# VON green metals

## **Building a BioCarbon and bioenergy industry**

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Market update Oslo, 31 October 2022



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#### Business and market update



Follum project | Status and opportunities



#### Concluding remarks





We **recycle** biomass waste streams into:

**BioCarbon** as a reduction agent for the metallurgical industry

**Climate neutral gas** to replace fossil energy sources



- We build, own and operate BioCarbon production plants at an industrial scale
- Vow Green Metals listed at Oslo Stock Exchange Euronext Growth under the ticker VGM and has more than 6000 shareholders
- VGM team with extensive experience from process industry and through a cooperation agreement supported by Vow with project and technology competence (250+ people)
- Building our first BioCarbon production plant at Follum, Norway; First phase with annual capacity of 10.000 tons, started studies for increasing capacity to 20.000 tons
- Ownership of the industrial VGM factory module, allowing for rapid growth



## We will create new materials from waste which currently is incinerated









#### Business and market update



2

Follum project | Status and opportunities





## Status

#### Operational

- Customer and partner relations
  - Advancing relationship with Elkem beyond initial letter of intent
  - Studies ongoing with more than 10 leading industrial players in Europe
- Building capabilities and capacity
  - Continually strengthening alliance with technology and solutions provider Vow
- Follum project well underway
  - Started study for expansion to meet demand from the industry to 20.000 tons

#### Financial

- Total assets as of 30 September was 134 million
  - 60 million in process equipment under construction for the Follum plant
  - 68 million in cash
- Phase 1, the process to produce 10.000 tons biocarbon, at Follum fully financed
  - With available cash and remaining 42 million grant from Enova



## Advancing relationship with Elkem

Going beyond the initial letter of intent

- The objective of the cooperation agreement is to qualify the competitive reduction material for Elkem's operations of producing Silicone and Ferrosilicone for delivery from Follum
- The production, which will take place at Vow Green Metals' factory at Follum, will be based on forest waste and other sustainable feedstock
- As part of the agreement, the parties will collaborate to secure the development, qualification and testing of the biocarbon product to Elkem



## Reduction agents currently account for more than 5% of the $CO_2$ emissions in Norway

#### Si and FeSi emissions, Norway



#### **Comments**

- Currently, the metallurgical industry is mainly based on fossil reduction materials
- Biocarbon can directly substitute fossilbased reduction agents
  - Metal producers can use existing infrastructure
- Close to 1 million ton fossil coal and coke used by metal producers in Norway annually
  - Corresponding to 3 million ton CO2 emissions per year



## Significant energy scarcity and increasing prices in Europe

#### **EU Natural Gas prices**

Dutch TTF Natural Gas Futures (Source: Yahoo Finance)



#### **Electricity prices in Germany**



Average monthly electricity wholesale price in Germany

#### **Cost of CO<sub>2</sub> emissions**



- Natural gas prices spike to 340 EUR/MWh in late August, now back down to >110 EUR/MWh
- Cost of CO2 emissions had a drop from all time high in February, but now above 80 EUR/ton CO2
- Electricity prices are increasing and the demand is expected to increase as several sectors are in a green transition



## International expansion with large scale factories

#### Recent, current and ongoing concept studies totalling 470,000 ton biocarbon

#### Norway

Sawmill company

- Potential: 30,000 ton biocarbon
- Concept study Q3 in 2022

Chemical processing company

- Potential: 25,000 ton biocarbon
- Concept study Q4 2022

Industrial park

- Potential: 30,000 ton
- Concept study Q4 2022 identifying partners and thermal energy demand

Industrial park

- Potential: **60,000 ton**
- Concept study Q1 2023

#### **Central Europe**

Paper company

- Replacing fossil energy sources
- Potential: >50,000 ton biocarbon
- Concept study due Q4 2022

Building materials company

- Replacing fossil energy sources on several sites in Europe
- Potential: **30,000 ton** biocarbon
- Concept study due Q4 2022



#### Nordics

Metallurgical company

- Potential: **50,000 ton** biocarbon
- Feasibility study delivered Q2 2022

Metallurgical company

- Potential: **50,000 ton** biocarbon
- Concept study delivered Q2 2022

Pulp and paper company

- Looking for a partner capable of processing >500,000 ton feedstock annually
- Concept study delivered in August 2022

#### **North America**

Bioenergy company

- Potential: 20,000 ton biocarbon
- Concept study due Q4 2022



## For larger capacities

CHE Reactor underway to market with design capacity of 10,000 tons biocarbon per year











3

Business and market update

Follum project | Status and opportunities





## Follum update



## Industrial BioCarbon production underway at Follum

- Vow Green Metals AS together with other parties at Treklyngen's Industripark, the industrial park at Follum, Norway, has identified a location which is well suited for Vow Green Metals AS' biocarbon factory
- Mid-October the company sent a notification to neighbors with a 3D image of the factory module as a first step in finalizing the process to secure a framework permit
- The process of preparing for filing of the framework application is progressing according to plan
- Study for final energy solution and capacity increase is ongoing

#### Strategic partners in place

- VOW ASA provides technology for the plant
- Lindum is secured as supplier of feedstock
- Signed partnership with Elkem
- Signed LOI with Vardar for energy offtake









Business and market update



4

Follum project | Status and opportunities

#### Concluding remarks



## **Expansion and efficiency**

Efficient set up for building up a new industry

- Currently working on concept studies with a combined 470.000 ton biocarbon potential
- Collaboration with Vow developing the factory module with new high capacity reactor and energy solutions

#### Expanding into Europe

- Focusing on large sites with high energy intensity
- Reducing dependency of external energy sources makes Vow Green Metals a frontrunner in the need for sustainable materials and energy
- EU has initiated RePower EU to speed up the green energy transition fueling Vow Green Metals ambition to become market leader



## THANK YOU FOR YOUR ATTENTION

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