

Proven Bio-Energy Solutions by Modular WoodRoll® Technology

August - 2024

Marko Amovic, CTO

Taking bioenergy forward!



Table of contents

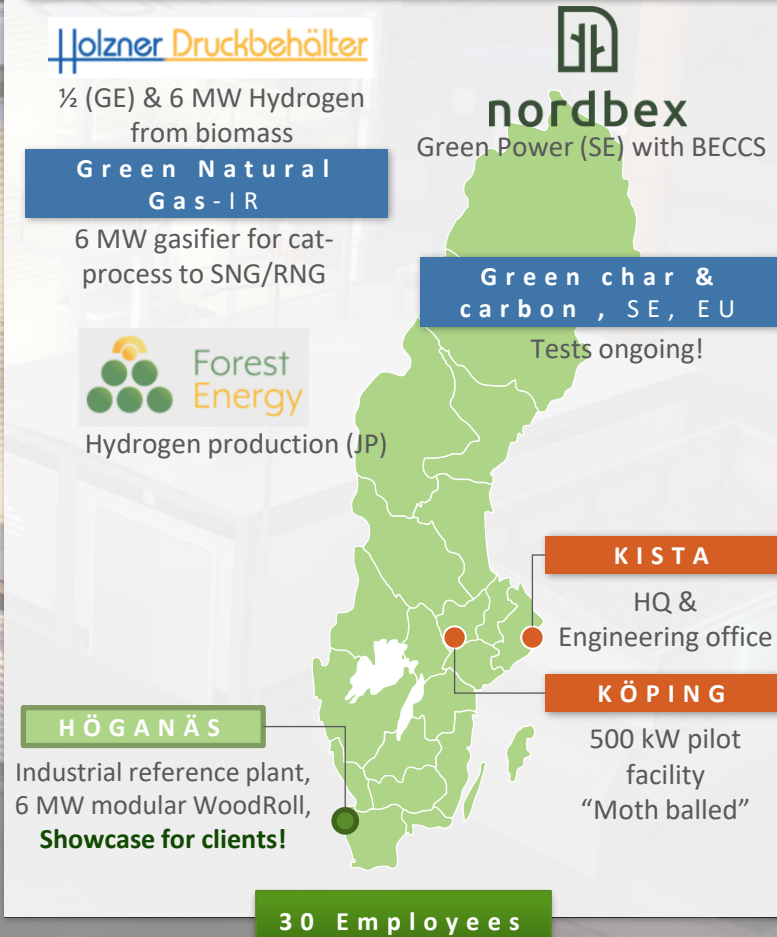
Section	
1	Introduction Cortus Energy and WoodRoll®
2	The Höganäs project



Company history

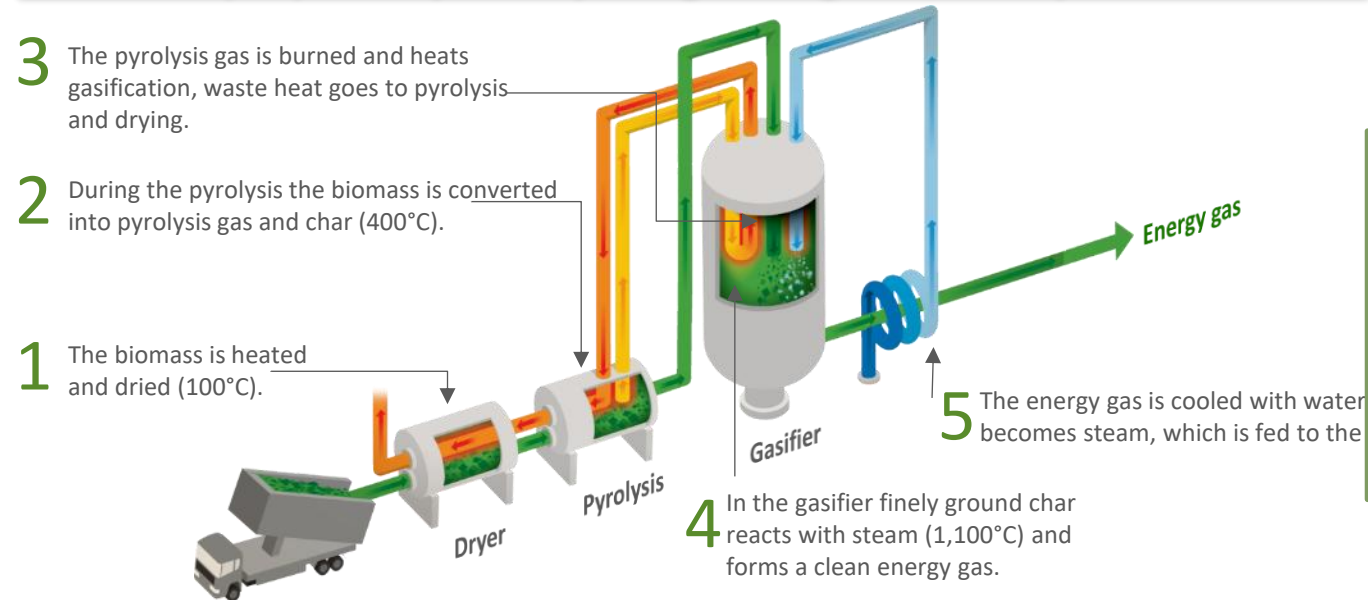
- 
2006–2010
 - The WoodRoll® technology invented and Cortus Energy is founded. The technology is confirmed on a small scale (150 kW)
- 
2011–2013
 - ½ MW gasifier followed by verifying all sub-processes in the WoodRoll®.
- 
2014–2015
 - The plant in Köping is upgraded to a complete reference and test plant. WoodRoll® fully integrated. Design of first commercial 6 MW modular WoodRoll® plant is initiated
- 
2016–2017
 - Basic engineering is performed for two 6 MW WoodRoll® plants (the projects in Höganäs and Japan), strategic cooperation agreement is signed with Forest Energy (Japan), the Höganäs project is granted SEK 47.6m in subsidy and the project in California USD 5m.
- 
2018–2023
 - The construction of the 6 MW WoodRoll® together with Höganäs. Commissioning & Start-up is ongoing.
 - Cortus has financed this plant and will deliver energy gas on a 20 years contract.

2024 Project pipeline



WoodRoll® – A breakthrough & patented gasification system

A proprietary & fully integrated gasification process



Strong patent protection

6 PATENT FAMILIES

162 confirmed patents

1. Gasification process
2. Hydrogen from gasification
3. Indirectly heated gasifier
4. Steam/char injector in WR
5. Biocoke process in WR
6. Pure hydrocarbons from WR

FEEDSTOCK OPTIONS

Wood



- ✓ Wood chips, bark
- ✓ Saw dust, recycled wood
- ✓ Branches, roots and tops

Crops



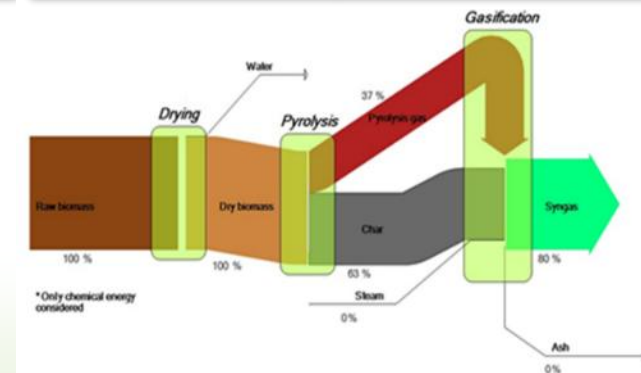
- ✓ Vine tree
- ✓ Vine cutting
- ✓ Stem with leaves
- ✓ Roots

Industrial waste

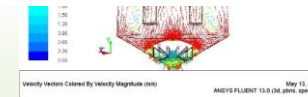
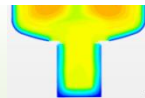
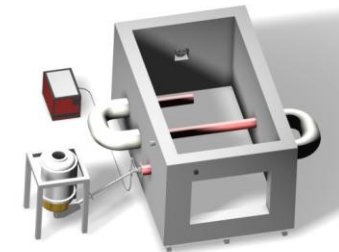
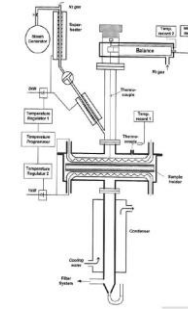
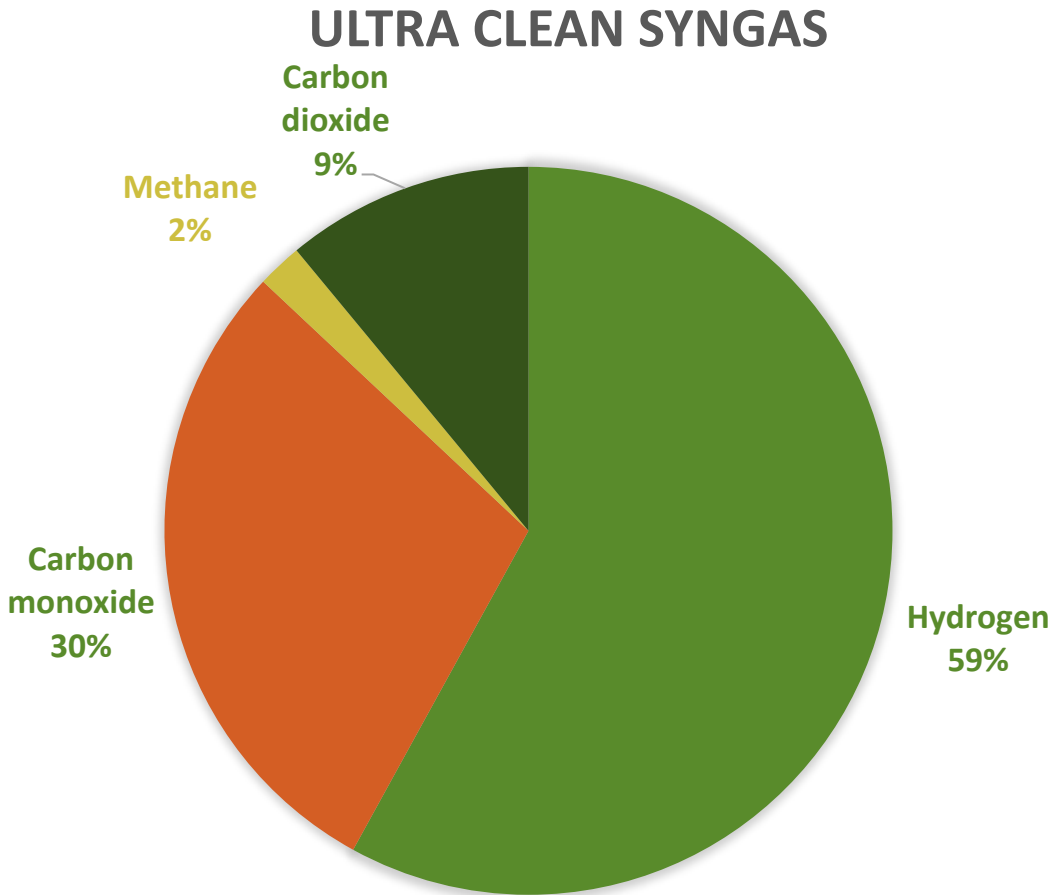
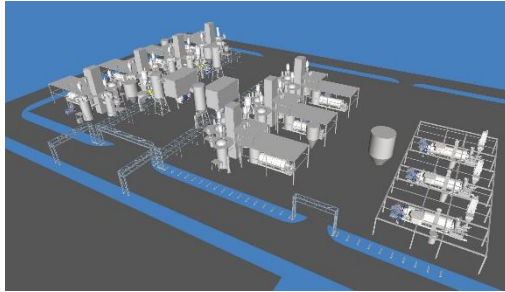


- ✓ Fiber sludge
- ✓ Chemical sludge
- ✓ Furniture manufacturing

ENERGY BALANCE – 80% YIELD



WoodRoll® – gasification development until today



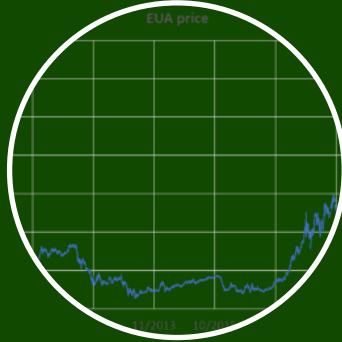
Biomass gasification – a key part of a renewable future!



Waste biomass
is available and,
on many places,
local



High energy
prices in the EU,
both Natural
gas and
Electricity



High prices for
CO2 emissions



Industrial
demand for
Green energy
and chemicals



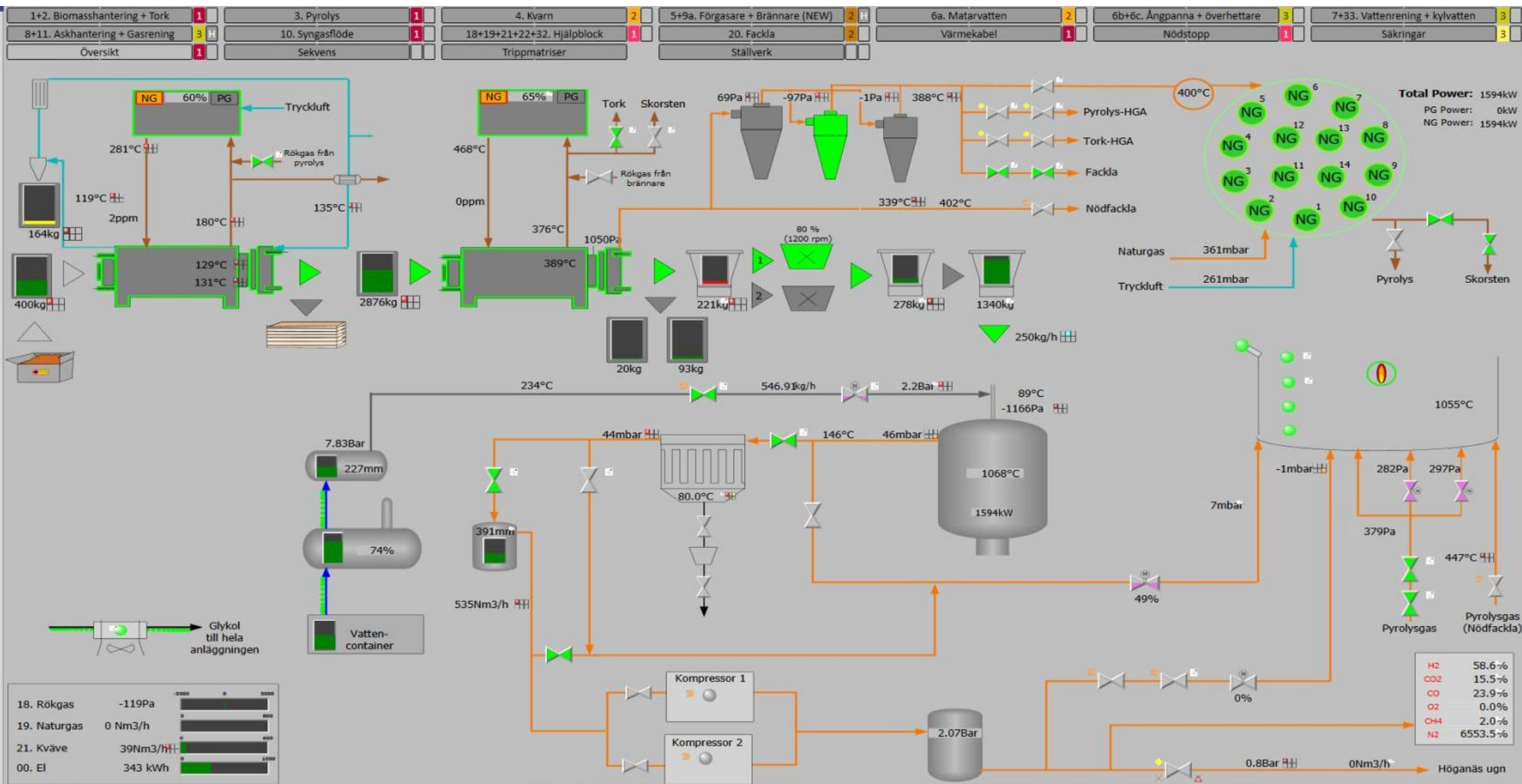
Green transport
fuels demands
are rising
quickly



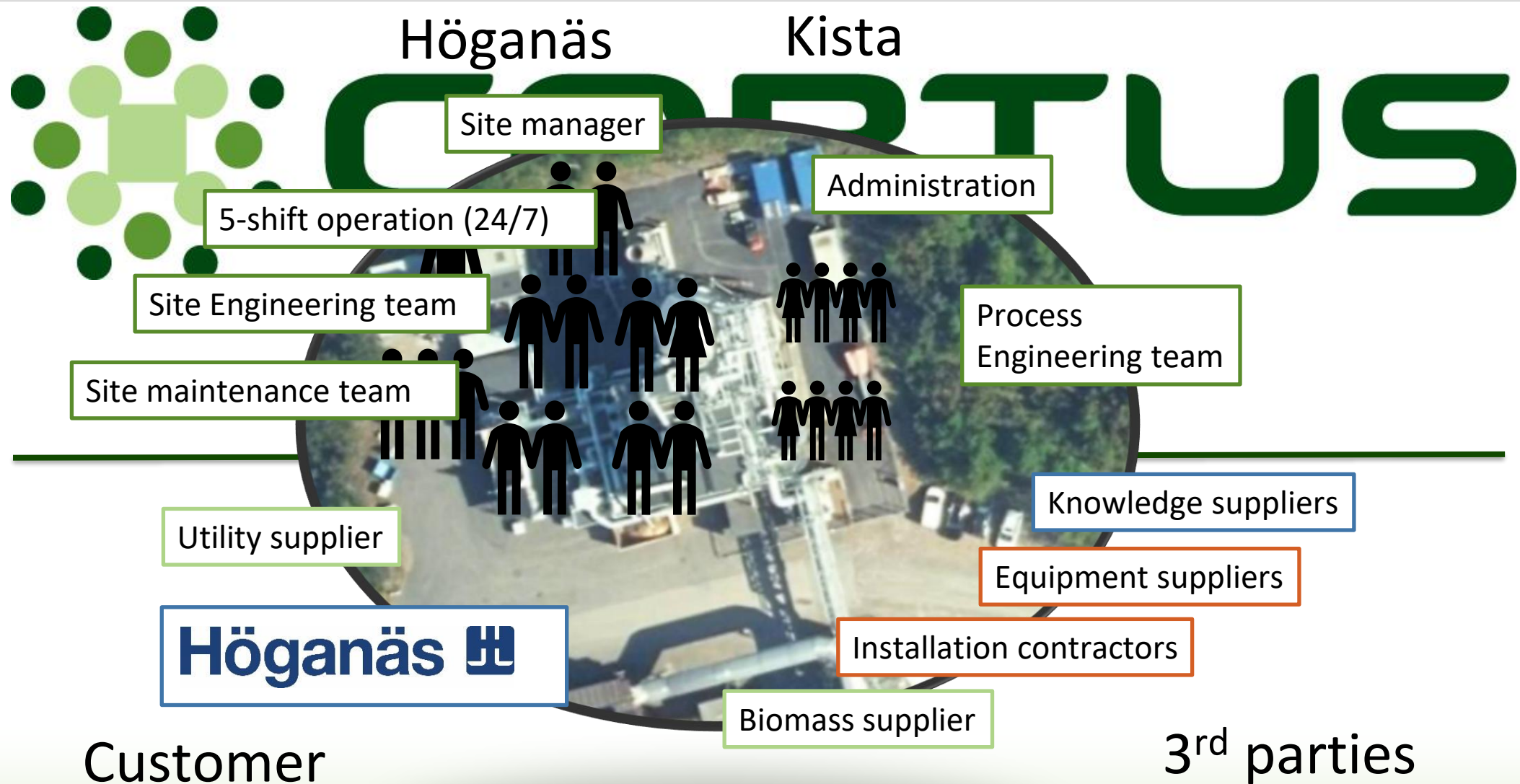
Table of contents

Section	
1	Introduction Cortus Energy and WoodRoll®
2	The Höganäs project



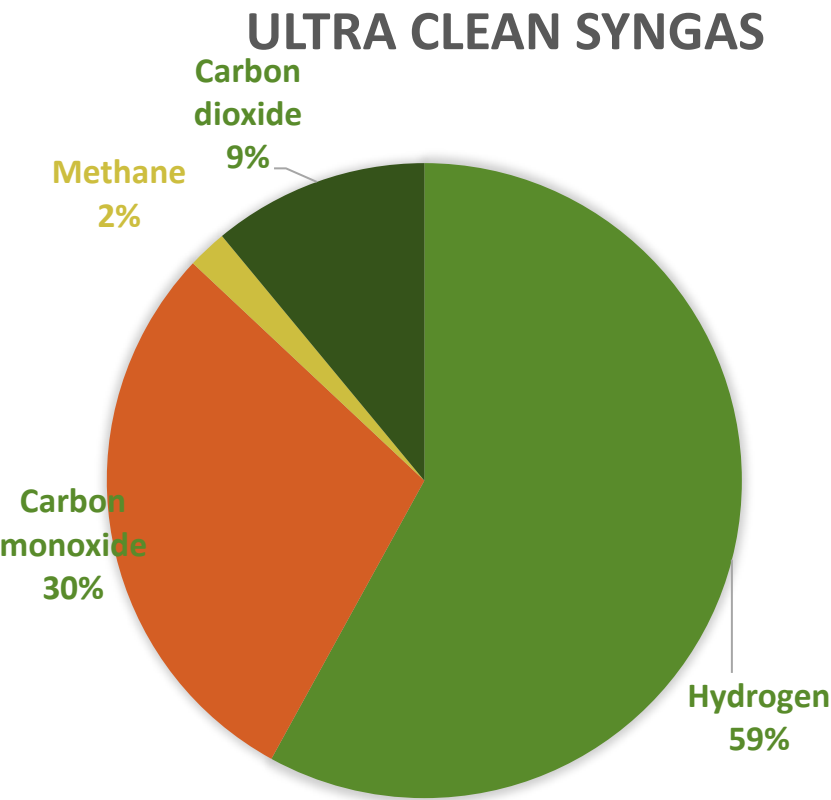


Höganäs Plant – Solid foundation for growth



Achievements during 2023 and 2024

Weekly operation with syngas to Höganäs AB



Certification of bio-char achieved (EBC) and delivery of about 200 ton biochar to customers

The fascination of Quality

Certificate

Number of certificate: CC-0033

Cortus AB
Isafjordsgatan 32C
16440 Kista
Sweden

Operator number: CSI-000480

The biochar produced of the mentioned company are certified according to the following standards:

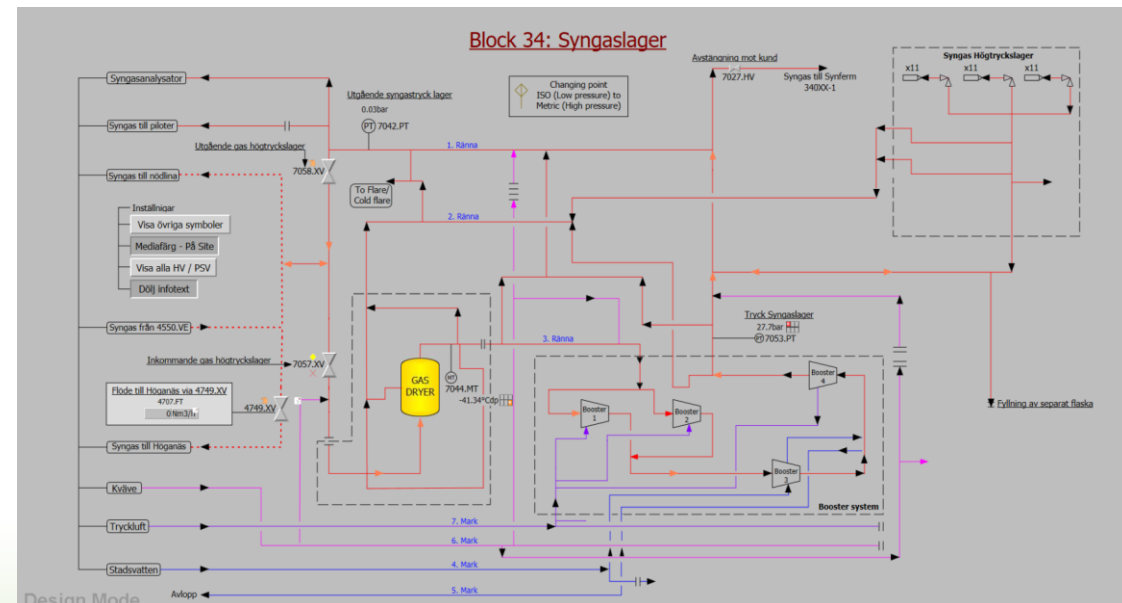
EBC European Biochar Certificate



Achievements during 2023 and 2024

Installation and commissioning of a high pressure storage (including drying and compressing of syngas) and first syngas filling of the system.

- ▶ The permanent storage will be used for Biological Methanation with partners from WoodRoll® during coming weeks and months.
- ▶ Possibility to produce and transport compressed syngas (150 bar) to customers/other applications for testing.
- ▶ Possibility to take part in other development projects on small scale for catalytic upgrading or other.



Other historical achievements

Production of bio-coke for metallurgical applications



Catalytic hydrolysis of pyrolysis gas producing renewable oil



Converting syngas in a catalytic methanation reactor and upgrading the methane to biogas quality



WoodRoll® application tree – true biorefinery technology!

