



MEC *ClearWaste*
Restoring Nature



MILLENNIUM E & C (M) SDN. BHD.
Kuala Lumpur, Malaysia.

Introduction to ClearWaste™

ClearWaste™ is a patent protected, novel, low energy use, at-source technology that treats waste at no harmful cost to the environment.

The explosive growth of waste and pandemic exacerbation has pushed the industry to a breaking point. With ever tightening regulations and increasingly prohibitive emissions, the industry urgently needs a more effective and comprehensive solution.

ClearWaste™ is **mobile** and **compact**, designed for rapid **on-site deployment** enabling at-source treatment and consequently landfill and incineration diversion.









ClearWaste™ combines two state-of-the-art technologies; our **ClearWaste™ Plasma Reactor**, with our **ClearWaste™ Ionic Scrubber**, setting new performance standards as 21st century technologies.

ClearWaste™ drastically **reduces waste management costs** and the **overall carbon footprint** thereof.

Our
50%
pledge.

- 50%** less capital cost.
- 50%** less operating cost.
- 50%** less plant footprint.
- 50%** less set-up time.
- 50%** less maintenance costs.

Key Features

-  No fossil fuels used.
-  No harmful emissions.
-  Compact & modular.
-  Mobile.
-  Plug & play.
-  Safe & user-friendly.
-  24/7 operation and online Monitoring.
-  Real-time emissions monitoring system.



At Millennium E & C (M) Sdn.Bhd, we are on a mission to engineer future-proof waste management solutions.

21 years in engineering, thousands of testing man hours, with patents recently filed in 153 countries, accumulated roll-out deals with some of the largest municipalities in countries with combined populations exceeding 1 billion.

Trademark & Patent:

MEC ClearWaste™ is Registered Trademark of **Millennium E & C (M) Sdn. Bhd.**

ClearWaste™ and **ClearWaste™ Mobile Sheltered & ClearWaste™ Trailer Mounted** Versions are patents pending in **Malaysia, UK, Indonesia, India, Bangladesh, South Africa** and **153 PCT** countries in the world under WIPO (World Intellectual Property Organisation).

ClearWaste™ is trusted by the following municipal corporations:



BMC-Mumbai



GCC-Chennai



DMC-Dhaka

Zero fuel.
Zero waste.

The Technology.

The fourth state of matter.

Typical thermal treatment processes that combust or decompose waste require large amounts of external energy, subsequent reaction steps and complex multi-equipment filtration processes that struggle to meet current emissions standards.

Utilising cascading ionisation principles in our patented **ClearWaste™** Plasma Reactor, we generate free-flowing electrons that undergo rapid complex reactions, molecularly dissociating carbonaceous waste into elemental forms.

Plasma is a highly conductive environment and the heat generated by the thermal disintegration of waste into elemental fragments creates an auto-thermal equilibrium with no requirement for any additional energy.

Future-proof emissions.

The Process gases require particle removal and gas cleaning prior to emission.

Our **ClearWaste™** Ionic Scrubber is a proven solution that treats both contaminants in a one-step process unlike the complex multi-equipment filtration processes employed today.

With regulations requiring particulate removal below 2.5 microns, we achieve the same levels in our system.

Simultaneously, our gas cleaning process emissions are 90% below existing thresholds today.

Gases treated:

- Acid gases (HCl, HF, H2SO4, HNO3)
- Sulphur dioxide (SO2)
- Ammonia (NH3)
- Hydrogen sulphide (H2S)
- Chlorine gas (Cl2)
- Carbonyl sulphide (COS)
- Silicon dioxide (SiO2)
- Metal oxides
- Heavy metals (mercury and chromium)
- Many other types of particulates and gas.

Compliant with
EU and EPA
standards.



	EU and EPA standards	ClearWaste™
Particle matters (actual)	100 mg/m3	✓
Particle matters (12% carbon dioxide)	100 mg/m3	✓
Hydrogen Chloride	40 mg/m3	✓
Oxides of Nitrogen	200 mg/m3	✓
Sulphur Oxide	50 mg/m3	✓
Dioxin	0.0001 mg/m3	✓
Mercury	0.05 mg/m3	✓
Carbon Monoxide	50 mg/m3	✓

Safe, eco-friendly ash-by-product.

4% of waste input stream gets converted into ash. Potential commercial application currently under development include:



Construction



Road-building



Pothole repair

ClearWaste™ Capacity and Options



BARE



MOBILE SHELTERED

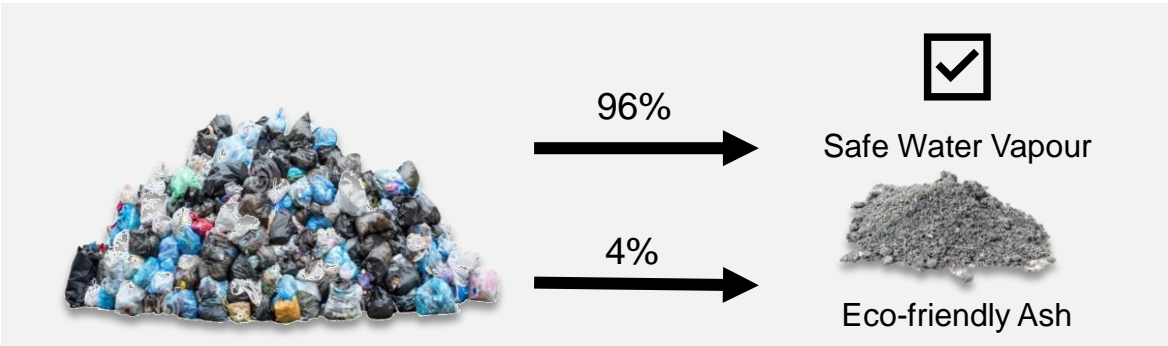


TRAILER MOUNTED

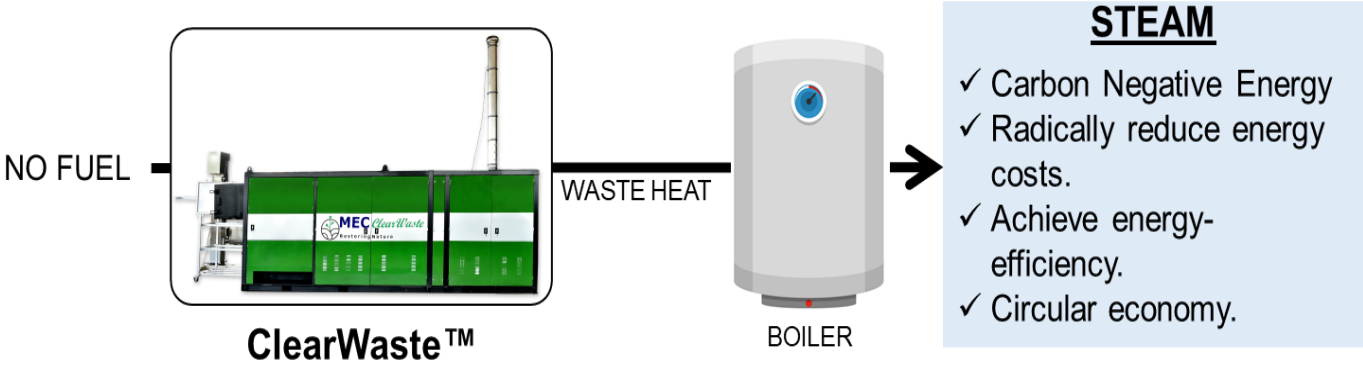
Model	Input Capacity	Output (byproduct)	Emissions	Power Source
2.5 TON per day	105 kg/h*	100 kg/day (@ 4%)	Water vapor	Electric (6 kWh)
5.0 TON per day	210 kg/h*	200 kg/day (@ 4%)	Water vapor	Electric (12.5 kWh)

*Operating on 24-hour basis, depending on the composition of waste [as per the manufacturer]

ClearWaste™ Treats TRASH into ASH



ClearWaste™ Energy Recovery

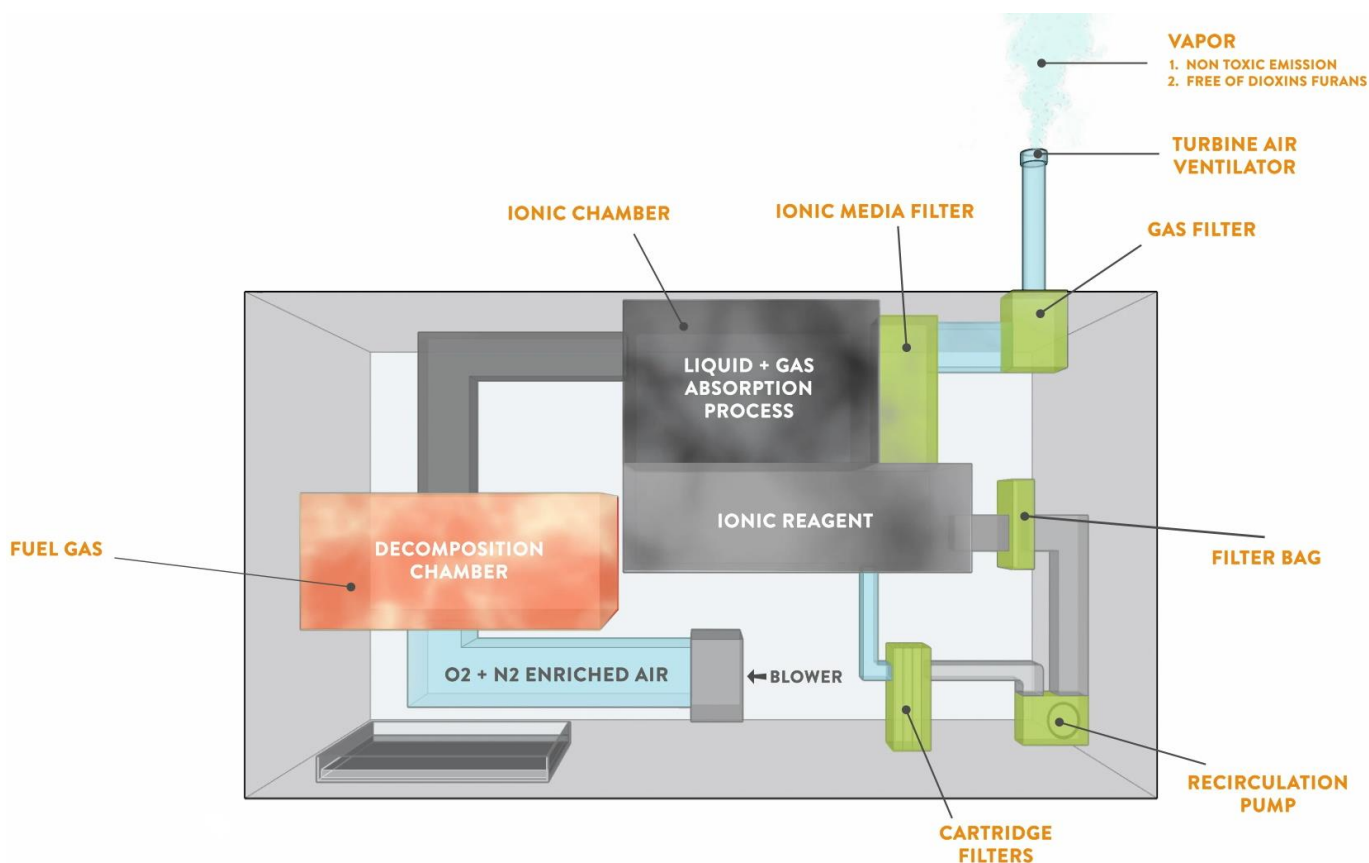


Steam for Boiler



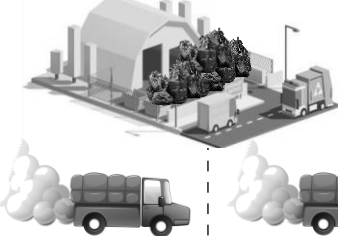


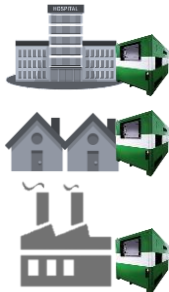

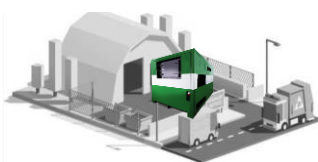

- Heat is converted into low-pressure steam and can be delivered to a boiler.
- An sustainable alternative to fossil-fuelled boiler systems.

System Operation.

- A. Atmospheric air is taken in by the blowers and passes through the **ClearWaste™ Plasma Reactor**. Within the controlled conditions the air is pre-treated and made plasma ready.
- B. The preconditioned air stream is introduced into the **Decomposition Chamber** where the thermal process proceeds to completion.
- C. The gases that get generated are then introduced into **ClearWaste™ Ionic Scrubber** where multiple wet and dry scrubbing phases takes place. In the first phase, coarse particles are removed through utilising MEC's proprietary gas filtration liquid during wet scrubbing. The charged droplets capture and remove particulate matter: coarse, fine, submicron, ultrafine and condensable.
- D. In the second phase, the dry scrubbing process occurs where the gasses are cooled and cleaned. Concurrently, the second stage of gas scrubbing occurs.
- E. In the third phase, the emissions are then passed through a secondary **ClearWaste™ Ionic Scrubber** where remaining coarse particles are removed through further wet and dry scrubbing processes. The processed gas stream passes through mist eliminators and Media Filter for further conditioning and treatment of the gases. The cleaner air finally gets polished in the stack before continuously monitored/recorded and ready to release to the atmosphere safely.

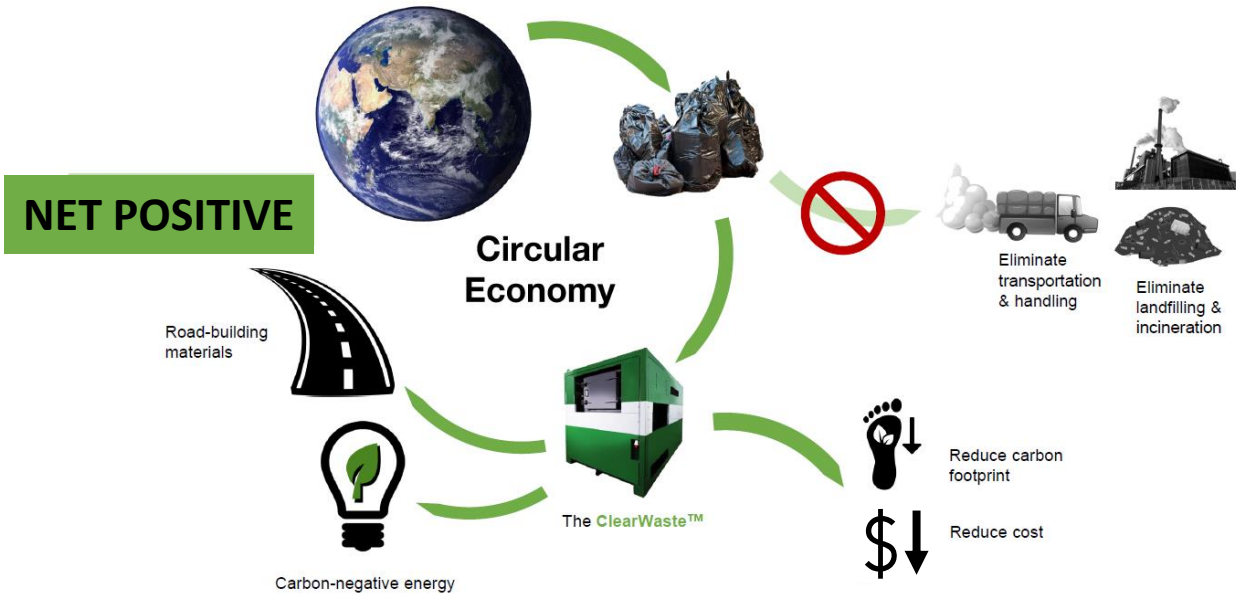


ClearWaste™ & The Waste Management Chain.

	Generation	Handling	Collection & Transport	Sorting & Segregation	Final Treatment
Conventional system	<p>Waste generated from various facilities.</p> 	<p>Waste collected and stored at secondary collection points.</p> 	<p>Waste collected from secondary collection points and transported to Transfer Stations.</p> 	<p>Waste is segregated and sorted. Recyclable materials are salvaged.</p> 	<p>Waste disposed at landfills and incineration plants.</p> 
	<p>ClearWaste™ placed on-site to treat waste at source.</p> 	<p>ClearWaste™ placed at secondary collection points.</p> 	<p>ClearWaste™ placed at Transfer Stations to divert waste from landfills and incineration plants.</p> 	<p>ClearWaste™ placed at landfills and incineration plants to clean up landfills, and to extend incineration plant capacity.</p> 	

NO LANDFILLING. NO INCINERATION

ClearWaste™ CIRCULAR ECONOMY



Applications.



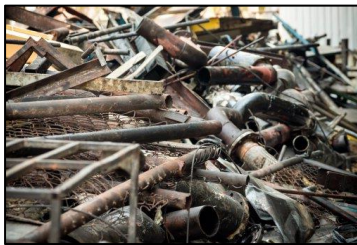
Municipal Solid Waste



Plastic Waste



PPE Waste



Industrial Waste



Agricultural Waste



Medical Waste



Wood Waste



Electronic Waste



Abattoir Waste



Textile Waste



Petrochemical Waste



Commercial Waste



Municipalities



Waste Transfer Stations



Hospitals & Clinics



Schools & Universities



Airports & Seaports



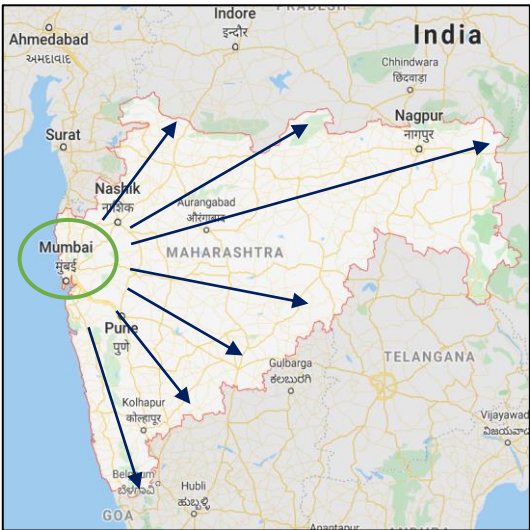
Stadiums & Arenas

ClearWaste™ Healing The Planet



- ✓ Circular Economy
- ✓ Clear Air
- ✓ Improved Life Expectancy
- ✓ Restoring Nature

ClearWaste™ & Transfer Stations



Mumbai, India.

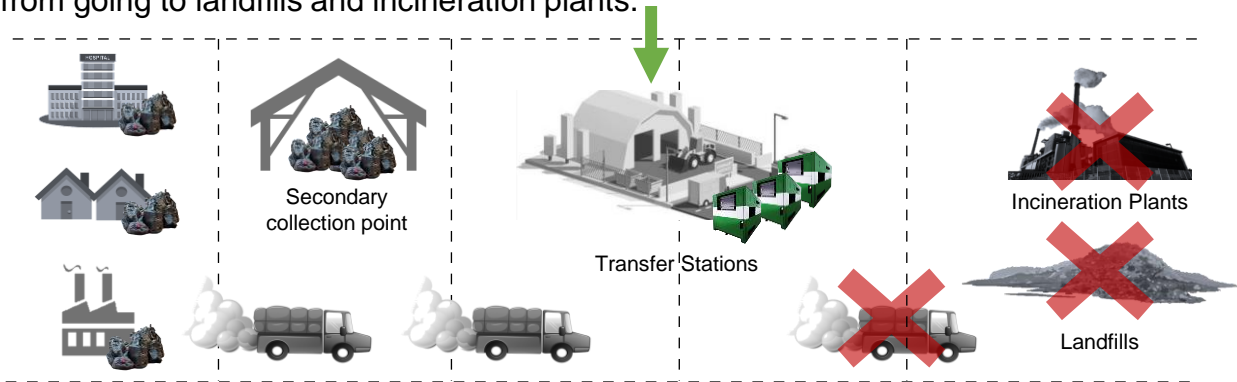
Population of Mumbai:
20.6 million people
Solid waste per day:
11,000 tonnes



BMC-Mumbai

In partnership with Brihan-Mumbai Municipal Corporation (BMC), we are diverting waste from **landfills**, and countless of dumping grounds through deploying our units in **Transfer Stations** across Mumbai. In doing this, we **reduce costs** and **CO2 emissions** across Mumbai's waste management chain.

Our units are being deployed at Transfer Stations at source to reduce and prevent waste from going to landfills and incineration plants.



ClearWaste™ & Public Spaces



DMC-Dhaka

Dhaka, Bangladesh.

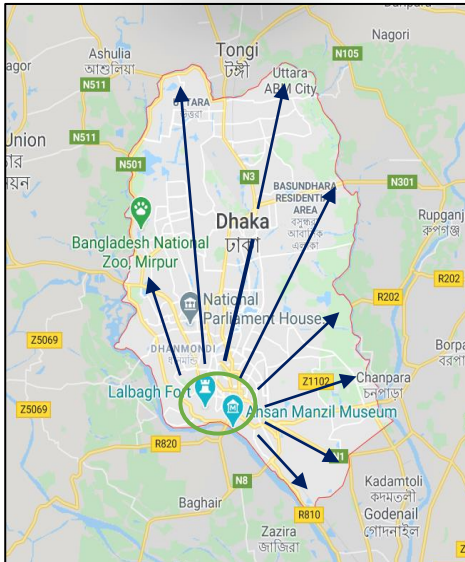
Population of Dhaka:
21 million people

Solid waste per day:
12,000 tonnes



In partnership with South Dhaka Municipal Corporation, we are setting up a **community-based modern disposal site** to treat local waste at source, and to provide an end-all solution for street waste.

Our units are being placed in localised community-based disposal centres as an end-all solution to street waste and incoming waste from surrounding districts. Our units to be deployed on site to capture waste at source, reducing waste leakages, subsequent handling and disposal.



ClearWaste™ & Suburbs



Chennai, India.

Population of Chennai:
10.9 million people

Solid waste per day:
5,200 tonnes

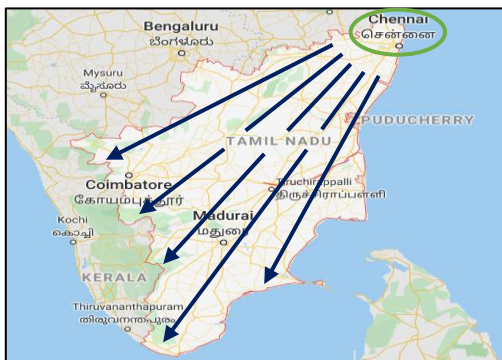


GCC-Chennai

We are working alongside Greater Chennai Corporation (GCC) to collect and treat waste that is generated in **suburban communities**, and at **various public gatherings and events**. For this application, we developed Mobile units, to enable the quick and efficient collection and disposal of waste on-the-go.

- Compact and 'plug and play' features enable Mobile design.
- Mobility enables at-source waste treatment across a wide coverage area.
- Mobility enables accessible and frequent waste treatment.
- 'On-the-go' treatment prevents subsequent handling and disposal.

Mobile units are being deployed in the suburbs of Chennai to treat waste generated across multiple locations, and at public gatherings and events. The mobility of the units enable wide coverage of collection points, providing a waste treatment solution in areas and instances where there was none.





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