

# The carbon makes the difference

Decentralised wood power plant with  
valuable carbon as by-product

IEA Bioenergy Task 33 Workshop  
“Small scale gasification CHP”  
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Marcel Huber

# The company



Wood gas power plant



Process engineering



Automation

- Supplier of turn-key wood power plants
- Consultants for process engineering
- Company for automation and mechatronics
- Head quarter in Austria / Tyrol (Schwaz and Aschau)
- Foundation 2009

# The wood power plant

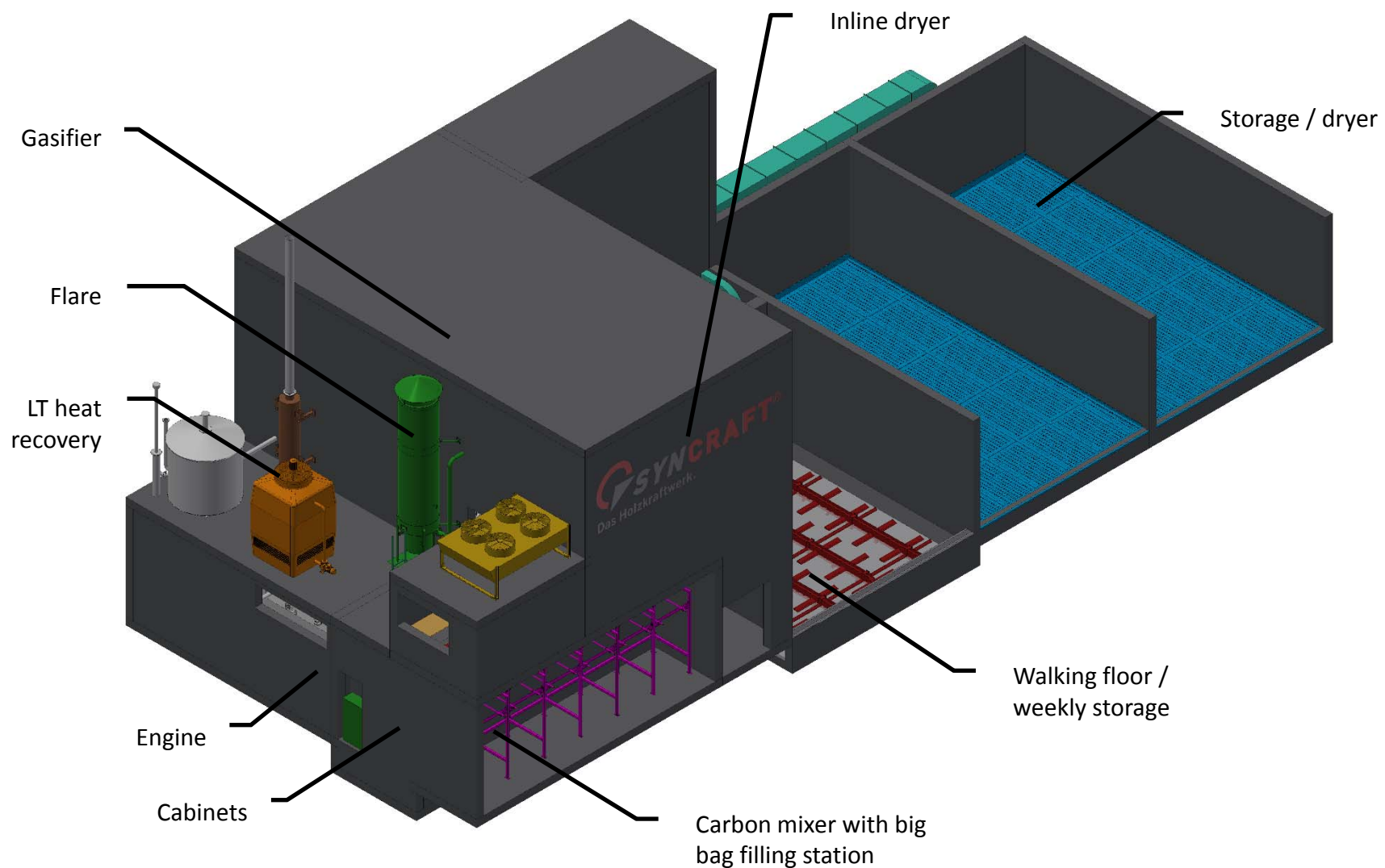


## Wood power plants in the power range up to 400kW\*

	<b>CW 700-200</b>	<b>CW 1000-300</b>	<b>CW 1200-400</b>
Electrical power	200 kW	300 kW	400 kW
Thermal power (basic variant)	326 kW	488 kW	615 kW
Thermal power up to	481 kW	719 kW	920 kW
Fuel heat capacity	721 kW	1.067 kW	1.368 kW
Fuel demand	140 kg/h	208 kg/h	267 kg/h
Specific fuel demand	0.70 kg/kWh <sub>el</sub>	0.69 kg/kWh <sub>el</sub>	0.67 kg/kWh <sub>el</sub>
Charcoal by-product	1.95 m <sup>3</sup> /d	2.9 m <sup>3</sup> /d	3.7 m <sup>3</sup> /d

\* In combination of multiple plants in parallel higher power levels are achievable

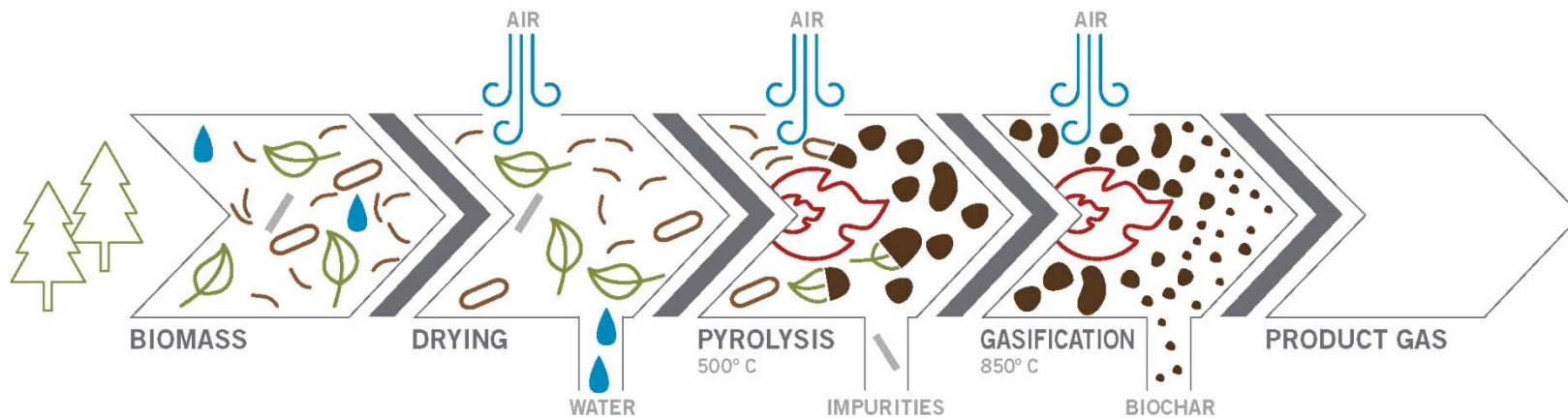
# The wood power plant





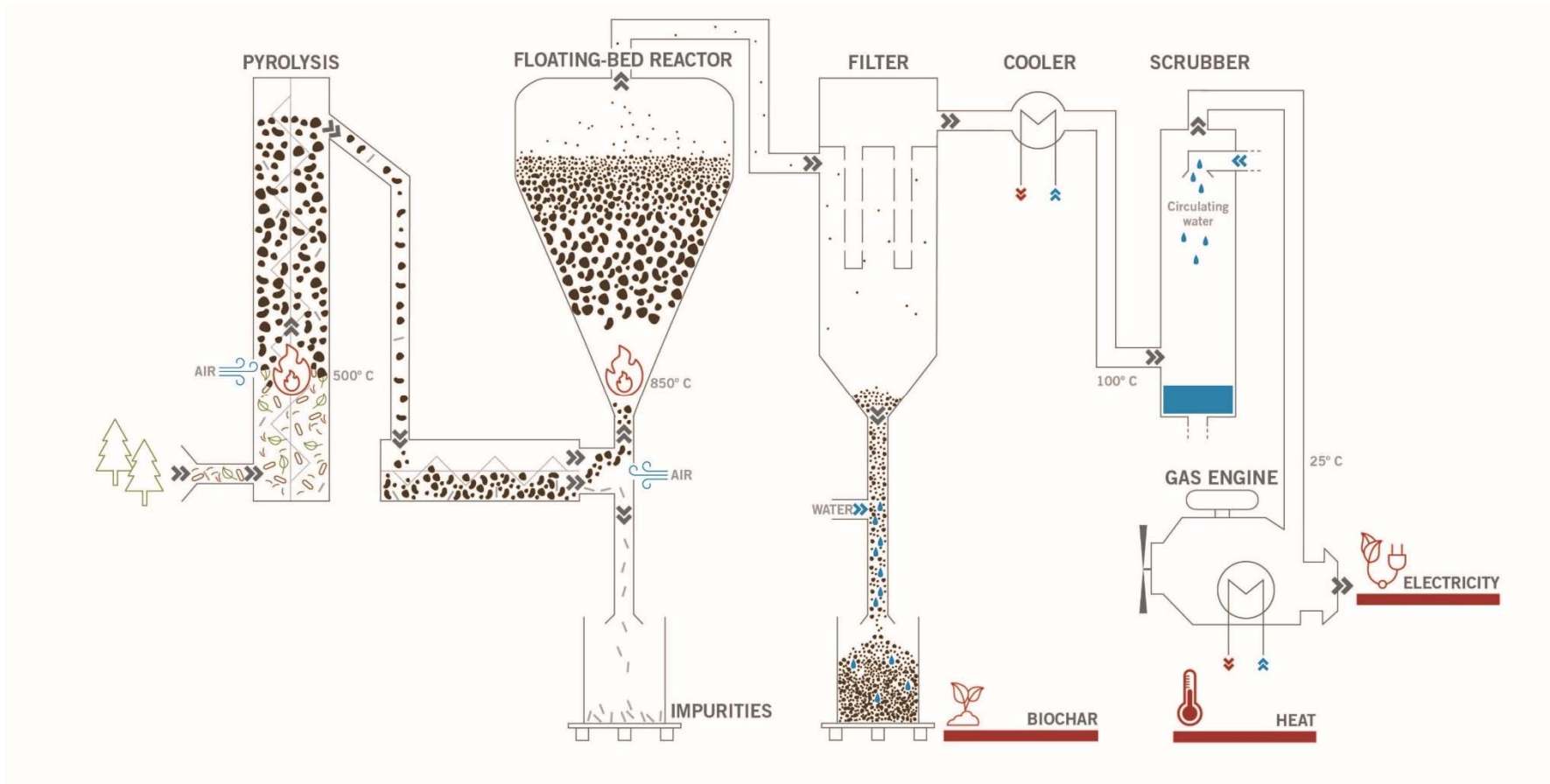
# The process

## Process flow scheme



Multi-staged conversion process of wet, solid biomass into a clean producer gas.

# The technology



**The fuel including  
fines and bark**







**Clear condensate  
without any treatment**

**By-product**

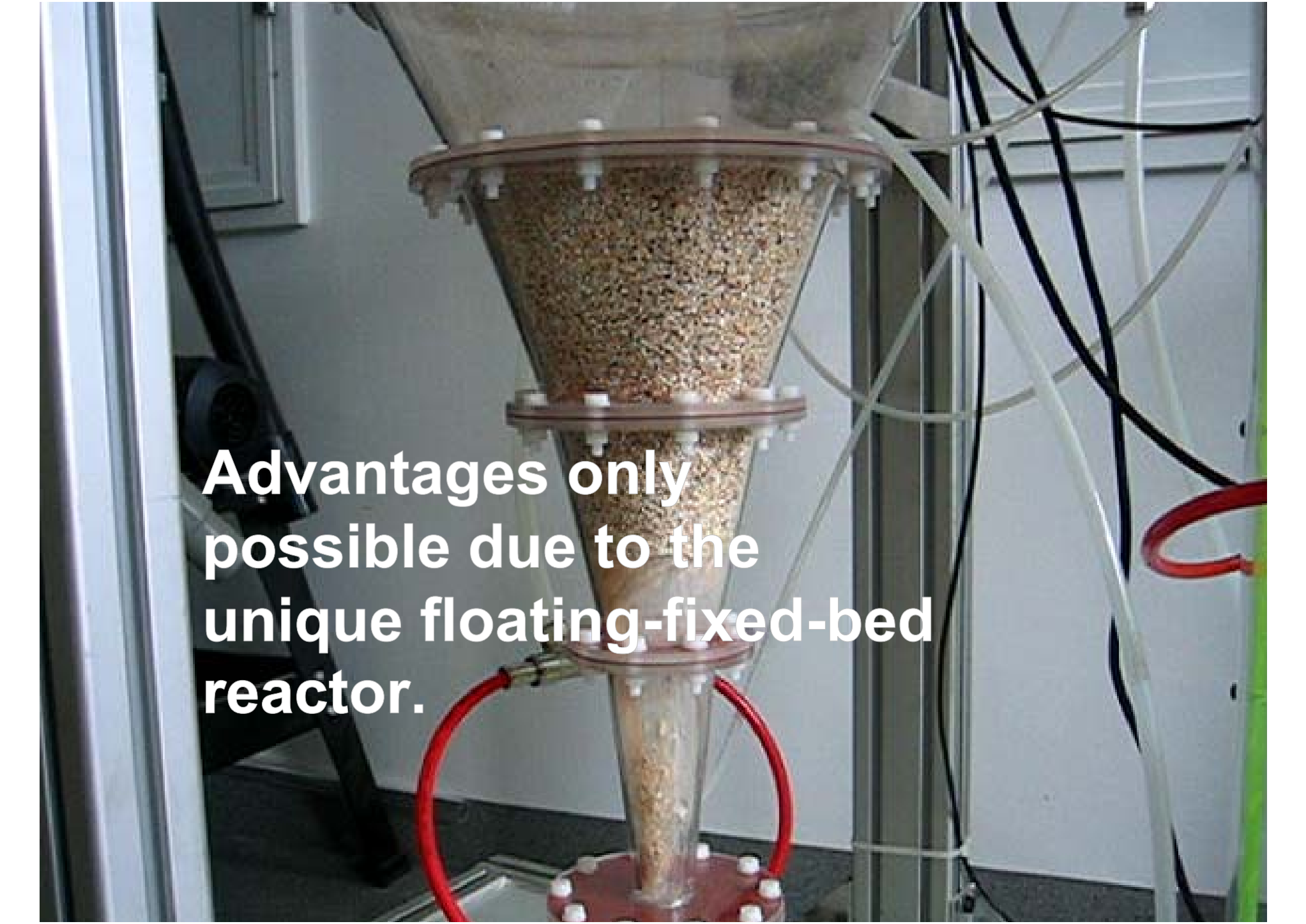
**Premium Biochar / Charcoal**





**> 30%\* electric  
overall efficiency**

\* approved by TÜV Süd over a measurement period of 1 day based on wood chips with 5% water content. Approval done on behalf of the client Innsbrucker Kommunalbetriebe AG.



**Advantages only possible due to the unique floating-fixed-bed reactor.**

## Disposal path

- Used PAC\*\* (not contaminated)
- Used PAC (contaminated\*)
- Biomass-ash

## Disposal costs

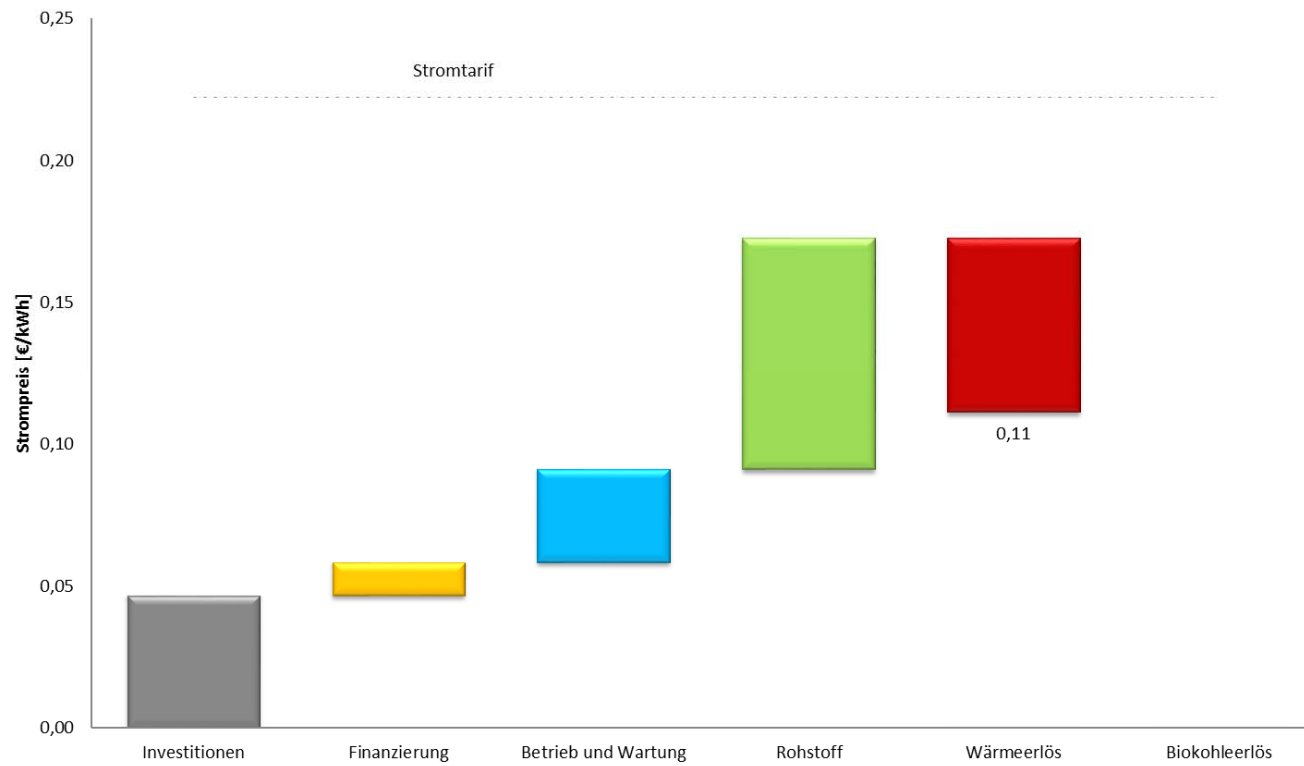
**50 - 200 EUR/t**

\*critical parameter: PAH 16 above or below 1,000 mg/kg

\*\* PAC = pulverised activated carbon

# Disposal path

## Disposal costs ~20.000 EUR/a



## Utilisation path 1



- Biochar / Terra preta production
- Manure treatment

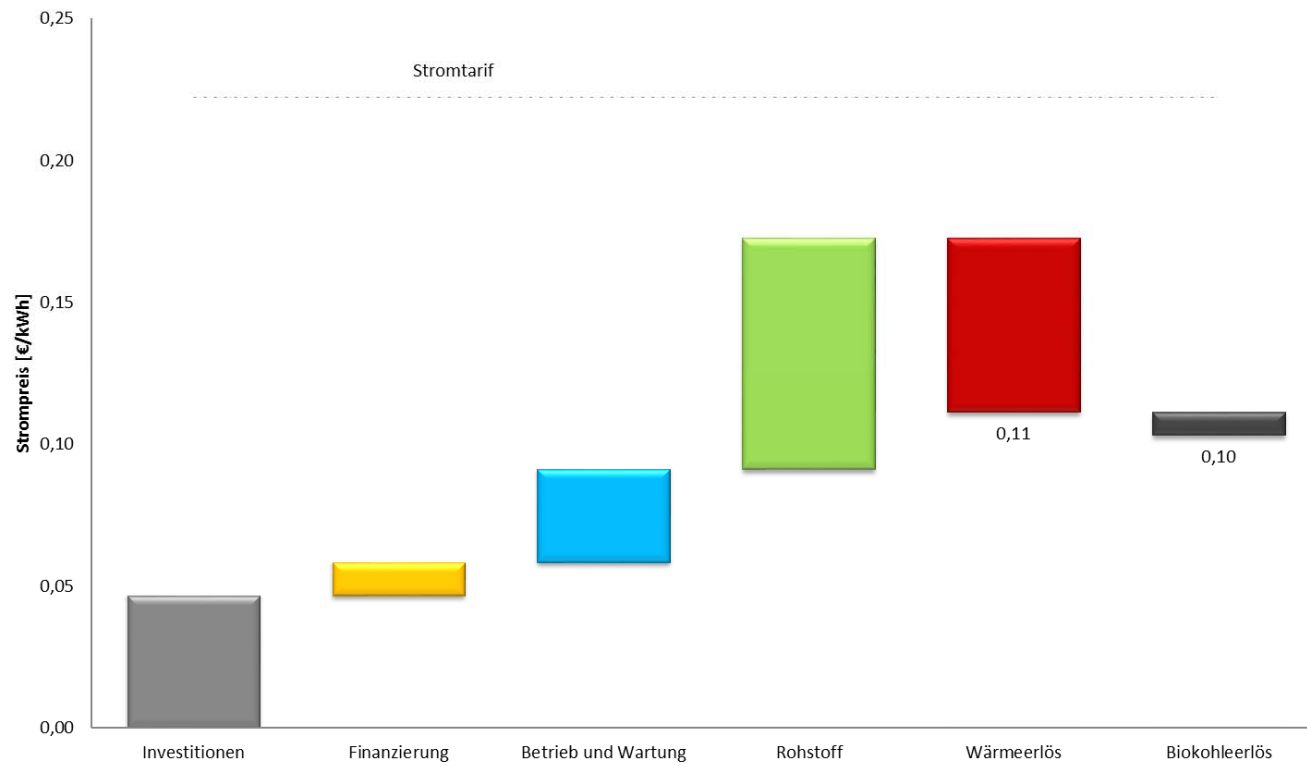
Market price

200\* EUR/t

\*200 – 300 EUR/t effective earnings at present by our customers

# Utilisation path 1

## Charcoal “pays” labour costs





## Utilisation path 2

- BBQ charcoal
- Premium-Biochar



Source: SYNCRAFT

Market price  
1,000\* EUR/t

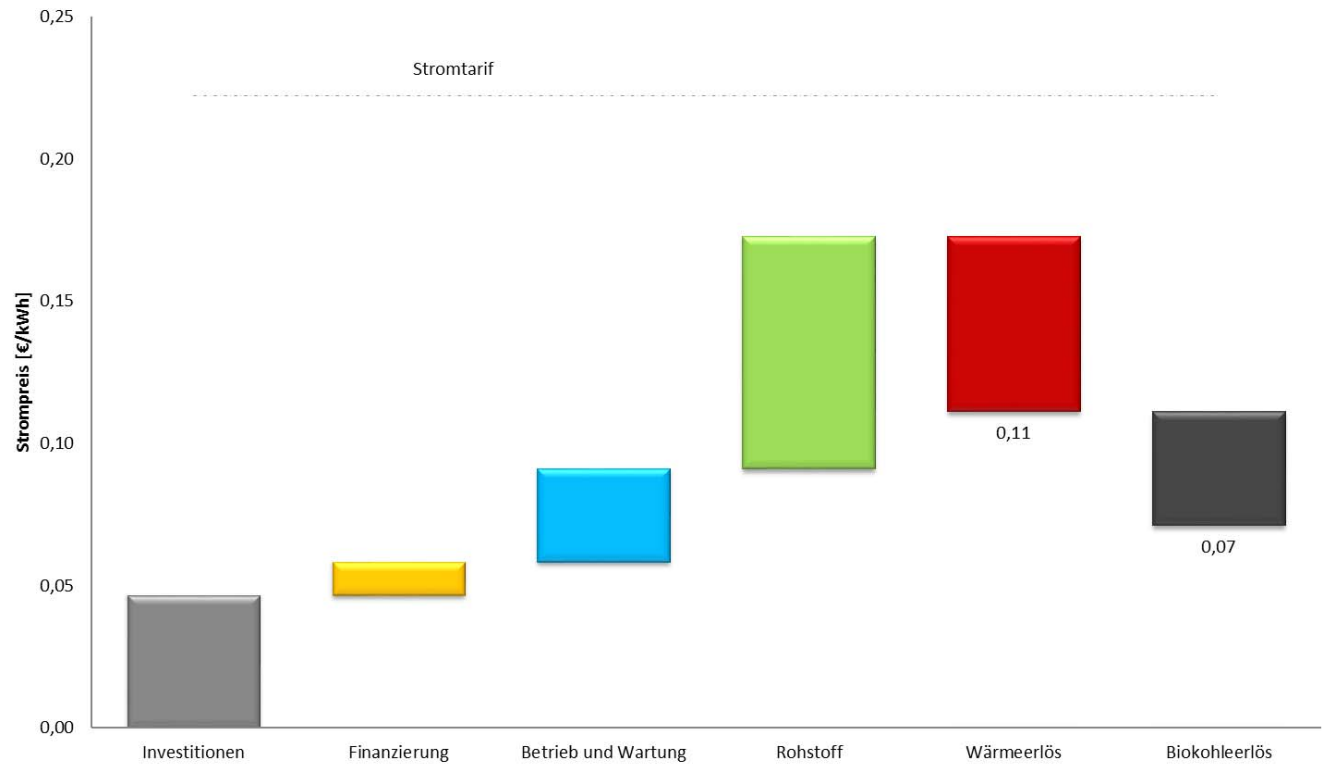


Source: EGOS

# Utilisation path 2



## Charcoal “pays” for operation and financing



## Utilisation path 3

- Animal feeding
- PAC\*

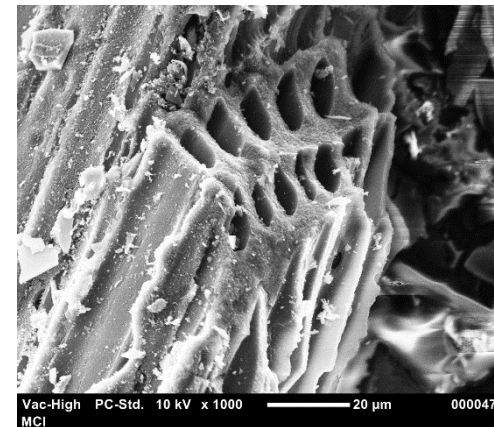
Market price

1,500 (up to 28k) EUR/t

\*SYNCRAFT®Kohle - 350m<sup>2</sup>/g



Source: Charline

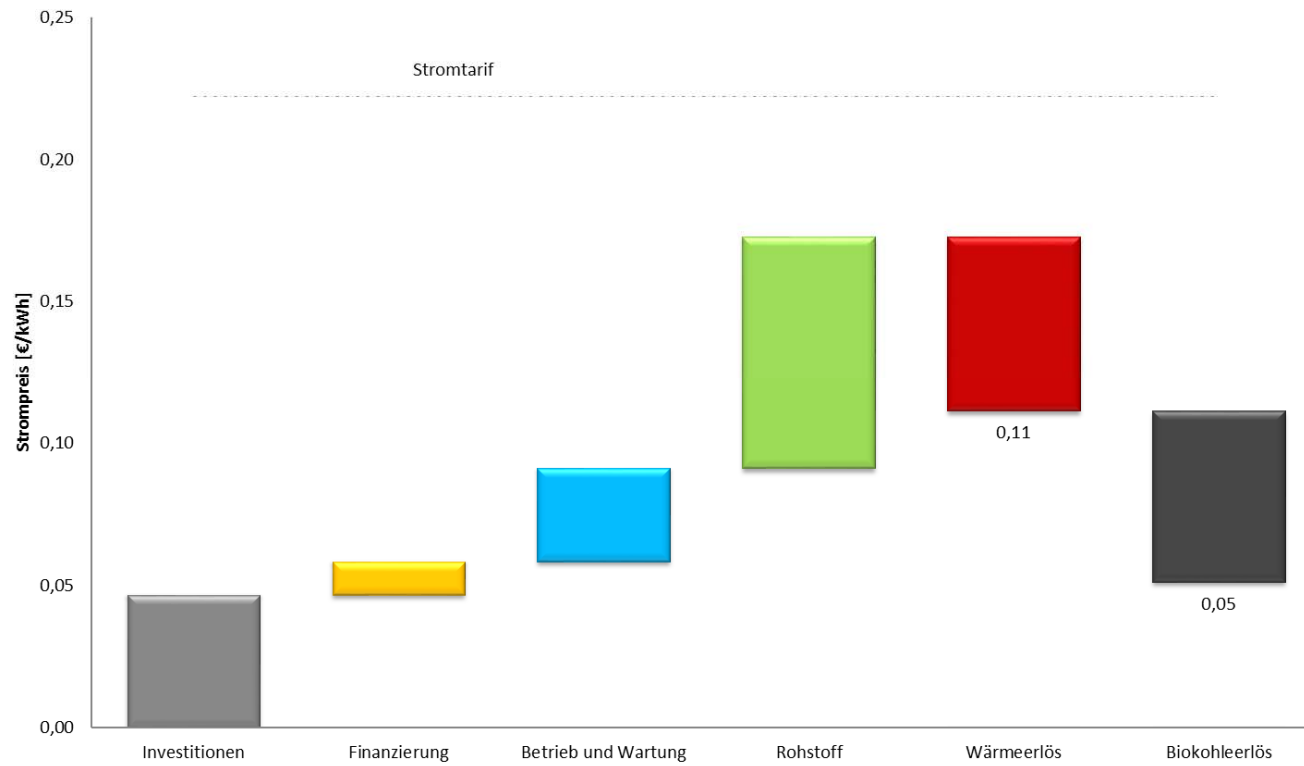


Source: MCI

# Utilisation path 3



## Turnover charcoal 180.000 EUR per year



# The Summary

- Decentralised wood power plant
- Total efficiency of 92% due to LT recovery
- > 30% electric efficiency from dry wood due to gasifier/gasengine combination
- High potential for further economic performance boost due to high-quality charcoal as by-product
- Outlook of CoE below 7 cent/kWh possible

## The References (selected)



**SYNCRAFT®Werk CW 1000-300 / Innsbruck / AT**  
Commissioned early **2017**; produces **261kW** power and **601kW** heat. Delivered including low-temperature heat utilisation and dryer.



**SYNCRAFT®Werk CW 1200-400 / Stadl / AT**  
Commissioned end **2016**; produces **324kW** power and **784KW** heat. Delivered including low-temperature heat utilisation and dryer.



**SYNCRAFT®Werk CW 700-200 / Dornbirn / AT**  
Commissioned end **2014**; produces **220kW** power and **500kW** heat. Delivered with 185kW power. Low-temperature heat utilisation retrofitted 2016.



**SYNCRAFT®Werk CW 1000-300 / Vierschach / IT**  
Commissioned mid **2014**; produces **300kW** power and **488kW** heat. Gas engine, dryer and feeding system supplied by customer.

