



W O I M A

CORPORATION

BROCHURE



waste WOIMA®CCUS
ZERO CARBON EMISSION
WtE POWER PLANT



waste WOIMA® CCUS

THE ZERO CARBON EMISSION WASTE-TO-ENERGY POWER PLANT

As part of the European Green Deal, the European Commission has raised the 2030 greenhouse gas emission reduction target to 55% compared to year 1990. Actions are required across all sectors, including increased energy efficiency, renewable energy generation, as well as carbon capture through storage and utilization. WOIMA has developed the *waste*WOIMA® CCUS waste-to-energy power plant to meet this challenge. The zero carbon emission plant will produce clean base-load energy and support increased renewable power generation.

The waste-to-energy power plants emit roughly 1,000 kg of CO₂ per ton of waste incinerated. This carbon dioxide is divided between fossil and biogenic origin, depending on the waste composition, i.e. the amount of organic waste in the feedstock. Typically, municipal solid waste (MSW) contains 20 to 60% of biowaste, while the more "engineered" waste fuels, like RDF, REF or SRF, contain less than 10%.

The incineration of the biogenic waste represents the renewable share in the recovered energy. With MSW as fuel this share is on average 55%. The incineration of the fossil waste component generates on average only 136 kgCO₂/MWh, which demonstrates significant emission savings compared to natural gas (202 kgCO₂/MWh) or coal (347 kgCO₂/MWh).

WOIMA uses the most cost- and energy-efficient technologies utilizing only safe and widely available chemicals in the CO₂ absorption. The *ccus*WOIMA® solution combines seamlessly with our *waste*WOIMA® power plant offering up to 95% capture rate. Modularity allows the customer to optimize the carbon capture level based on the fossil waste fuel ratio, regulatory requirements and/or economic feasibility.

The *waste*WOIMA® CCUS offers all the same benefits of robustness, movability and scalability as does the standard *waste*WOIMA® plant, but with reduced CO₂ emissions. The plant is designed for a 30-year lifespan in the harshest of conditions. The design is based on 20' and 40' sea-container-sized modules that are easy, fast and secure to transport to virtually any destination.

The *wasteWOIMA*[®] power plant's modularity is based on a *WOIMAline* (boiler island) ideology. The plant consists of one to four *WOIMAlines* each with the following parameters

- thermal efficiency 89%
- electrical efficiency 25%
- CHP efficiency 19% electricity / 68% thermal

The plant can also generate a combination of steam, thermal energy and electricity, and switch flexibly between the commodities, while reducing 0 - 95% of the CO₂ emissions.

The *wasteWOIMA*[®] CCUS is capable of handling a wide range of solid waste fuels, such as

- municipal solid waste (MSW)
- refined waste fuels (REF, RDF or SRF)
- industrial and commercial waste (ICI)
- construction and demolition waste (CDW)
- agricultural waste (AW)
- waste wood and
- different biomasses

The *ccusWOIMA*[®] solution is a stand-alone system that can also be installed in existing power plants without interruption to normal operations.

The *ccusWOIMA*[®] supports the two different approaches to carbon capture

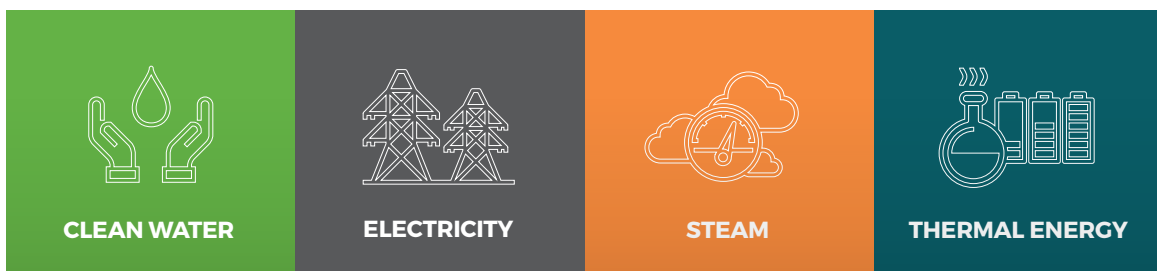
1. Carbon Capture and Storage (CCS), where CO₂ is compressed or liquefied and transported to a geological storage in the sub-surface rock formations, depleted oil and gas fields or deep saline formations.
2. Carbon Capture and Utilization (CCU), where CO₂ is recycled for further usage. Captured CO₂ can be converted to e.g. hydrocarbons, plastics, concrete and reactants for various chemical synthesis.

Our CO₂ compression, liquefaction and methanation solutions enhance the economic feasibility of carbon capture, as well as support the European Green Deal.



KEY FACTS

- Easy to build; established on a concrete slab of 2,000 - 8,000 m²
- Erection and commissioning within 4 months of delivery
- Simple operation; robust and proven technology
- Safe operation under any conditions
- Easy exchange of broken or worn-out plant components
- Remote monitoring of plant performance
- Capable of producing electricity, thermal energy and potable water
- Complies with the EU Emission Standards and the European Green Deal





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