

ESTEP 2025 Annual Event

28-30 October 2025
Udine (ITALY)

How decarbonisation, digitisation
and circular solutions forge the
sustainable European steel future?

Thomas Bräck
Meva Energy
Business Development
Director
Thomas.brack@mevaenergy.com

MEVA ENERGY

On-site renewable biosyngas as a scalable pathway to decarbonize high- temperature processes

Bringing learnings from replacing natural gas in copper production to steel



DIGIMET



DANIELI AUTOMATION



UNIVERSITÀ
DEGLI STUDI
DI UDINE
HIC SUNT FUTURA



Overall challenge: Decarbonization and natural gas

- The case study: Replacing natural gas at Elcowire's copper wire production

Background

The copper sector and the steel sector share a common challenge: dependence on natural gas for high-temperature heating and reducing processes.

Elcowire Group is one of Europe's leading manufacturers of copper and aluminum wire products for electrification and infrastructure. With over 70 years of experience and production facilities in Sweden and Germany, the company plays a key role in energy transmission, including high-voltage cables and railway electrification.

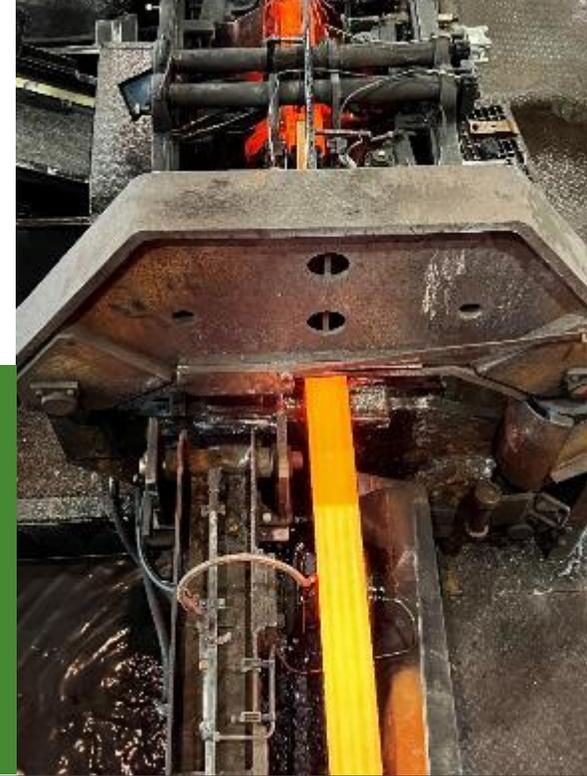
Elcowire is one of the pioneers in low-carbon copper products, but one remaining hard-to-abait CO₂ emission has not been able to be resolved; the combustion of natural gas needed to melt the copper in their shaft furnace. To get a proper efficiency in the shaft furnace, a flame temperature of about 1800°C is needed and together with requirements on quality, no alternative renewable solution has been found.

The dependency on natural gas results first and foremost to significant CO₂ emission, but it also means being directly affected by fluctuating market prices on fossil fuels and need of paying emission allowances.

Thesis: Installing a biosyngas plant at site

Utilizing hot biosyngas directly in the shaft furnace produced at site by Meva Energy could be an option. However, some questions raises from this: can then the necessary flame temperature be reached? And will the substitution affect the copper quality in terms of oxygen content in the copper? Would use of biosyngas lead to a higher risk for an increased dioxin formation comparing with the current natural gas-based process?

elcowire

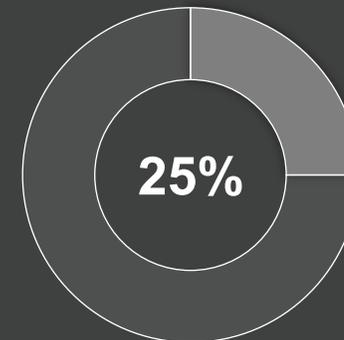


Short info about furnace and requirements:

- 26 burners 10MW gas need
- Quite even gas consumption
- Operates Mon-Fri,
- Gas quality requirements: oxygen level in copper melt or the slag important.
- High flame temperature, 1800 degrees, to reach 1200 degrees in oven

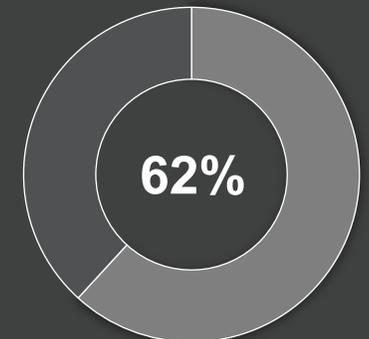
The manufacturing industry has a large CO₂ footprint and is too dependent on fossil gas

Direct emissions: Manufacturing¹⁾
% of global CO₂ emissions



Manufacturing industry emits 25% of global CO₂ emissions

Natural gas consumption: Manufacturing²⁾
Natural gas % of total fossil fuels consumption (EU)



Manufacturing industry consumes 62% of all fossil fuels within the EU

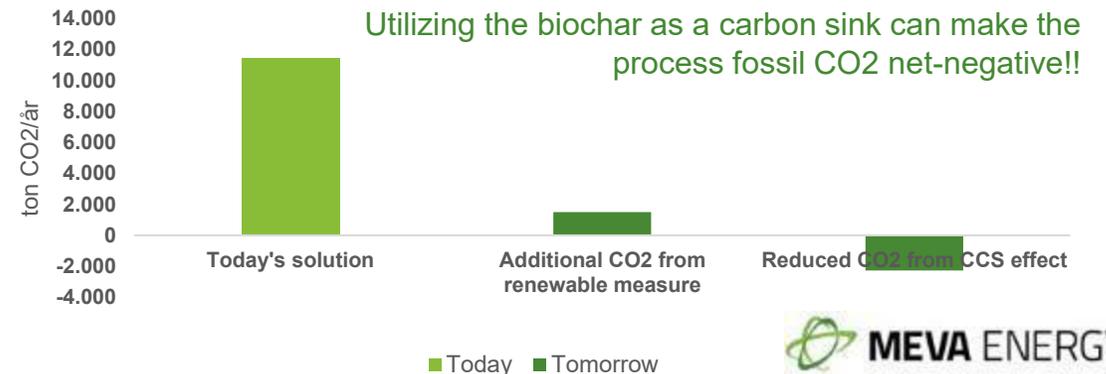
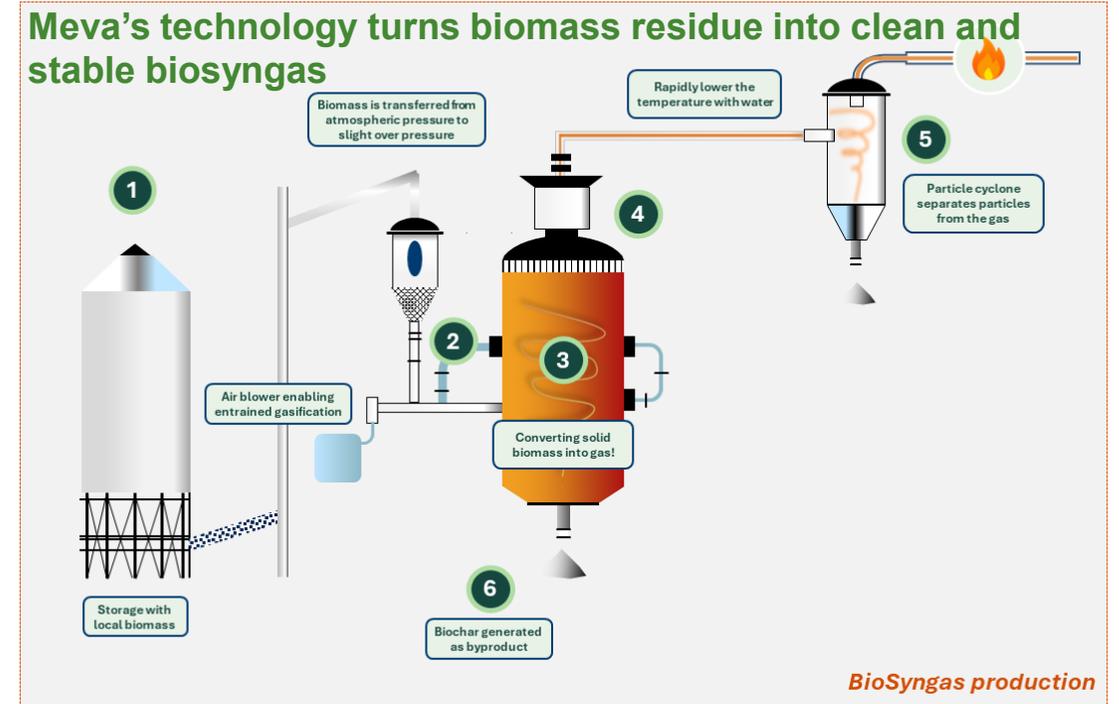
1) International Energy Agency (IEA), 2022, 2) EC Europe, 3) Trading Economics 14 Feb 2025, 4) Bloomberg NEF: EU ETS Market Outlook H1 2024

Solution – renewable biosyngas produced on-site

Utilizing Meva Energy biomass gasification to replace the fossil natural gas

Meva Energy will design, own, and operate an on-site energy plant capable of producing 10 MW of renewable biogas for Elcowire's Helsingborg facility. The solution is based on Meva Energy's biomass gasification technology. The project marks a historic milestone for the metal industry by enabling the world's first fossil-free copper production in scopes 1 and 2.

The gasification plant will be run by local wood residues supplied in wood pellets, which will be opened up by a plate mill and feed into a hot reactor with an air stream. The air enters the hot reactor from two sides, creating a vortex which gives also a cyclonic effect, separating the particles into gas and biochar, a valuable side stream that can be utilized in the steel industry to replace fossil carbon.



On-site biosyngas production from local biomass waste streams means security of supply with affordable renewable energy

Flame temperature of (1800°C) can be reached with hot biosyngas

No effect on critical copper product quality

Method:

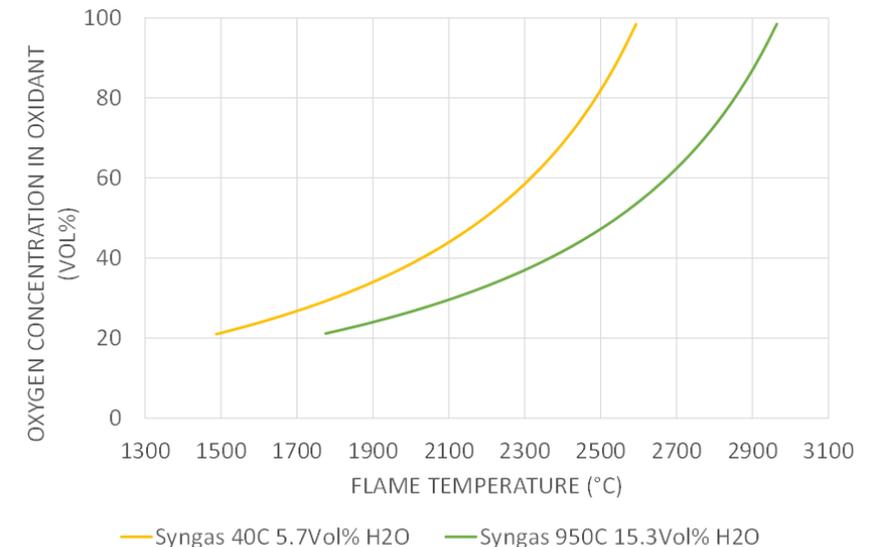
Thermodynamic modelling by Swerim using FactSage for modelling the copper smelting in a shaft furnace, Meva biosyngas vs. natural gas, with focus on O-content in the molten copper etc. and HSC-program for the calculation of the heat and mass balance and also possible formation of dioxin under the provided conditions.

CFD-modelling by RISE to investigate means to reach desired flame temperature by oxygen enriched gasification or using hot syngas.

Result:

- 1 800°C degrees can be reached without oxyfuel by using hot syngas.
- Thermodynamic modeling show that the risk of affecting the O-content in the copper product is minimal.
- No increased risk for formation of hazardous gases including dioxin.
- Zero risk for increased H-content in copper melt or other H-risk as the H₂-content in the process gas (after combustion in the shaft furnace) is in fact lower comparing to the use of natural gas (i.e., the reference case).

Temperature of 1800°C can be reached by using hot biosyngas



For more info about the solution, scan the QR-code or contact Meva Energy:



Thomas Bräck
+46706-248493

Thomas.brack@mevaenergy.com

