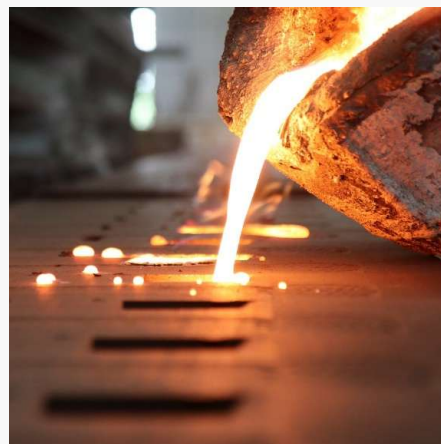
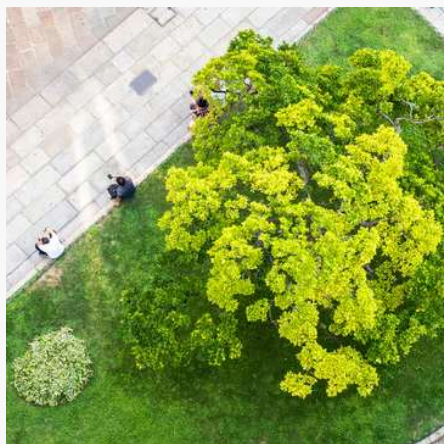
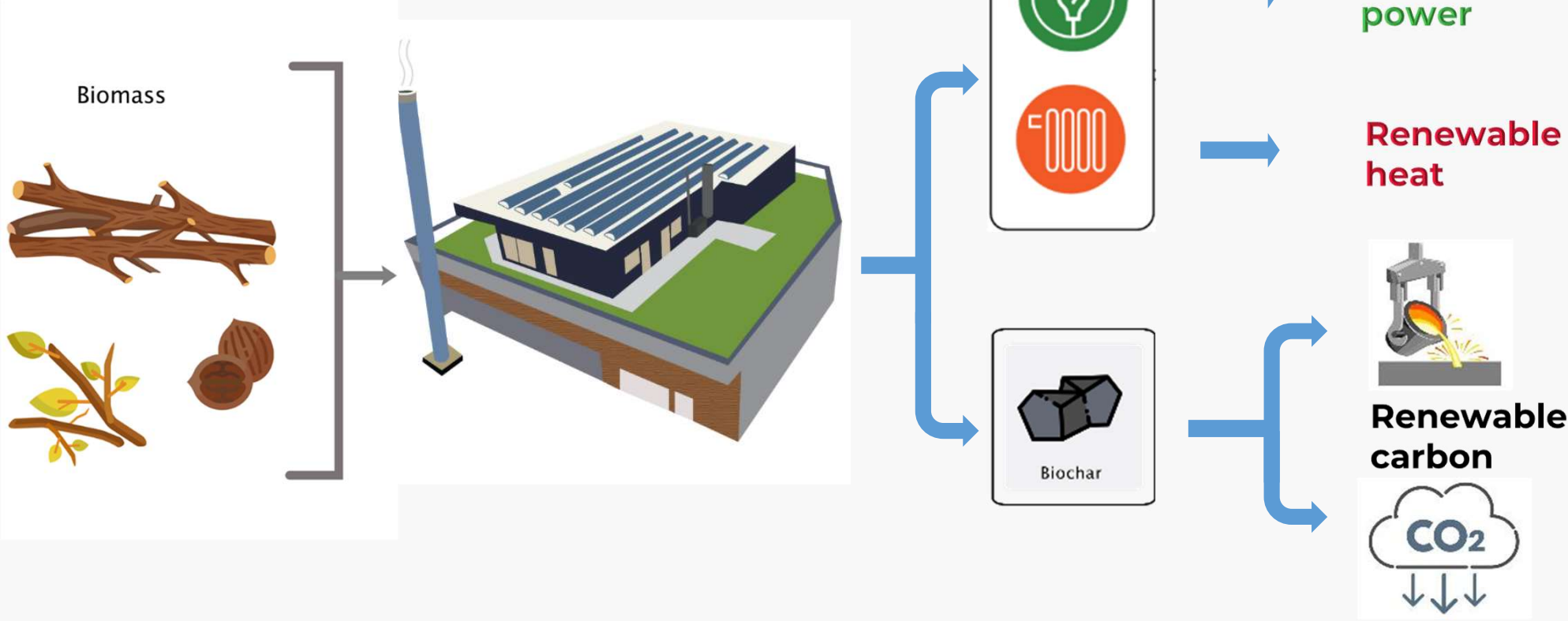


How are the biochar markets developing in the near future?

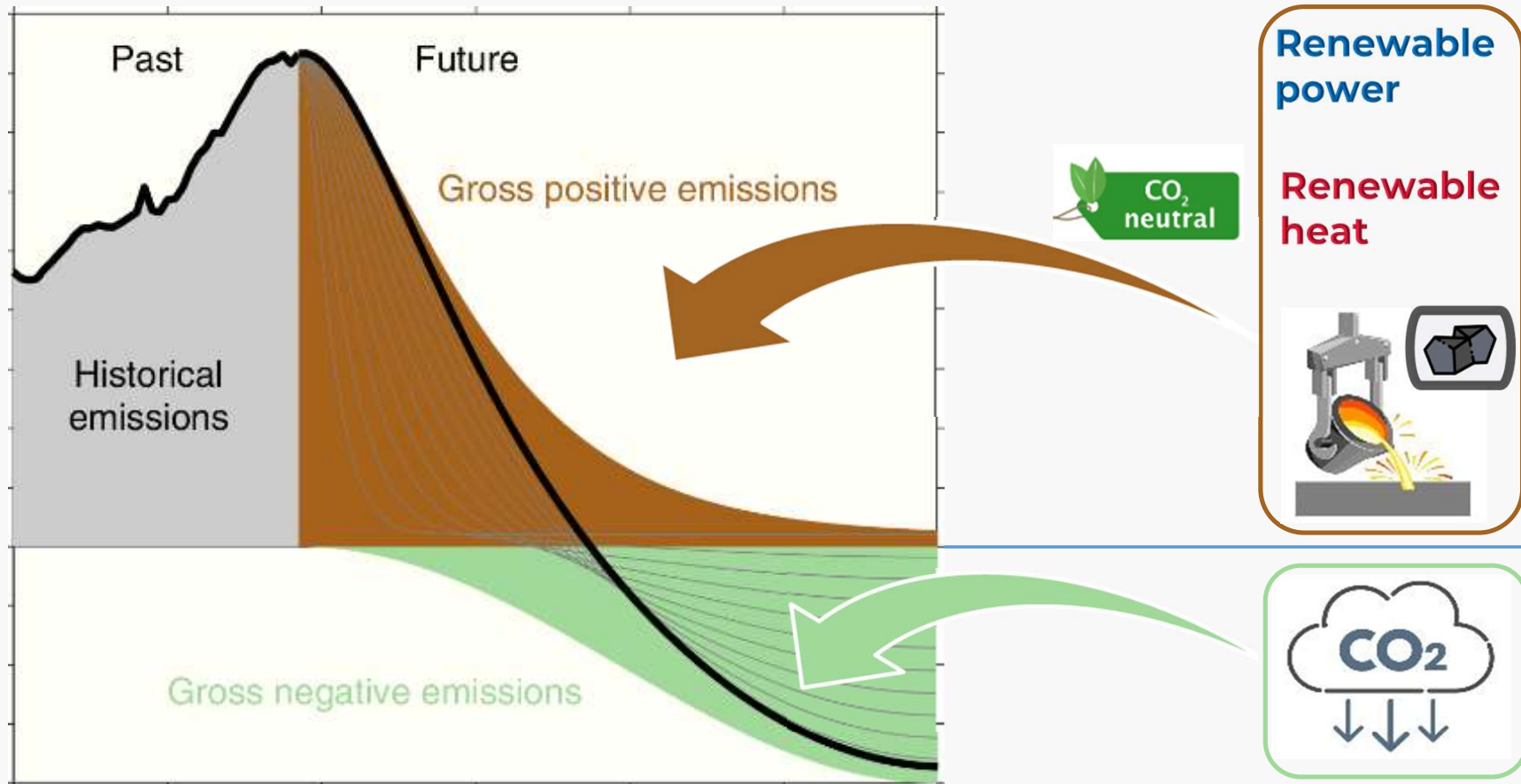
Dr. Claus Möllmann, CEO Carbuna AG



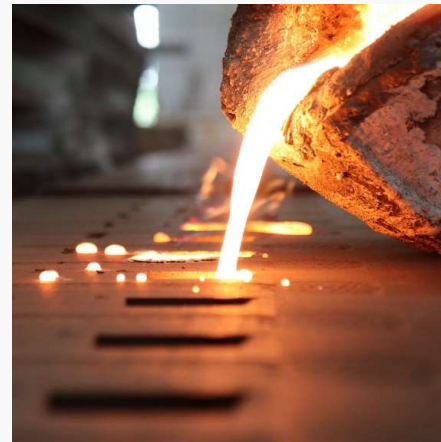
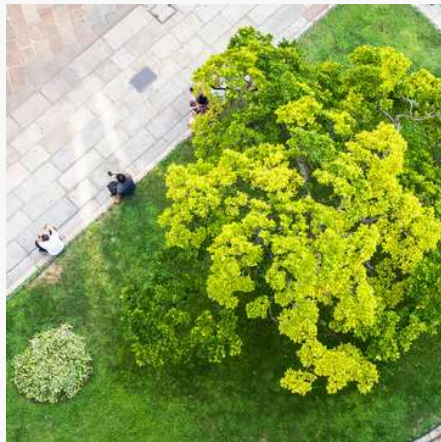
Use of biomass for **emission reduction** and **carbon removal**



Use of biomass for **emission reduction** and **carbon removal**

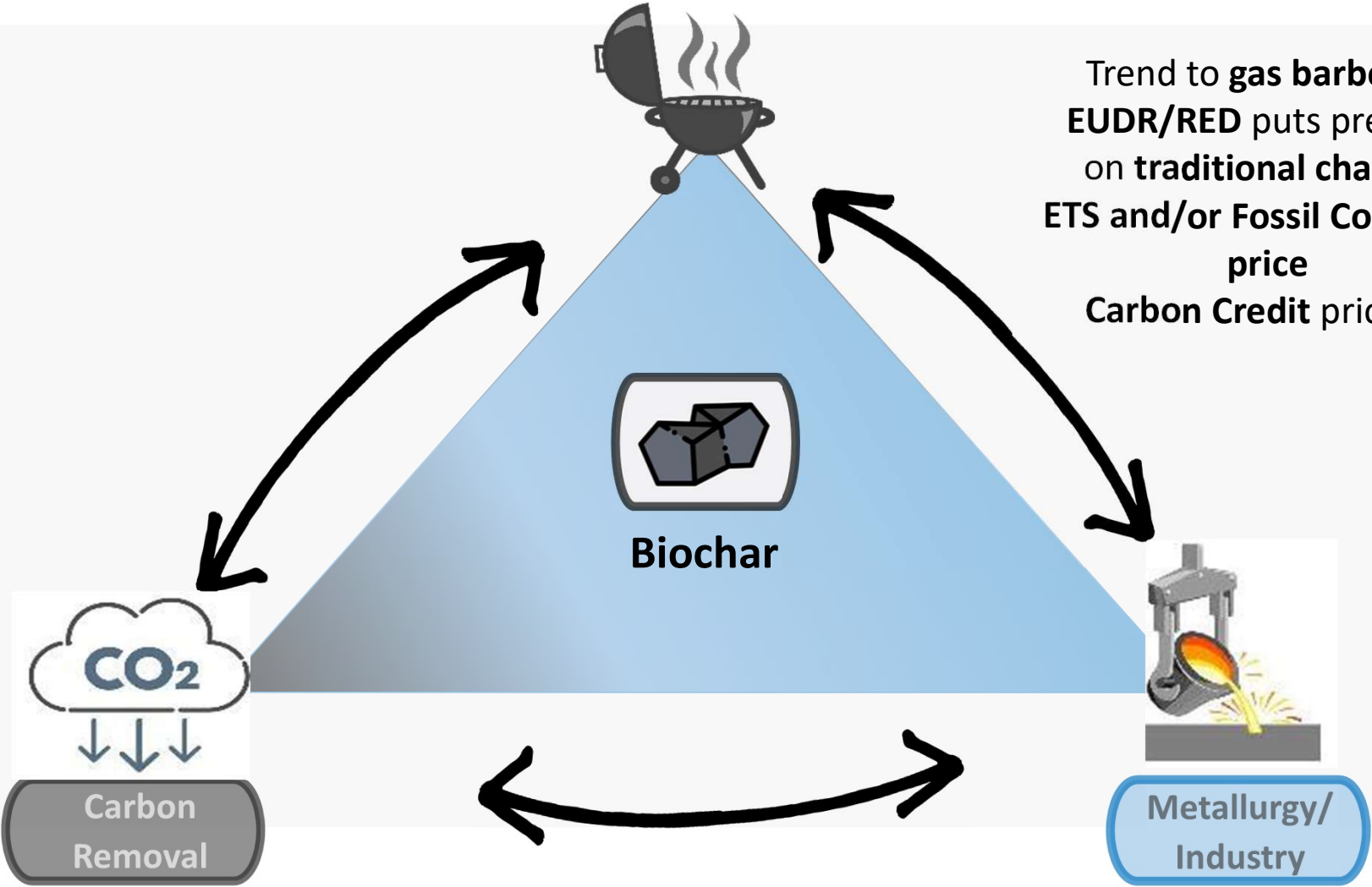


Biochar markets in transition



Biochar markets in transition

Responsible
Charcoal



Trend to gas barbeque
EUDR/RED puts pressure
on traditional charcoal
ETS and/or Fossil Coal up in
price
Carbon Credit price up

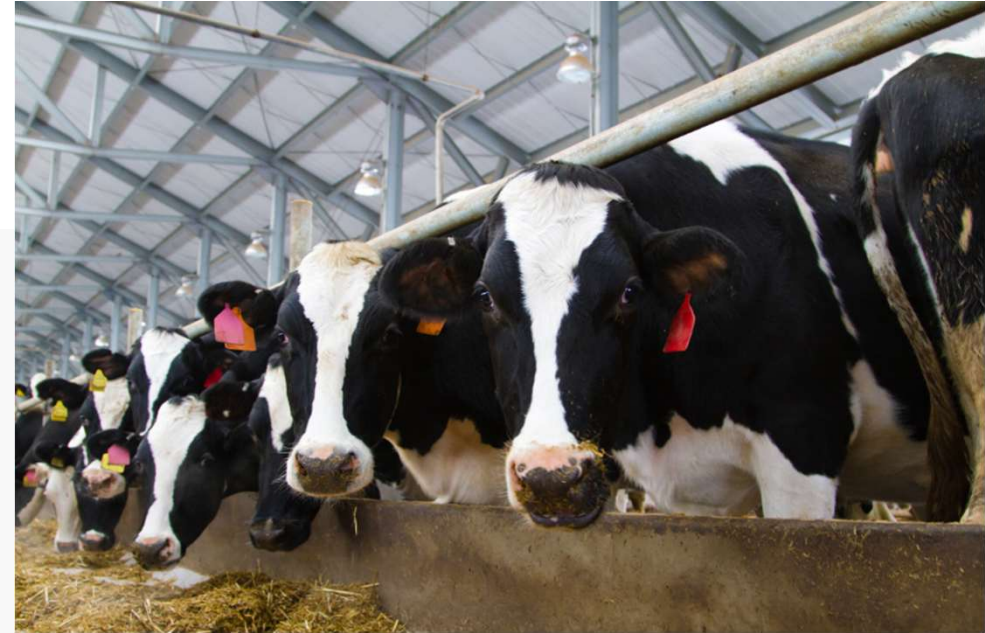


Biochar for Metallurgy

Technical proof of concept: ✓
(for first applications)

Today: First relevant volumes **but prices under pressure**

Tomorrow: With increasing ETS price for fossil coal, this market has the **potential to scale rapidly**



Biochar in Agriculture

Technical proof of concept: ✓

Market relevance: Substantial volumes, but **not growing fast**



Biochar in Concrete

Technical proof of concept:

Today: **Volumes still small**

Tomorrow: Once regulatory hurdles are cleared, this market has the **potential to scale rapidly**



Biochar for Urban Soils

Technical proof of concept: ✓

Market relevance: Substantial volumes and **growing (moderately)**

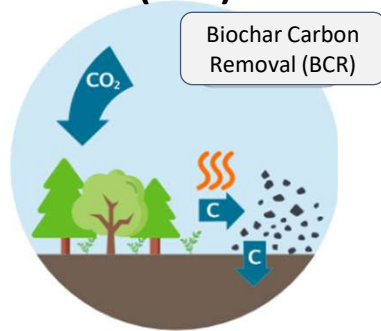
Three Options for permanent Carbon Removal in Europe

Description of the three technology paths & assessment of costs in 2030/2035

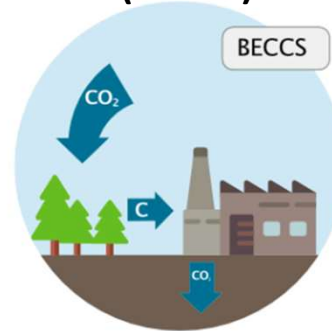


CARBUNA

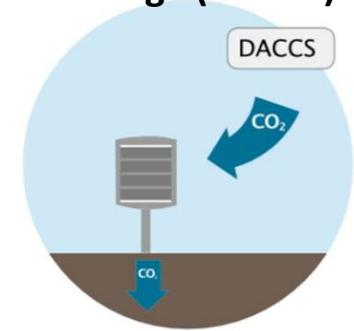
Biochar Carbon Removal (BCR)



Bioenergie Carbon Capture and Storage (BECCS)



Direct Air Capture and Storage (DACCS)



C as transport- and storage medium

CO₂ as transport- and storage medium

biomass-based methods

direct extraction from the air

renewable energy generation alongside with carbon removal

requires additional renewable energy

permanent removal of CO₂

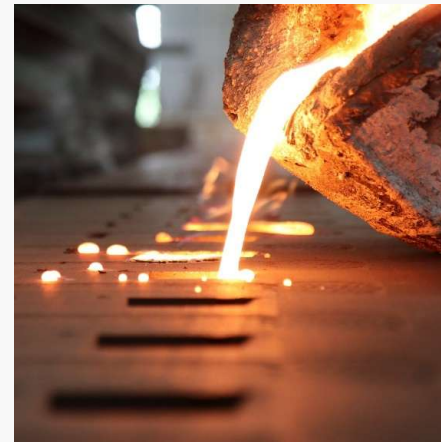
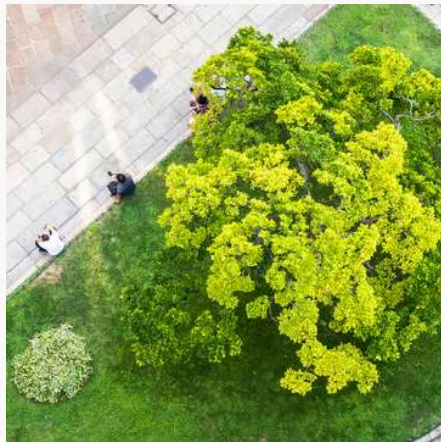
150 – 250 €/t CO₂ *

300 – 450 €/t CO₂ *

> 450 €/t CO₂ *

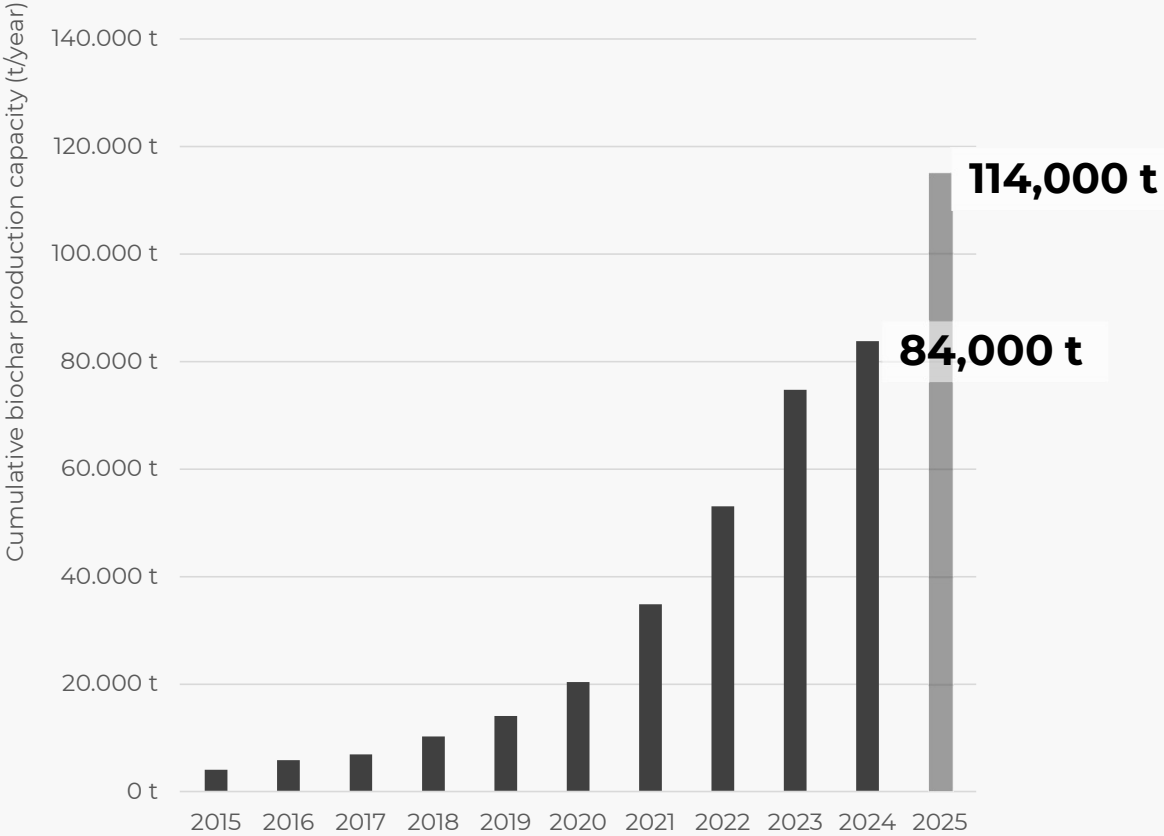
* Estimates on unsubsidized CDR prices for projects in Europe 2030/2035 (based on own cost calculations, industry reports and expert interviews)

Biochar market growth



Biochar market growth and growth rates

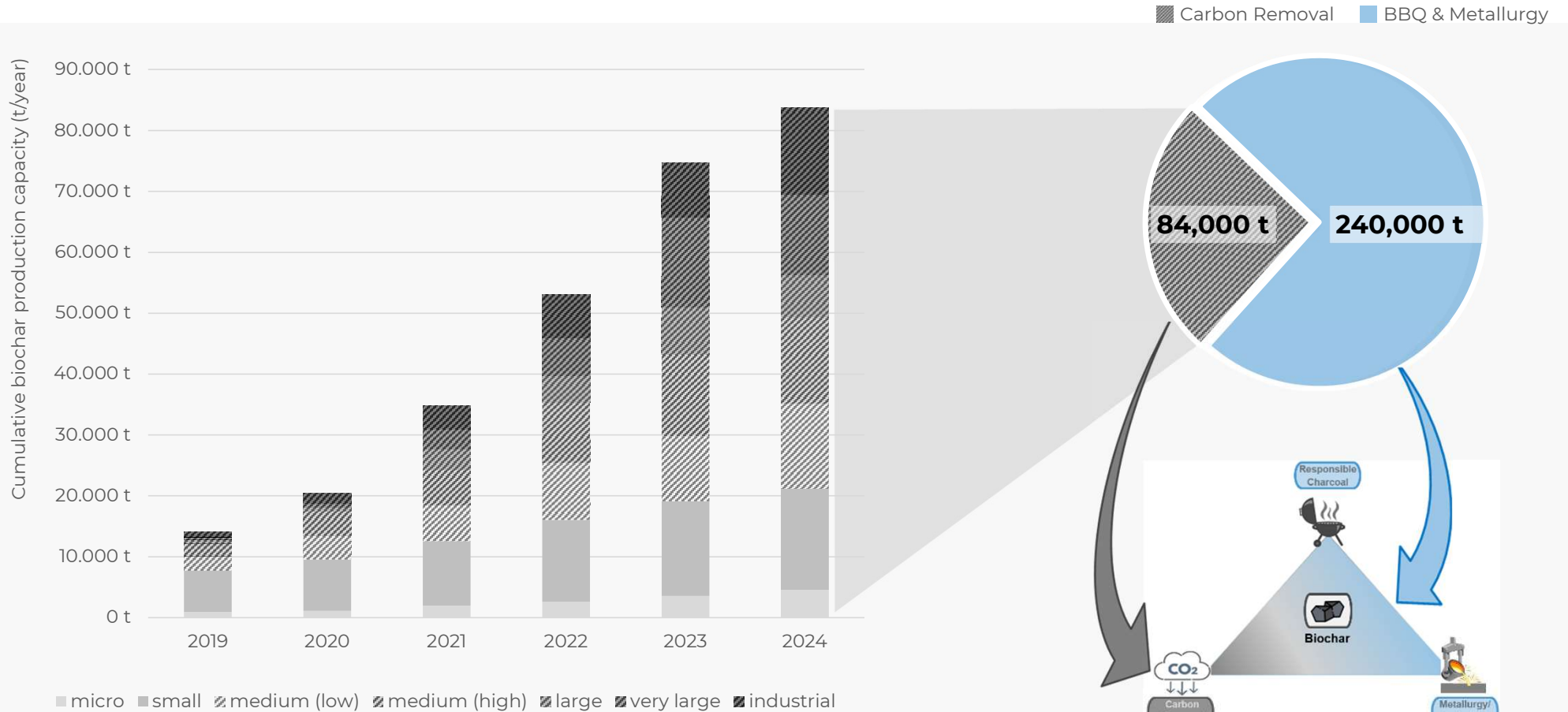
Cumulative biochar production capacity dedicated to BCR in Europe



- According to data provided by producers for 2025, **production capacity** dedicated to BCR is expected to grow to **114,000 t**

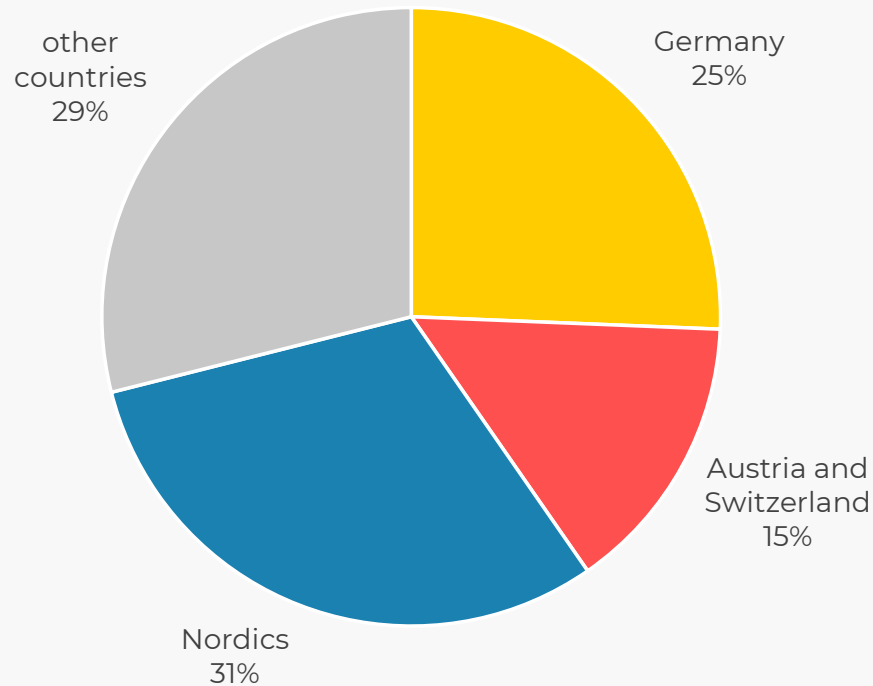
Biochar production by size of equipment

Cumulative Biochar production capacity dedicated to BCR in Europe



Biochar production by regions/countries

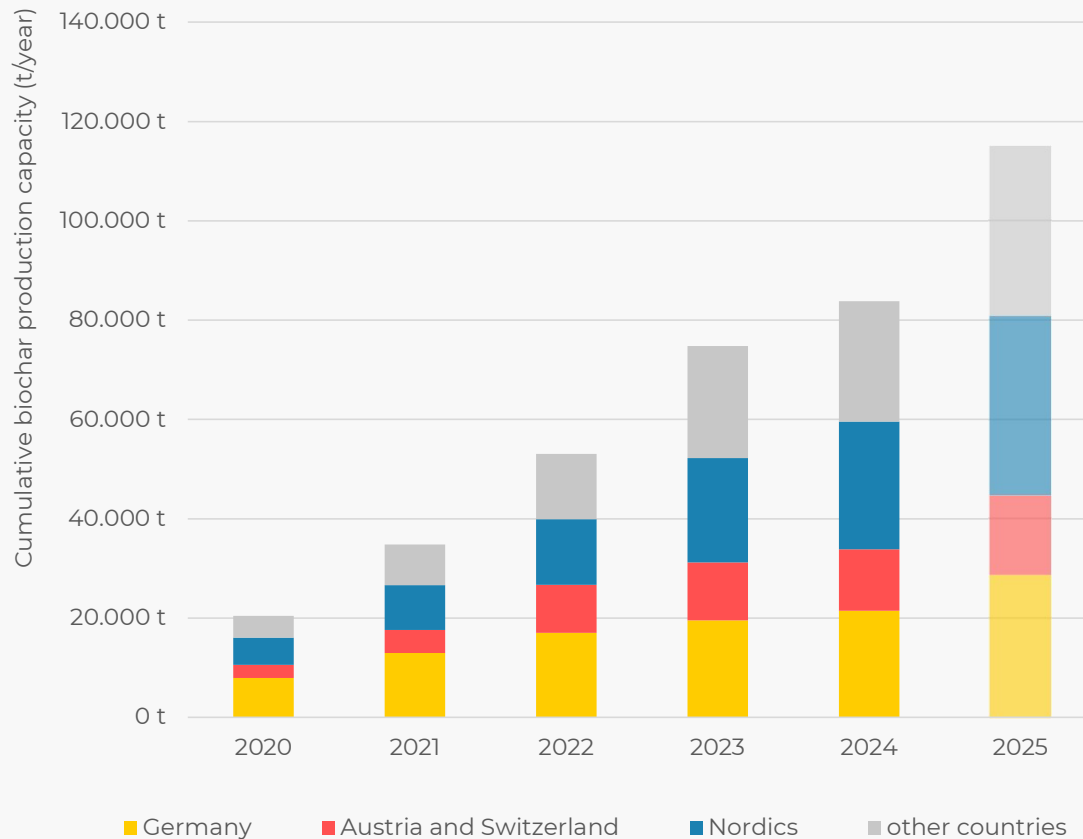
Cumulative Biochar production capacity dedicated to BCR in Europe end of 2024



- About **70%** of the **production capacity** end of **2024** is distributed among **three dominating regions/countries:**
 - Germany
 - Nordics
 - Austria and Switzerland

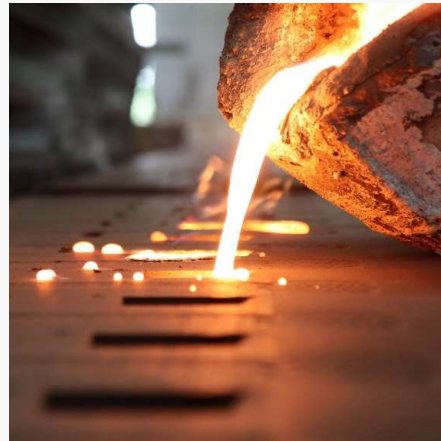
Biochar production by regions/countries

Cumulative Biochar production capacity in Europe dedicated to BCR since 2020



- **Germany** remains the **leading country** in terms of **production capacity**
- **Austria & Switzerland** is **growing steadily**
- The **Nordics** has **grown very fast**
 - with **Sweden**
 - **Denmark** and
 - **Finland**being the countries with the most relevant activities
- The share of "**other countries**" is **steadily increasing** with most relevant activities
 - in **Spain**
 - **France** and
 - **United Kingdom**

Key takeaways



Key takeaways



- Pyrolysis is very efficient – but only if you extract the full potential from the biomass and market it
- Renewable carbon is the new kid on the green raw materials market
- Quality is becoming increasingly important – the industry demands compliance with technical specifications.
- Certifications require effort but also provide security (EUDR, REDIII, REACH, LCA, etc.)
- Scientific traceability and full transparency are the foundations for CO2 certificate trading (CRCF, MRV+).

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Pflanzenkohle
www.carbuna.com**