

BIOCHAR PREPARATION & PRODUCTION TECHNIQUES



In Association with SVCH-Technologii, Moscow (Russia)

ISO 9001:2015 | ISO 14001:2015 | ISO 45001:2018

ABOUT US

KERONE is now renowned for serving the specialized needs of customers with the best quality and economical process of Heating /cooling and drying products, manufactured in a high-quality environment by a trained and qualified workforce (special purpose machinery)

-  48+ Years Manufacturing Excellence
-  Great Sale Support
-  Highly Customized Product
-  Adherence to Standards
-  Sound Infrastructure
-  Team of experts Delivering Quality
-  Timely Delivery
-  Cost Effective Solutions



KERONE is a pioneer in application and implementation engineering with its vast experience and team of professionals.



KERONE is devoteded to serve the industry to optimize its operations both economically and environmentally with its specialized heating and drying solutions.



KERONE is having immense expertise in manufacturing and implementing various types of engineering solutions.



KERONE is possessing employee strength of more than 280+ experts continuously putting efforts for happy industrial engineering solutions.

WHY CHOOSE US

With decades of expertise, cutting-edge technology, and a customer-centric approach, Kerone Engineering offers tailor-made heating solutions that prioritize quality, flexibility, and cost-effectiveness. Benefit from our commitment to excellence, post-sales support, and innovative solutions for your unique heating needs. Choose Kerone Engineering for reliability, performance, and unmatched value.

MISSION

- ✓ To enhance the value of customer operation through our customer need centric engineering solution
- ✓ We are committed to provide our customers, unique and best in class products in Industrial heating drying and cooling segment with strategic tie-up for the technical know-how with renowned leader in the industry specific segment

VISION

- ✓ Turn into a world leader in providing specialized, top-notch quality and ecological industrial heating, cooling, and drying solutions across the globe.
- ✓ To attain global recognition as the best of quality and environment-friendly engineering solution company.

“

Enhance the value of customer operation through our customer need centric engineering solution.

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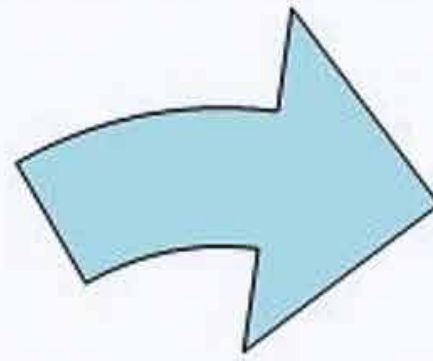
What is Biochar?

"Biochar is a fine-grained charcoal high in organic carbon and largely resistant to decomposition. It is produced from pyrolysis of plant and waste feedstock's. As a soil amendment, biochar creates a recalcitrant soil carbon pool that is carbon-negative, serving as a net withdrawal of atmospheric carbon dioxide stored in highly recalcitrant soil carbon stocks. The enhanced nutrient and moisture retention capacity of biochar-amended soil not only reduces the total fertilizer requirements, but also the climate and environmental impact of croplands."

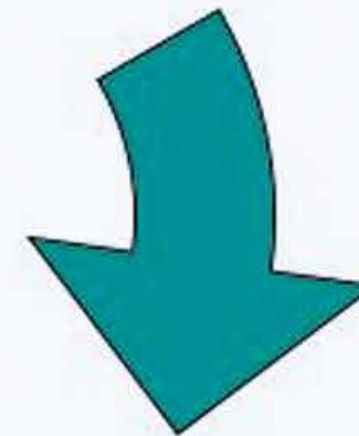




**Climate
Change**



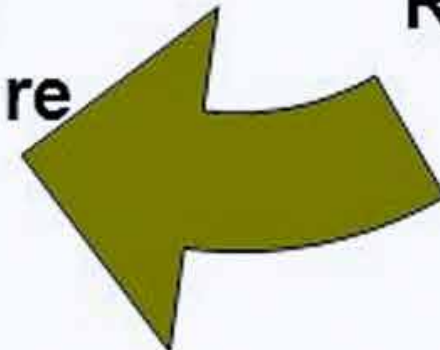
Waste



**Renewable
Energy**



Biochar



**Soils &
Agriculture**

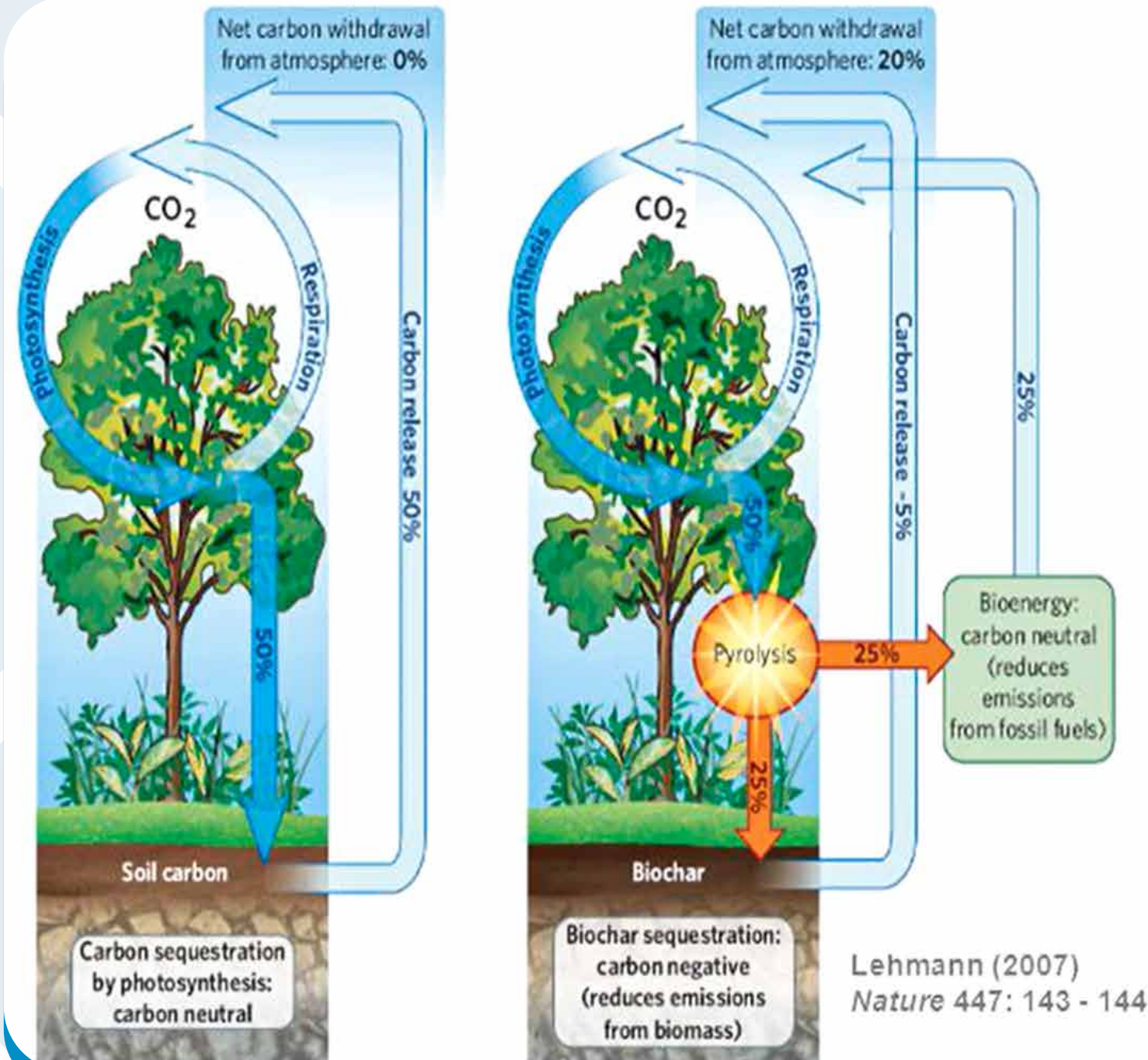


Why is it Important?

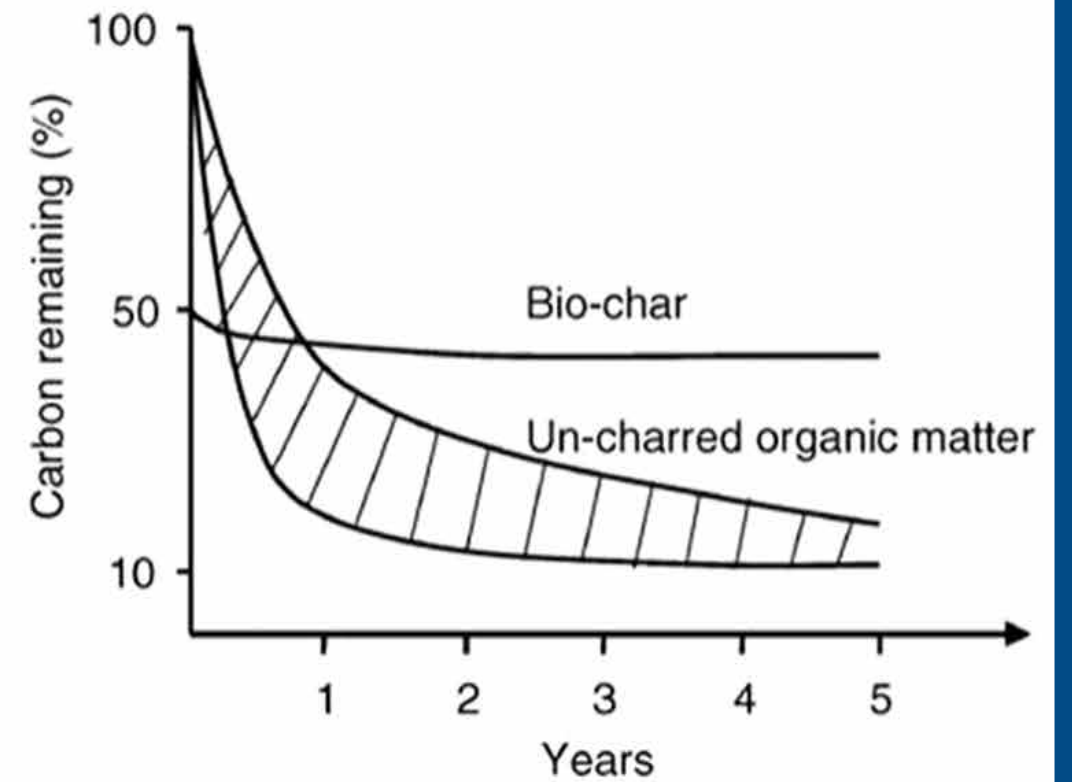
- Global soil reserves represent a large potential carbon sink BUT... traditional manures break down and oxidize rapidly
- Contains C in a form which is highly resistant to degradation
- Potential to sequester large amounts of C in the soil with a residence time of hundreds and possibly thousands of years
- Potential to be a C negative form of geo-engineering
- Research suggests that biochar use has many other soil benefits: chemical, physical and biological
- Biochar amendment to improve soil properties and sequester carbon Lewis Peake



Biochar Carbon Cycle



Lehmann (2007)
Nature 447: 143 - 144

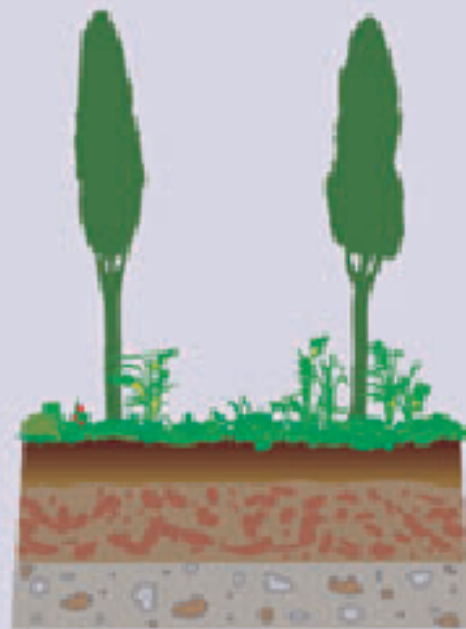


Lehmann et al (2006)
Mitigation & Adaptation Strategies for Global Change 11: 403 - 427

Thermal Conversion of Biomass

Biomass
– manure
– organic wastes
– bioenergy crops (grasses, willows)
– crop residues

(C) 100%



(C) 50%
Returned to soil as **biochar**

Pyrolysis

Residual heat

Biofuel
– bio-oil
– hydrogen

(C) 50%

Transport
Energy
Coproducts (oil, cosmetics)
Industry

Optionally, N_2 , NO_x , SO_x , CO_2 can be added to increase C sink and nutrient content

Thermal Conversion of Biomass

Overall an endothermic process:

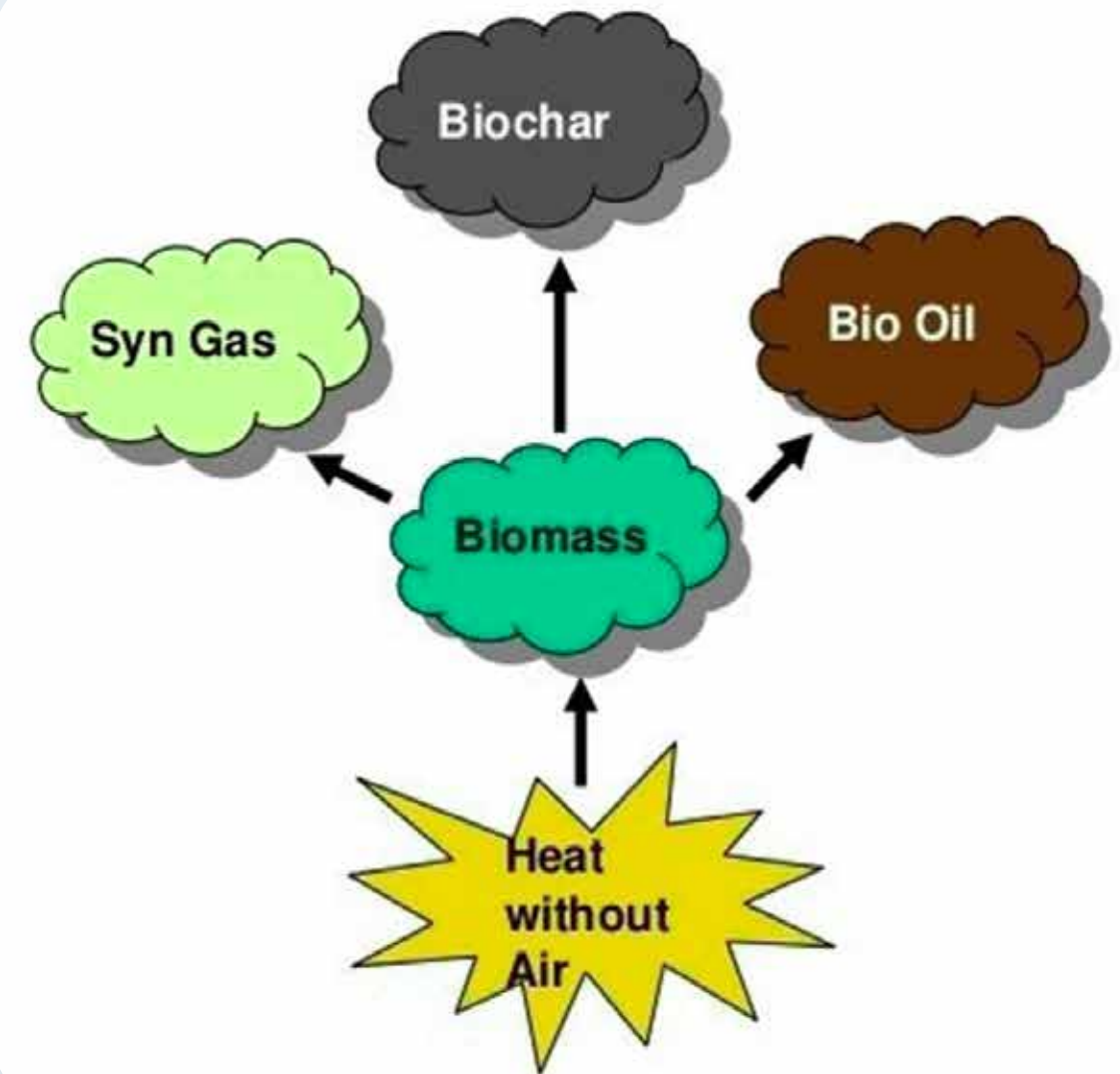
- Energy is required to initiate the process

At present the technologies can be split into two distinct categories:

- Charcoal production
- Bio oil or syn gas production

However, there is potential to move towards a third:

- "Tri-generation" that makes use of the biochar, energy-rich co-products (bio oil, syn gas) & heat



Bio Production Techniques

	Temp & Duration	Solid (Biochar)	Liquid (Bio oil)	Gas (Syn Gas)
Slow Pyrolysis	~500°C Days	35%	30%	35%
Fast Pyrolysis	~500°C Seconds	12%	75%	13%
Gasification	>800°C Hours	10%	5%	85%



CHP Gasification



Slow Pyrolysis (retort)



Slow Pyrolysis (kiln)



Fast Pyrolysis

Biochar production

Dynomotive:
Bio oil via Fast Pyrolysis



BEST Energies:
Biochar via Slow Pyrolysis



Eprida:
Hydrogen & Char Fertiliser via Pyrolysis

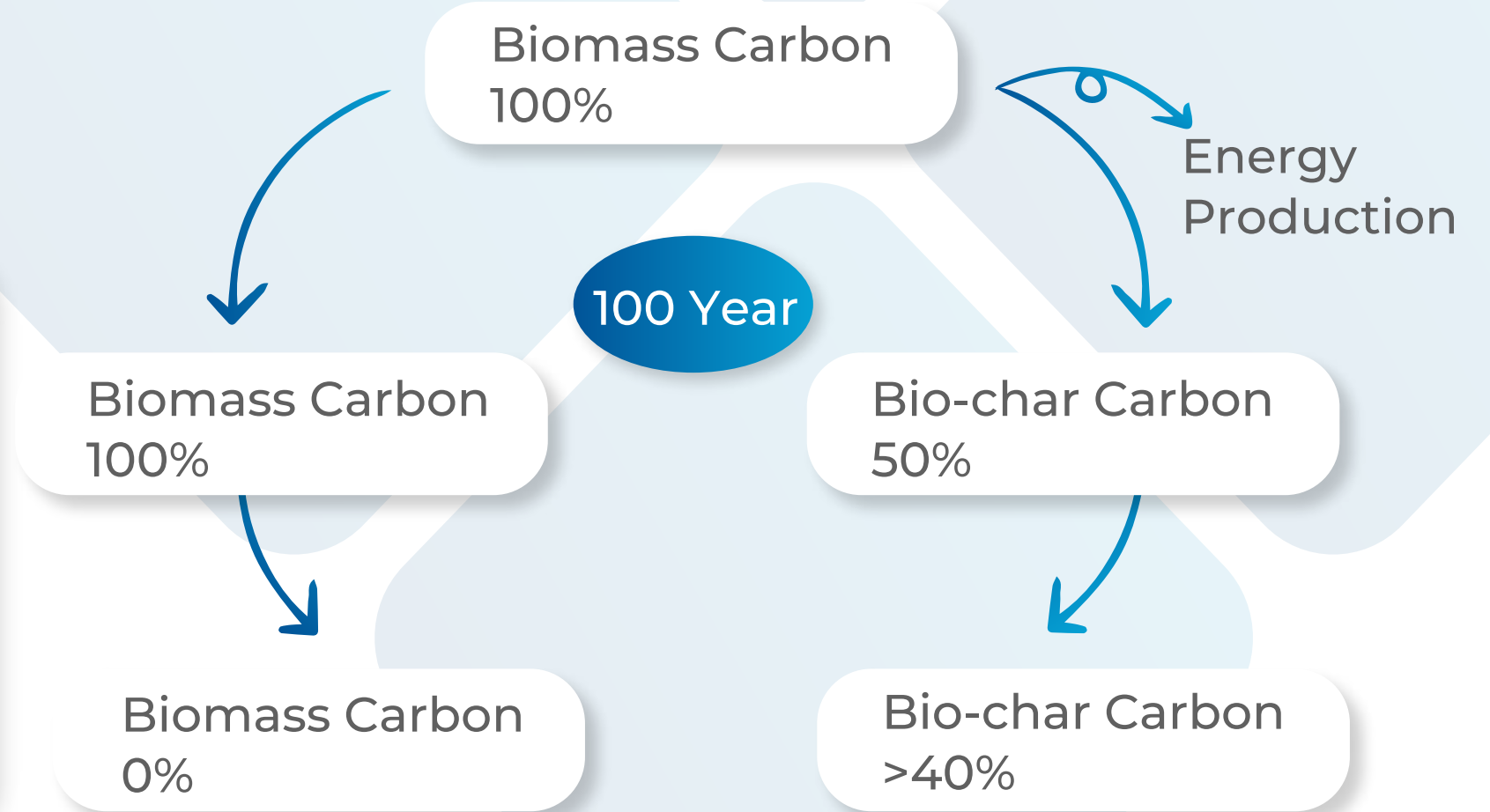
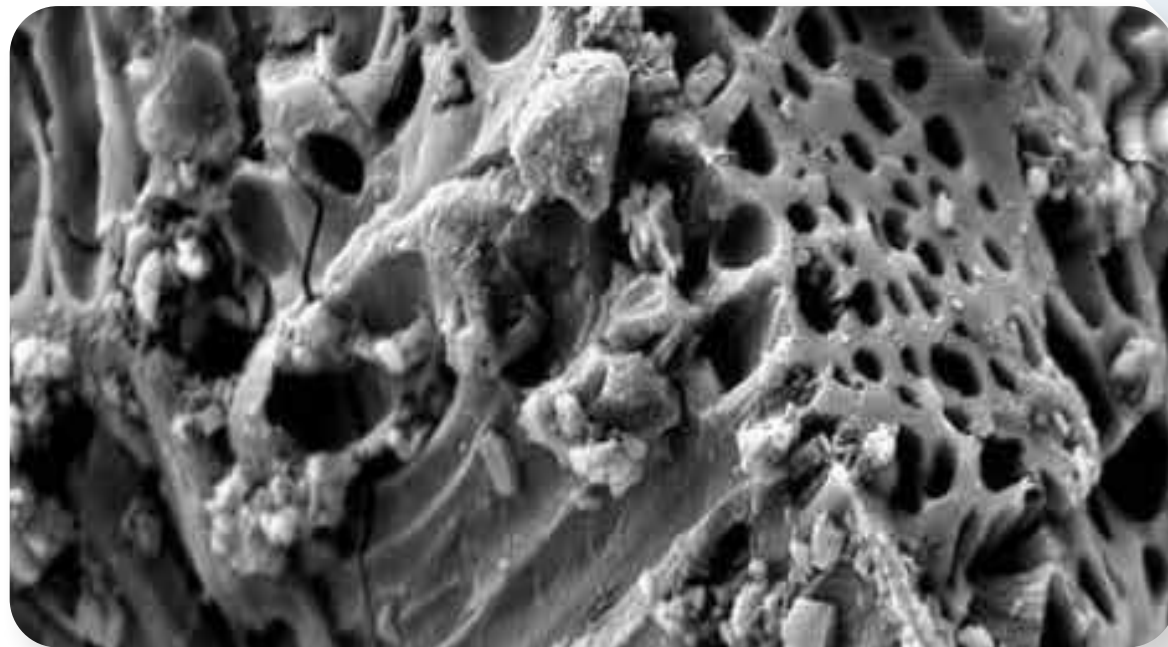


University of Hawaii:
Flash Carboniser (Fast Pyrolysis)



Biochar Properties

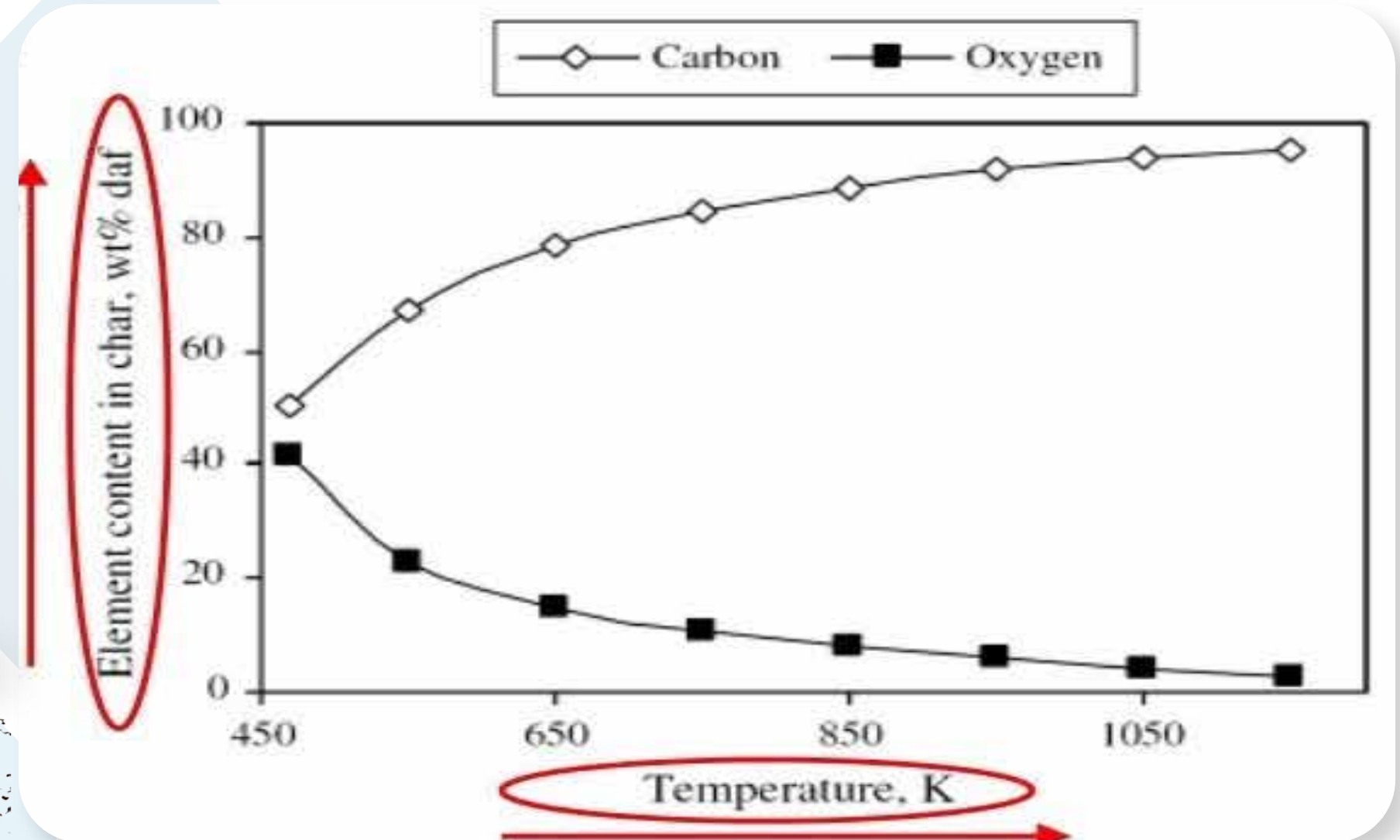
- High carbon content (60-95% C)
- Resistant to biodegradation
- Significant adsorptive qualities (similar to activated carbon)
- Nutrients (& contaminants) essentially lock on to the structure
- Increases moisture holding capacity
- Enhances microbial biomass



Biochar Properties: Process Conditions

Enhanced biochar yields from:

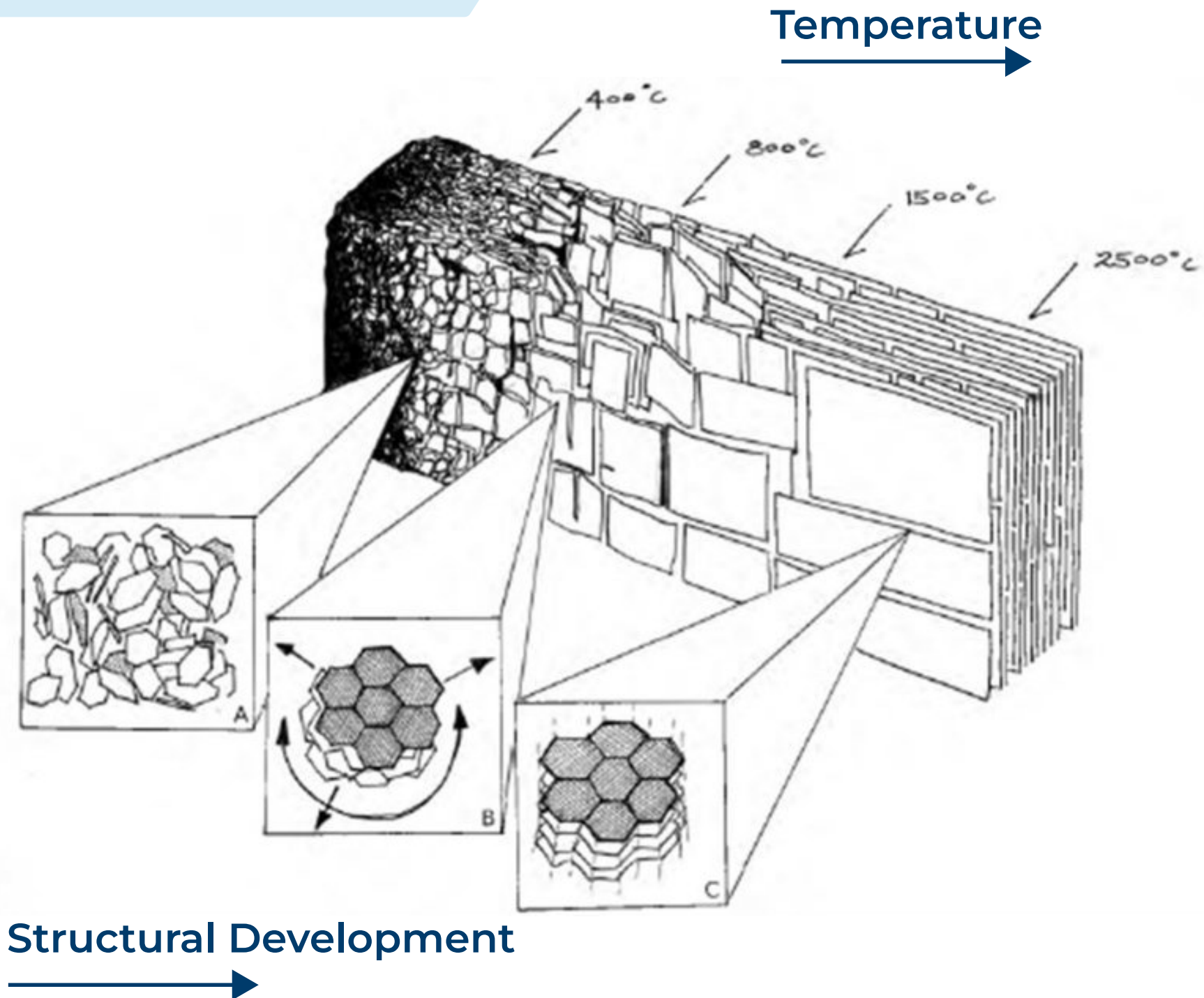
- Lower temperatures (<400°C)
- Higher pressures
- Longer vapour residence time
- Slower heating rate
- Larger particle size



Biochar Properties: Process Conditions

As temperature increases:

- Biochar yield decreases
- Fixed carbon increases
- Surface area increases
- Ash content increases



Biochar Properties: Feedstock Materials

The variable nature of the chemical constituents in the feedstock biomass influence the structure, properties & yield of biochar.

Woodchip



Roundwood



Rice Husks



Biochar Properties: Feedstock Materials

Manure



Hardwood



Biodegradable Waste

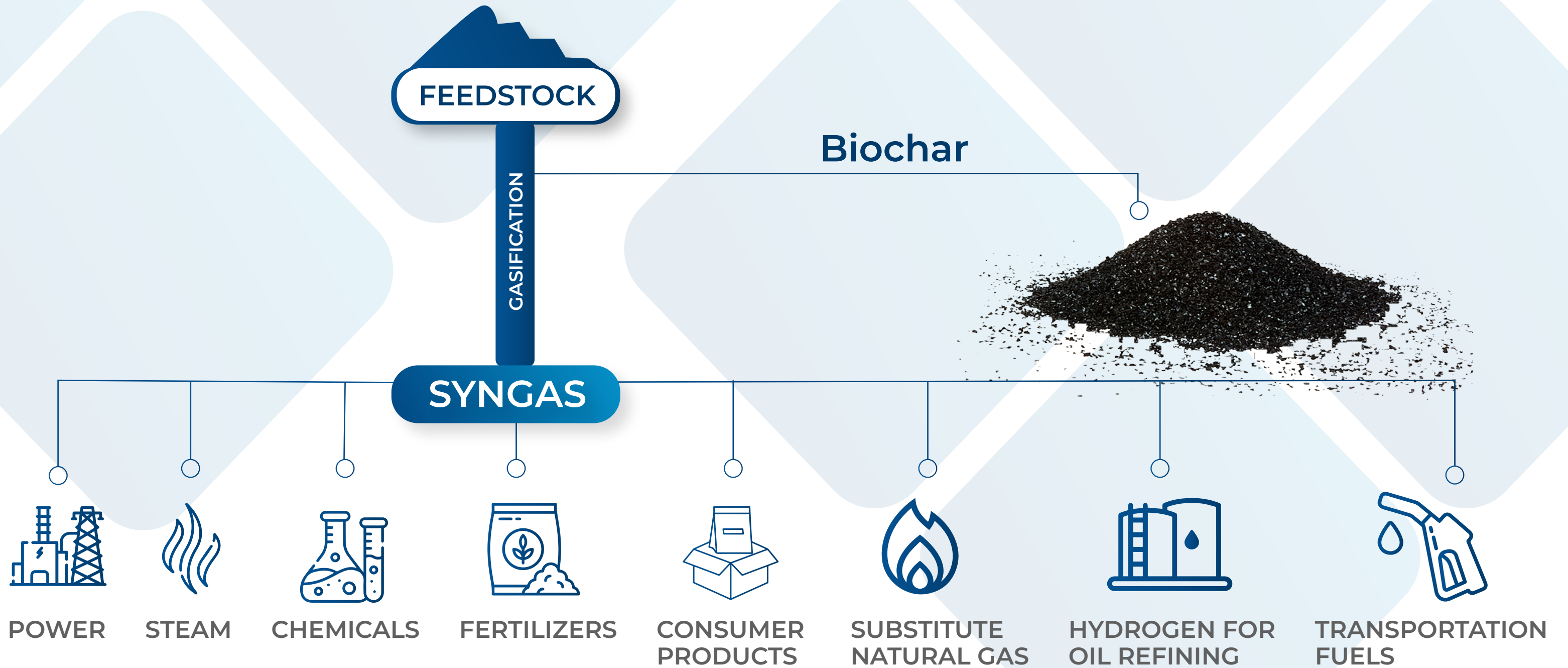


Softwood



Poultry Litter

Gasification Outputs



TRUSTED PARTNERS

AFCONS

Technip

TÜV

ISO 14001:2004

TOYO
ENGINEERING

EIL

LLOYD'S

ZEPPELIN
WE CREATE SOLUTIONS

Reliance
Engineering
Associates Pvt. Ltd.

TATA
TATA CONSULTING ENGINEERS LIMITED

SC Shroff Consultants

STERLING & WILSON

THANK YOU

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