

Pioneering
green solutions

Verbio

The RNG Opportunity

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Capital Markets Day
September 28, 2023

Disclaimer

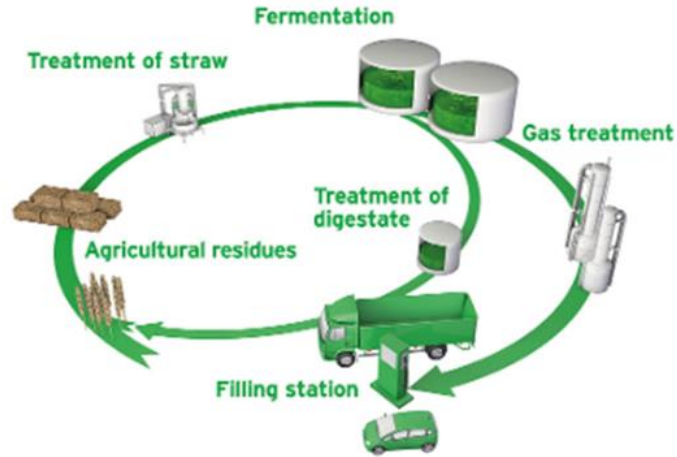
This presentation contains forward-looking information, which is based on assumptions and estimates of the company management of Verbio Vereinigte BioEnergie AG. Even though company management believes that these assumptions and estimates are correct, the actual future development and actual future results can deviate substantially from these assumptions and estimates due to many factors. For example, these factors can include alteration of the economic situation, legal and regulatory constraints in Germany and the EU, and changes in the industry. Verbio assumes no liability and provides no warranty that future developments and actual future results will agree with the assumptions and estimates expressed in this presentation

Verbio's RNG Innovation: A Technological Advantage

Prof. Dr. Oliver Lüdtko

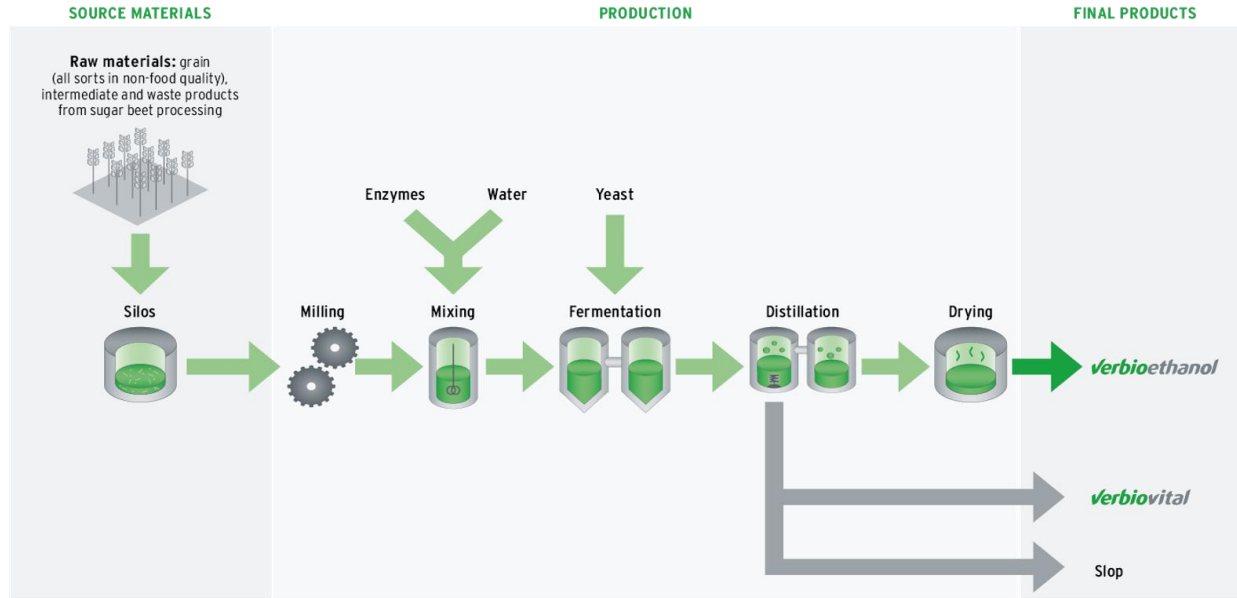
RNG – Our Leading Technology (1)

Straw to RNG as Monofermentation



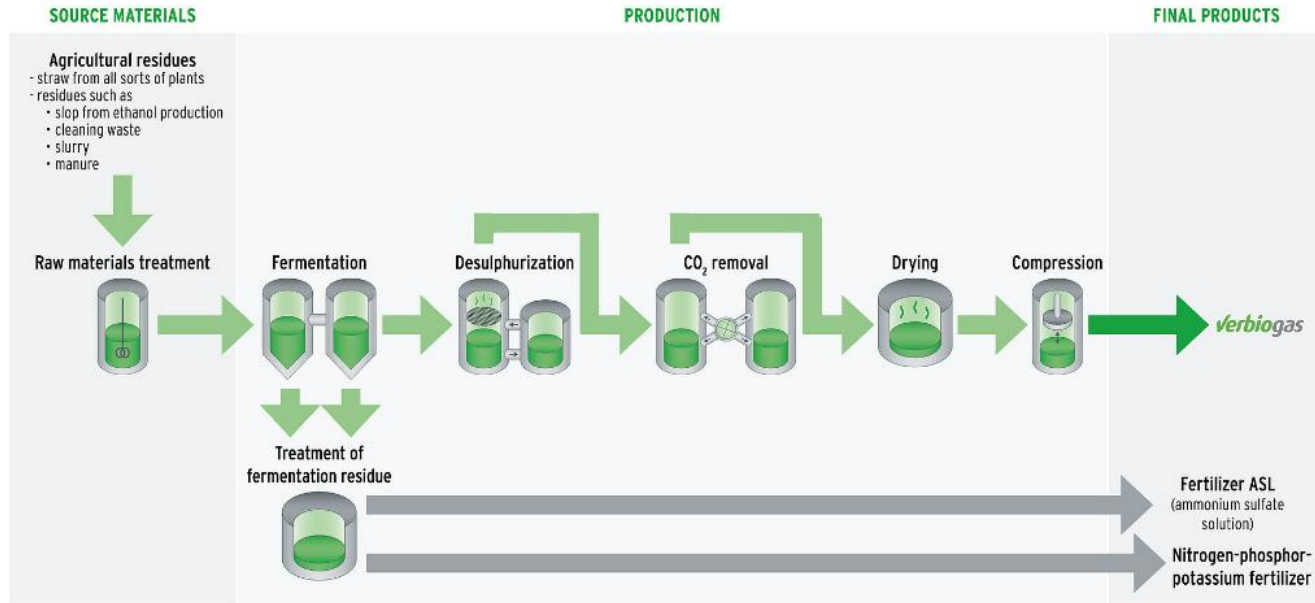
RNG – Our Leading Technology (2)

Ethanol & RNG Biorefinery (I)



RNG – Our Leading Technology (3)

Ethanol & RNG Biorefinery (II)



RNG – Our Leading Technology (4)

Areas of our technology:

- I. Raw material pretreatment
- II. Fermentation
- III. Gas Purification to RNG
- IV. Residual treatment

- V. + for Straw & for Biorefinery / rawmaterial supply in our hands**

Operation Excellence team is globally optimizing the supply chain

For example:

We have developed an APP to control & organize the full supply chain, from moisture measurement on the field over baler to transport and storage on satellites



Our Competitive Advantage (1)

We have all technology success factors in our hand:

- I. IP + R&D = Research and Development teams
- II. EPC = Engineering / Procurement & Construction teams
- III. OE = Operational Excellence teams
- IV. Plant = Plant teams

Examples:

- ✓ OE designs plant on latest developments & EPC builds it based on this design;
 - ✓ global sourcing by own EPC (Vietnam/EU/India/China/US) & no third party EPC – **15 - 25 % of Capex**
- ✓ Operational Excellence teams globally control & support our local plant teams.
 - ✓ High speed identify & multiply best practice in our global plants **lowest Opex**

Our Competitive Advantage (2)

Multiple feedstock:

- All straw types (all lignocellulose types)
- All animal waste streams (manure)
- All industrial waste streams consisting mainly of organic matter

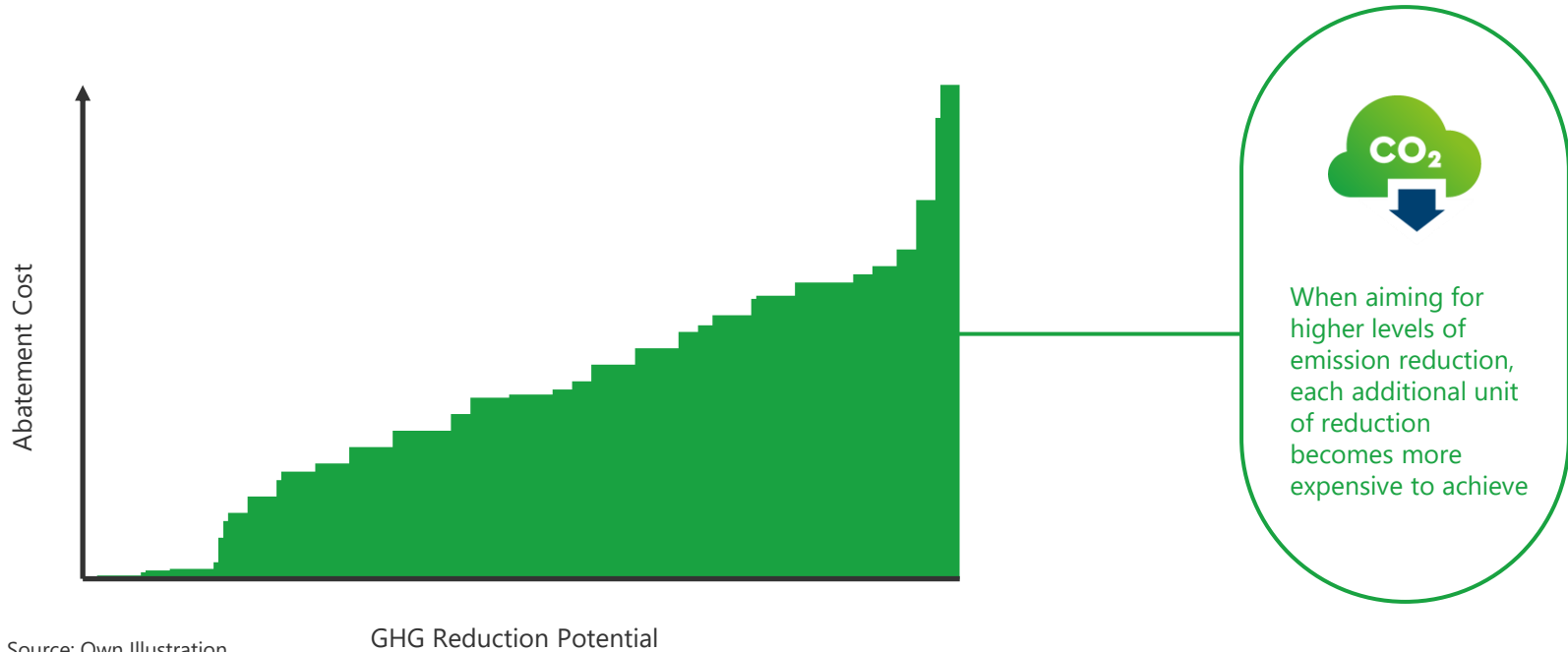
We focus on industrial scale & industrial design:

- I. First plant 25 MW in 2011/12 (world largest plant at that time)
- II. 100 MW plant in Schwedt in 2020 (currently world largest RNG Plant)
- III. Next generation in US 200 MW plant / Start in 2026

Mandated Markets and Regulatory Arbitrage

Claus Sauter

GHG Abatement Costs

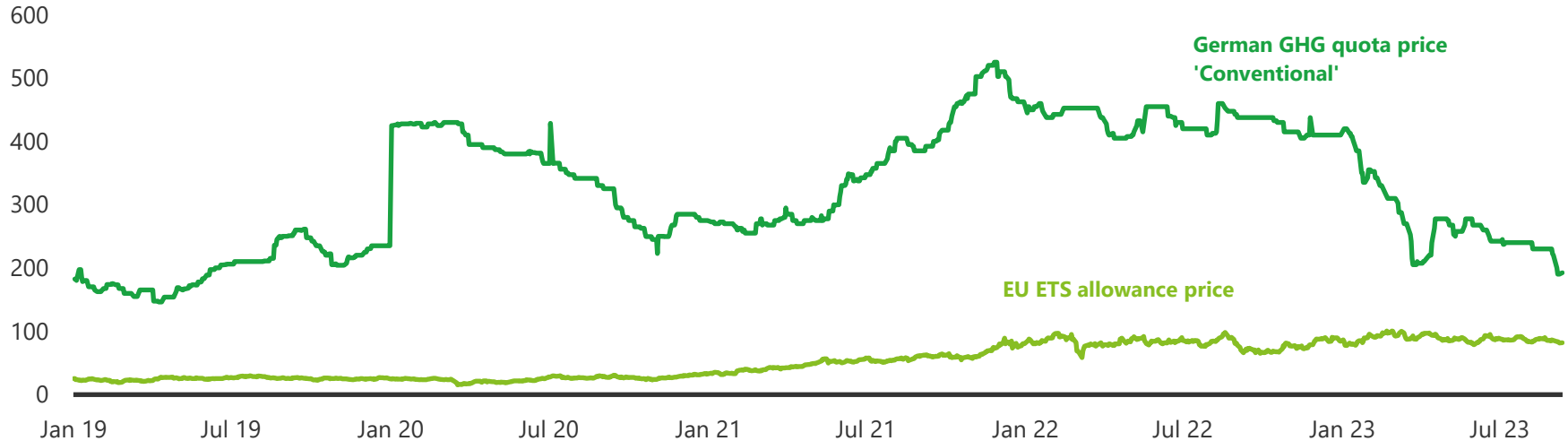


Source: Own Illustration

GHG Reduction Potential

German Regulatory Framework

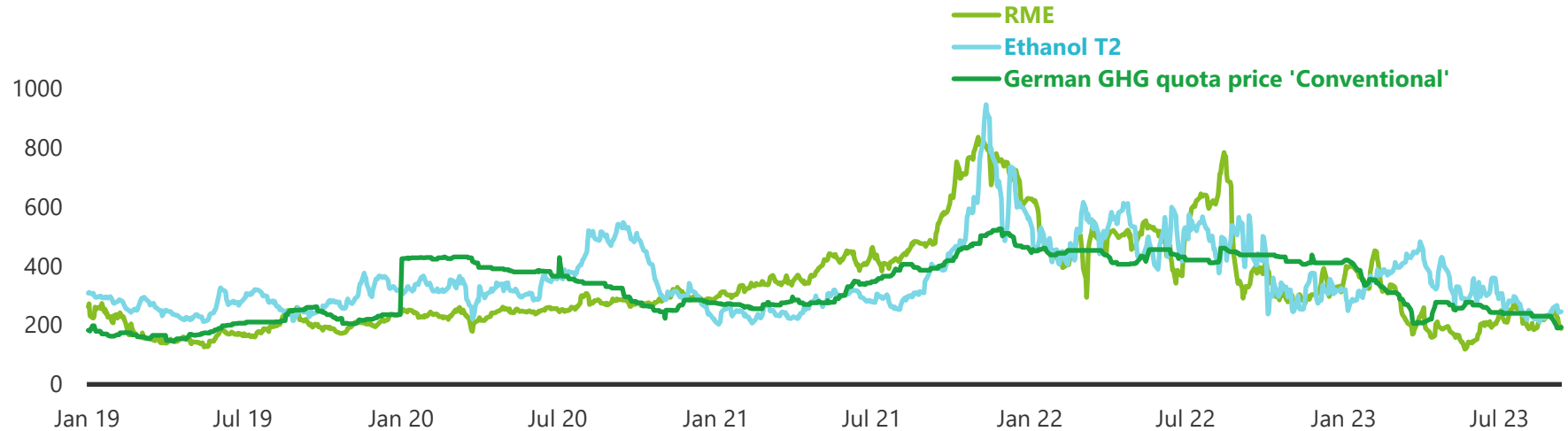
Carbon Pricing in Different Sectors: EU Carbon Allowance vs. German GHG Quota Price in €/t CO₂-eq



Source: SCB, Refinitiv

German Regulatory Framework

Carbon Pricing in Transport: GHG Reduction Costs of Biofuels vs. GHG Ticket Price in €/t CO₂-eq



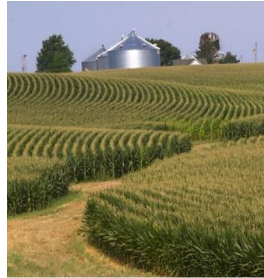
Source: SCB

German Regulatory Framework

Feedstock Determines Value ($\text{CH}_4 \neq \text{CH}_4$)



Fossil
Natural Gas
 CH_4
LNG/CNG



Corn
RNG
 CH_4
1. G Biofuel
Counted **1x** towards
GHG mandate



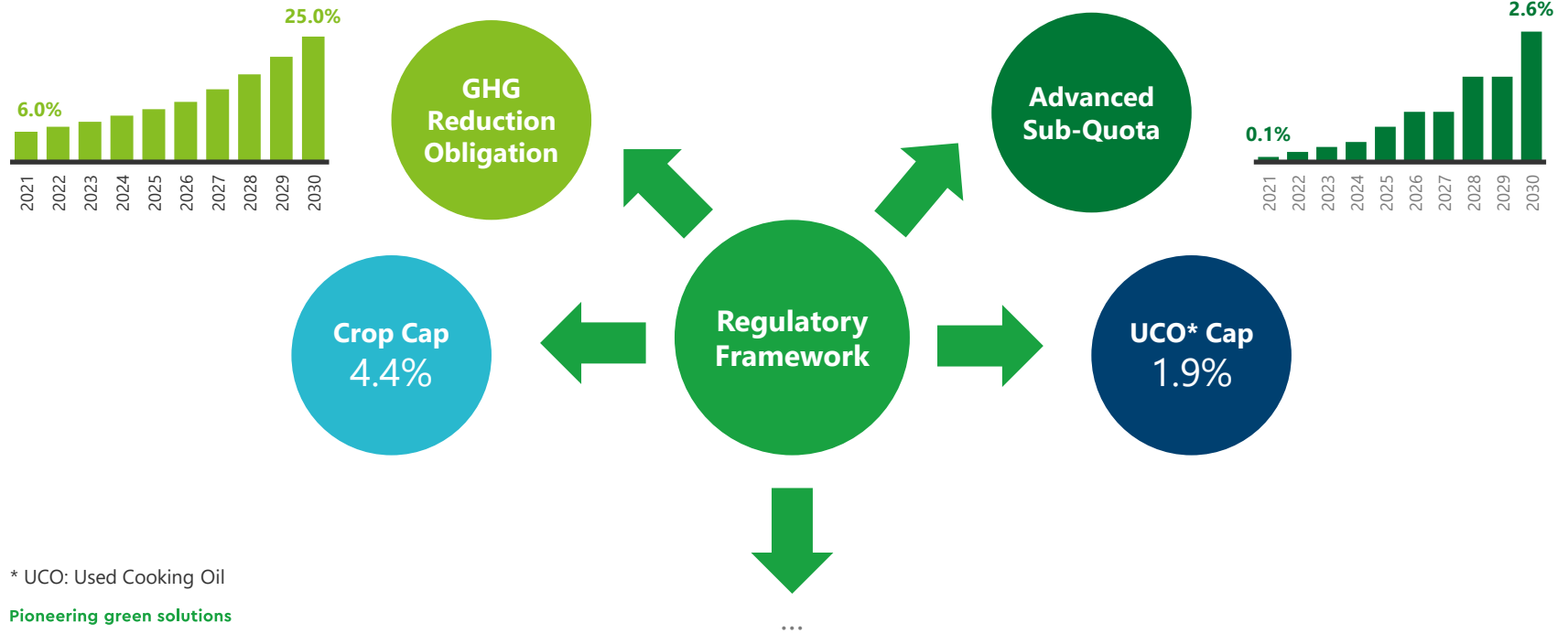
Straw/Stillage
RNG
 CH_4
2. G Biofuel
Counted **2x** towards
GHG mandate



Electricity + CO_2
RNG
 CH_4
SynGas
Counted **2x** towards
GHG mandate

German Regulatory Framework

Competitive Advantage of Verbio's Broad Product Portfolio in GHG Mandate World



* UCO: Used Cooking Oil

US Regulatory Framework

RINs – The Currency of the Renewable Volume Obligation

Conventional Renewable Fuel (D6)

Example feedstock: Corn

Advanced biofuel (D5)

Example feedstock: Sugarcane

Cellulosic biofuel (D3)

Example feedstock:
Corn stover

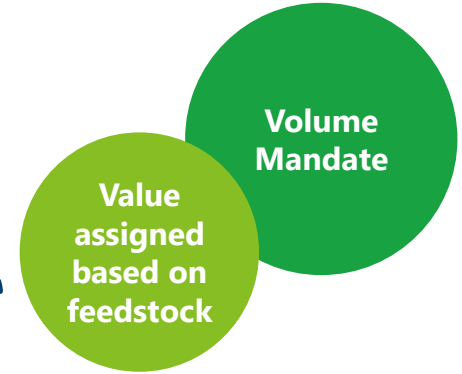
Biomass-based Diesel (D4)

Example feedstock:
Soybean oil, Canola oil

Source: EPA

US Regulatory Framework

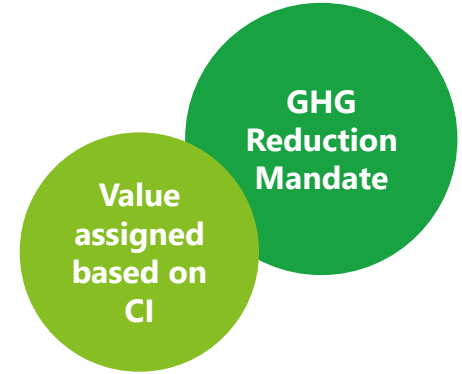
RINs – The Currency of the Renewable Volume Obligation in USDct/RIN



Source: Argus

US Regulatory Framework

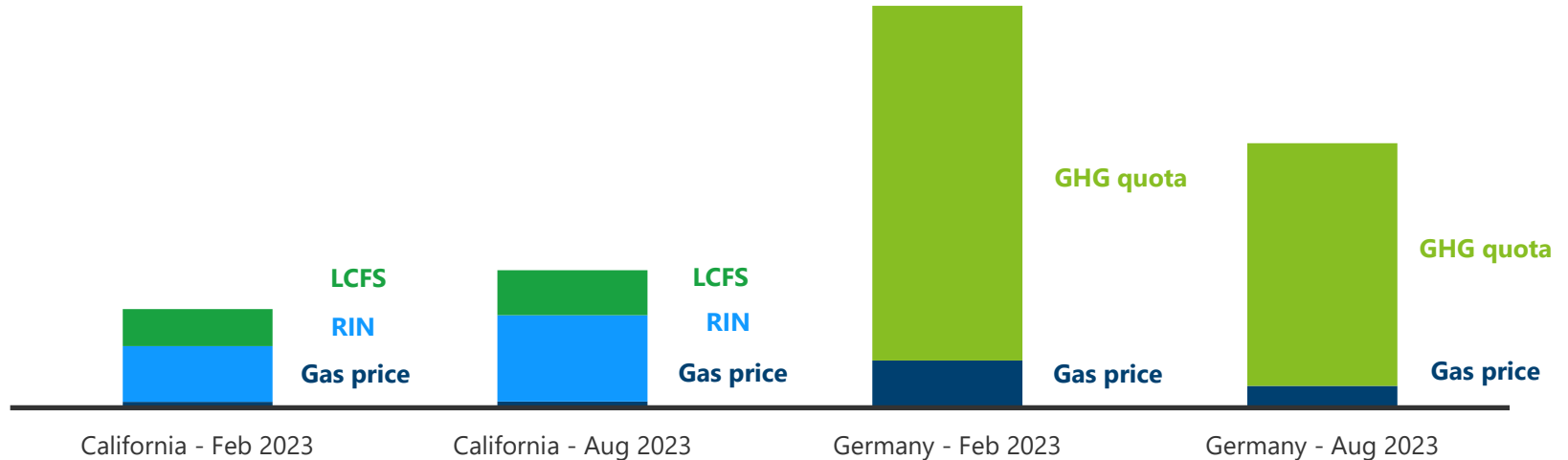
Low Carbon Fuel Standard Creates a Local Market for Low CI Products
Price in USD/t CO₂-eq



Source: OPIS

Regulatory Arbitrage

Illustrative Value Components of RNG in Different Markets at Different Times in USD/MMBtu

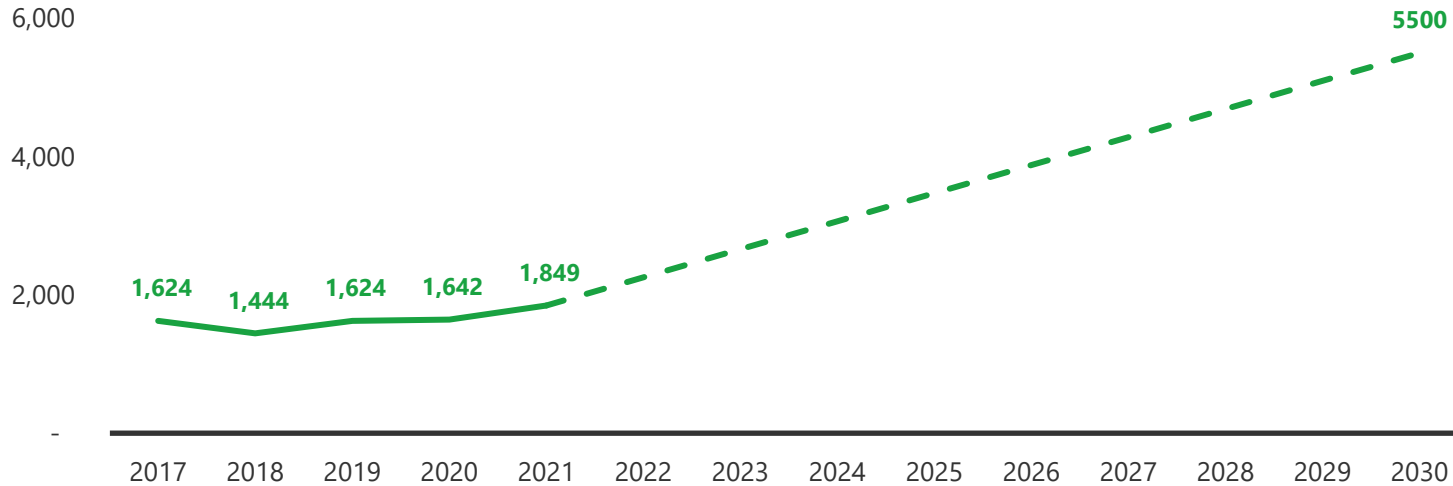


Source: Own calculation based on Refinitiv, Argus, OPIS and default emission/ CI manure gas of -100 gCO₂/GJ (GE) and -150 gCO₂/GJ (CA);

Conversion: 1 USD/MMBTU = 3,4 USD/MWh

RNG Demand in German Transport

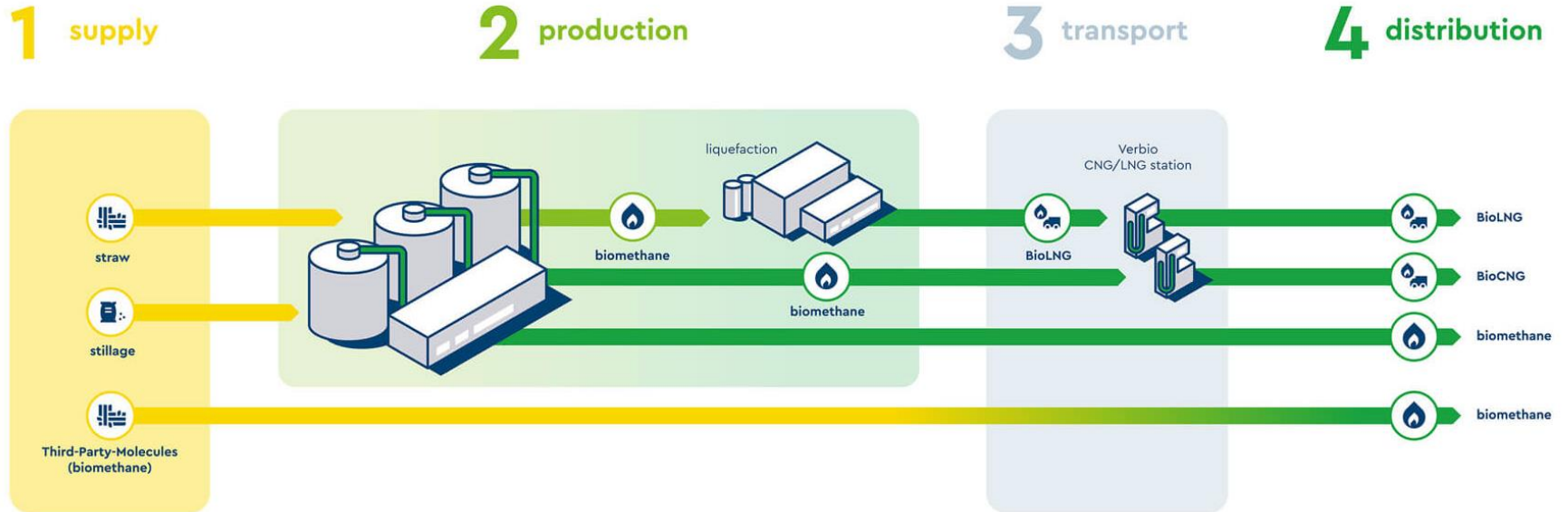
RNG Demand Projected to Grow until 2030 in GWh



Source: AGEBA (2017-2021), VERBIO forecast (2030)

Bio-CNG/ LNG in Germany

Positioning Verbio along the RNG Value Chain



Voluntary Market in North America

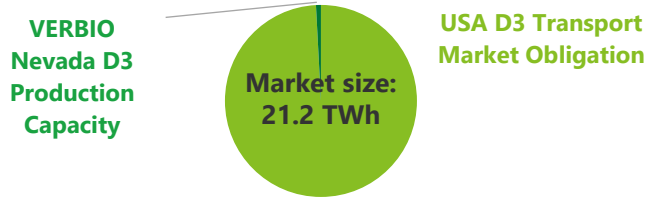
Market Size and Growth Projection

Stefan Schreiber

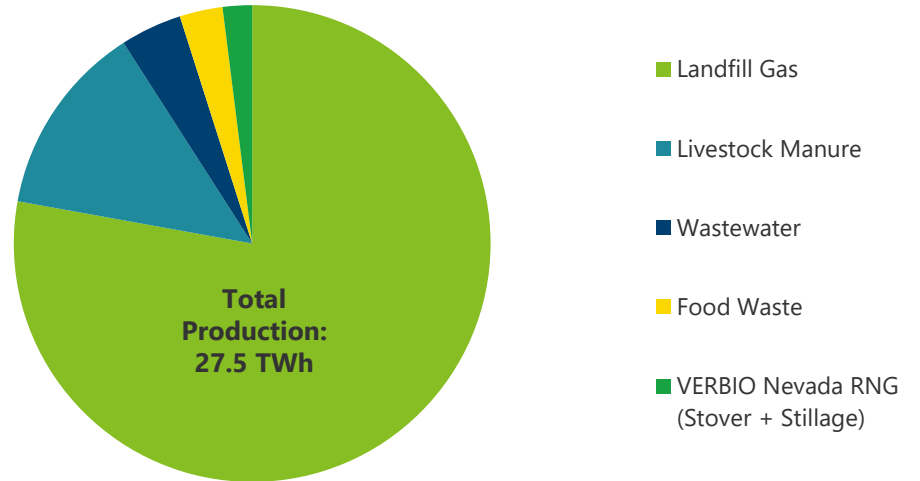
Voluntary Markets in North America

Current Market Size US: Ample Growth Opportunities for Verbio

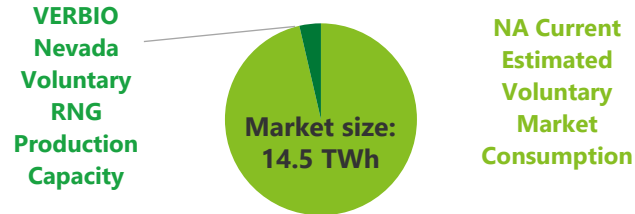
US D3 RIN Obligated Transport Market



RNG Production by Feedstock in TWh



NA RNG Voluntary Market

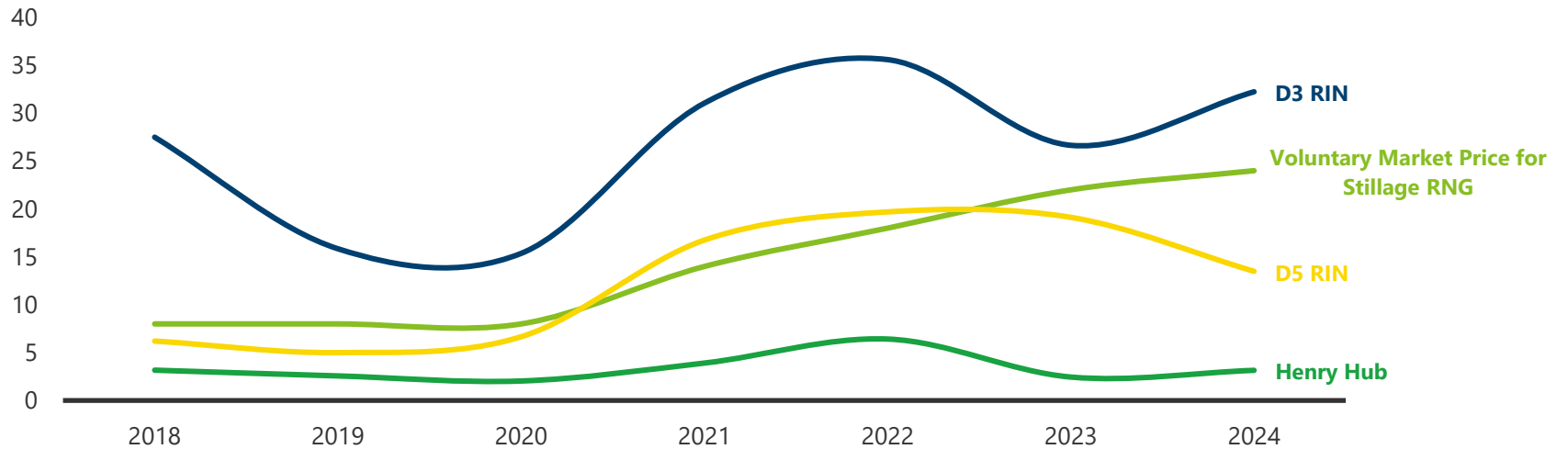


Source: Verbio Analysis, EPA

Voluntary Markets in North America

RNG Demand Projected to Grow until 2030 in GWh

Voluntary Price (USD/MMBtu) Against Henry Hub and RINs is Growing

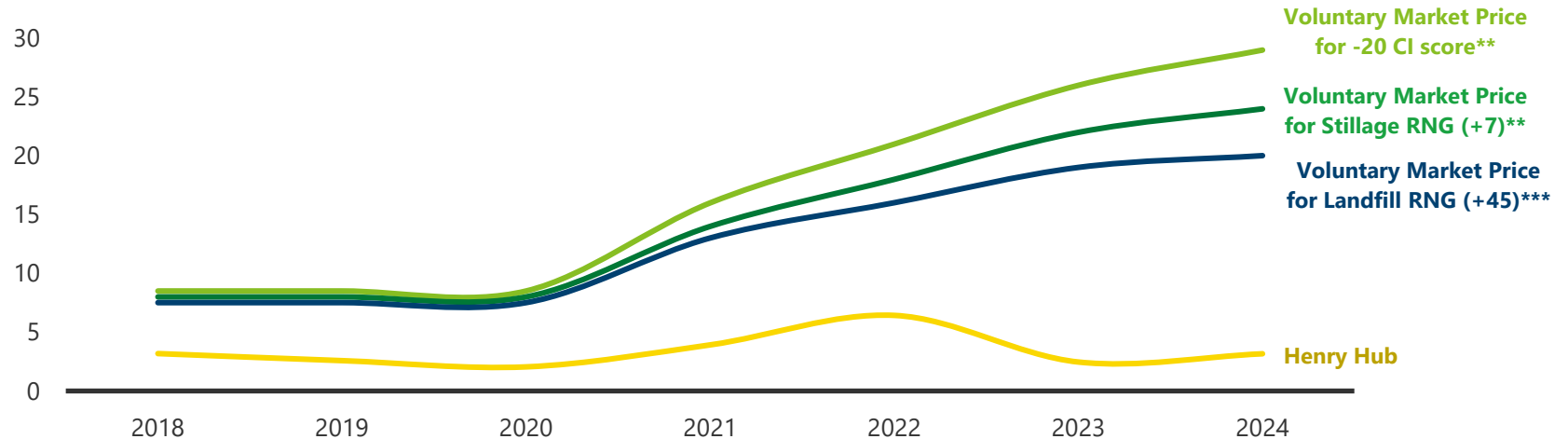


Source: Verbio Analysis // Conversion: 1 US\$/MMBTU = 3,4 US\$/MWh

Voluntary Markets in North America

Voluntary RNG price based on Carbon Intensity (RED II methodology)

Voluntary Price is Growing and Diverging based on Carbon Intensity Score*

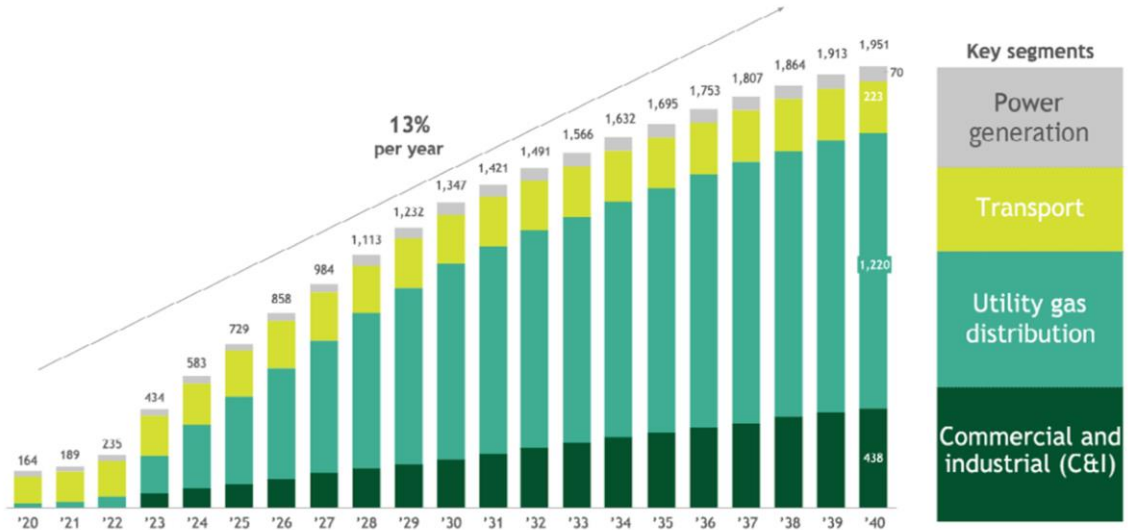


Source: Verbio analysis // Conversion: 1 US\$/MMBTU = 3,4 US\$/MWh

*Carbon Intensity Score is a function of Feedstock; **Scores based on ISCC/ REDII methodology as this is becoming standard methodology even in NA voluntary markets; *** Landfill gas based in CARB standard value as no value under RED II

Voluntary Markets in North America

Future Market Size, KMMBTU/d (includes IRA)



2023: 434 kMMBTU/d = 46,4 TWh p.a.*
 2040: 1,951 kMMBTU/d = 208,6 TWh p.a.

Source: BCG, June 2023; *more ambitious than Verbio Analysis with 35,7 TWh p.a. (see Slide 24)

Voluntary Markets in North America

Growth Drivers for Voluntary RNG

- Corporate sustainability goals / ESG targets - best avenue for decarbonizing thermal demand and difficult industries (e.g. steel)
- Government, non-profit, and university sustainability goals / ESG targets - same as corporates but can be less cost sensitive
- Use as a low-CI feedstock for producing others renewable products (e.g. SAF, methanol, fertilizers, plastics)
- Public gas utility targets or government mandates for sourcing and blending RNG into overall supply portfolio
- Matching RNG Supply with LNG Export Capacity to open new markets for RLNG
- The increasing value of biogenic CO2 is increasing demand; it is a byproduct of RNG production
- Bio-Hydrogen production from RNG

Voluntary Markets in North America

Verbio's competitive advantage with biorefinery concept:

Ethanol plus stillage gas

Ethanol Ebitda Margins - \$/gallon), avg per year	2018	2019	2020	2021	2022	2023 ytd
Average Iowa Plant with DDGS	\$ (0,04)	\$ (0,01)	\$ 0,01	\$ 0,20	\$ 0,04	\$ 0,13
Verbio Nevada Plant with RNG to D5	\$ (0,01)	\$ 0,03	\$ 0,06	\$ 0,54	\$ 0,43	\$ 0,36
Verbio Nevada Plant with RNG to Voluntary Markets	\$ 0,18	\$ 0,17	\$ 0,12	\$ 0,51	\$ 0,43	\$ 0,55
Ethanol Ebitda Margins - \$/mt, avg per year	2018	2019	2020	2021	2022	2023 ytd
Average Iowa Plant with DDGS	\$ (13,32)	\$ (3,33)	\$ 3,33	\$ 66,60	\$ 13,32	\$ 43,29
Verbio Nevada Plant with RNG to D5	\$ (3,33)	\$ 9,99	\$ 19,98	\$ 179,82	\$ 143,19	\$ 119,88
Verbio Nevada Plant with RNG to Voluntary Markets	\$ 59,28	\$ 56,94	\$ 40,14	\$ 169,16	\$ 144,35	\$ 181,68

Source: Verbio analysis

Status IRA

Opportunities and Challenges

Stefan Schreiber

Status Inflation Reduction Act (IRA)

IRA Provisions relevant for Verbio

Section 48: Investment Tax Credit (ITC)

- Maximum credit equal to 50% of "qualified biogas property" expenditures
- Relevant for Verbio are 30% subject to meeting **apprenticeship and prevailing wage requirements**
- **Nevada Phase 2 (Stillage gas) are exempt from above requirements (in 2023 finished)**
- Construction must have begun before the end of 2024
- Tax credit is not paid directly, but can be either used or creates a tax loss carry forward

Section 45 Q: Carbon Capture and Sequestration (CCS) Credit

- The credit is available for a 12-year period starting when the equipment is placed in service.
- \$85/MT for CO₂ captured and sequestered
- \$60/MT (from \$35) for CO₂ captured and used in a permissible way
- The 45Q is fully refundable (direct pay in cash) to the taxpayer
- **Apprenticeship and prevailing wage requirements apply**

Section 45Z: Clean Fuel Production Credit (CFPC)

- Production Tax Credit for low-emissions fuels between 2025 and 2027
- Up to 1 \$/gal (or 1,75 for aviation fuels) multiplied with an emission factor
- Factor is 0%, if emissions equal or greater to 50 kg CO₂ / MMBTU (approx. 47 grCO₂/MJ)
- **Apprenticeship and prevailing wage requirements apply after 2025**
- Tax credit is not paid directly, but can be either used or creates a tax loss carry forward
- **Not to be combined with 45Q**

Section 45V: Clean Hydrogen Production Tax Credit

- 10-year production tax credit is available for the production of clean H₂
- Construction needs to start until end 2032
- 3 \$/kg H₂ multiplied by a percentage, which is 100%, if GHG emissions less than 0,45 kg CO₂ / kg of H₂
- Credit is inflation adjusted
- **PTC is directly paid in cash for first 5 years and can be combined with 45Q**

IRA – Opportunities & Challenges

Completed Investments

- Nevada Phase 2 (stillage gas) can apply for the ITC (30%) without being bound to other requirements
- We estimate the ITC to come in a range from 25-30 mln US\$
- The ITC generates either a tax loss carry forward, tax reductions or can be sold at about 90% of its value

New Investments

- The ITC remains an estimation because the IRS guidelines have not yet been published (what is eligible?)
- 45Z / 45V require a GHG-savings-calculation but methods and guidelines are equally missing
- New investment do require payment of prevailing wages and an accepted apprenticeship program for Verbio and also for sub-contractor and sub-subcontractors (guidelines are missing)
- If one of the requirements is not met, the ITC reduces to 6%

Presenters

Management Board



Claus Sauter
CEO, Chairman of the
Management Board

Responsible for global business development, global marketing and communication, global human resources, global trading, global risk management and specialities, sustainability



Prof. Dr. Oliver Lüdtké
CTO, Vice-Chairman of
the Management Board

Responsible for technical planning, procurement and construction, research and development, operations excellence



Theodor Niesmann
CTO

Responsible for technical planning, procurement and construction, research and development, operations excellence



Bernd Sauter
COO Europe

Responsible for marketing & communication Europe, agrarmanagement Europe, procurement, trading and sales, VERBIO logistics, finance Europe, governmental and regulatory affairs Europe, quality management Europe, personnel Europe, head of production Europe



Stefan Schreiber
COO North America

Responsible for development of synthetic fuels, government and regulatory affairs North America (NA), human resources (NA), VERBIO Nevada, VERBIO Canada, agrarmanagement (VEA) and VERBIO North America (VNA)



Olaf Tröber
CFO

Responsible for global IT, internal audit, global accounting and taxes, enterprise risk consolidation, global insurance, global controlling, global treasury, global legal department, investor relations, compliance

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