TERRAGON

Enabling Sustainable, Healthy Living Generating Resources from Waste - Micro Auto Gasification System

2012
Globe Foundation
Award for Excellence
in Emerging Technology

Lloyd's List Awards
North American Maritime | 2014
Winner
Technical Innovation Award

SHIP EFFICIENCY AWARDS 2015
WINNER
The One to Watch
fathom

Lloyd's List
North American Awards | 2016
Maritime intelligence | informa
Innovation Award
WINNER

Bad Southern Habits Propagated North

Waste exists in our behaviour

- Currently we generate nearly 3kg of garbage and 300L of sewage per person, daily.
- Waste is material we do not know how to use and we discard to a municipal transfer process.
- In remote habitats the consequences are disastrous.

The local generation of thermal energy and clean water offers significant social, economic and environmental opportunities!

Total Resource Utilization (TRU) Habitat

***TRU* -** Generating resources from what is now “waste” to support autonomy and local sustainability

A habitat could generate most of its thermal energy and clean water needs from materials we currently waste

Practical Resource Generation Appliances

Terragon is revolutionizing waste management by
enabling the local generation of resources with simple and cost effective appliances

MAGS

Energy from waste

Terragon's Micro Auto Gasification System is a novel energy appliance fueled by waste. Safely convert your solid waste and sludges onsite to recover valuable energy.

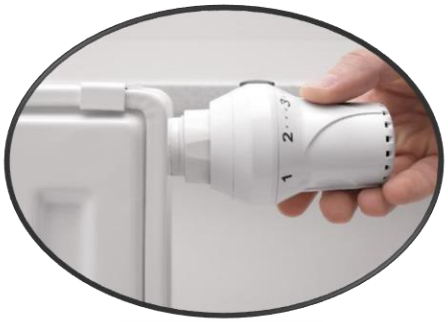
WETT

Wastewater Solutions

Terragon's Wastewater Electrochemical Treatment Technology purifies oily water, grey water or black water for onsite recovery of clean water or safe discharge to the environment.

Energy Resources

Most materials currently considered waste are made of various hydrocarbons (i.e. biomass) and are a great source of renewable energy. They include plastics, paper, cardboard, cloth, wood, Styrofoam, used oils, leather, etc.



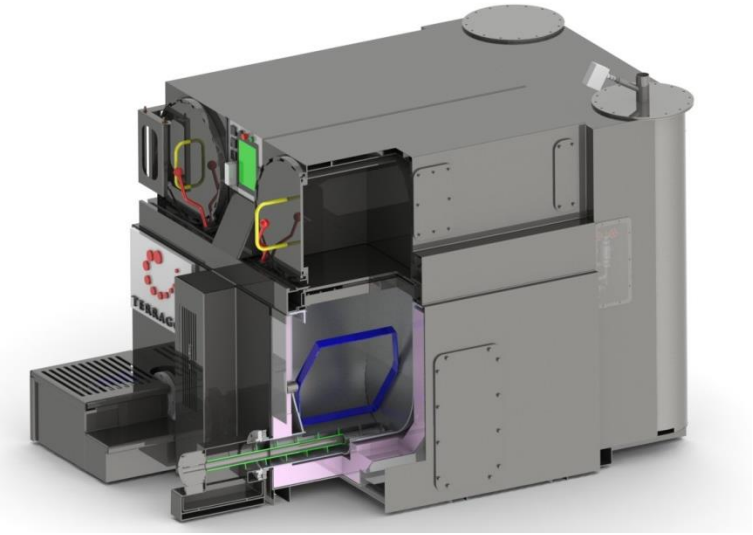
These materials can be used to provide a portion of the thermal energy needed by the habitat in the form of hot water.

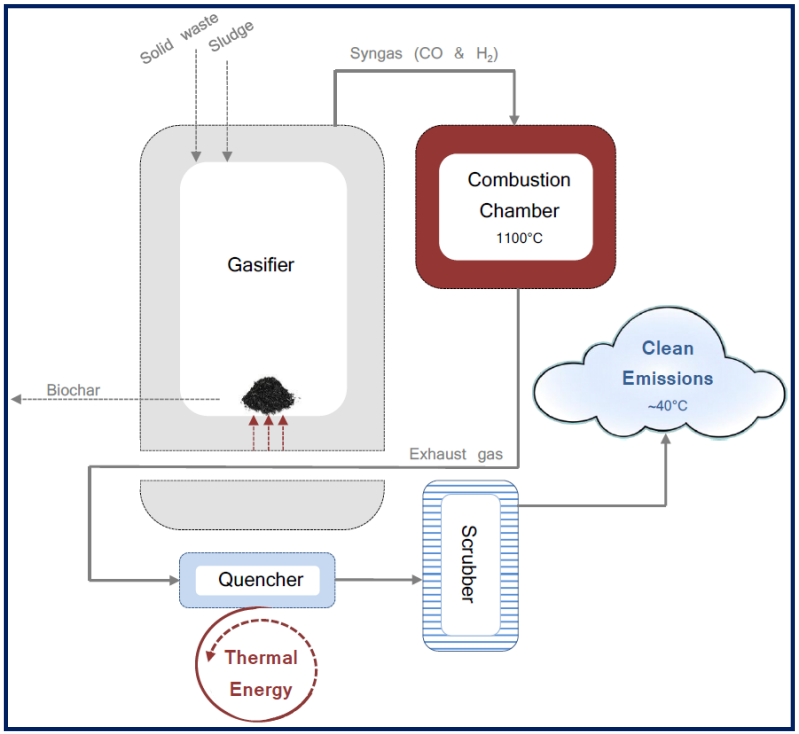
Each kilogram of “waste” can generate about 2.5kWh of energy.
In remote locations, a tonne of “waste” would generate about $500 worth of energy!

MAGS: An Energy Appliance Fueled by Waste

MAGS offer exceptional energy efficiency and can be operated anywhere

Auto Gasification
is a patented technology which thermally breaks down hydrocarbons into solid carbon and synthesis gas and uses the synthesis gas to fuel the process.





MAGS converts all organic waste, such as plastics, papers, food, cardboards, textiles, wood, used oil, and sludge, into energy , bio-char and water.

MAGS sequesters carbon and generates soil enriching bio-char.

MAGS: Safe, Simple, Economical , Commercial

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Ship Efficiency Awards 2015 Winner The One to Watch fathom

Greentec Awards 2017 Top 10

Specs	V8
Size:	10.1m³
Weight:	4,820kg
Capacity:	50 kg/hr
Feeding Lid:	0.15m³
Feeding:	15 sec every 10 min Automated for sludge
Char Removal:	Automated
Operation:	24 hours/day

Lloyd's Register Type approved www.lr.org

Type Approved Product DNV·GL Maritime

Design ABS Assessed

United States Coast Guard 1790

ClassNK Approved

More compact, more capable, simpler operation, but equally clean and safe

Atmospheric Emissions

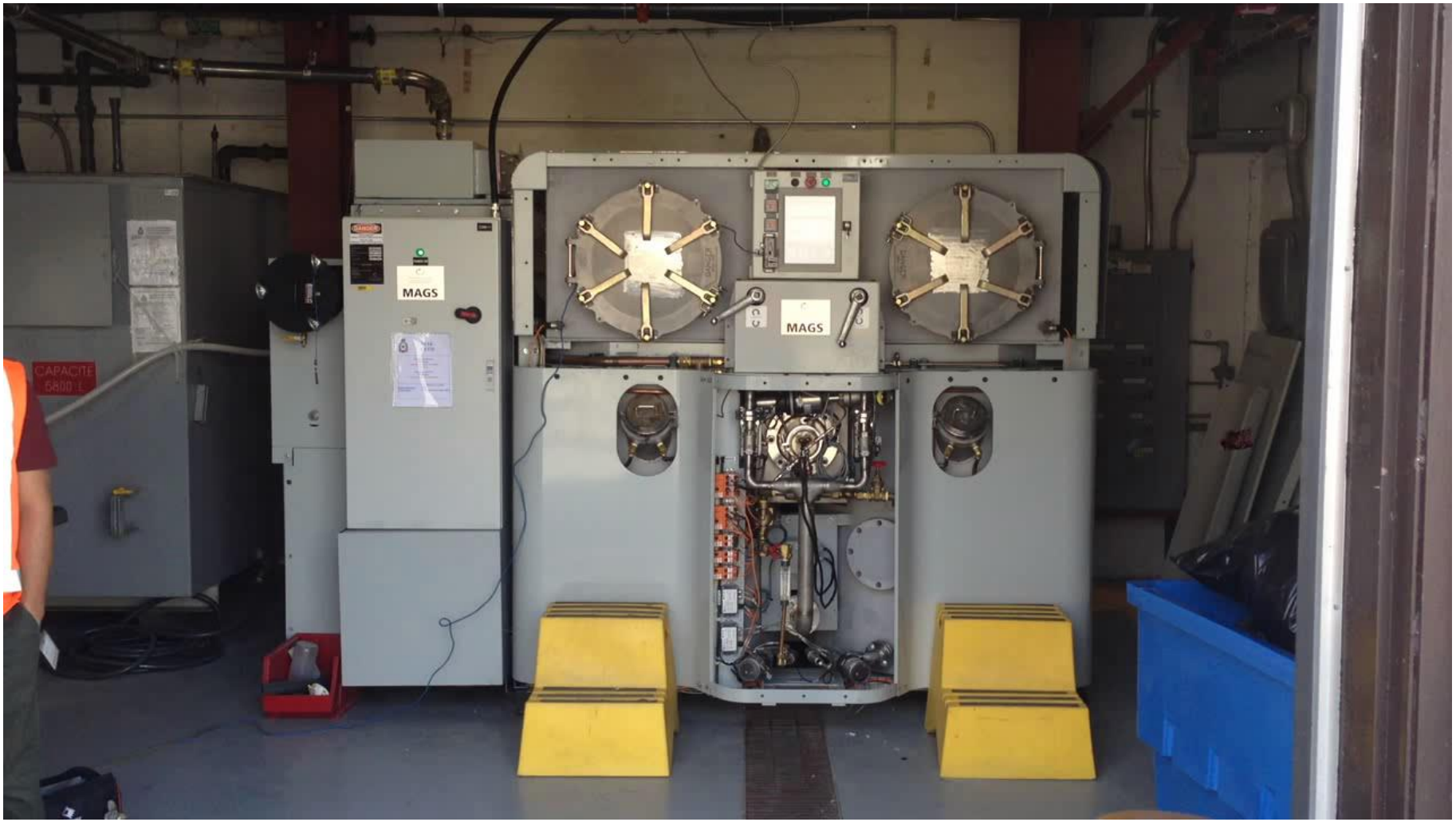
Contaminants	**MAGS** Emissions	EPA Limits	Units
Particulates	**0.8**	**46**	mg/m^3
Carbon Monoxide(CO)	**10**	**16**	mg/m^3
Hydrochloric Acid (HCl)	**<0.6**	**46**	mg/m^3
Nitrogen Oxide (NOx)	**112**	**248**	mg/m^3
Dioxins/Furans	**0.001**	**11**	ng/m^3
Mercury	**0.6**	**10**	$\mu g/m^3$

New classification from IMO being drafted (Pollution Prevention & Response Group)

A self fueling device that sequesters carbon and does not require an incinerator exhaust stack

Note: Emissions based on extreme feed with 60% plastics.

MAGS has very clean, cold, invisible and odorless emissions and can be operated anywhere without damaging the local environment.

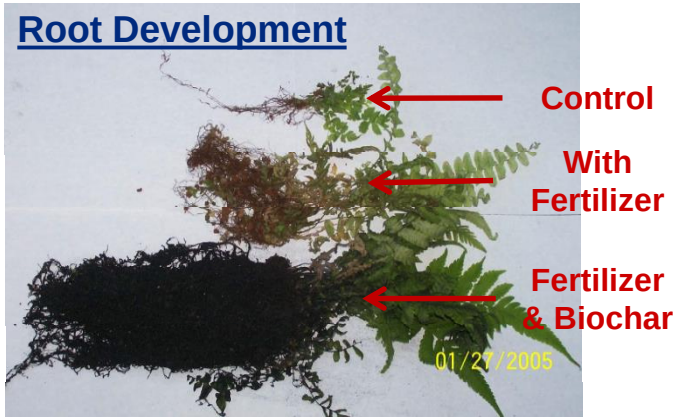

MAGS
MAGS

Generation and Use of Bio-char

About 5% of the waste used for energy generation in MAGS will be recovered as **bio-char**. Bio-char is essentially inorganic carbon rich in minerals. The recovery of bio-char sequesters carbon and reduces GHG emissions.

Bio-char has been used for centuries for soil enrichment. When combined with compost or fertilizer, it can significantly enhance growth, as shown in the adjacent picture from a study undertaken in Hawaii in 2005.

Bio-char that cannot be used in the habitat's grounds, can be safely discharged in the landfill.



Sample MAGS Installations

Commercial Marine


Nat. Geo. Orion


Maersk


Matson


Crystal Serenity


Big Lift

Remote Communities


Canadian Arctic


Caribbean


Hawaii

Military & Defense


NAVSEA


Canadian DND


Maersk Line

Enterprises, Industrial and Hospital

Engenium, Canada


Dyno Nobel, USA

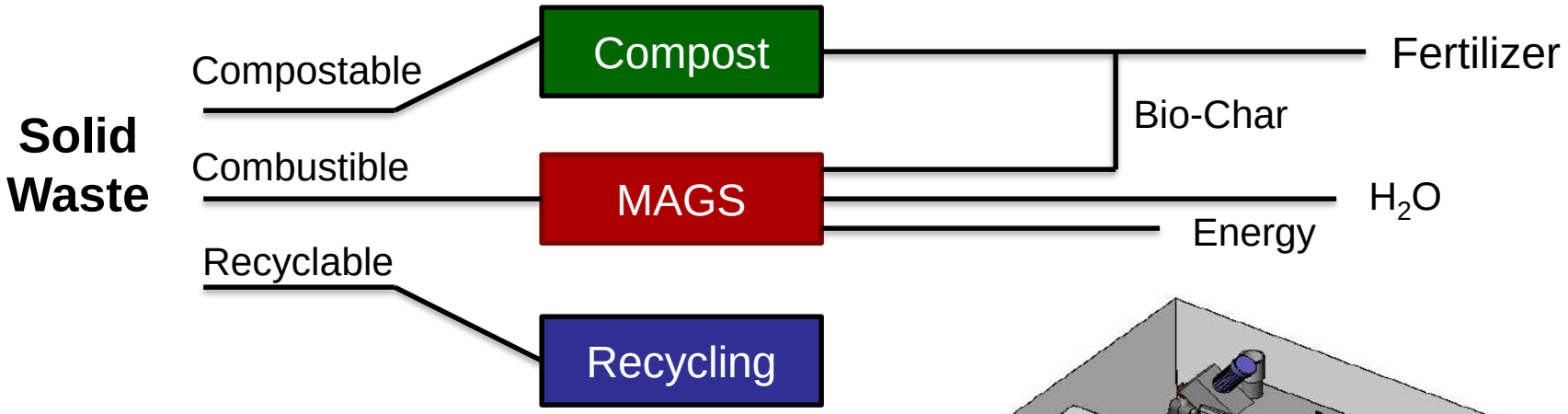

Fortech, Costa Rica

MAGS is a cost effective and proven technology, that is daily used in many applications, globally.

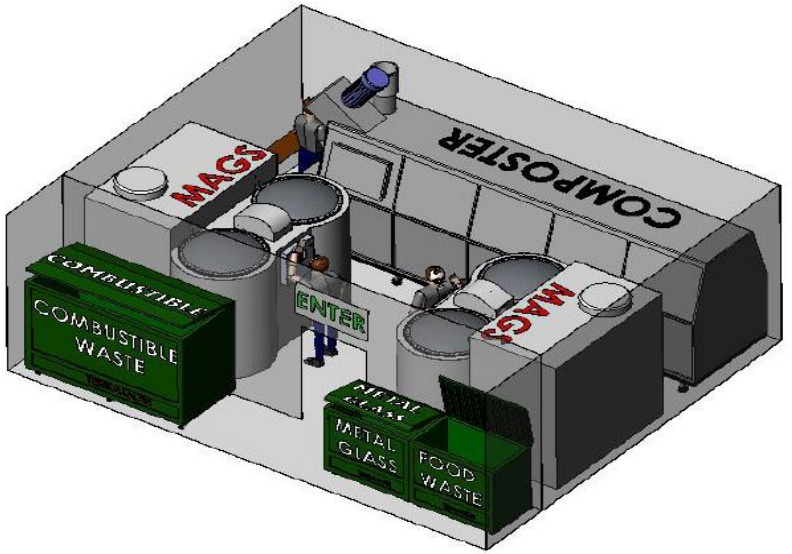
Simple Installations

Integrated Solid Waste Management

In combination with effective composting and recycling programs, MAGS enables all habitats to nearly eliminate waste discharge.



The bio-char from MAGS can be combined with habitat's compost to create soil fertilizer for the local gardens and green spaces.



Simplifying Sustainability

Terragon develops products that offer a practical and economical option for the safe generation of energy and water from waste.

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