WASE

unlocking the power of waste

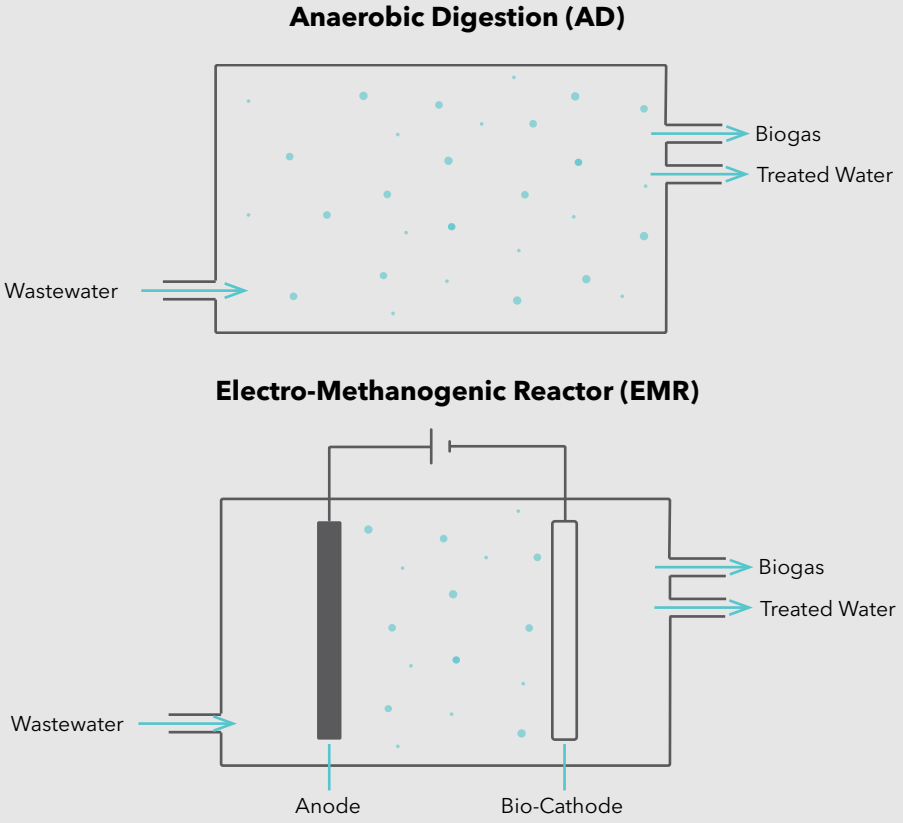
Technical Data Sheet

EMR is the FUTURE of AD

Electro-Methanogenic Reactors (EMR) are the core of our technology and have various advantages over existing technologies like Anaerobic Digestion (AD).

Our patent-pending process **accelerates** the breakdown of waste using a unique, low energy (<5W) electrode technology which **boosts energy** production.

Our process stabilises internal reactions during treatment. Regulating the pH and stabilising performance compared to AD, ensuring **reliable performance** that can be monitored and controlled remotely.



Making EMR Affordable

WASE is the first to commercialise an affordable modular Electro-Methanogenic Reactor technology. Our patent-pending system not only packages the performance of large-scale AD into small modular units, but it also accelerates performance.

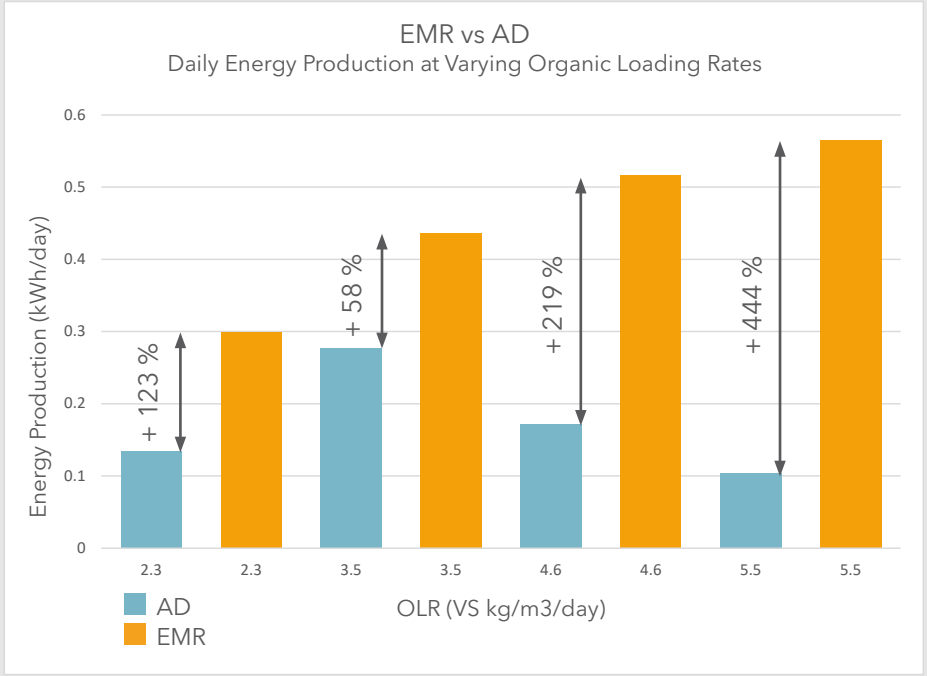
Our innovation is unlocking the future of 'waste to energy' systems.

WASE

Boosting Energy Production

Our patent-pending technology **boosts energy** production compared to AD systems. EMR generates hydrogen directly in the reactor, which converts carbon dioxide into biomethane.

The boost allows us to generate biogas with up to **70 - 90% biomethane** content compared to AD, which sits around 50 - 60%.



WASE

Higher Waste Removal Rates

EMR has higher waste removal rates compared to AD systems.

The effluent characteristics vary depending on the different waste streams. Tertiary treatment can be added to ensure the system can:

- Meet EU discharge standards
- Reuse water for non-potable uses
- Reuse water for irrigation

Waste treatment performance compared to AD

	COD (mg/L)	Turbidity (NTU)	Total Dissolved Solids (mg/mL)	Total Suspended Solids (mg/mL)	Total Solids (mg/mL)	Volatile Solids (mg/mL)
EMR % Difference	+ 44.83%	+ 41.46%	+ 24.39%	+ 3.88%	+ 42.58%	+ 39.68%

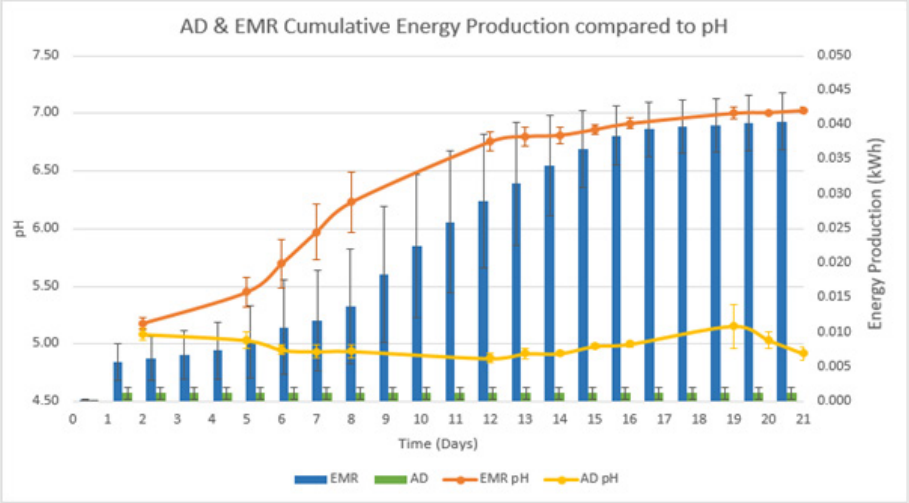
WASE

Increasing Operational Stability

Our EMR technology exhibits **greater operational stability** for different reactor conditions compared to AD. Including pH, temperature and organic loading rates making the system robust and easy to operate.

The graph shows the ability of EMR to stabilise pH within the reactors. The pH and the energy production are correlated as the microorganisms that convert the hydrogen, and carbon dioxide into methane require a pH between 6 – 8.

Our technology can handle greater ranges of organic loading rates which cause pH drops due to chemical reactions such as fermentation that cause



a build-up of Volatile Fatty Acids (VFAs). The EMR technology **accelerates** the **breakdown** of VFAs increasing organic removal and energy production while reducing treatment time.

WASE

We do things three WASE

saniWASE

saniWASE provides decentralised treatment for onsite sewage and faecal sludge management in peri-urban and urban communities.

industriWASE

industriWASE provides onsite wastewater and organic waste treatment, alongside energy production for food and drink manufacturers.

agriWASE

agriWASE is a specialised treatment solution for agricultural waste to maximise energy production from organic waste

Versatile Applications

Using our innovative solutions we can treat a variety of different waste streams. We have a **tailored solution** for a variety of sectors, so you can be assured our system will maximise your energy recovery and provide you with the **future of circular waste management** systems.

	industriWASE			saniWASE			agriWASE					
	Brewery Tank Bottom	Brewery Boil Water	Spent Grain	Faecal Sludge	Septic Tank Wastewater	Municipal Wastewater	Municipal Food Waste	Cow Manure	Dairy Wastewater	Sugar Cane (pretreated)	Sugar Cane (untreated)	Tea Leaves
Biomethane Yeild (m^3/tonne)	44	71	73	15	0.6	0.3	194	33	17	663	134	328
Energy (kWh/tonne)	239	362	763	99	3	1.5	1158	197	101	3959	800	1958

* All values are estimates and will vary depending on the exact waste stream and location.

WASE

Current Projects

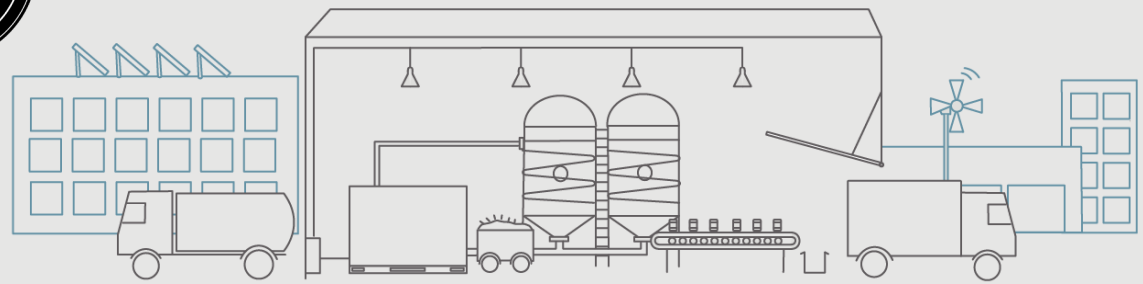
saniWASE biocentre Pilot at a 1/5th of the capacity has been developed within a 20ft container. The system is designed to process 2 tonnes of organic waste a day to produce sustainable electricity/heat. The pilot will commence in February 2021 at a farm in Herefordshire, UK directly comparing the system to a commercial AD system that is supplying the grid. The farm is interested in the energy increase and operational stability EMR can provide.

AD upgrade: we have installed our EMR system into 1.5 m^3 bag AD systems to treat food waste in Nairobi comparing our system to AD. The pilot is part of an Innovate UK project with SNV one of the leading organisations in setting up the Kenya Biogas Program. They are interested in validating the tech with food waste and then testing the system on sanitation waste in Nairobi slums.

Commercial Solution: We have sold a small scale EMR system (3m^3) to a Bristol-based company, BioFactory that are treating faecal sludge and will be shipping the system to Mozambique. They have developed new business models to tackle faecal sludge and waste production in schools and markets using the unique compact treatment, energy recovery and realtime monitoring that our EMR solution offers over AD.

WASE

Future Projects



Decentralised Faecal Sludge Treatment Plants: The next stage the product development is trailing the technology in operational environments. In partnership with the United Nations World Food Program and SNV we will be installing 3 systems in Nairobi slums providing safe sanitation to 1500 people. The treated sludge will be reused as a soil conditioner, and the biogas will provide cooking gas for local households.

Forest Road Brewery: Forest Road is a craft brewery producing 800 m^3 of beer a year. The brewery is in central London and they are trying to establish how they can treat their waste (400 m^3 of wastewater, 200 tonnes of spent grain and 100 tonnes of tank bottom waste per year). The project will generate 212.5 MWh/year of sustainable biogas for heating and offsetting 48 tonnes of carbon per year.

Sludge Treatment – Energy Recovery: We are planning a pilot of our containerised system to treat sludge at one of Scottish Water's research centres. Replacing AD with EMR, a centralised treatment plant could treat 3-10 times more sludge. The system will treat the waste in 3-6 days and increase energy production by 20-40%.

WASE

New Biocentres Launching in 2022

Lead the way in sustainable innovation with one of our most advanced affordable waste to energy treatment systems.

- **>20%** more energy than AD
- **3 - 10x** faster treatment than AD
- Higher waste removal (COD) rates than AD
- Treat up to **10 tonnes** of sludge/ wastewater a day
- Remote operation and monitoring
- ROI in **3-4** years compared to AD's 5-6

WASE

Contact us:

WASE

CTO - William.Gambier@wase.co.uk

CEO - Thomas.Fudge@wase.co.uk