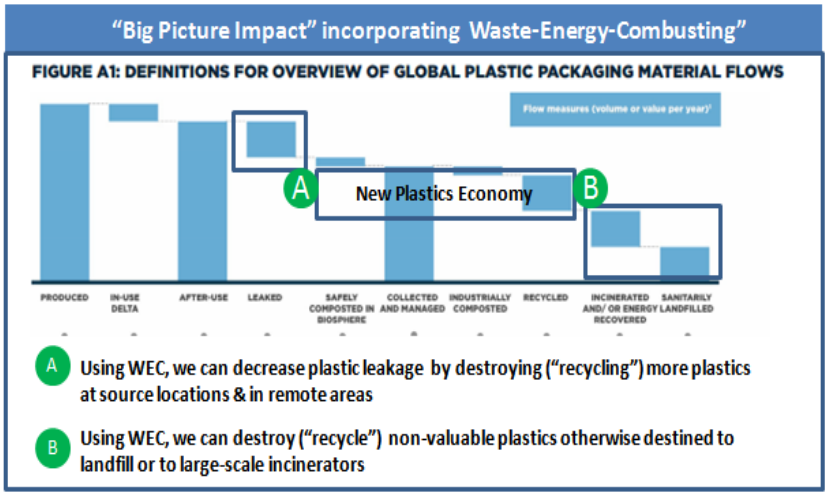
THE CASE FOR SMALL-SCALE AND MOBILE COMBUSTION AS VALID TOOL FOR THE "NEW PLASTICS ECONOMY"

-Response to January 2016 Report "The New Plastics Economy" by Ellen MacArthur Foundation-
-Showcasing the Impactful role of Frontline's Small-Scale & Mobile Waste To Energy (WEC) Combustor-

The Dire Facts about Plastic Packaging & Recycling:

[1] 311,000,000 tons of plastic produced globally in 2014. 26% is plastic packaging
[2] 14% of plastic packaging is recycled globally (by weight). Most into one-use lower-valued applications
[3] Recycling rates for other plastics even lower than for plastic packaging
[4] 8,000,000 tons of plastics "leak" into oceans each year. 1 ton plastic to 3 tons of fish by 2025. Worse in 2050
[5] At best, recent European study suggests just 53% of plastic packaging could be recycled efficiently/economically
[6] 32% of plastic packaging "leaks" outside world's collection efforts. Plastic material persists for centuries
[7] Big divide between countries/regions that have collection/recycling infrastructure and those that don't
[8] Mechanical recycling (open and closed loops) effective, but inefficient. Chemical recycling is not ready yet
[9] 5 countries (China, Philippines, Vietnam, Indonesia, Thailand) contribute 60% of ocean marine debris.

"Big Picture Impact" incorporating Waste-Energy-Combusting"



WHY EXPANDING RECYCLING TO INCLUDE WEC MATTERS IN WAR AGAINST PLASTICS

[1] Our Unit's mobility extends efforts of The New Plastics Economy to remote locations where mechanical recycling methods not cost-effective

[2] Our Unit creates a small-scale tool to destroy plastic waste in hard to reach locations (avoiding leakage into oceans), with potential to use waste heat to provide needed electricity (up to a net 75kW/h) for local community uses

[3] Waste collection and recycling efforts fall short, in many locations, even with proper infrastructure. Our Unit is easier to set up, operate and potentially produce power than same-scale pyrolysis/gasification projects tethered to a fixed location within a community

Use Cases Where Small-Scale WEC Can Have A Lasting Positive Impact On The New Plastics Economy

- **For Developed Countries with High Collection/Recycling Infrastructure**
  - Use by MRFs, municipalities, waste companies and "sustainability" companies as an acceptable onsite "clean disposal/75 kW/h energy creation" recycling method when reuse or recycling is not a cost-effective viable option
  - Use by MRFs to sort out unwanted, non-recyclable plastics (SoC contamination, PVC, PS) for onsite disposal, rather than se landfill (tipping fees and transport fees). Result in higher quality plastic bales that can be sold/re-used
- **For Developing Countries with "High Leakage" and Poor Infrastructure** (P76)
  - Use as an acceptable recycling method as key part of recycling infrastructure for greater capture of plastics
  - Use as alternative to open burning to improve air quality and indirectly improve everyone's health
  - Use to create causal tie-in to a community collecting plastic waste and benefiting from the direct "visible" use of electricity it produces
- **Temporary Emergency Situations: Localized Natural Disaster, Refugee Camps & Volunteer Ocean Cleanups**
  - Use to prevent plastics "leakage" during emergency disasters. A fleet of our units could be quickly transported by rail, boat, and truck to destroy plastics and other combustible debris, especially near water areas. Potential to generate needed electricity within hours once mobile combustor arrives. Avoid sending disaster debris to landfill

Frontline WASTE Systems

Cleaner Streets, Cleaner Air, Better Health, Less Waste

HOW OUR UNIT CAN BE EFFECTIVELY USED BY NEW PLASTICS ECONOMY PARTICIPANTS

Solution: Frontline Waste's Small-Scale & Mobile Waste Heat To Energy Solutions		
What We Offer	A production ready mobile combustor that utilizes technology which can dispose of a wide array of discarded plastics (and other solid waste streams). Installation of appropriate pollution abatement equipment will insure that emissions will meet applicable environmental standards. We have option to generate off-grid power from the waste heat using an off-the-shelf Organic Rankine Cycle generator	**Small-Scale Combustion – Incineration 2.0** [1] Our unit minimizes ash. Not even close to 1 to 4 ratio as cited in report (P82). Our unit makes ash disposal less of a "toxic disposal" concern. [2] Our unit goes where waste (plastic) is located. Can be transported by boat, rail, or semi-trailer truck. No permanent infrastructure investment required at each site. Can replicate and scale as needed when it works. [3] Due to mobility and small-scale, volume of exhaust air is minimal compared to what is produced by fixed, large-scale biomass incinerators – less chance to negatively impact local air quality and health.

Major Benefit To Leaders Of New Plastics Economy: "Trial" Locally and Small-Scale Globally

Unit mobility and small scale allows for low cost way to "trial" (as in MVP) different ways to incorporate our unit within the developed world and developing world. This is based on local/regional involvement and available infrastructure in each geographic area, especially where large-scale fixed infrastructure solutions are not economically feasible. For each solution, this creates a cost-effective way to scale the implementation of our Unit to multiple countries when a use case economically works

For Developed Countries with High Collection/Recycling Infrastructures

Big Picture Opportunity: One Unit can destroy up to 7000 tons per year of plastic packaging material. Within cities with large waste collection and recycling systems, 7000 tons may be considered a rounding error. Our unit is not meant to replace any recycling activity that the New Plastics Economy is working to improve. However, the world's current mechanical closed or open loop recycling efforts are limited by "recycled plastic" demand, quality of the reusable plastic, and sorting problems. Thus, a large amount of plastic ends up in landfill (58%). By strategically placing our unit in situations where we can divert a high percentage of non-recyclable plastic from leaking into oceans, or ending up in landfill, or even being incinerated in large-scale incinerators, each unit can make a big "marginal" difference due to its mobility and small scale. At some point, with enough grains of sand one has a beach –and if our unit works in one location for one use case, then our unit can be used throughout the world for the same solutions. We believe when our units can find their niche use cases within the Developed World, the potential is huge for our future business partners!

For Developing Countries with "High Leakage" And Poor Infrastructures

Big Picture Opportunity: Most developing countries have a huge waste problem and extremely poor infrastructure to effectively collect waste, let alone figure out how to recycle it via The New Plastics Economy. Yet, where there are problems, there are major long-term opportunities to leap frog the existing waste processing /recycling infrastructure limitations of the developed world. New Plastics Economy Waste Processing Systems for plastic packaging can, in many ways, be implemented faster without status-quo players interfering.

Our Unit can play a significant role in the growth of secondary and tertiary cities and even in small rural villages because it helps solve two problems: [1] Getting rid of solid waste, including excess agricultural waste, and {2] creating cost-effective community-level sustainable, reliable off-grid power. As our unit fits on a boat, we're great for islands (SIDS), too.

The ability to "pilot test" and "trial" units for different solutions in different countries will be very valuable for our partner(s). In many cases, they'll be creating "Green Field" solutions that can be replicated in numerous local areas and tailored to a local area's different population growth stages and their economic/waste/electricity