




BEST


Bioenergy and
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Pyrolysis of biogenic feedstocks and biochar production at the GreenCarbonLab

Wieselburg, 23. September 2025

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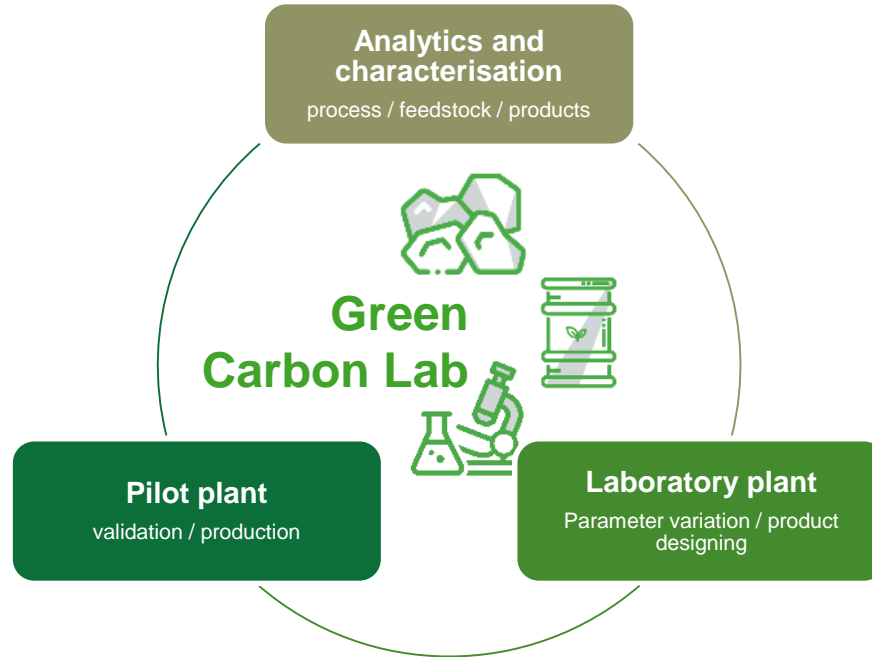
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GreenCarbon-Lab – from lab to pilot



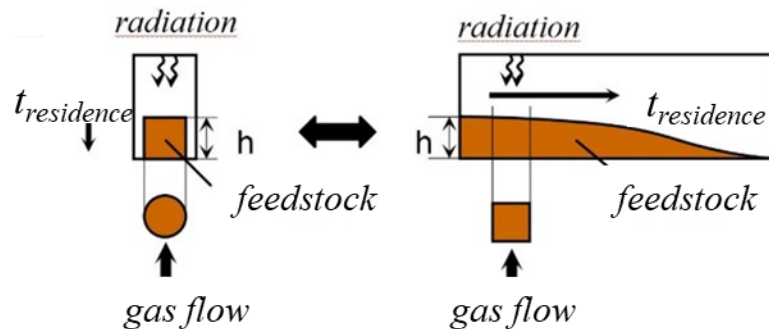
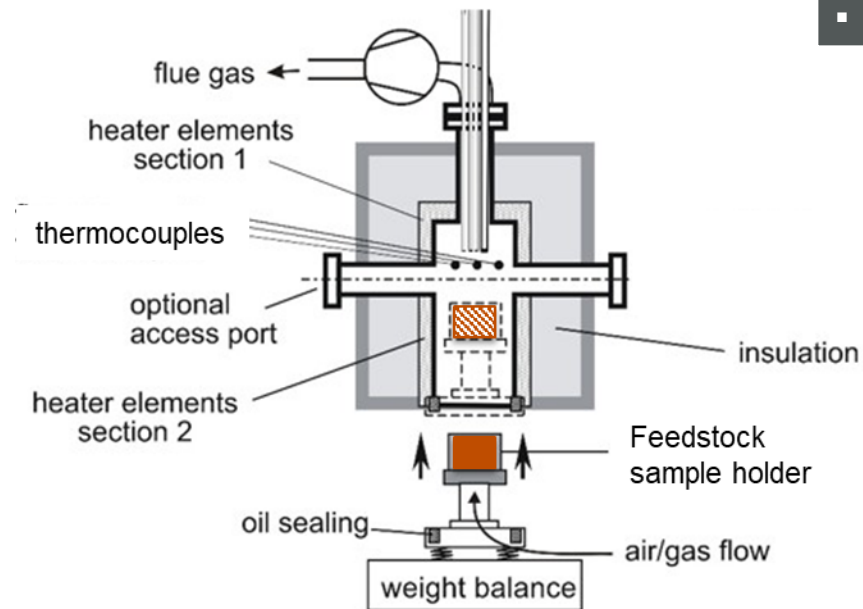
GreenCarbon-Lab - from lab to pilot

Method	Fuel input / capacity	Information – output
Thermogravimetric analysis + Steam-TGA, + FT-IR- coupling	50 mg	Reaction kinetics
Single Particle Reactor	3 g 1 pellet / particle	Influence of temperatur, atmosphere on conversion chracteristics
flex200 Muffle furnace	200 g	Batch operation
flex400 Laboratory-reaktor	250 g – 400 g	Fuel bed / bulk
pyro2k Pyrolysis unit – lab scale	2kg/h ~ 20 kW	Raw material-Tests (stationary), parameter-study (residence time, temperature, throughput, ...), product design
pyro90k Pyrolysis unit – pilot scale	90 kg/h ~ 150 kW	Validation of lab tests, production of test batches

GreenCarbon Lab – flex400 pyrolysis – gasification - combustion

Batch reactor

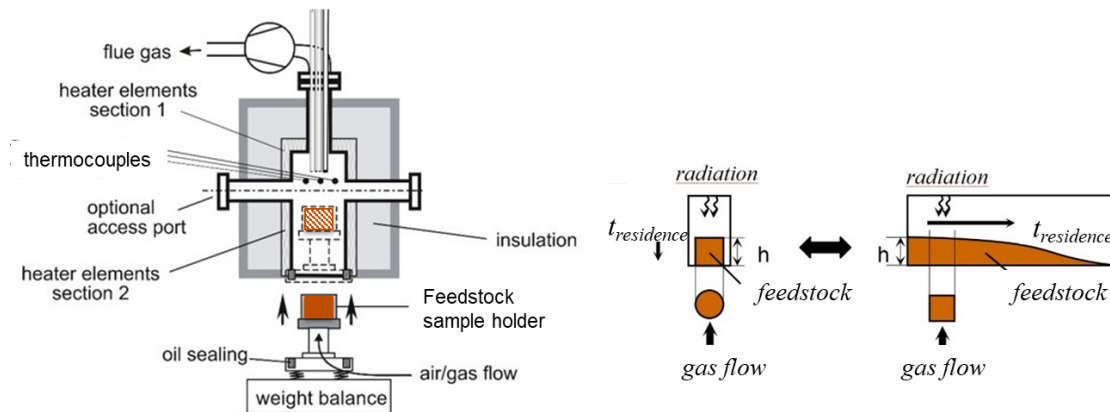
- up to 400g feedstock
- 1000 °C
- heating rate up to 20°C/min
- variable gas atmosphere



GreenCarbon Lab – flex400 pyrolysis – gasification - combustion

Batch reactor

- up to 400g feedstock
- 1000 °C
- heating rate up to 20°C/min
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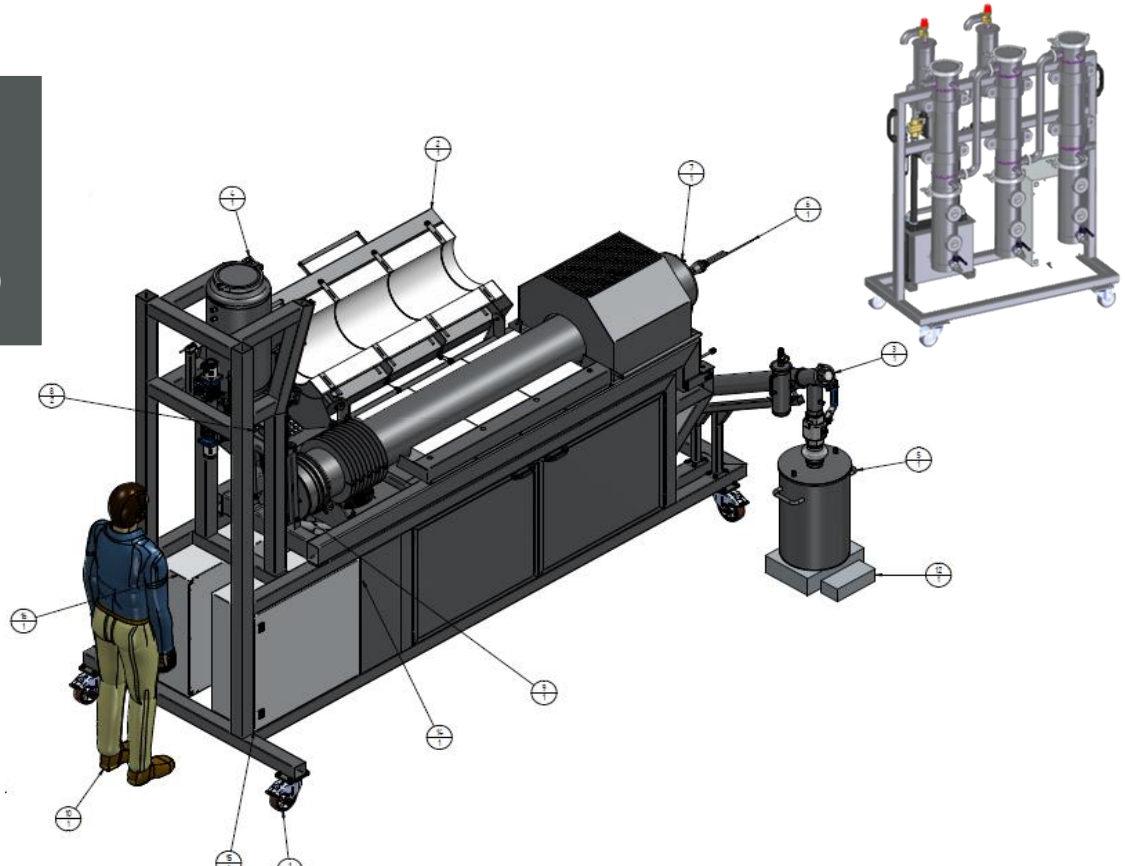


feedstock behaviour – first product samples – process innovation tests

GreenCarbon Lab – pyro2k

Rotary kiln – lab-scale

- 2 kg/h feedstock input
- 3 temperature zones
- 200° - 1000°C
- Variable residence time (10-60mins)
- Defined gas atmosphere



GreenCarbon Lab – pyro2k



Europäische Union

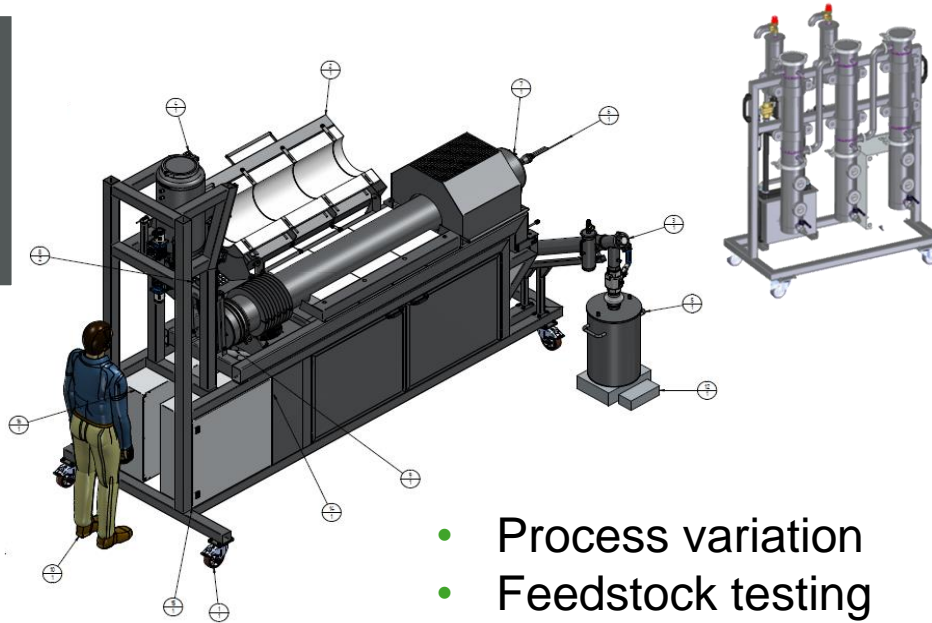


Investitionen in Wachstum & Beschäftigung. Österreich.



Rotary kiln – lab-scale

- 2 kg/h feedstock input
- 3 temperature zones
- 200° - 1000°C
- Variable residence time (10-60mins)
- Defined gas atmosphere



- Process variation
- Feedstock testing
- Product sample production
- Mass- and energy balances

GreenCarbon Lab – pyro 90k



Europäische Union

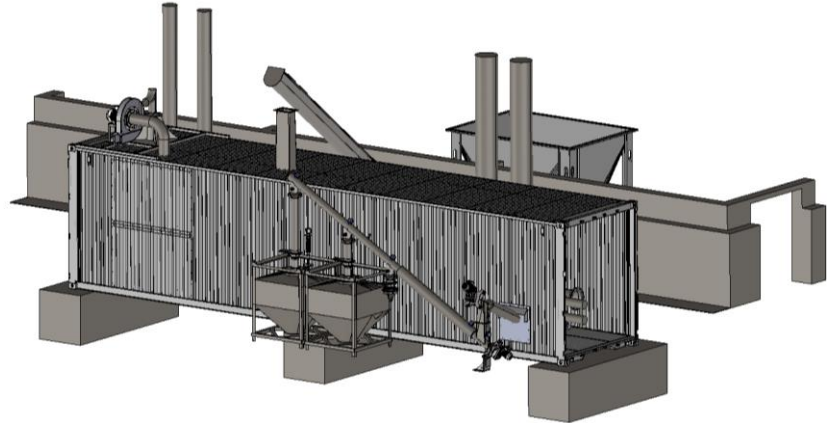


Investitionen in Wachstum & Beschäftigung. Österreich.



double-auger – pilot-scale

- 90kg/h input
- 25 – 30 kg char /h
- 3 temperature zones
- 300° - 800°C
- Defined process conditions
- Direct combustion of pyrolysis gases



GreenCarbon Lab – pyro 90k



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Investitionen in Wachstum & Beschäftigung. Österreich.

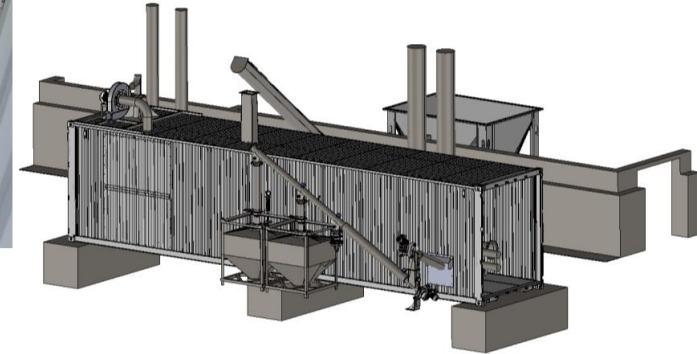


- validation of biochar-„recipes“
- Pilot testing for biochar applications
- Long-term tests (24/7)
 - deposits
 - corrosion



double-auger – pilot-scale

- 90kg/h input
- 25 – 30 kg char /h
- 3 temperature zones
- 300° - 800°C
- Defined process conditions
- Direct combustion of pyrolysis gases



GreenCarbon Lab – Feedstock-tests



Spruce pellets



Wood chips



Coffee husks



Poplar pellets



Walnut shells



**Compost screening
overflow**



Sunflower kernel



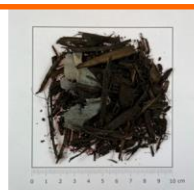
**Sunflower kernel
husks**



Tobacco stalks



Wheat bran



**Compost screening
overflow**



Sunflower kernel



**Sunflower kernel
husks**



Tobacco stalks



Wheat bran



**Compost screening
overflow**



Sunflower kernel



**Sunflower kernel
husks**



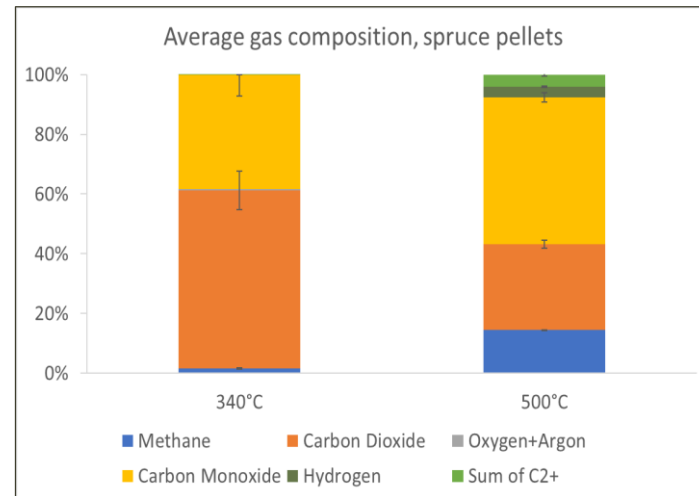
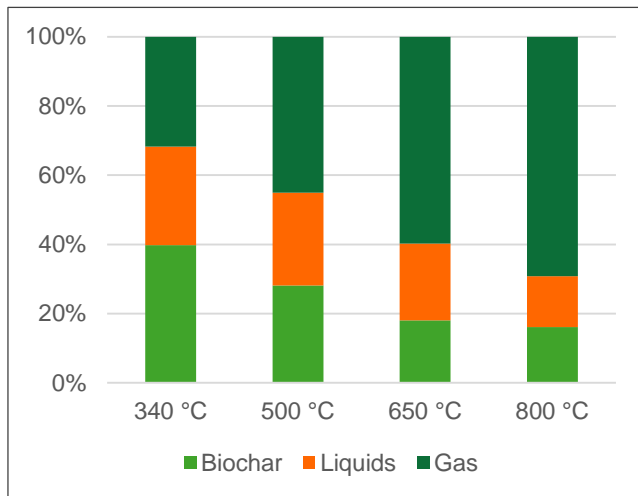
Tobacco stalks



Wheat bran

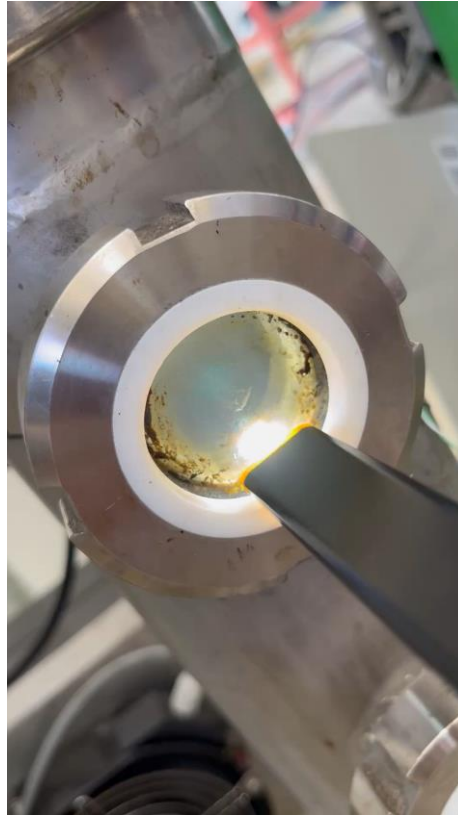
just started!

GreenCarbon Lab – pyrolysis temperature impact



Product quality
Product yields
Energy efficiency

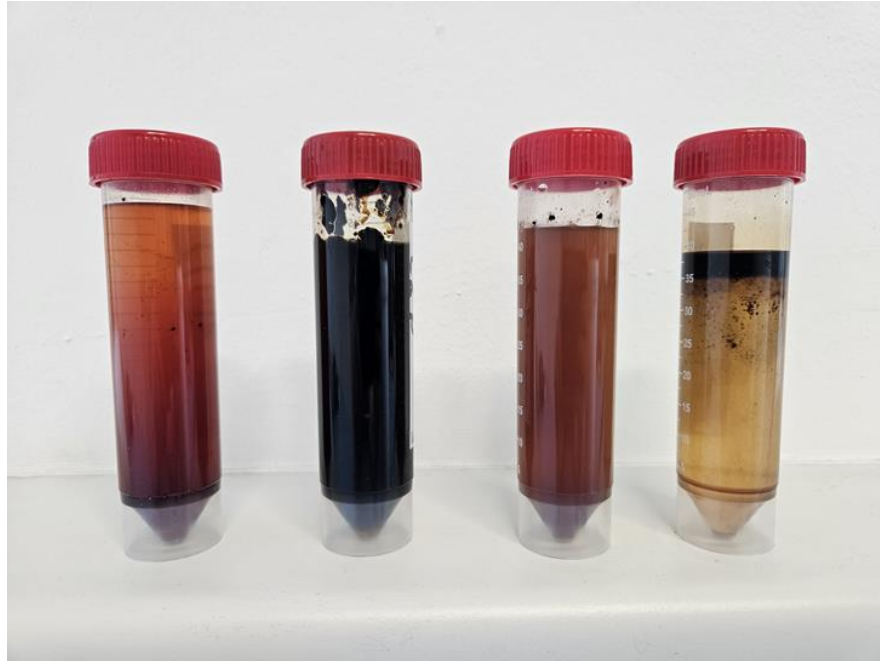
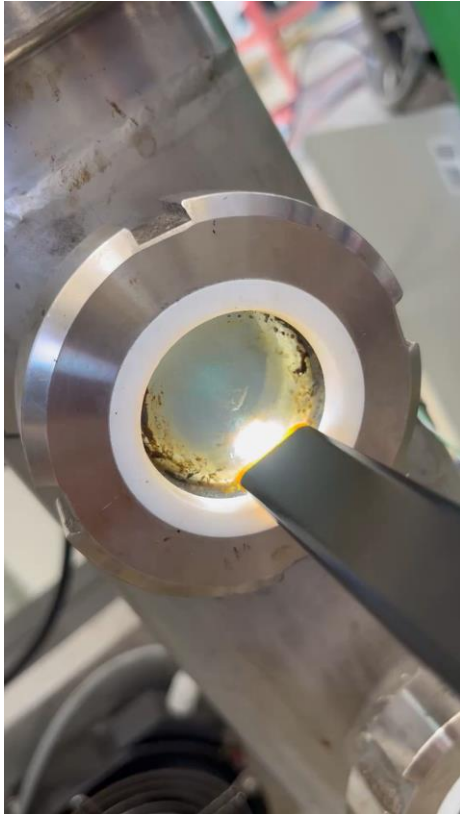
GreenCarbon Lab – pyrolysis liquids



ESP **on**....

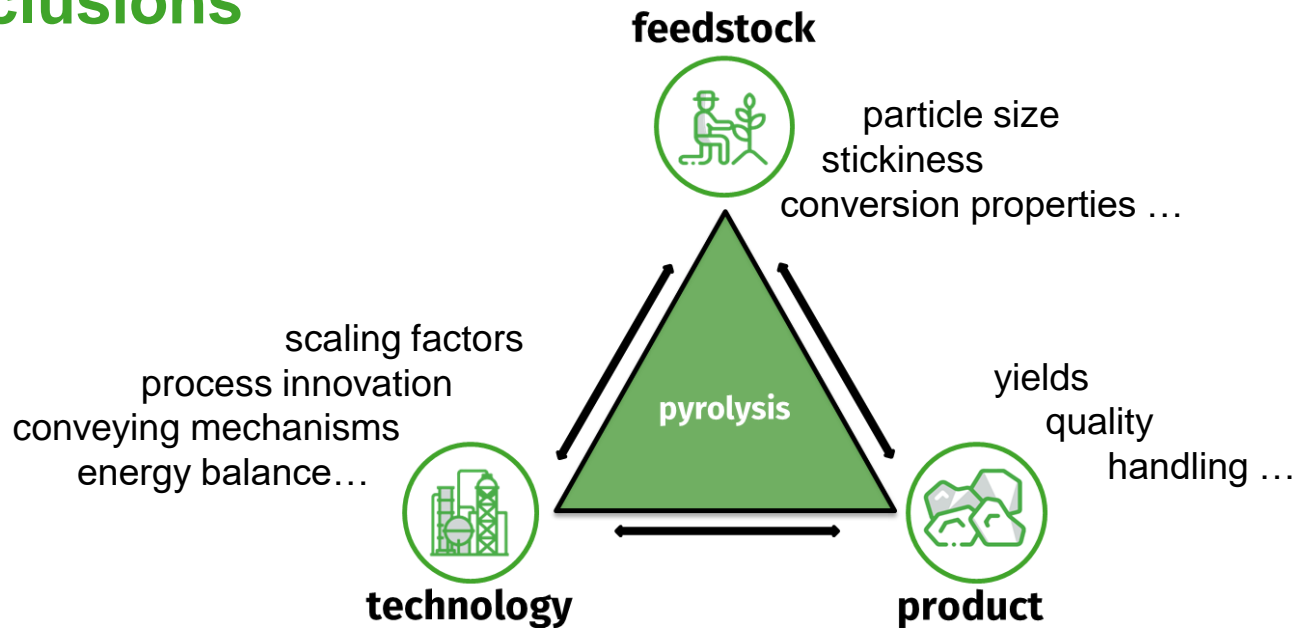
ESP **off**....

GreenCarbon Lab – pyrolysis liquids



... up to 7% of feedstock input!

Conclusions



... any Questions?



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