Joensuu Biocoal at an industrial scale

Company presentation | February 2025

Joensuu Biocoal production facility

Joensuu Biocoal Ltd, **Europe's largest industrial-scale torrefied biomass production** plant is starting production

The production capacity is **60,000 tonnes annually, reaching 30-45 000 t already in 2025**

The facility has been built next to the 160 MW CHP plant owned and operated by Savon Voima Oyj, a local energy company. All the excess heat from Joensuu Biocoal goes to the City of Joensuu's district heating network

Patented scalable biomass torrefied technology

- Joensuu Biocoal Ltd has an exclusive access to the innovative NextFuel Torrefaction Technology in Finland and Canada
- The technology was initially developed by Andritz in Austria, including one tonne per hour pilot facility, and subsequently spun off from Andritz, leading to the creation of the technology company NextFuel


100% sustainable biomass


Coal substitution for heavy industries


CO2 neutral for energy


High energy density of 22,5 GJ/t


Production at an industrial scale


Low on sulfur, no heavy metals

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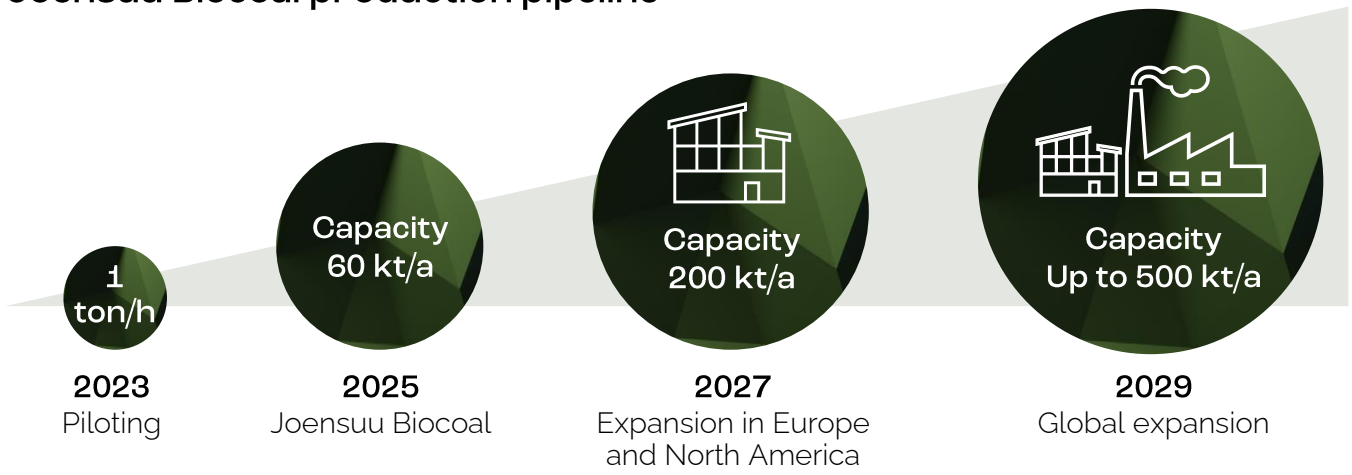
Joensuu Biocoal – biocoal at an industrial scale

1. **Challenges related to fossil-based materials span across sectors,** affecting not only the energy and steel industries but also the chemical, cement, and several other industries reliant on carbon
2. **Biocoal can substitute fossil carbon in several processes**
3. **Biocoal is a drop-in solution** that has higher CV and bulk density than white pellets and biomass

Joensuu plant operates within a temperature range of 300 to 400 °C

Producing both high energy density briquettes and higher fixed carbon biocoal

Joensuu Biocoal production pipeline



Joensuu Biocoal is the sustainable solution

Sustainable Finnish forest biomass from precommercial thinnings

RED II & RED III compatible

All the electricity from 100% biomass CHP plant

All excess heat to City of Joensuu's district heating network

Logistics to Hamina Port via biogas trucks, 49 t briquettes/truck

Bulk, container or big-bag shipments from the port storage

Key role in industrial green transition

For heavy industries that require high temperatures or the use of carbon atoms as ingredient, biocoal is the only viable option for green transition.

With

87-95%

Emission reduction potential compared to fossil coal,[1]

our biocoal provides a low emission alternative. Using only certified forest biomass as raw material

1) Compared to fossil coal when used in cement production, as a chemical ingredient or power source in steel production
The values presented are based on publicly available Lifecycle Assessment studies, LCAs that cover the whole lifecycle of the material in question
A) Biochar source, torrefaction source B) source (many studies show similar results) C) source. D) source E) source
Please see disclaimer on page 10.

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Technical specifications compared to coal and white pellets

Specification	Unit	JOENSUU BIOCOAL	Fossil coal	White pellets
NCV	GJ/t	**22,5**	24	17
Bulk density	t/loose m3	**850**	750–850	600–750
Storability	-	**Good**	Excellent	Poor
Volatiles	%	**60**	5–35	70–80
Ash	%	**2-4**	5–20	0.5–1
Sulfur	%	**0,02**	0.5–1	<0.05
Grindability	-	**Very good**	Excellent	Good
Fixed carbon	%	**32 (briquette)** **65 (400 °C biocoal)**	60–85	10–15

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Biocoal can be used in various heavy industry processes

Industry sector	Utilisation case	Replacing, function	Pre-treatment needs
Steel industry	Blast furnace – Tuyere injection	Pulverised coal	Milling/pulverization
	Electric arc furnace – As foaming agent	Foaming coal	Milling/pulverization
Alloys	Reducing agent	Green carbon molecules replacing fossil carbon	None, crushing or pulverization
Cement industry	Kiln –Injection	Fossil fuels, improving low CV alternative fuels efficiency	Milling/pulverization
Ceramics	Kiln – Injection	Fossil fuels, improving low CV alternative fuels efficiency	Crushing or pulverization
Pulverized coal-fire power plants (PCC)	Boiler	Coal, pellets	Milling/pulverization
CHP or power plants	Boiler	Coal, peat, biomass	None, crushing

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Any questions?

Contact us to hear more!

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"I bring in over 15 years of experience in forest biomass and bioenergy, with the past two years dedicated to developing innovative pyrolysis and torrefaction products.

Let's schedule a meeting to explore how Joensuu Biocoal can seamlessly integrate into your process and help achieve your goals."

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