



PEOPLE | PLANET | PROSPERITY

**An overview of Blue Planet's Waste Management Solutions**



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**Blue Planet**  
Environmental Solutions

# About Blue Planet

Blue Planet Environmental Solutions Pte. Ltd. (BPES) is a Singapore-headquartered pan-Asian company driving regional sustainability through technological enhanced and IT based end-to-end integrated solutions. The company provides waste management solutions ranging from collection, segregation to transportation and processing of all types of wastes from bulk generators.

By using an end-to-end model, Blue Planet secures exclusive access of waste streams from the point of generation which gives the company the ability to manage, process and upcycle waste in an efficient manner. This makes the model more efficient than most current practices which are often inefficient and have low-recovery rates.

Blue Planet achieves high efficiency levels by selectively acquiring technologies, partnering and collaborating with like-minded teams already successful in their respective domains and integrating them to create an innovative sustainable end-to-end solution. Blue Planet is regulated by Singaporean corporate law and codes of practice.

## Sustainability at Blue Planet



The waste management industry in Asia is currently highly fragmented and inefficient, and lacks the capacity to handle the ever-growing volumes of waste.

This in turn results in health hazards, environmental degradation and resource wastage, along with social exclusion. With a vision to consolidate the fragmented waste management industry, Blue Planet operations are focused on deploying innovative technologies that optimizes resource recovery thereby contributing to sustainability.

Blue Planet's solutions are catered to create a net positive social and environmental impact aligned to the United Nations' Sustainable Development Goals.

The company adopts the Triple Bottom Line ethos of 'People, Planet, Prosperity' throughout its operations and is focused on the integration of Environmental, Social and Governance (ESG) aspects in its core business strategy and reporting processes.

By practicing equal opportunity and providing employment to vulnerable groups in society, the company hopes to address urban deprivation, empower women and other marginalized groups.

## Why Us?



Blue Planet is Singapore's leading Integrated waste management company servicing 1/3rd population of Singapore



150 Projects on waste management in more than 15+ countries with offices in 5 countries across the globe



Top player with the biggest installed base of more than 90 anaerobic-digestion based plants across India



Completed more than 14 projects of landfill mining across India



Daily processing capacity of 20,000 MT



Plastic to fuel technology has also been featured on the Discovery Channel for its unique solution



One of the only 2 companies in Malaysia, that have been granted a license to own and operate the only secured industrial landfill in North Malaysia



Nudging 0.4 Million students via Blue Nudge Platform for practicing source segregation

## Our Services



### GREEN ENERGY

- Biomass; organic mixed waste; Agriwaste using AD
- Thin plastics to fuel using TCD tech
- Waste to Energy using incineration



### URBAN MINING

- PMR & base metals recovery from eWaste using proprietary hydrometallurgy solution
- Battery recycling \*\*
- Industrial waste



### REMEDIATION & RECOVERY

- Landfill mining
- RDF to brick pallet board
- RDF to shutter board
- RDF to lumber for pallets
- Thin plastics to fuel



### INTEGRATED PROJECTS

- End to end waste management for municipal waste



### RECYCLING & UPCYCLING

- MRF's
- Paper recycling
- Metals recycling
- Wood recycling
- Plastics recycling
- CND to geopolymer blocks



### COLLECTION SERVICES & MRF

- Public collection
- Industrial collection



### CONSULTING: EDUCATION & SPECIALIZED SERVICES

- Sustainability education and training
- Social awareness
- Consulting for waste management

## Types of waste we are processing



**Industrial Waste**



**Food Waste to Energy**



**Plastic To Fuel Technology**



**E-waste Management**



**C&D / Inert Waste to Construction Blocks**



**Municipal Solid Waste**



**Legacy Waste**





## End to End solution for collection & processing

**Wah & Hua Pte Ltd – a multi-material recycling and waste Management Company** that provides service for the collection of recyclables materials from small business to large corporations in Singapore with **operating track record of more than 40 years.**

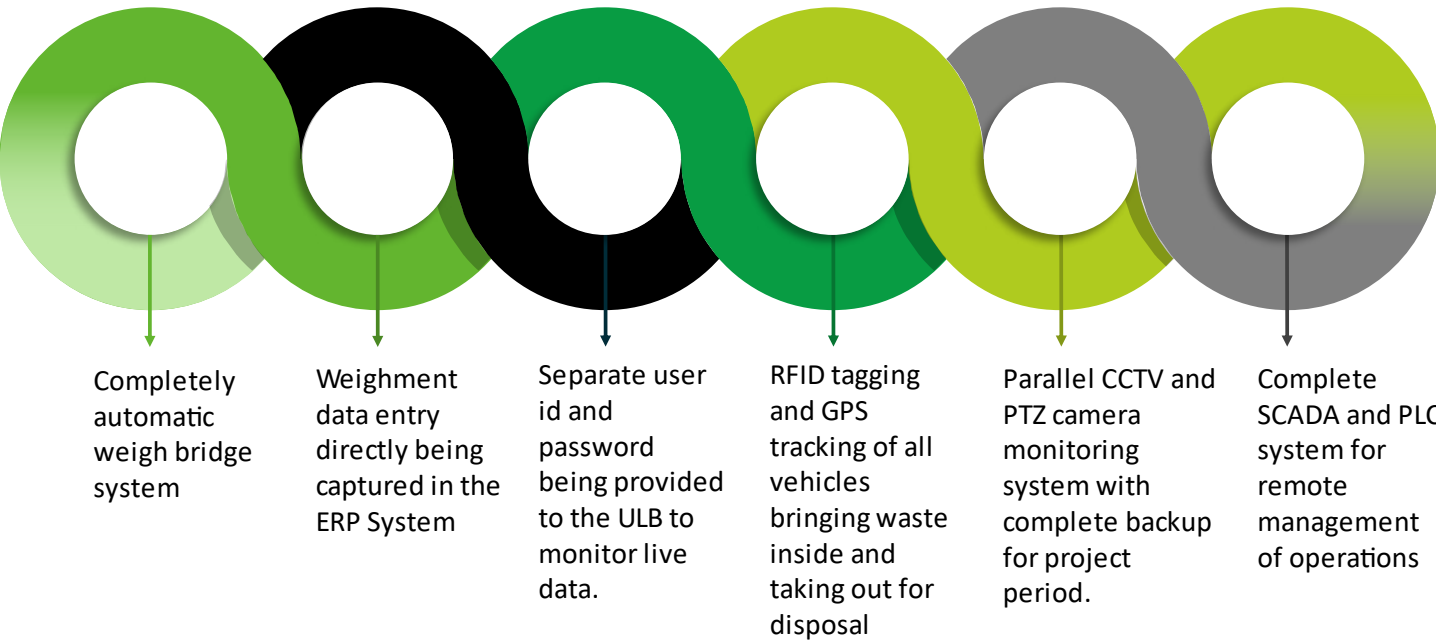
**WH processes more than 25,000 tons of industrial and commercial waste annually from customers including many MNCs such as Shell, Hitachi, 3M, DHL, Hitachi and Panasonic.**

WH is also building its own waste to energy (WTE) plant and will generate around 9 MW of power.

The WTE plant will be able to process 100 tons of industrial waste and 200 tons of biomass daily. The integrated facility will have a daily processing capacity of 500 tons of which 300 tons of waste will be incinerated to produce 9.9MW of electricity which will be sold to the power grid.

To reduce CO2 emissions the WTE plant will be fitted with advanced pollution control equipment comprising electrostatic precipitators, lime injectors and fabric filters to treat and clean the flue gas from the combustion process.

# Our ERP System







## MONITORING / TRACEABILITY / AUTOMATION





## Decentralized Organic Waste Management

PARAMETERS	COMPOST MACHINE	ORGANIC WASTE CONVERTOR	BLUE PLANET SOLUTION
 Technology	Volume reduction through heating	Old composting process	<b>Improved anaerobic digestion</b>
 By-product	Undigested acid residue	Organic compost	<b>Energy and organic compost</b>
 Operating Cost	High cost due to heater and bioculum	High cost due to saw dust and culture	<b>Comparatively lower</b>
 Return on Investment	No revenue generating products	More than 5-7 years	<b>Within 18 – 30 months</b>

### Key Features of Bio methanation Plants:

- ✓ Improved two-stage Laterally Stirred Tubular Reactor (LSTR), with a patented scum breaker design and packed microbe holding arrangement
- ✓ Indigenously developed efficient crushing-cum-pumping system
- ✓ Uncomplicated installation and a quick construction time and start-up
- ✓ Small space required due to the compact and efficient design
- ✓ Submersible heater for automatic temperature control
- ✓ High-quality standardized components and parts with a low-maintenance operation which allows a stand-alone operation
- ✓ Programmable Logic Control (PLC) based panel for ease of operation and control of the plant
- ✓ Fabricated from IS 2062 grade mild steel of 6mm thickness, with double layer epoxy and PU coat and is tested at 3 times its operational pressure





We generate Biogas from paddy straw as well

## Our Specialized Products



Modular small scale anaerobic digesters to process smaller volumes of feedstocks and wastes on site



Easy to transport and deploy small scale anaerobic digestion system ideal for military, trial and other humanitarian operations. A flexible, hard-wearing PVC digester (all components can fit onto standard NATO pallets)



flexible, removable lagoon cover that operates as an anaerobic digester, floating on a lagoon or open top tank to collect biogas and harvest rain water



A simplified, scaled down manual anaerobic digester for remote or off-grid locations in developing countries.



PowerQUBE is a small combined heat and power (CHP) generator ranging from 3.2kW to 50kW which is able to start and run off 100% biogas.



Fabric based dry digester allowing biodegradable stackable feedstocks to be digested in a controlled anaerobic environment

Check out more about QUBE Renewables dryQUBE Installation in the Philippines







# Centralized Organic Waste Management

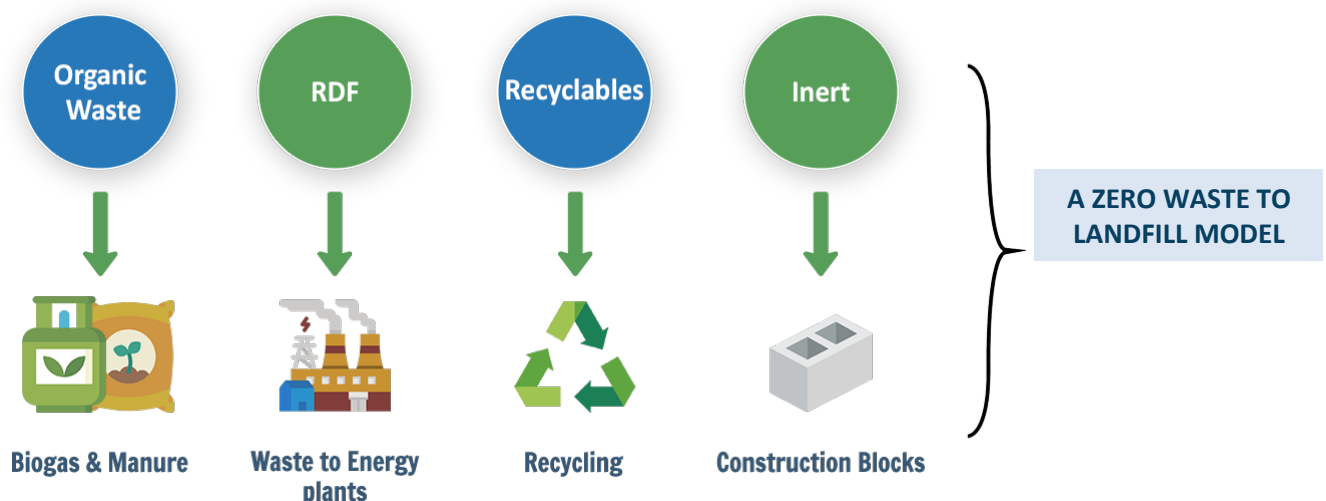
## Description of Technology

Blue Planet's technological solutions are focused in the domain of Scientific Treatment of Municipal Solid Waste. In our endeavor to provide a comprehensive, sustainable and innovative solution for the treatment of MSW, the company has also developed a centralized Anaerobic Digester Technology based on the principles of Thermophilic Bio methanation.

The success of the centralized organic waste processing solution lies in managing the two critical phases of process – the highly efficient segregation process and state of the art Anaerobic Digester technology.

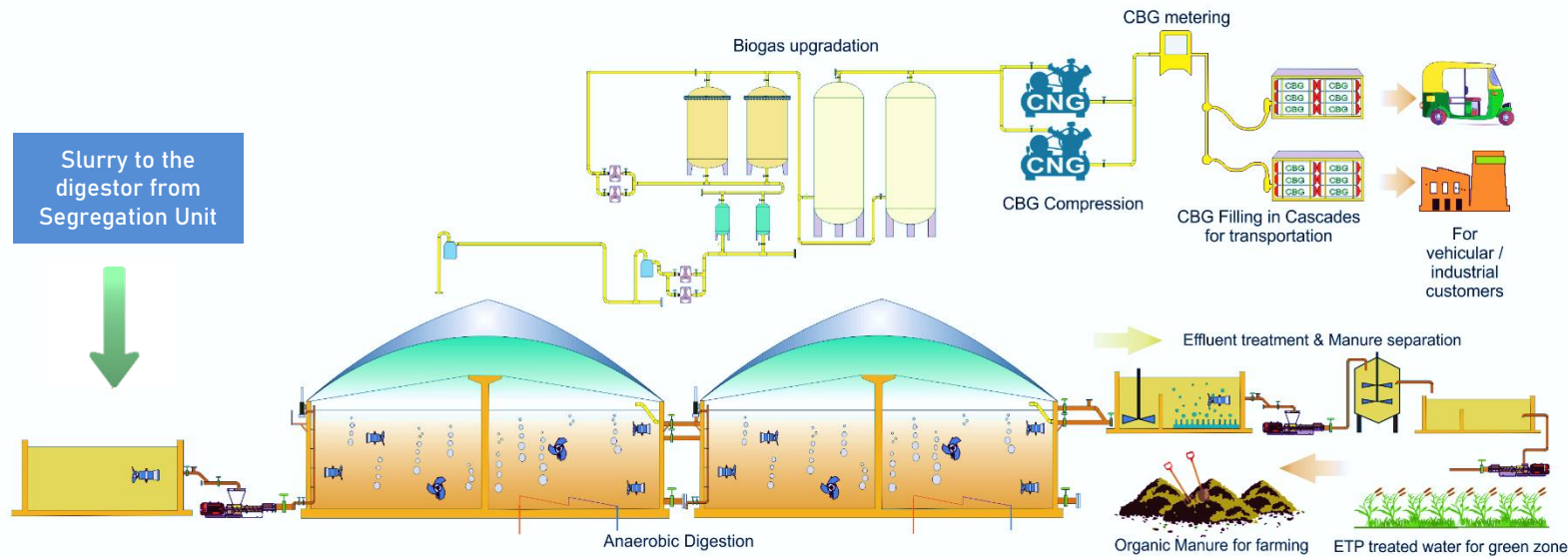
After the segregation process, the operating unit recovers almost 80-85 % of organic content from the MSW. The segregated organic waste is further transferred to a homogenization chamber for thermophilic treatment followed by transfer to the bio-digester tanks for Bio methanation.

## Waste Components after segregation





## Our Biomethanation Plants:



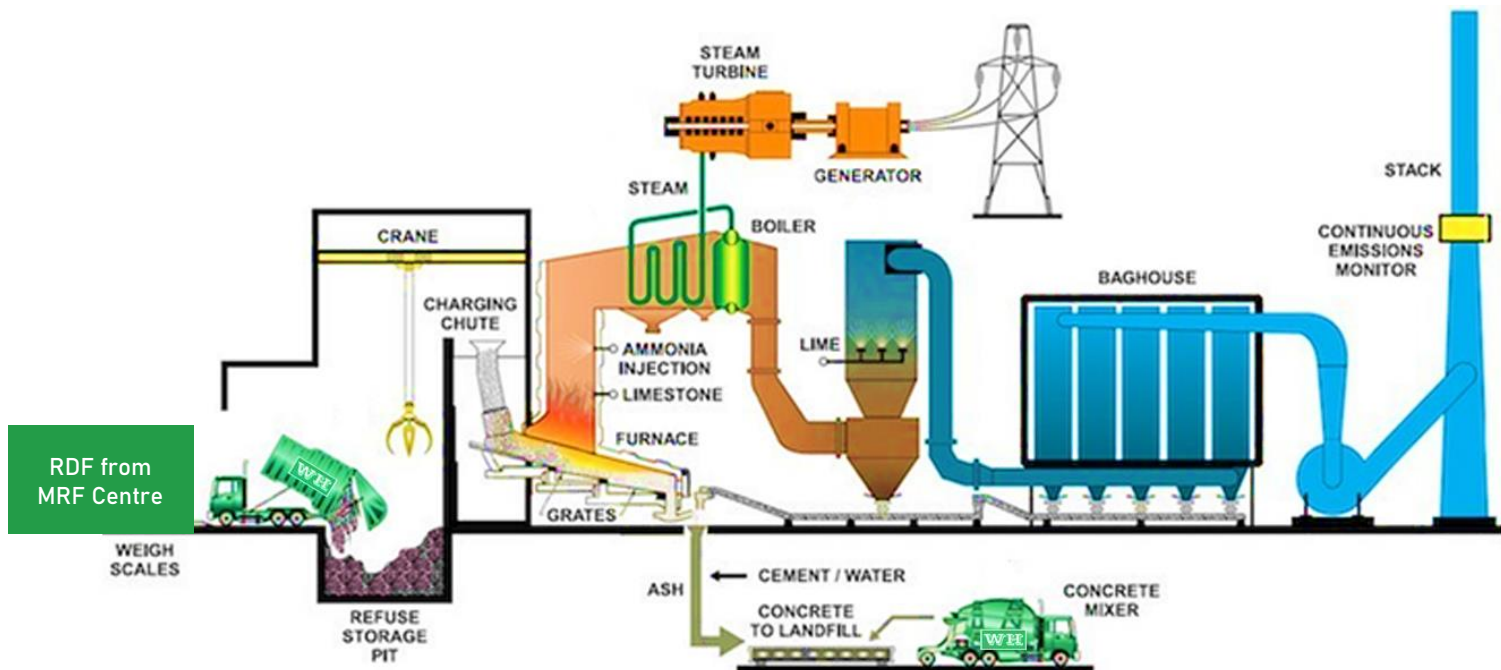
### Organic Waste Processing details

- Feeding to anaerobic digesters
- Manure separation and effluent treatment
- Production of CBG for supply to vehicles / industries

### By-products

- Compressed biogas
- Manure

## Our RDF to Energy Plants:

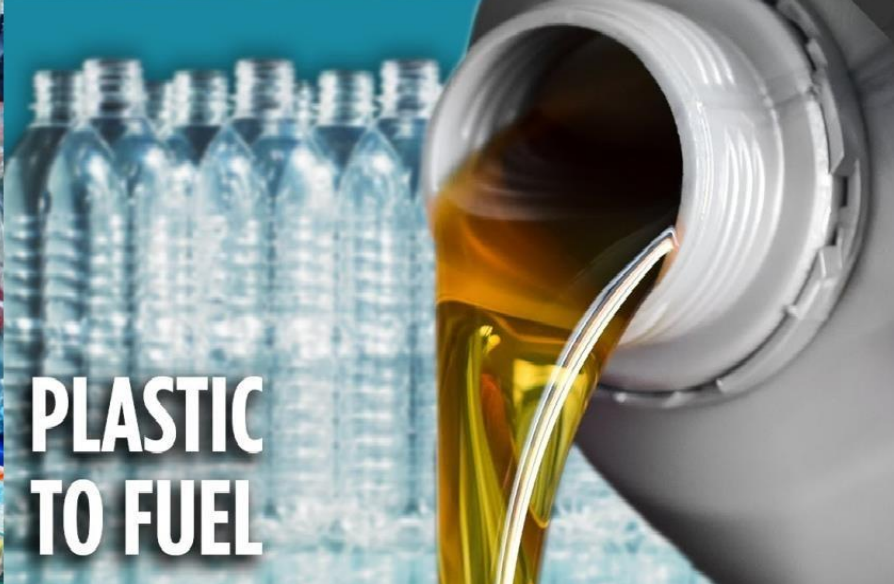


### RDF to Energy Conversion

- RDF fed to the Charging Chute for closed incineration
- Heat used to generate steam through boiler
- The turbine and generator generate power

### Power and other byproducts

- Power generated can be transmitted to the grid
- The cement water or ash can again be used for manufacturing of construction blocks



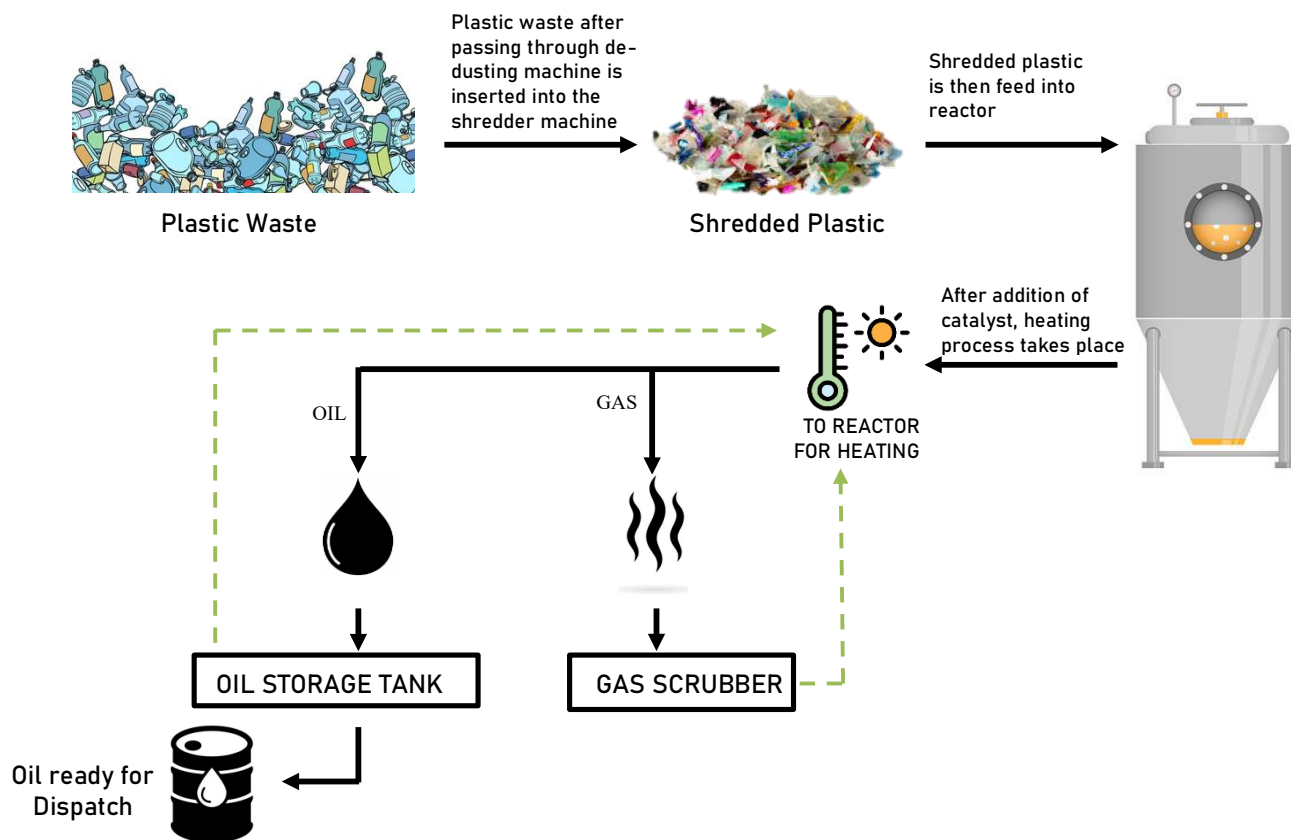
# PLASTIC TO FUEL



## Plastic Waste Management

To ban all the thin, multilayer and non-recyclable plastic is still a dream to far. Thus, we have been successful in finding solution for non-degradable polymer waste by the "TCD" – **Thermo Catalytic Depolymerization** process to generating poly fuel from the plastic waste.

### Process

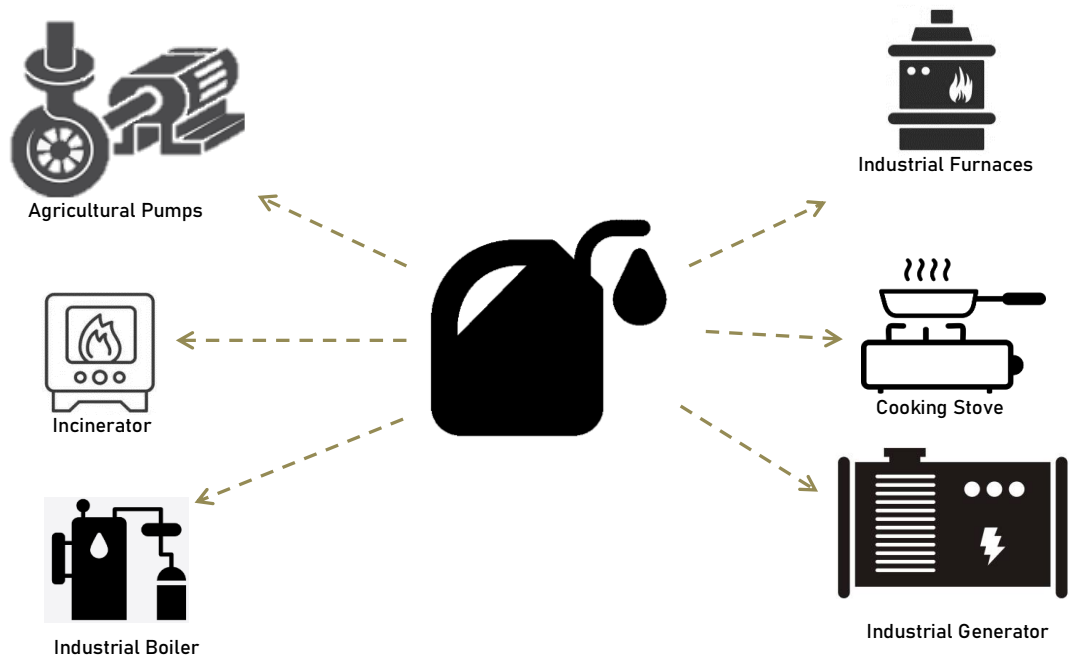


Check out more about our process in the series Planet Healers from





## Uses of Fuel



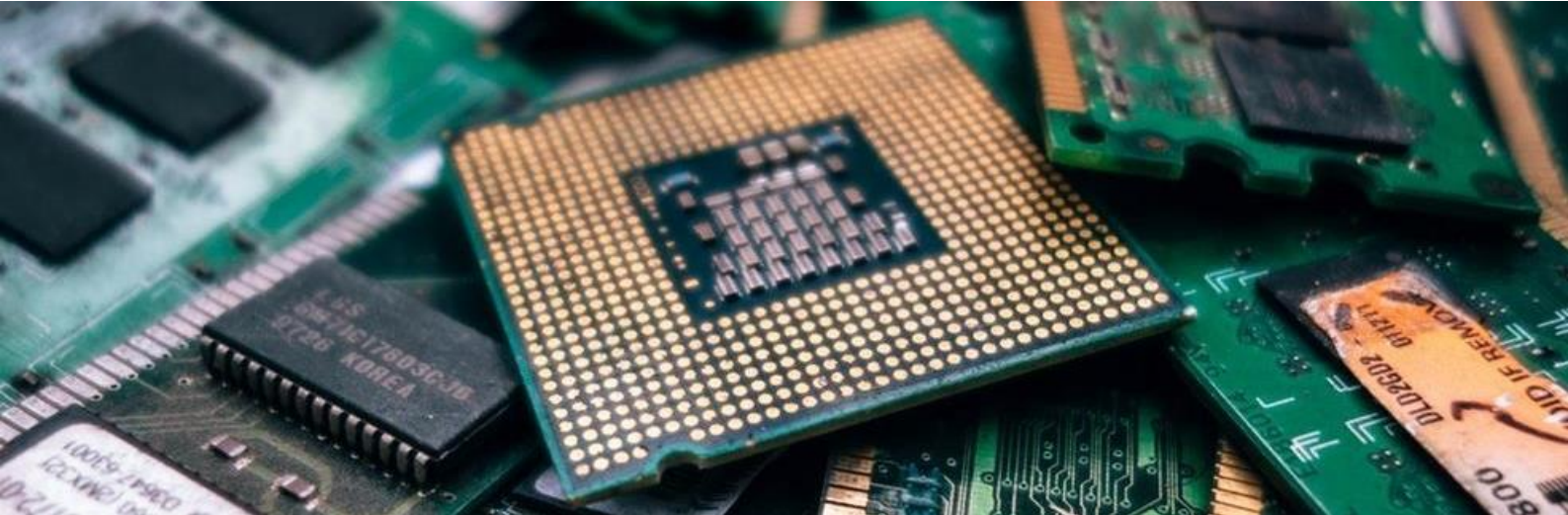
## Input Output Ratio for 100 KG Batch-type Machine

100 kg loading of waste plastic, we will get:		
1	Gas	10 to 12 KG
2	Fuel	55 to 65 Liters
3	Residue	3 to 5 KG
4	Moisture	7 to 10 KG
5	Gas Consumption during process	10 to 20 KG
6	Fuel Consumption during process	12 to 15 Liters
Net Output		45 to 50 Liters

**Note:** Output will vary as per grade of plastic used. Impurities like moisture and other organic contamination will be converted into water vapor and char respectively.



Live sites of plastic waste processing located in Maharashtra



Smart Creative Technologies Ltd  
ENVIRONMENTAL SOLUTIONS



Blue Planet  
Environmental Solutions

# Electronic Waste Management

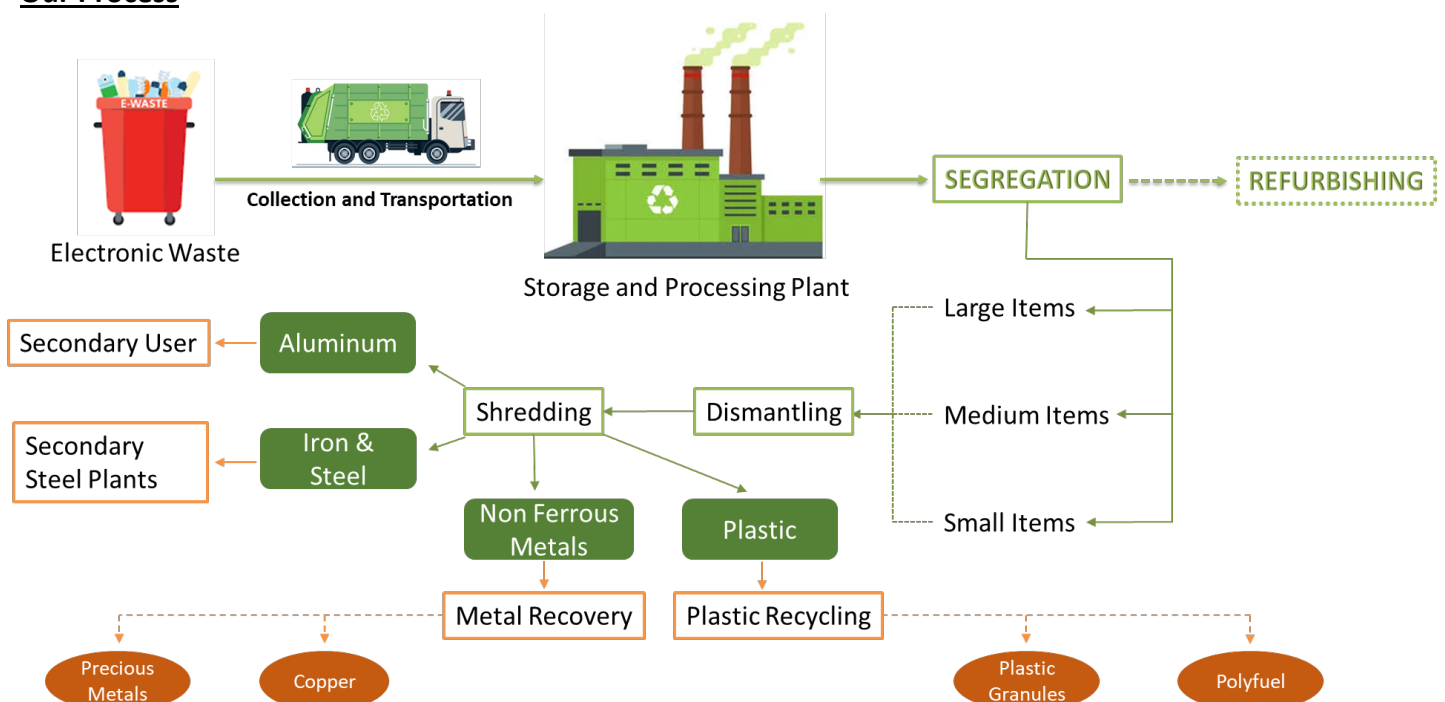
According to the Global E-Waste Monitor 2017, India generates about 2 million tons (MT) of e- waste annually and ranks fifth among e-waste producing countries, after the US, China, Japan and Germany. In 2016-17, India treated only 0.036 MT of its e-waste. E-waste is growing at a compound annual growth rate (CAGR) of about 30 per cent in the country.

Since India is highly deficient in precious mineral resources (whereas untreated e-waste goes to landfill), there is need for a well-designed, robust and regulated e-waste recovery regime which would generate jobs as well as wealth.

**Our end-to-end solutions are uniquely positioned over the competition in the market with the following advantages:**

- ✓ Hassle Free Waste Collection Mechanism
- ✓ Direct Transportation from source to processing facility
- ✓ State of the Art Automatic Shredding
- ✓ Integrated Processing Area to recover metals, plastics etc

## Our Process



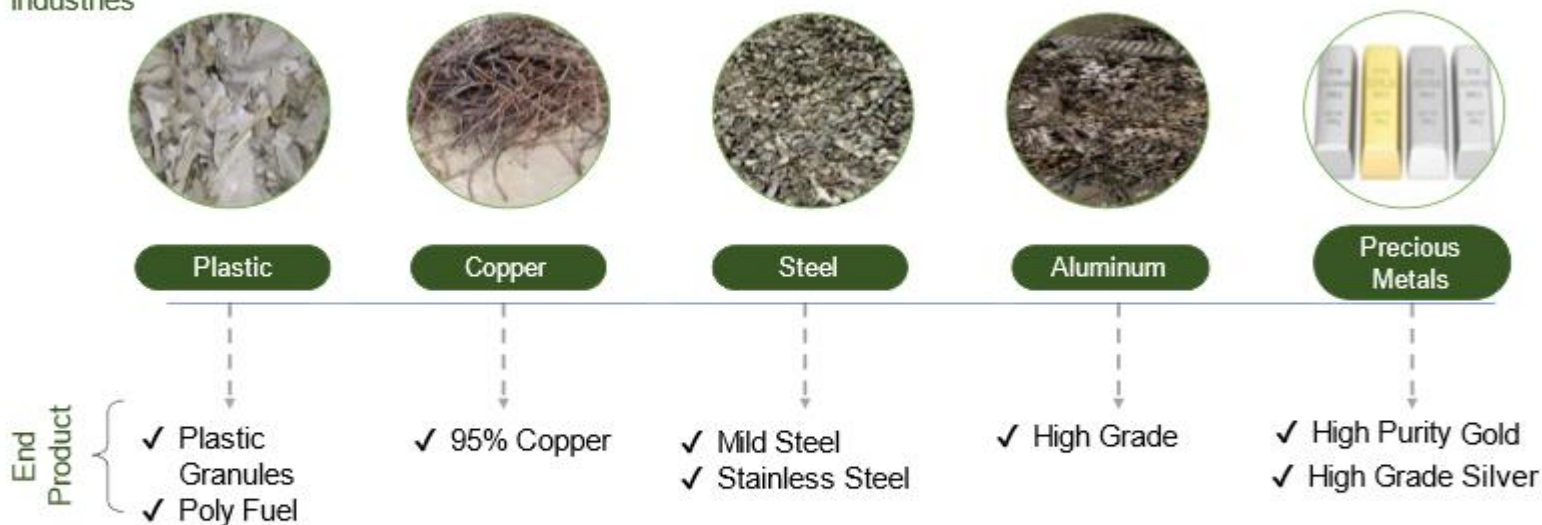


## Our Impact

The Smart Creative technology lowers energy consumption by up to 80 per cent compared to traditional methods like smelting. It enables the increased conservation of natural resources by extracting significantly higher levels of materials without risk to humans and the planet.

Smart Creative is an important technology for Blue Planet in its quest to achieve zero waste to landfill, and is aligned with Blue Planet's vision of providing solutions that cater to the triple bottom line of protecting the environment, benefitting people and achieving prosperity.

After Technically sound E waste recycling following material is available for Direct Sale to secondary industries



- Dismantled Devices shall be turned in to various metals and materials.
- Further processing shall be done more on the basis of the material composition
- Recycling processes are mostly mechanical processes and used for material segregation and size reduction
- The separate non-ferrous metal will be recycled to recover metals including precious metals.

Through the synergies between the group companies & technology sharing, we excel in the end-to-end process of Integrated E Waste management.



World Class integrated recycling facility  
Current capacity - 13100 MT per annum

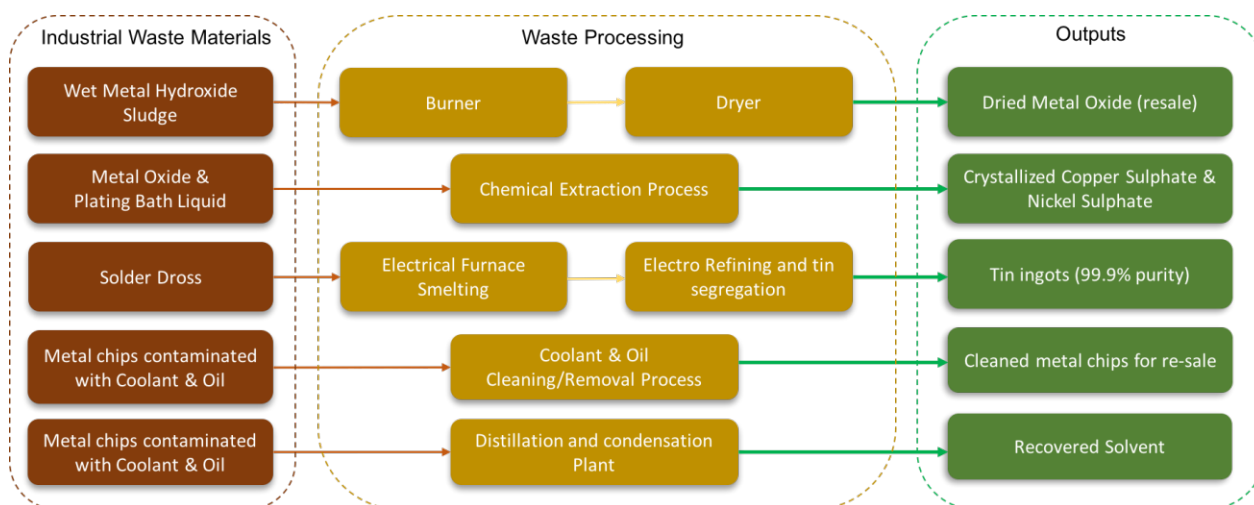
Scalable up to the capacity of 40,000 MT  
per annum





## Industrial Waste Management

We offer fully integrated facilities to handle and process industrial waste. Globecycle – a Blue Planet Group company is a major player in Malaysia for collection, segregation and recycling of general and scheduled waste including plastic scrap, electronic waste, ferrous and non-ferrous metal, solder dross, oil residue and others.



The company's operations include a material recovery facility located in Kulim, Kedah which provides easy access to northern industrial areas of Malaysia. At the site, recyclable materials, including ferrous metals, non-ferrous metals, electronics and plastics, are extracted and processed before being sold for further processing and use.





# Landfill Waste Management

## Biomining

Zigma has been introducing a holistic approach in the Indian Solid Waste Management sector which was looking for an efficient solution with transparency. **Zigma follows the three Ts—technology, transparency and testing & their operations.** The scalability, efficiency and technology of our machines are responsible for the disposal of aggregates. We hence lay high emphasis on continuous research, development and innovation.

### The Process



**Step 1:**  
**Pre-Stabilization**

The entire landfill site is converted into equal sized windows and turned frequently along with spraying of bio-culture and de-odouriser. This would ensure removal of stench, reduction of flies, elimination of pathogenic activities, complete bio-degradation and reduction of moisture



**Step 2:**  
**Sorting & Segregation**

In this stage, the mobile stage of the art system separates the excavated landfill waste into soil, stones and combustibles with almost accuracy thus ensuring an impeccable quality of aggregate.

**Step 3:**  
**Disposal**

In this stage, the non-combustible fraction namely soil and stones are disposed for construction / earth filling and combustible fractions as Refuse Derived Fuel to Cement companies.





The company has designed its own ERP system which provides live data feed to the ULBs. This includes 24x7 video monitoring of operations, automated weighbridge data live update with unique data-like truck picture capturing. Further, a system is incorporated which provides aerial view of reclamation of the land at every stage, captured using drones.

**Transparency and traceability of the materials** were almost non-existent earlier and Zigma has benchmarked this in the landfill mining projects in India, being **the first organization to implement this procedure. Traceability**— where you send these aggregates very important and needs to be monitored. Otherwise, the risk of contamination that is now limited to the dumpsite can go offsite.

Zigma lays high emphasis on its testing of aggregates before disposal and has worked its way in achieving the same. The company collaborated with reputed institutes like IIT, Mumbai to undertake research and provide advisory in methodologies for aggregate disposal. Zigma now has tie-ups with various laboratories across the country with NABL and MoEF accreditation to undertake various tests. These tests are carried out in strict adherence to SWM Rules and CPCB Guidelines. In addition, the company ensures an in-house laboratory being set up at every project site for certain tests that need to be carried out before everyday disposal of aggregates.

At present, we are operating with 18 projects in 5 different states. Zigma was awarded the Best Innovation in Sustainable Solid Waste Management Award by Frost and Sullivan in 2016. In 2020, it was awarded by CII 3R Award for Excellence in Municipal Solid Waste Management Award.

NOIDA DUMP YARD  
RECLAMATION PROJECT

Amount of waste cleared : 1,00,000 MT  
Span of land cleared : 4 acres  
Project period : 2018.12-2019.07  
Application plan : Land Reclamation



KUMBAKONAM DUMP YARD  
RECLAMATION PROJECT

Amount of waste cleared : 2,00,000 m<sup>3</sup>  
Span of land cleared : 12 acres  
Project period : 2016.07-2018.03  
Application plan : Fresh Waste Processing Facility





## AQUA BLOCK

Our Aqua Blocks offer easy to install solutions for sea and flood defence systems, as well as ground work solutions for harbour work

## BUILDER BLOCK

All of our block formulas are stress tested to meet with British civil engineering industry standards and to stand the test of time

## PANEL WALLS

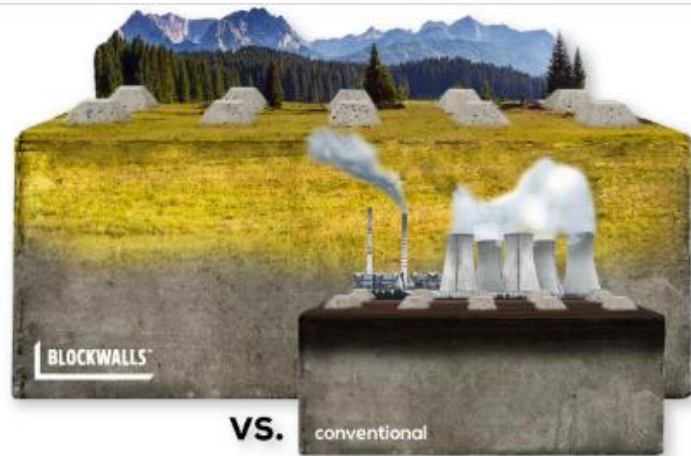
Our pre-stress tested panel walls provide a simple stacked wall solution. They offer to your project an increased wall strength and are perfect for sectioning open space into sectioned bays

## LOAD BLOCK

Our load block range consists of our patented pending stack block design to offer the ability to build structures higher than 8m in height

## ROAD BLOCK

For temporary and permanent applications alike, our road blocks are easy to install and remove



**BLOCKWALLS™**

# From waste to building blocks: A circular economy solution

- ✓ Civil Engineering
- ✓ Flood Defence
- ✓ Construction
- ✓ Security

Virtues Concrete Solutions Ltd. is a UK based company offering are sustainable concrete blocks called Blockwalls, **manufactured from 87 per cent recycled materials** comprising mainly low-value inert waste materials.

Virtus Concrete is a bespoke precast concrete product manufacturer and solutions provider with a focus on civil, groundwork and infrastructure projects. With a patent-pending design, the company provides a stacking solution that has a unique reinforced design which allows the blocks to be installed to a height of over 8m, almost double the height of any other block provider.

Blockwalls structures can be set up instantaneously due to lack of expensive and tedious joining methods. They can also be shaped and designed to be used for multiple purposes such as create material bays, segregation walls, storage sheds, barriers, marine defence blocks and eco-retaining walls.



Conventional Block



Virtus Concrete Block

## Materials Used

Quarried materials like sand and stone

Reclaimed stone, kiln ash, inert waste and sodium silicate (sourced from recycled e-waste)

## Carbon Savings

0 kgCO<sub>2</sub>/block

105.4 kgCO<sub>2</sub>/block

## Cost Savings

High cost due to reinforced concrete

Reduced cost (~50%) due to easy assembly and stacking

## SAFE, SUSTAINABLE & STACKABLE

Simple and easy to install, we offer a wide range of builder blocks that create a multitude of fire grade structures of up to 8 meters in height.

All of our block formulas are stress tested to meet with British Civil Engineering industry standards and to stand the test of time.

We also offer a range of finishing blocks that provide a high-aesthetic finish to any construction project.





**Protecting the Environment  
that Surrounds You**

## Clean Surfaces

**Play Key Role in  
Preventing Cross Contamination**



### Surface Disinfection Services

**Continuous 180-Days Self-Disinfecting Antimicrobial  
Surface Coating**



Vehicles



Medical Facilities



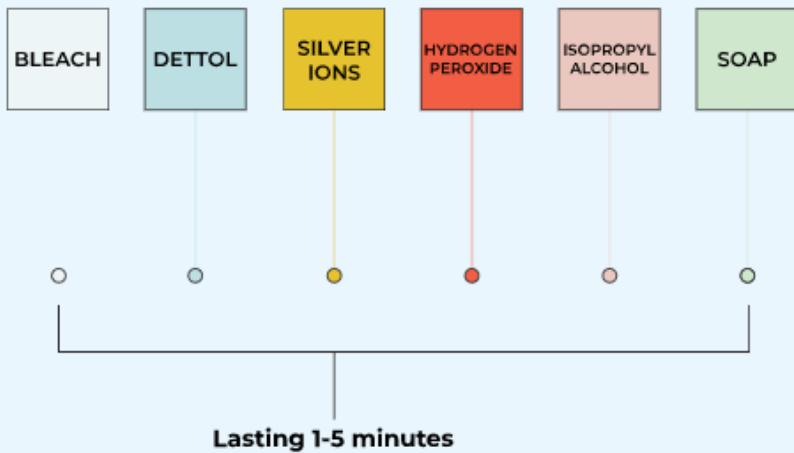
Offices



Hospitality

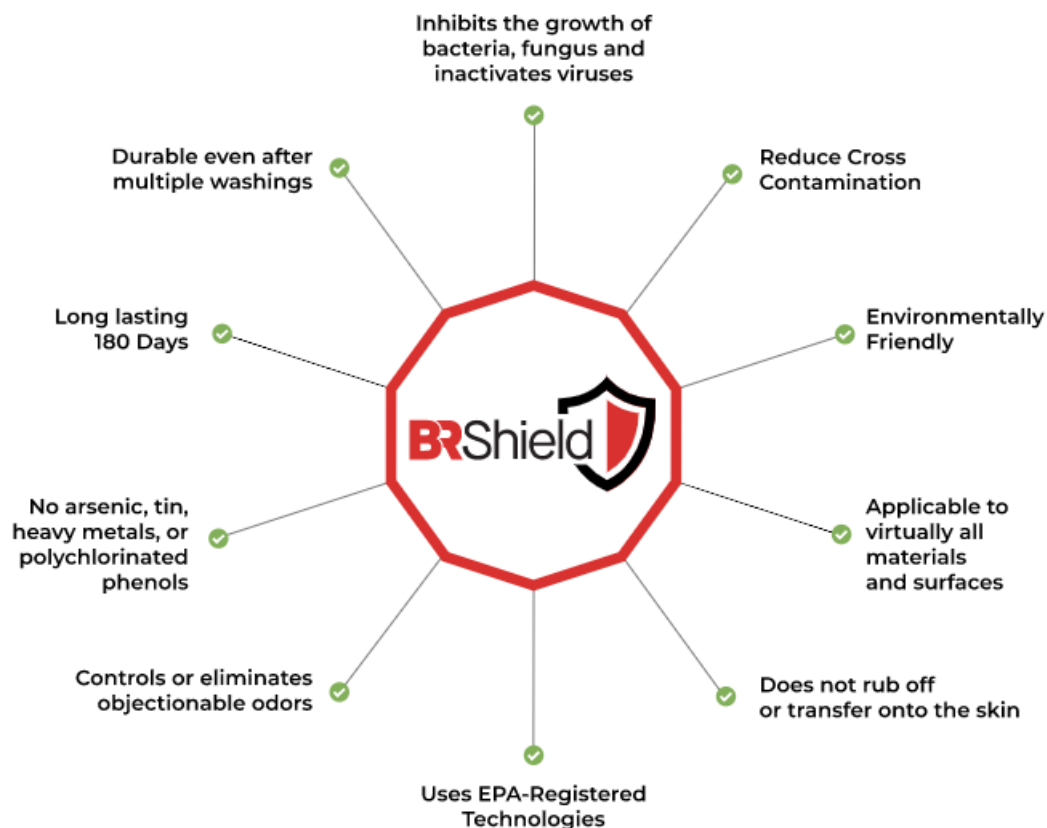
BR Shield is a durable long-lasting **chemically bonded residual antimicrobial coating containing a quaternary based organo-silane compound**. This scientifically proven chemical formula is unique in that it bonds chemically at the molecular level onto any surface to which it is applied.

Therefore, once bonded to the treated surface, this semi-permanent antimicrobial surface coating will provide consistent, residual protection against 99% of all known pathogens and deliver 99.99% or 4 log reductions in their numbers 24/7 for min of 180 days surface antimicrobial protection.



## Why Choose BR Shield?

- ✓ Kills pathogens and inactivates viruses 24/7
- ✓ Long Lasting anti-microbial up to 180+ days
- ✓ Safe for humans and pets
- ✓ Can be used virtually anywhere, on any surface
- ✓ Does not involve leaching technology or heavy metals
- ✓ "Prevents superbug" mutation as there is no chemical interaction with microbes





# Our Clients







Rudra Env. Sol. featured on  
DISCOVERY CHANNEL

## AN INNOVATION TO CONVERT PLASTIC INTO POLYFUEL



Organization of the Year  
Plastic Recycling  
Conference Asia Awards



Large Scale Industry Award at the  
2019 Legacy International Awards



RUDRA Env. Sol. awarded in TECHNOLOGY  
INNOVATION PIONEERS SUMMIT 2020



Yasasu EMS  
Awarded

AD AND BIOGAS  
INDUSTRY AWARDS 2019  
#BestMicroDigester

YASASU Green awarded the "Best Micro digester"  
in UK AD & World Biogas Expo 2019 in Birmingham,  
United Kingdom



Founder of Smart Creatives and  
Virtus Concrete as TEDx Speaker



Co-Founder & Director of Zigma Global, Mr. Nagesh Prabhu  
Chinivarthar featured on CNBC TV 18 sharing his expert insights



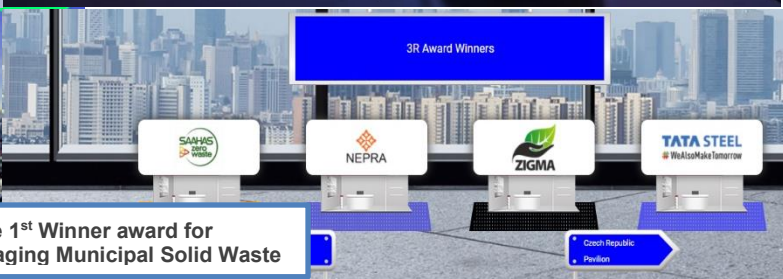
Also Featuring

THE GLOBAL GOOD  
GOVERNANCE AWARD  
& SUMMIT 2020™

INTEGRATED SUSTAINABILITY  
REPORTING COURSE  
MASTERCLASS 2020  
3-4 MARCH 2020

Blue Planet awarded for 3  
categories at The Global  
CSR Awards and The Good  
Governance Awards

JW Marriott Hotel Hanoi, Vietnam | 5-6 March 2020



Zigma received the 1st Winner award for  
Excellence in Managing Municipal Solid Waste



# Get in touch with us ...



## For more information

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- India (Mumbai)**  
12th Floor, 1201-1203, Meridian  
Business Centre Plot No. 27, Sector  
30A, Vashi, Navi Mumbai Mumbai  
Thane MH 400705
- Vietnam**  
SBI Building, Plot 6B, Street No.3,  
QTSC, Street No. 3, Tan Chanh Hiep  
Ward, District 12, Ho Chi Minh City
- Malaysia**  
No 4, Jalan Pala 14, Imperial Industrial  
Park, Permatang Tinggi, 14000 Bukit  
Mertajam, Malaysia.
- UK**  
Quinnovations House, Dock North  
Road, Bromborough, Wirral, UK,  
CH62 4AG

For more  
scan the QR



## Our Presence

