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Charvester development for a sustainable biomass production

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Concepts

In recent years, the usage of biomass for heating purposes of houses has increased as a means to replace burning of fossil fuels. However, this will lead to a decreased amount of soil organic matter.

A sustainable solution to this problem would be to convert some of the organic matter into stable biochar, mimicking humus.

Already existing techniques can be used for gathering biomass for pyrolysis, while suitable equipment for pyrolysis needs to be developed. As the energy needed for collection of biomass with a mobile unit increase linearly with the area of collection, while it increases with the square for a stationary unit, a mobile unit is chosen.

The current state of the Swedish **Charvester** project is to create a prototype for a mobile pyrolyser autonomously moving using the pyrolysis heat for mechanical work. Possibly, a surplus fraction of the pyrolysis gases will be used as feedstock to the synthetic industry. The produced char will be optimized for biological virtues, machinery size and process time.

A preliminary study indicates an excess of energy from the entire process.



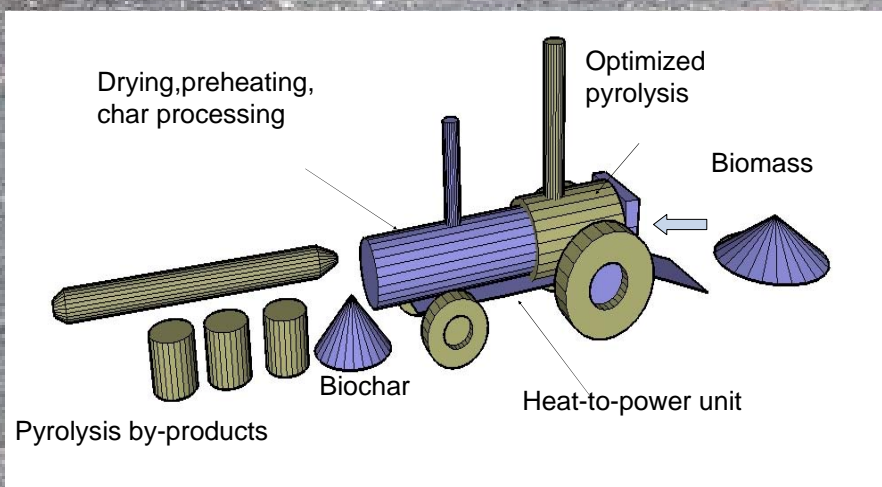
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Potential global biomass sources for charring

- Straw and husk 1.2 Gt → 0.36 Gt char
- Wood for fuel 1.7 Gt → 0.51 Gt char
- World paper use 1 Gt → 0.3 Gt char
- Forestry surplus 1.8 Gt → 0.54 Gt char

Pyrolysing stoves 1.2 Gt → 0.36 Gt char
 Annual sum 2.07 Gt char

Based on an estimated capacity of 500 kg char/hour and a utility factor of 68%, a large part of the globally possible charring could be achieved with 1 – 6 million charvesters.



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