted that the agency has no documentation to back up their preference for incineration over landfilling in their waste management hierarchy, and since July 2022, the hierarchy has been accompanied by a disclaiming explaining that: "EPA is now in the process of reviewing the waste hierarchy to determine if potential changes should be made based on the latest available data and information."[62] This is a slow process that was still in motion at the end of the Biden administration (its status since is unknown).

[62] U.S. Environmental Protection Agency. "Sustainable Materials Management: Non-Hazardous Materials and Waste Management Hierarchy." February 3, 2025. www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy

One notable piece of the EPA page that SCS cited that they did not choose to quote is the most recent addition to the Frequently Asked Questions, where FAQ #6 explains that passing the test for whether incinerator ash is legally hazardous waste does not mean that this legally "non-hazardous ash" is safe. After explaining that the test is only looking at what leaches out in a landfill context where ash could threaten groundwater, it states: "Non-hazardous MSW combustor ash may still present potential risks via other pathways, such as through inhalation, ingestion, or dermal (skin) contact. These risks should also be considered during transport, disposal and/or beneficial reuse of the ash as a non-hazardous secondary material."

3. Greater London Authority (GLA). 2020. Marner, Dr. B., Richardson, T., and Laxen, Prof. D. Health Effects due to Emissions from Energy from Waste Plant in London. Air Quality Consultants, Ltd. Prepared for GLA. And Institute of Occupational Medicine (IOM). 2019. Health Impacts associated with Energy-from-Waste Incinerators. Literature Review. Report 144 / August 2019. https://cdn.ca.emap.com/wp-content/uploads/sites/6/2020/10/Health-Effects-due-to-Emissions-from-Energy-from-Waste-Plant-in-London.pdf

Uses the "modern incinerators are different" rationale and uses many qualifiers such as recent, consistent, and modern in sentences such as this:

> *Recent epidemiological studies (i.e. population based) have not found consistent evidence of health effects associated with modern MSWIs…. Earlier studies did not find convincing evidence….*

Despite these qualifiers, SCS quoted studies (of "older" incinerators) finding excess congenital heart defects and genital anomalies near incinerators, and sarcoma and lymphoma risks.

For modern incinerators, however, they quoted findings that "consideration should be given to secondary pollutant formation (e.g. fine particles formed in the atmosphere from gaseous emissions from MSWIs), as well as to emissions from additional heavy-duty road traffic in the vicinity of the plants."

4. Public Health England. 2019. Guidance: PHE statement on modern municipal waste incinerators (MWIs) study. Updated 15 October 2019. https://www.gov.uk/government/publications/municipal-waste-incinerators-emissions-impact-on-health/phe-statement-on-modern-municipal-waste-incinerators-mwi-study

Uses the "modern incinerators are different" rationale and admits to small health risks such as birth defects for children born within ten kilometers of incinerators.

> *…modern, well run and regulated municipal waste incinerators are not a significant risk to public health…. While it is not possible to rule out adverse health effects from these incinerators completely, any potential effect for*

people living close by is likely to be very small. This view is based on detailed assessments of the effects of air pollutants on health and on the fact that these incinerators make only a very small contribution to local concentrations of air pollutants.

The dismissal of impacts by talking about how incinerators contribute in a very small way to local concentrations of air pollutants is wrong-headed. Trash incinerators are among the largest toxic polluters in any area, and evidence has shown that toxic metals, dioxins, PFAS, PCBs, and other chemicals accumulate in local food and the environment (mosses, soils…). Since some of these chemicals bioaccumulate in fatty tissue, concentrations in animal products have been shown to be especially high. That the emissions are in low concentrations in the outside air at any given time does not negate that the pollutants build up over time and can be highly toxic in small concentrations.

5. Joint Institute for Strategic Energy Analysis (U.S. Department of Energy's National Renewable Energy Laboratory). 2013. Analyzing the Economic and Environmental Viability of Waste-to- Energy (WTE) Technology for Site-Specific Optimization of Renewable Energy Options. NREL/TP- 6A50-52829. https://www.nrel.gov/docs/fy13osti/52829.pdf

Climate-only and compares incineration to landfilling using inappropriate metrics (greenhouse emissions per kilowatthour and per year instead of per ton of waste disposed). See climate section for details.

6. Department for Environment Food and Rural Affairs (DEFRA). 2013. Incineration of Municipal Solid Waste. https://assets.publishing.service.gov.uk/media/5a7c909ced915d48c24109e5/pb13889-incineration-municipal-waste.pdf

Uses the "modern incinerators are different" rationale. Page 37 has an "Air Emissions / Health Effects" section that reads like an incinerator advertisement. The only part on health impacts is quoting England's Health Protection Agency (source 8 below).

7. California Department of Resources Recycling and Recovery (CalRecycle). 2012. Walker, S. and W, Gin. CalRecycle Review of Waste-to-Energy and Avoided Landfill Methane Emissions. https://pw.lacounty.gov/epd/conversiontechnology/download/CalRecycle_Review_of_WtE_Avoided_Emissions_07032012.pdf

Climate-only and uses outdated climate science to erase over half of the incinerator greenhouse gas emissions on the debunked notion that this carbon in the atmosphere should not be counted because it's "biogenic." See climate section for details.

8. Health Protection Agency (England). 2009. The Impact on Health of Emissions to Air from Municipal Waste Incinerators. https://webarchive.nationalarchives.gov.uk/ukgwa/20140714074352/http:/www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1251473372218

Outside of this archive, this UK website states that "[t]his publication was withdrawn on 16 October 2019" and that it was reproduced in a newer report. See: https://www.gov.uk/government/publications/municipal-waste-incinerator-emissions-to-air-impact-on-health and https://www.gov.uk/government/publications/municipal-waste-incinerators-emissions-impact-on-health/epidemiological-evidence-review-in-the-uk-and-eu-following-implementation-of-the-waste-incineration-directive

This report uses the "modern incinerators are different" rationale.

9. Health Protection Scotland. 2009. Incineration of Waste and Reported Human Health Effects https://eipie.eu/wp-content/uploads/2021/07/REF00022-SEPA-2009-incineration_of_waste_and_reported_human_health_effects.pdf

Uses the "modern incinerators are different" rationale and simply echoes the previous source.

10. Medical Officer of Health, Durham Region, Ontario, Canada. 2007. Smith, Lesbia. F. Energy from Waste Facility in the Region of Durham. Report prepared for Medical Officer of Health. http://www.durhamenvironmentwatch.org/Incinerator%20Files%20II/REPORT%20FINAL.pdf

The quotes attributed to this source use the "modern incinerators are different" rationale, but the quote is not from this source, which is an anti-incineration environmental group's report. The quote also does not appear in any source via a Google search. The statement "emissions from incinerators are considered very small for dioxins, furans, and heavy metals" is simply untrue, as incinerators are among the largest sources of these contaminants.[63] Relatedly, use of the term "very small" when characterizing the most toxic chemicals known to science (dioxins/furans) is inappropriate; dioxins are highly toxic at very small concentrations and are regulated by the U.S. Environmental Protection Agency in nanograms[64] and parts per trillion.[65]

[63] U.S. Environmental Protection Agency. "An Inventory of Sources and Environmental Releases of Dioxin-Like Compounds in the U.S. For the Years 1987, 1995, and 2000 (Final, Nov 2006)." Fig. 1-5. assessments.epa.gov/dioxin/document/&deid=159286

[64] U.S. Environmental Protection Agency. "Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Large Municipal Waste Combustors." 2006. www.govinfo.gov/content/pkg/FR-2006-05-10/pdf/06-4197.pdf

[65] U.S. Environmental Protection Agency. "Draft Recommended Interim Preliminary Remediation Goals for Dioxin in Soil at CERCLA and RCRA Sites." 2010. www.federalregister.gov/documents/2010/01/07/2010-16/draft-recommended-interim-preliminary-remediation-goals-for-dioxin-in-soil-at-cercla-and-rcra-sites#:~:text=Based%20on%20a%20consideration%20of%20oral%20and,soil%20and%20950%20ppt%20for%20commercial/industrial%20soil

11. Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. 2005. Waste Incineration — A Potential Danger? Bidding Farewell to Dioxin Spouting. https://www.swa.org/DocumentCenter/View/6482/Waste-Incineration---A-Potential-danger--Bidding-Farewell-to-Dioxin-Spouting

This report about dioxin emissions reductions in Germany does not evaluate health impacts around incinerators.

12. Department for Environment, Food and Rural Affairs (DEFRA). Enviros Consulting Ltd. and University of Birmingham. 2004. Review of Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar Wastes. Queen's Printer and Controller of HMSO. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69391/pb9052a-health-report-040325.pdf

Uses the "modern incinerators are different" rationale.

> *The review has concluded that the effects on health from emissions from incineration, largely to air, are likely to be small in relation to other known risks to health.*

The idea that a risk is small compared to other risks does not account for the fact that risks are cumulative, if not synergistic.

13. Ontario, Canada. Environmental Sciences & Standards. Standards Development Branch, 1999. *Environmental Risks of Municipal Non-hazardous Waste Landfilling and Incineration: Technical Report Summary*. Ministry of the Environment, Environmental Sciences & Standards Division, Standards Development Branch. https://archive.org/details/environmentalris00ontauoft/page/n1/mode/2up

Uses the "modern incinerators are different" rationale, and at a time when incinerators in the U.S. and Canada were still "second generation."

INTEREST GROUPS / TRADE GROUPS

1. International Solid Waste Association (ISWA). 2024. ISWA's Position on Waste Incineration with Energy Recovery. https://www.iswa.org/wp-content/uploads/2024/11/ISWA-Position-Paper-on- Waste-Incineration-November-2024.pdf

This is the "international non-governmental association" that is actually a trade association funded by incinerator corporations, and with an SCS Engineers Vice-President as their association Board President. See the end of the "Poor Methodology" section, above, for details. The Position Paper is neither an academic study nor a health study. It states that a modern, well-run incinerator following strict European standards minimizes emissions and protects public health.

2. City College of New York. Marco J. Castaldi. 2021. Scientific Truth About Waste-To-Energy. https://ccnyeec.org/wp-content/uploads/2021/05/WTE-REPORT7603.pdf

Uses the "modern incinerators are different" rationale. This is report authored by the Director of the incinerator industry funded Waste-to-Energy Research and Technology Council (WtERT), which is not disclosed in the report, or by SCS.

3. ClientEarth. Ballinger, A., Shanks, W., Hogg, Dr. D., Sherrington, Dr. C., and Duffield, L. 2020. Greenhouse Gas and Air Quality Impacts of Incineration and Landfill. Eunomia Research & Consulting Ltd, report to ClientEarth. https://www.clientearth.org/media/1h2nalrh/greenhouse-gas-and-air-quality-impacts-of-incineration-and-landfill.pdf

Uses the "modern incinerators are different" rationale. This is the fourth source pointing to the same England Health Protection Agency statement.

4. Centre for Air pollution, energy and health Research (CAR). 2019. Cole-Hunter, Tom, Cowie, Christine, Johnstone, Fay, Marks, Guy, Morawska, Lidia, Morgan, Geoff, Overs, Margery, & Porta-Cubas, Ana. Position Paper: Waste-to-Energy processes: what is the impact on air pollutants and health? https://www.car-cre.org.au/position-papers

Uses the "modern incinerators are different" rationale after listing a litany of health problems found in incinerator health studies.

5. Zero Waste SA. Ricardo-AEA. 2013. Waste to Energy Background Paper. Report for Zero Waste SA. Ricardo-AEA/R/ED58135 i / Issue Number 5 – Final Report. https://www.greenindustries.sa.gov.au/__media_downloads/165466/Waste%20to%20Energy%20Background%20Paper%20FINAL.pdf

Uses the "modern incinerators are different" rationale. This report by a consultant for South Australia makes the incredulous claim that:

> *W2E processes themselves impact on the environment, through emissions of greenhouse gases, pollutants, noise, dust and traffic. However, modern, regulated W2E facilities pose no risk to human health and operate at levels commensurate with other industrial facilities.*

This sweeping generalization is not supported by any documentation in the report. Even in epidemiological studies that fail to find a correlation between incinerators and health impacts (which are hard to find for any industry due to many limitations), no credible epidemiologist would conclude that this means that incinerators ("W2E facilities") pose no risk to human health.

The notion that they are comparable to other industrial facilities is simply not true in the U.S. According to the most comprehensive data on industrial emissions in the U.S. – the Environmental Protection Agency's National Emissions Inventory – trash incinerators are consistently at the top of the list (or in the top five) for most chemical pollutants released within any county with an incinerator.[66] Incinerators are not average industrial polluters, but share the top ranks with oil refineries, large fossil fuel power plants, cement kilns, and airports. This is also true of "modern" incinerators.

[66] U.S. Environmental Protection Agency. National Emissions Inventory. www.epa.gov/air-emissions-inventories/national-emissions-inventory-nei

Pro-incineration Biases

The authors of the White Paper are biased in favor of incineration.

Arcadis, for example, is an associate member of the Florida Waste-to-Energy Coalition, a trash incineration lobby group formed in recent years to promote the development of new and expanded trash incinerators and to seek government subsidies for them.[67]

SCS Engineers has "waste-to-energy" as a core part of their business, where their website states, "[o]ur Sustainable Materials Management practice includes… Waste conversion and WTE facility design, permitting, engineering, and compliance."[68] Their affinity for the technology shows in how they advertise their services, with statements such as:

> "Most communities without mass-burn waste-to-energy (WTE) plants have become completely dependent on landfill disposal.… If you are considering a waste conversion solid waste disposal facility, or thermal-chemical, biochemical, or hybrid processes to convert waste to energy, then you will want to have an assessment completed. All of these technologies convert waste into useful energy. They also generate by-products that may – or may not – have a market for beneficial reuse.… Your WTE strategy should consider beneficial reuse markets for waste by-products.… SCS Engineers can determine if a WTE program, and which technology, is right for your community or agency."[69]

The process that led to this White Paper has also been biased in favor of incineration, via the scope of work for the SCS Engineers / Arcadis consulting for the Authority to draft the Solid Waste Master Plan.[70] The consultants were directed to provide recommendations "landfill reduction" and "diversion from landfills," to explore an expansion of the South Broward incinerator with a 4th boiler, to follow a waste hierarchy that preferences incineration over landfilling, to recover energy from waste, and to "identify new and emerging beneficial reuse opportunities for process residue… ash output" (meaning to pursue recycling incinerator ash into roads or construction materials, as Palm Beach County has been trying to do for years). Using ash to build roads and such will allow the Solid Waste Authority to claim "zero waste" because the toxic ash is not put in a landfill. However, putting ash into roads and driving all over it is more harmful than centralizing ash disposal in a lined landfill. Ash recycling has also failed repeatedly when attempted throughout the U.S.

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[67] The Florida Waste-to-Energy Coalition. "Associate Members." www.fwtec.us/associate-members/

[68] Leonard, Michelle. "Sustainable Materials Management." SCS Engineers. www.scsengineers.com/services/solid-waste-planning/zero-waste-plans/

[69] SCS Engineers. "Waste Conversion Assessments." www.scsengineers.com/services/solid-waste-planning/waste-conversion-assessments/

[70] "Agreement Between the Solid Waste Disposal and Recyclable Materials Processing Authority of Broward County, Florida and SCS Engineers for Consultant Services for the Preparation of a Regional Solid Waste and Recycling Master Plan." May 2024. browardleague.org/wp-content/uploads/2024/05/48F050803-SCS-Engineers-Master-Plan-Consultant-Agreement-v3-1.pdf