EARTH SYSTEMS
Environment | Water | Sustainability

CharMaker CPP
continuous pyrolysis plant

Conversion of Waste Biomass to Biochar

A core expertise of Earth Systems is the development and application of technology for the pyrolytic conversion of waste biomass to energy and other useful solid and liquid products. The continuous pyrolysis furnace, the CharMaker CPP, has been designed and patented by Earth Systems to convert waste biomass to energy and a suite of high-value biochar and liquids products on site.

Earth Systems has developed a new Continuous Pyrolysis Plant (CPP) technology that allows biomass to be converted on-site into energy and high- value biochar and liquid products. Pyrolysis is the high-temperature treatment of biomass in a low-oxygen environment to produce a special form of char known as biochar.

The CPP has a shipping container footprint for simple integration with standard transport methods, making it possible to access stockpiles of biomass that would otherwise have required transport for disposal. Fixed installations are also possible where the biomass is transported to the CPP.

The technology is useful for the treatment of waste biomass that incurs cost for disposal. As well, the high temperature treatment is effective for high risk material such as invasive wood species, biosecurity risk or pathogen risk biomass providing a method of complete destruction. A sophisticated thermal oxidiser arrangement makes the technology suitable for contaminated biomass sources. The CPP units can also be deployed with heat energy recovery and bolt-on bio-liquids recovery for a longer-term fixed bioenergy hub arrangement.

KEY FEATURES OF THE CONTINUOUS PYROLYSIS PLANT

- Internationally patented technology based on a novel and rapid pyrolysis process for smaller sized biomass .
- Easily transportable unit with access to most remote areas or fixed installation.
- Continuous processing with up to 2 tph processing capacity. Small and large units are available.
- The CharMaker CPP can produce biochar at up to 350 kg/h.
- Processes all smaller fractioned feedstocks including wood chip, mulch, nut shells, cotton gin waste, biosolids etc.
- Continuous processing designed for automated operation. 24/7 operation possible with suitable automated feed system.
- Targeted temperature range can be selected (400–550°C).
- Destruction of all pathogens.
- High-quality char product with a high fixed carbon content.
- Very low to zero smoke emissions.
- Minimal operating costs: unit is fully automated.

- Global remote connectivity via smart phone and computer. Monitor, data log and operate globally.
- High thermal energy output with capacity for high-grade heat export to industrial processes.
- Bolt on bio-liquids recovery plant also available for pyroligneous liquids (wood vinegar/smoke water) and bio-oil.

RECENT APPLICATIONS

- Conversion of cotton gin trash to biochar for a gin in NSW.
- Conversion of biosolids samples to char with RMIT University.
- Biochar demonstrations for farming and agricultural use across Australia.

KEY BENEFITS OF BIOMASS TO BIOCHAR CONVERSION

- Reduce waste volumes by up to 90%. Reduce waste disposal costs. Create a high value biochar product with soil benefits.
- Carbon is locked in stable biochar to reduce CO2 emissions.
- Depending on feedstock, biochar may be suitable for resale as agricultural, horticultural, or activated charcoal.

For more information: www.esenergy.com.au

What is Biochar?

Biochar is produced from biomass (typically plant matter), and has received much interest for its potential uses in improving soil properties and for capturing and storing carbon. Potential benefits include improved nutrient and water retention, reduced soil acidity, increased cation exchange capacity, and increased habitat for beneficial soil microbes.

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EARTH SYSTEMS
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CharMaker MPP
mobile pyrolysis plant

Conversion of Waste Wood to Biochar

A core expertise of Earth Systems is the development and application of technology for the pyrolytic conversion of biomass to energy and other useful solid and liquid products. The mobile batch pyrolysis furnace, the CharMaker MPP, has been designed, manufactured and patented by Earth Systems to convert woody biomass waste to a high-value biochar product on site.

Earth Systems has developed a new mobile pyrolysis plant (MPP) technology that allows biomass to be converted on-site into high-value biochar products.

Pyrolysis is the high-temperature treatment of woody waste in a low-oxygen environment to produce a special form of char known as biochar, which has a variety of valuable applications.

The mobile pyrolysis plant has a shipping container form factor for simple integration with standard transport methods, making it possible to access stockpiles of woody biomass that would otherwise have required removal and transport for disposal or conversion.

The technology is particularly useful for the treatment of invasive pest tree and plant species, providing a method of complete destruction with minimal risk of spread. A sophisticated thermal oxidiser arrangement also makes the technology suitable for contaminated biomass sources where contaminants can be volatilised and destroyed in the high-temperature afterburner flue system. The MPP units can also be deployed in batteries with a bolt-on bio-liquids recovery system for a longer-term fixed bioenergy hub arrangement.

- Global remote connectivity via smart phone and computer.
- Designed for farm and forestry machinery operation.
- High thermal energy output with capacity for high-grade heat export to industrial processes.
- Bolt on bio-liquids recovery plant also available for pyroligneous liquids (wood vinegar/smoke water) and bio-oil.

KEY FEATURES OF THE MOBILE PYROLYSIS PLANT

- Internationally patented technology based on a novel and rapid pyrolysis process for large-sized woody biomass.
- Easily transportable unit with access to most remote areas.
- Batch processing with 32 and 43 m^3 internal volume per batch for the MPP40 units.
- Pyrolysis converts biomass to 2–4 tonnes of biochar per batch.
- Processes all larger wood feedstocks, including logs. Minimal feedstock pre-treatment is required (no chipping required).
- Batch processing takes a few hours (normally 4–6 hrs per batch)
- Targeted temperature range can be selected (300–550 °C).
- Destruction of all pathogens.
- High-quality char product with a very high fixed carbon content.
- Very low to zero smoke emissions.
- Minimal operating costs: unit operates itself after loading with auto-turn off at end of run, and can be operated unattended.

RECENT APPLICATIONS

- Conversion of waste willow wood to biochar for waste management as part of an Australian government waterways program.
- Conversion of industrial hardwood flooring to saleable char for a government authority in Australia.
- Safe destruction of contaminated wood products for a major Australian industrial.
- Demonstrations for farming and agricultural use across Australia.

KEY BENEFITS OF BIOMASS TO BIOCHAR CONVERSION

- Reduce waste volumes by up to 90%.
- Carbon is locked in stable biochar to reduce CO_2 emissions.
- Depending on feedstock, biochar may be suitable for resale as agricultural, horticultural or activated charcoal.

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