Technical Critique of "Stemming the Tide"

Presented by the Global Alliance for Incinerator Alternatives

Summary: "Stemming the Tide" was released on September 30, 2015, commissioned by The Ocean Conservancy. The steering committee on this report includes the World Wildlife Fund, the U.S. State Department, Coca Cola, Dow Chemical, and the American Chemistry Council.

The report examines the problem of plastic waste in our oceans, and outlines land-based strategies for reduction. The focus is on the five countries from which Ocean Conservancy has determined that roughly half of plastic debris enters the ocean: China, Indonesia, Philippines, Vietnam, and Thailand. The report recommends short, medium and long term actions, although most of its focus in on short and medium term strategies, with an aim to find the most cost effective approaches.

Unfortunately, the report fails to achieve its stated aim, and focuses almost entirely on waste management pathways that were long ago discredited. Specifically, it recommends:

- increased collection, and then burning, of up to 80% of waste in coastal areas of Asia
- changes in national laws and an increase in public subsidies to "de-risk" project financing and ensure profit for US, European, and other waste corporations, at an enormous cost to Asian cities, national governments, and the public at large
- an acceptance of industry trends that project a massive increase in plastic use as inevitable and even beneficial, including the use of low-grade and non-recyclable single-use plastic packaging

The report does state that product redesign and reduction of plastic use is important, but claims that this is not a short or mid-term priority, but rather something that we can postpone for at least 10 years. It disregards many successful producer responsibility and policy-making approaches as too "hard" and thus unviable. More details about the report's unsustainable economic and environmental approaches are provided below.

<u>After an initial review of "Stemming the Tide" we have identified the following problematic aspects:</u>

In the report's recommendation of incineration over recycling, the authors contradict broadly accepted research without clear or quantitative justification. Recycling is recognized as strongly preferable to either incineration or landfilling on both environmental and economic measures.[i] Recycling has been proven to reduce greenhouse gas emissions and conserve significantly more energy than incineration can produce.[ii] Recycling also creates 10-20 times as many jobs as incineration, and saves public money which can be invested in expanding zero waste, developing clean energy, and supporting public health.[iii]

Nearly half of the 134 "experts" consulted on this report either stand to benefit financially from the expansion of plastics industries and/or incineration industry, or work for the primary contractor on the report (McKinsey & Company). In addition, key members of the steering committee have strong financial incentives to promote

increased plastic production, in particular Dow Chemical and the American Chemistry Council. This casts significant doubt on the veracity of the conclusions, as well as the author's willingness to explore solutions pathways that call for the immediate reduction of plastic production. The report does not recommend strategies to design out plastics until 2025 by which time the amount of plastics produced will have already dramatically increased, according to the report. The burden of this increase will be felt for generations to come by cities and countries responsible for waste management, and communities impacted by pollution, at high cost to national and local budgets and public health.

The cost analysis of implementing the recommended solutions pathway in "Stemming the Tide" greatly underestimates the true cost of incineration, both direct capital and operational costs, as well as public health and climate costs.

- **The report's claim that implementing the authors' recommendations will cost $5 billion is only a fraction of the cost of the proposal to burn plastics and garbage.** Pollution control devices and other technical equipment make up an important part of the cost of a facility, and downgrading incineration technology just because it is used in Asia would be not only a morally problematic double standard, but would create significant pollution problems leading to high costs of public health systems and human lives (see below for examples).

- **Assuming Ocean Conservancy is not recommending sub-standard facilities with little to no pollution controls, it would cost between $80 and $201 billion to build facilities that can burn 80% of *existing* coastal waste in the 5 countries covered by the study.** Building an incinerator costs $200,000 on average for every ton/day of capacity, according to an incineration industry-affiliated think tank.[iv] Incinerators are frequently even more expensive than this: facilities in Japan cost approximately $500,000 on average/ton/day to build, due in large part to strong national regulations around toxic emissions.[v] A recently proposed facility in the USA would have cost $400,000/ton/day. The numbers listed above are based on these cost projections and data from the Ocean Conservancy's own commissioned reports on coastal waste.[vi]

- **Within the next 10 years, the mid-term costs associated with implementing the report's recommendations would likely be even higher.** Given that waste management methods are generally consistent throughout a country, it's likely that incinerators would be built further inland as well. Building enough "modern" incinerators to burn 80% of only China's waste would cost between $192 and $482 billion. Also, these estimates only include costs associated with current waste streams, and not the future increase in plastic waste volumes assumed in the report.

- **The report's calculations also grossly underestimate the ongoing cost of operating an incinerator.** A study done for the European Commission by Eunomia Research and Consulting[vii] examined operating and maintenance costs of incinerators in Europe, and found that these costs ranged from a *net* of $38 to $365/ton, with a common cost of $84/ton for facilities with more modern pollution controls, *after* revenue from energy and heat generation. Many Southeast Asian countries are too warm and infrastructure-poor to use the heat generation capacity of incineration, so some of these revenues would not apply to the

countries in the Ocean Conservancy's report. Yet even assuming proportional parity in revenues, it would cost between $5-53 billion per year to operate incinerators (built to European standards) for coastal waste in the 5 countries studied by "Stemming the Tide."[viii] Again, these are real costs to be paid by real national budgets, even if they are wrongly covered by subsidies and feed-in tariffs meant to boost renewable energy generation.

- **The report calls for public financing of expensive infrastructure projects which will profit incinerator companies while bankrupting public coffers.** The report claims that expanding incineration to cover 80% of waste in the countries examined will provide a financial return of about $200 million. Yet someone has to pay for the cost of construction and operation, so one can only assume that the hundreds of billions of dollars noted above would need to be national and city budgets, global philanthropy, and the public at large. This exorbitant price tag is nowhere considered in the report, which uses an un-transparent set of economic assumptions to claim that waste-burning will be a profit-generating activity, presumably for foreign and national waste management companies that would need "de-risked" operating conditions per the report's authors. Incinerators may provide a financial return to the companies that operate them, but the costs are borne by the public in the form of billions of dollars in public financing and fees**,** sometimes even running cities into bankruptcy.

The report advocates unproven technologies which have failed in the key countries in the report. In the Philippines, incineration has long been banned for its negative effects on public health and clean air. In China, where the government has invested heavily in incineration, existing facilities -- which the report assumes would be used as part of their "solutions" pathway -- have failed to meet key emissions and reporting requirements.

- In December 2013, the government of China released the results of a survey on the pollutant emission levels of over 20 "typical" Municipal Solid Waste incinerators in China. The results showed that 57% of incinerators would not be able to meet current environmental regulations on the emission of dioxin, one of the most toxic and persistent endocrine disrupting chemicals created during incineration processes. Known health impacts of dioxin include cancer, IQ deficits, disrupted sexual development, birth defects, immune system damage, behavioral disorders, diabetes, and altered sex ratios.[ix]

- In 2015, Chinese environmental NGOs Wuhu Ecology Center and Friends of Nature published their report on information disclosure of all the 160 existing and operating MSW incinerators in China. Their results show that among 160 incinerators, 40% have incomplete air emission data and only 8% have dioxin emission data available to the public. Among those that have some emissions data, 69% have a record of violating new environmental standards.[x]

The report also recommends technologies like gasification, while admitting that these technologies do not yet function as projected and have never been successfully implemented in any country of the world.[xi] Similarly, it promotes the creation of refuse derived fuel for burning in cement kilns, while noting that this approach would not be profitable and that it requires extensive pre-treatment to sort out PVC and other chlorine containing materials. Just as with incineration, pollution is a problem this this approach.[xii] And finally, while the report is clear in stating that fuel from pyrolysis "could be commercially viable only for unrefined diesel output, not for

even a low-grade bunker fuel," it also appears to encourages "investing in the expansion of pyrolysis capacity" in order to make it more cost-competitive: a clear waste of resources needed to fight plastics pollution.

The report ignores the impact of its recommendations on the climate, public health, and the long term health of oceans and marine life. Burning waste plastic releases persistent organic pollutants like dioxin, heavy metals like mercury, and greenhouse gases which are harmful to both sea life and human life. Yet the report makes practically no mention of the climate or public health impacts of incineration and other polluting waste management choices, except in one paragraph where it notes the controversy associated with waste-burning and then claims that these problems have been solved by "modern" incinerators.

- **Even the most modern and expensive pollution control devices cannot prevent the escape of many hazardous emissions such as ultra-fine particles and nanoparticles.**[xiii] Ultra-fine particles are produced from burning materials (including PCBs, dioxins and furans), which are smaller in size than what is currently regulated or monitored by the U.S. EPA. These particles can be lethal, causing cancer, heart attacks, strokes, asthma, and pulmonary disease.

- **The dramatic expansion of waste burning could be disastrous to future generations,** particularly in China where more than 4,000 people already die p*er day* from air pollution.[*xiv*]

- **Incineration also releases extremely high levels of greenhouse gases per unit of energy generated**[xv] which in turn will lead to rising sea levels, increased ocean toxicity, and destruction of coral reefs and other marine life through climate change. According to the US Environmental Protection Agency, incineration is notably the worst possible end-of-life management approach for plastics from a greenhouse gas perspective,[xvi] as these materials are petrochemical based.

- **The report ignores the costs associated with these impacts altogether, while claiming to be based in a solid economic analysis**. Recent studies have shown that climate change costs the world trillions of dollars.[xvii] In countries like the Philippines, which bear the brunt of climate change exacerbated natural disasters, the costs in terms of infrastructure destruction, human lives lost, and other socio-economic impacts, are particularly high. Finally, a recent study published in the American Economic Review found that among U.S. industries, the waste incineration industry has the highest ratio of negative economic impacts from air pollution compared to the financial value added by the industry.[xviii]

The report does not advocate for reduction of waste or product redesign until 2025, and its mid-term goals undermine this long-term goal. It's worth noting that the report calls for a long-term effort to reduce the generation of plastics overall. Yet it also claims that "the inevitable forces of innovation" will lead to a dramatic increase in future production of plastic that is also less recyclable.

- **Because the report accepts the increase in plastics production as inevitable, it fails to address the root causes underlying plastic pollution in our oceans.** Specifically, the authors predict a 52% increase in plastics production over the next 10 years, and they even present the market forces behind this shift in a positive light, referring to factors such as greater brand promotion, more single-serving packages for low-income

consumers, and more globalized food sources with "longer shelf-life." While these shifts may serve the interests of plastics manufacturers, the obesity and diabetes epidemics have shown that heavily processed food distribution does not serve society well, nor will small packages of personal care products solve the problems of the urban poor, who end up spending more per unit of product delivered at great cost to the local environment (flooding, plastic pollution to waterways, etc.).

- **We cannot wait for another decade of excessive plastics production to put intensive effort into plastics use reduction strategies.** The plastics industry and those companies that use plastics in products and packaging bear the responsibility of solving this challenge, as do the governments that regulate these industries. Yet the mid-term strategies proposed in the report make this long-term solution (reduction of plastics) impossible. As the cover letter to the report states, "it is important to consider long-term implications of the choices we make today," as "large-scale deployment of waste-to-energy technology… may also hinder the development of plastics that offer higher-residual-value uses at the end of their life cycle." If countries follow the recommendations of this report, they will spend the coming decades - critical years for protecting the oceans and public health, and preventing catastrophic levels of warming - constructing polluting facilities while facilitating the unimpeded growth of the plastics industry

Finally, the report largely ignores all of the work on plastics reduction and management already being done by entities across Asia. Little credit is given in the report to the communities and governments that have developed and implemented real solutions, although several of these are mentioned in passing as positive contributors to the baseline plastics pollution problem.

To be clear, the report mentions the Philippines' Ecological Solid Waste Management Act, South Korea's efforts to reduce waste and improve recycling, and Taiwan's expanded recycling rates, and speaks of the first as significant to reducing plastic flows to the ocean, and the last two as "tremendous results" that could be replicated.

These remarkable efforts to create real solutions have been supported by many GAIA network members with minimal staffing and financial resources, and achieved in collaboration with forward thinking government officials, and much more could be done at a fraction of the expense associated with the report's recommendations. Leading city governments across Asia and in other world regions are banning and regulating single-use disposable plastics, including plastic carry bags, polystyrene, and disposable food ware, and demanding producer responsibility. Civil society groups, including many social enterprises, are developing material substitution projects that use locally sourced materials like bamboo, jute, and redesigned product delivery systems to replace single-use plastics. Worker cooperatives, NGOs, and local authorities have improved recycling and composting systems, and developed pilot programs that are successfully moving toward zero waste goals.[xix]

I**nstead of promoting expensive and polluting boondoggles that distract attention from the real problem, we can and should be giving these solutions practitioners the credit and resources they need to expand and strengthen their work, and support to embed their achievements in national policies. These are the real solutions pathways, and investing in them is the best way to win back our future.**

[i] Hoornweg, Daniel Hoornweg and Perinaz Bhada-Tata, "What a waste: A Global Review of Solid Waste Management." The World Bank, March 2012, No. 15

[ii] USEPA: Solid Waste Management and Greenhouse Gases: A Life-Cycle Assessment of Emissions and Sinks, 3rd edition September 2006, p. ES-14.

[iii] Tellus Institute and Sound Resource Management, "More Jobs, Less Pollution: Growing the Recycling Economy in the U.S." 2011. Pg. 34

[iv] WTERT, http://www.seas.columbia.edu/earth/wtert/faq.html

[v] Japanese Ministry of Environment, http://www.env.go.jp/recycle/waste_tech/setti/index.html

[vi] Jambeck et al, Plastic waste inputs from land into the ocean, *Science* 13 February 2015: Vol. 347 no. 6223, pp. 768-771, DOI: 10.1126/science.1260352, http://www.sciencemag.org/content/347/6223/768

[vii] Eunomia Research and Consulting, "Costs for Municipal Waste Management in the EU." http://ec.europa.eu/environment/waste/studies/pdf/eucostwaste.pdf

[viii] *Ibid.*

[ix] Lester, Stephen, The American People's Dioxin Report, Center for Health and Environmental Justice, 1999. http://chej.org/wp-content/uploads/Documents/American%20Peoples%20Dioxin%20Report.pdf

[x] Hong'e, Mo, "121 waste incinerators refuse to disclose data on fly ash." Ecns.com. May 28, 2015.

[xi] Specifically, the report says: "Gasification system based on as yet unpiloted estimates."

[xii] Community Environmental Monitoring and GAIA India, Concrete Troubles, January 2014.

[xiii] Howard, C.Vyvyan, Statement of Evidence, Particulate Emissions and Health, Proposed Ringaskiddy Waste-to-Energy Facility, June 2009.

[xiv] Mosbergen, Dominique, "Air Pollution Causes 4,400 Deaths In China Every Single Day: Study." The World Post. August 14, 2015.

[xv] Platt, Brand, David Ciplet, Kate M. Bailey and Eric Lombardi, "Stop Trashing the Planet." Institute for Local Self Reliance, June 2008.

[xvi] US EPA assessment of plastics management and greenhouse gas implications, found at: http://www3.epa.gov/climatechange/wycd/waste/downloads/plastics-chapter10-28-10.pdf

[xvii] Pandey, Avaneesh, Climate Change Could Cost the World Over Half Trillion Dollars a Year by 2050: UN Report, International Business Times, December 6, 2014.

[xviii] Muller, Nicholas Z., Robert Mendelsohn, and William Nordhaus, Environmental Accounting for Pollution in the United States Economy, American Economic Review, 101(5): 1649-75, 2011.

[xix] GAIA, Road to Zero Waste, 2012; Connett, Paul, The Zero Waste Solution: Untrashing the Planet One Community at a Time, 2013; Zero Waste Europe, numerous case studies from 2014 and 2015, http://www.zerowasteeurope.eu/zw-library/case-studies/; press articles available upon request.