

Pioneering green solutions

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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

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



More than 80% of primary energy use comes from fossil sources

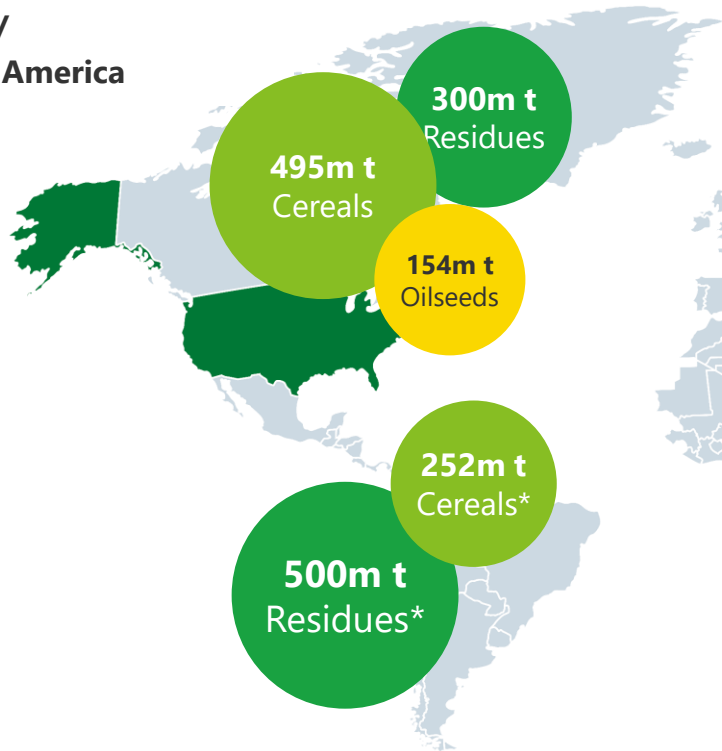


Setting the Scene: More from Biomass

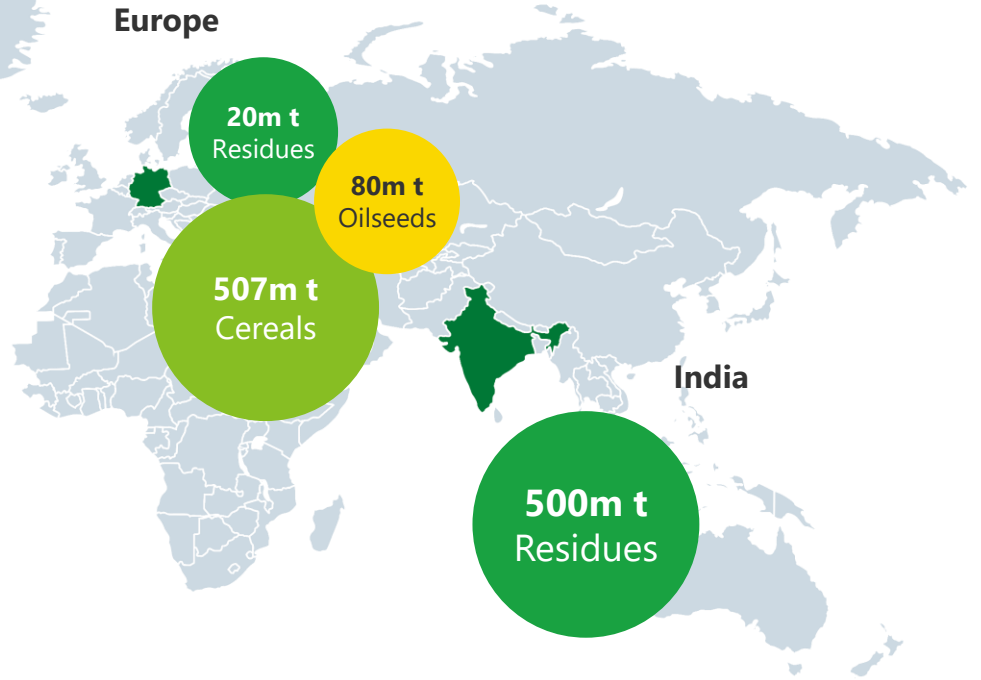
Bernd Sauter

Biomass Availability in relevant markets

North/
South America



Germany/
Europe



Source: UFOP/Verbio; *potential future market

Increasing the Efficiency of all Biomass Processing

Green Solutions

- Food
- Feed
- Industrial Applications (incl. Biofuels)

- Bioenergy
- Soil Improvement

Building blocks

- Cob (53%)
- Starch (66%)
 - Protein and Fiber (30%)
 - Corn Oil (4%)

- Straw (47%)
- Cellulose
 - Lignin
 - Hemi-cellulose



Building blocks

- Seeds (30%)
- Oil (50%)
 - Protein (20%)
 - Starch + Sugar (5%)
 - Cellulose (5%)
 - Others (Vitamins, Lignin, Ash, Minerals...)

- Straw (70%)
- Cellulose
 - Lignin
 - Hemi-cellulose

Green Solutions

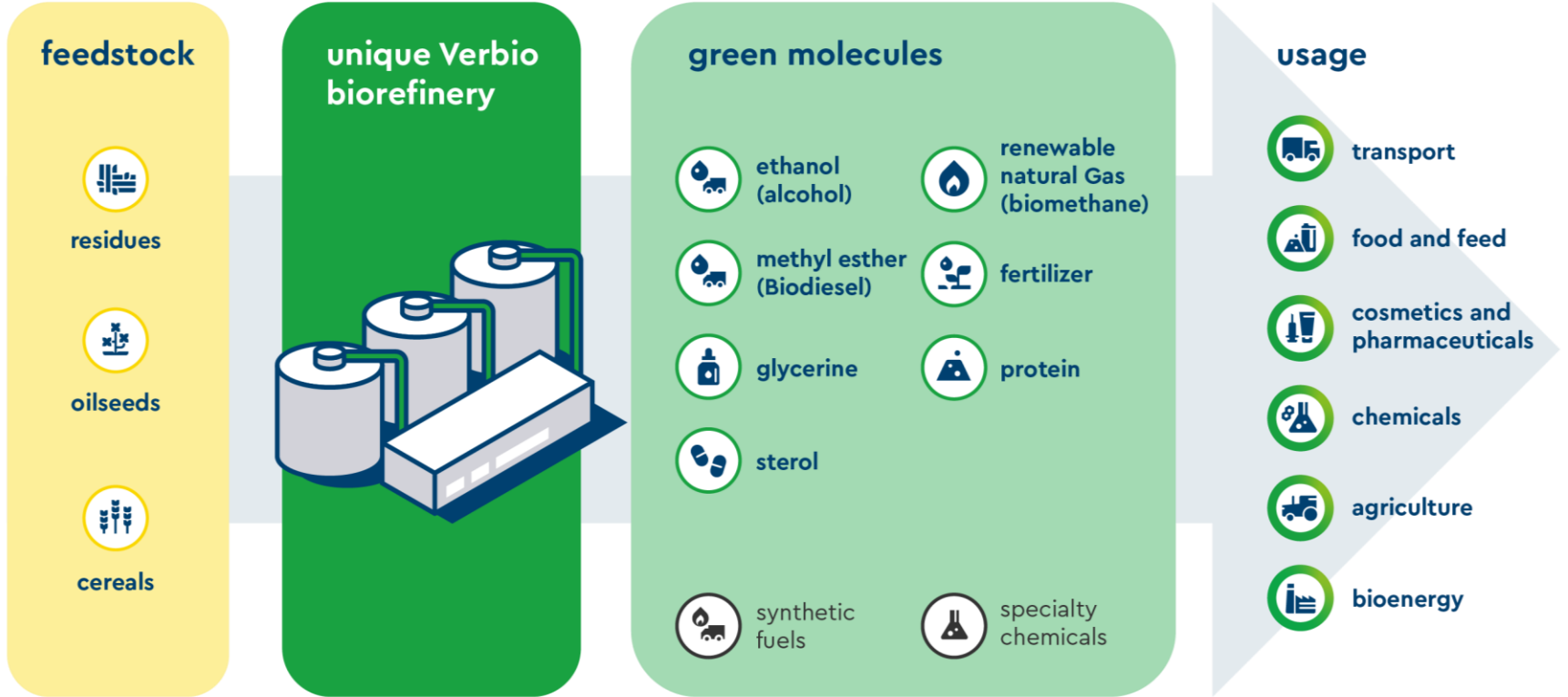
- Food
- Feed
- Industrial Applications (incl. Biofuels)

- Bioenergy
- Soil Improvement

Current Technology Scaling and Adding a Asset-light Business

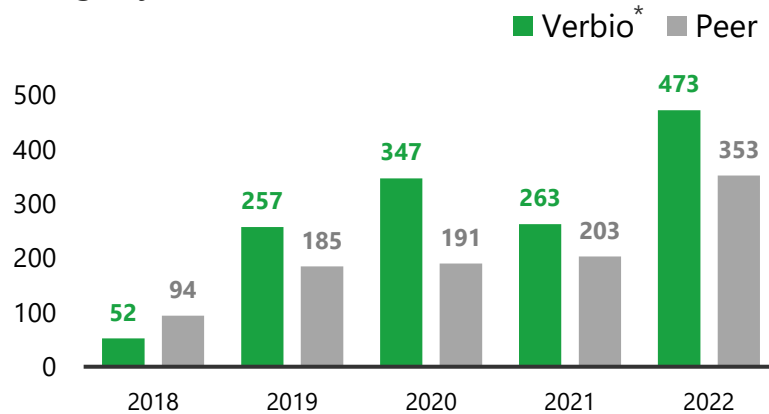
Claus Sauter

Our Biorefinery Model

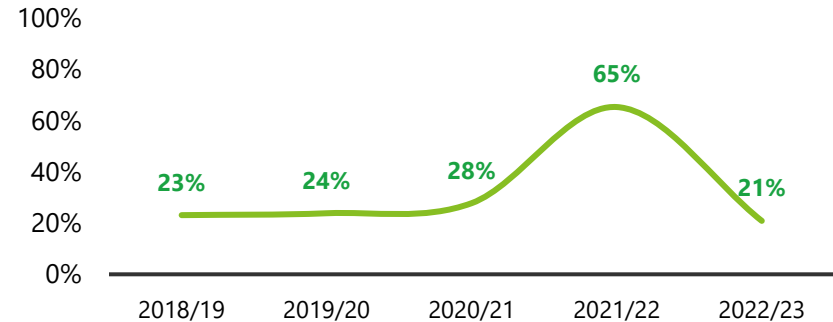


Our Competitive Advantage leads to attractive Returns

Higher EBITDA in € per ton of Ethanol
(timing-adjusted)



ROCE**

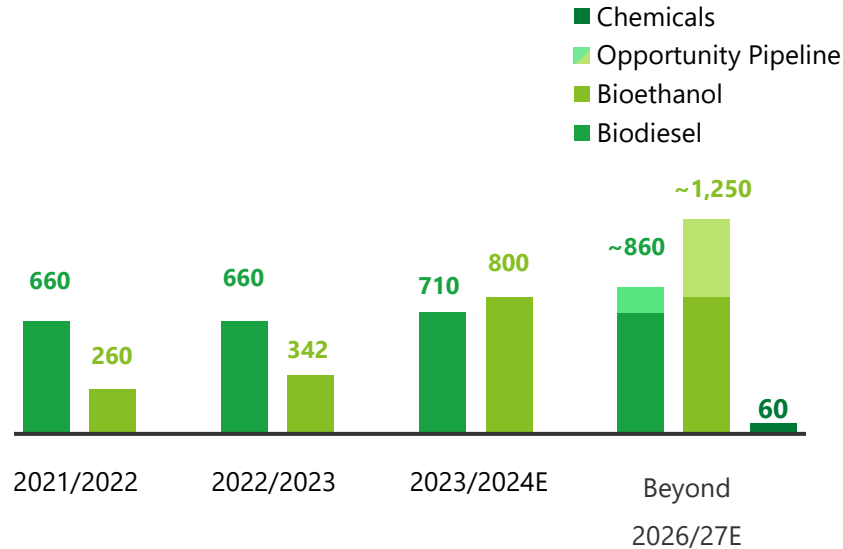


*incl. RNG from straw

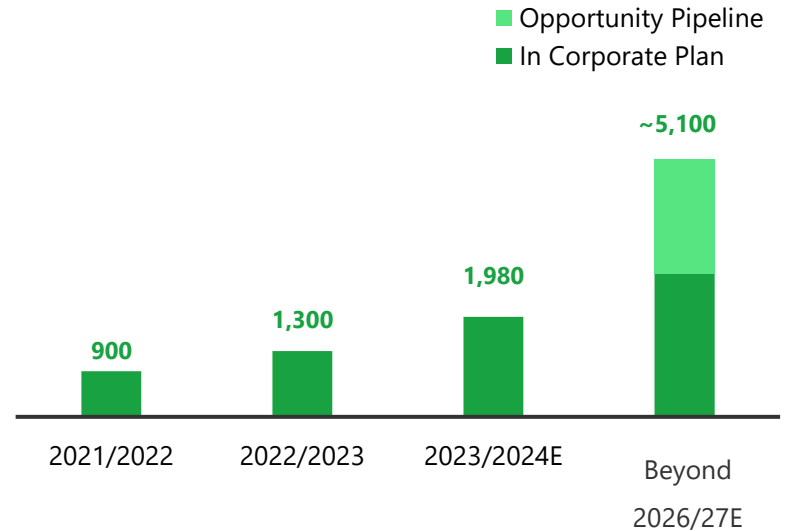
**ROCE calculated as EBIT divided by average Capital Employed

Growth Engine I: Implementing our Technologies across the World

Green molecules in thousand tons



RNG in GWh



Our Platform provides Trading Optionality



Strong Analytics
Capabilities



Multiple Green
Molecules



Multiple
Customers,
Markets and
Pathways



Size

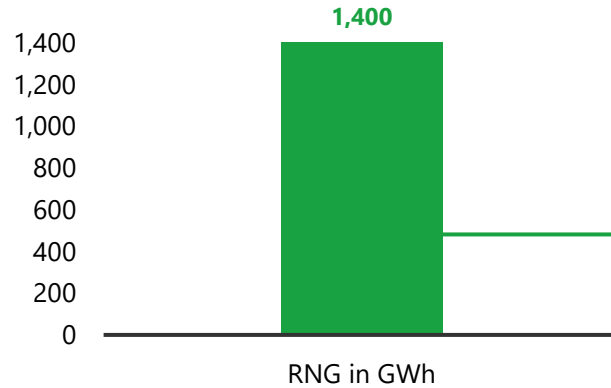
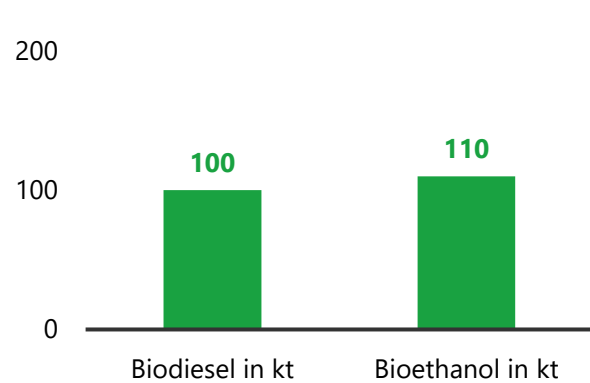


Strong Risk
Management



Growth Engine II: Increasing our established Portfolio with third-party Molecules

Leveraging our Platform to maximize the Value of each Molecule:
Opportunity Pipeline (Figures p.a.)



Buying third-party Molecules via Offtake/Equity

New Technology Deployment: Chemical Feedstocks from VegOil

Theodor Niesmann

Why Chemical Feedstocks from Biomass?

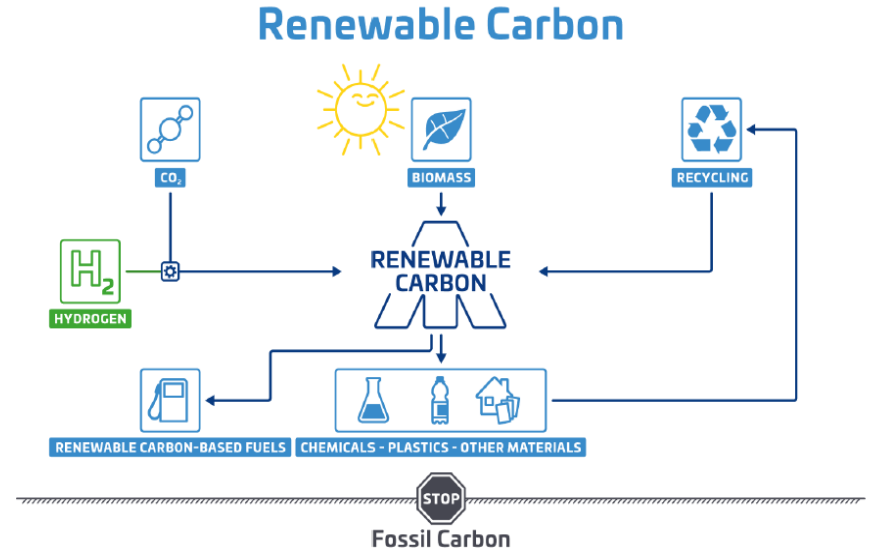
Global trends in the chemical industry:

Climate Neutrality – Consumer Goods Industry has established goals for CN between 2030 to 2050
Chemical industry urgently needs solutions

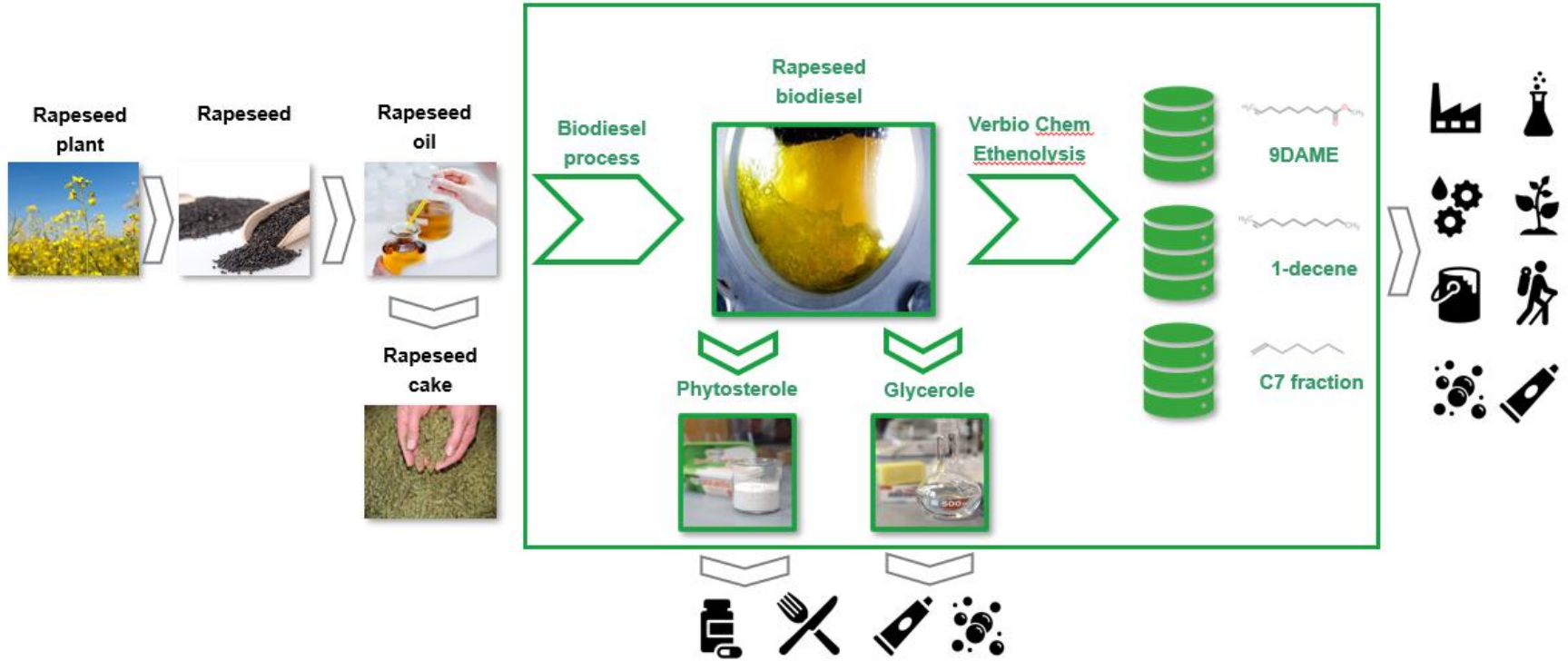
Circular Economy – Shift to renewable/biobased chemicals to reduce waste, resource use and CO₂

Decarbonization in Chemical industry is impossible

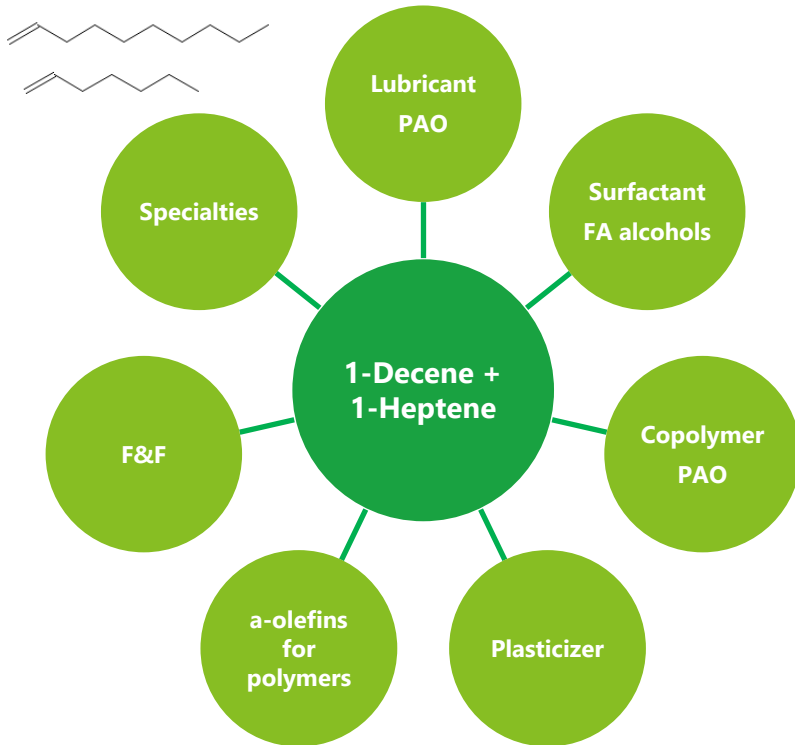
→ **Renewable Carbon needed**



Verbio's core Biorefinery Concept on VegOil



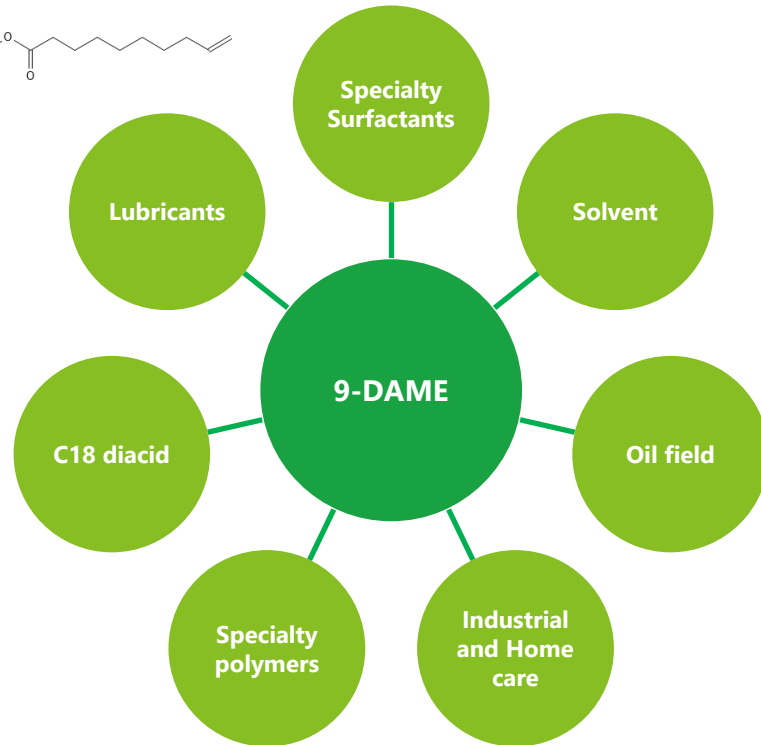
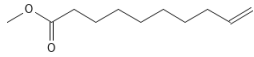
Products and Market



Linear α -olefins – addressable market ~USD 7-10bn (2023)

- 1-Decene - market of ~USD 2.5bn p.a. 700-800kt/a (2022) mainly lubricants
- Heptenes not on the market but e.g. n-heptane solvent ~USD 0,6-1 bn p.a., 300 kt/a (2020)

Products and Market



9DAME Very versatile, but new to the industry → Verbio is First Mover

- Surfactants ~30-35 bn USD/a, 17-18 Mio t/a, Target market 150-300 kta
- Solvents USD 40-45bn p.aa, biobased solvents 0.5-1m t/a, USD 1,5-2bn p.a.
- Specialty polymers, e.g. PA11/PA12 300kta, USD 3bn p.a.
- C8/C10 FA/alcohols market in general, 150-300kt/a, USD 0,6-1,5bn p.a.
- New polymers based on C18 diacid as recyclable PE alternatives
- New PAO lubricants, see 1-decene

VerbioChem – Ethenolysis Plant, Bitterfeld

Existing Biodiesel Plant

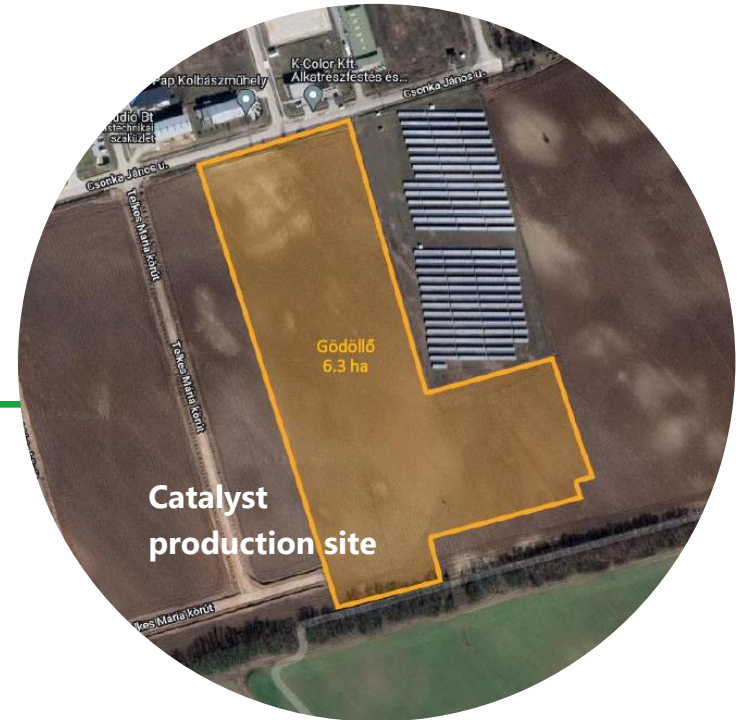
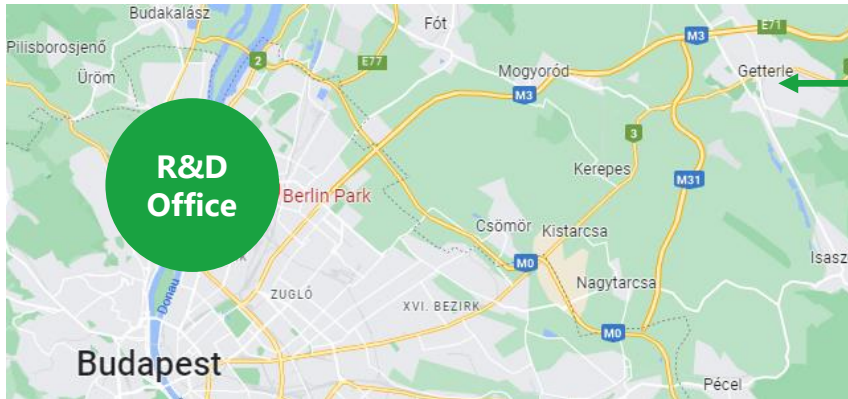


Ethenolysis Plant Expansion

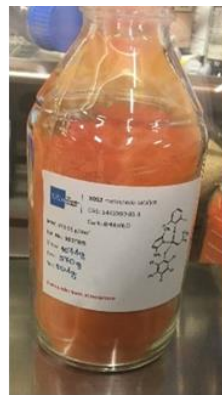


XiMo – Our Catalyst Producer

- 100 % affiliate of Verbio
- Hungarian based catalyst developer and producer
- Specialised on Metathesis Catalysts
- Exclusive IP (licensed / own patents)



XiMo's Products



ID	C1
Structure	
CAS	194659-03-5
Formula	$C_{12}H_{14}Cl_2P_2Ru$
MW	800.96





ID	CR27
Structure	
CAS	253688-91-4
Formula	$C_{14}H_{16}Cl_2N_2PRu$
MW	826.97

ID	X052
Structure	
CAS	1445990-85-1
Formula	$C_{28}H_{32}BrMoN_2O$
MW	973.95

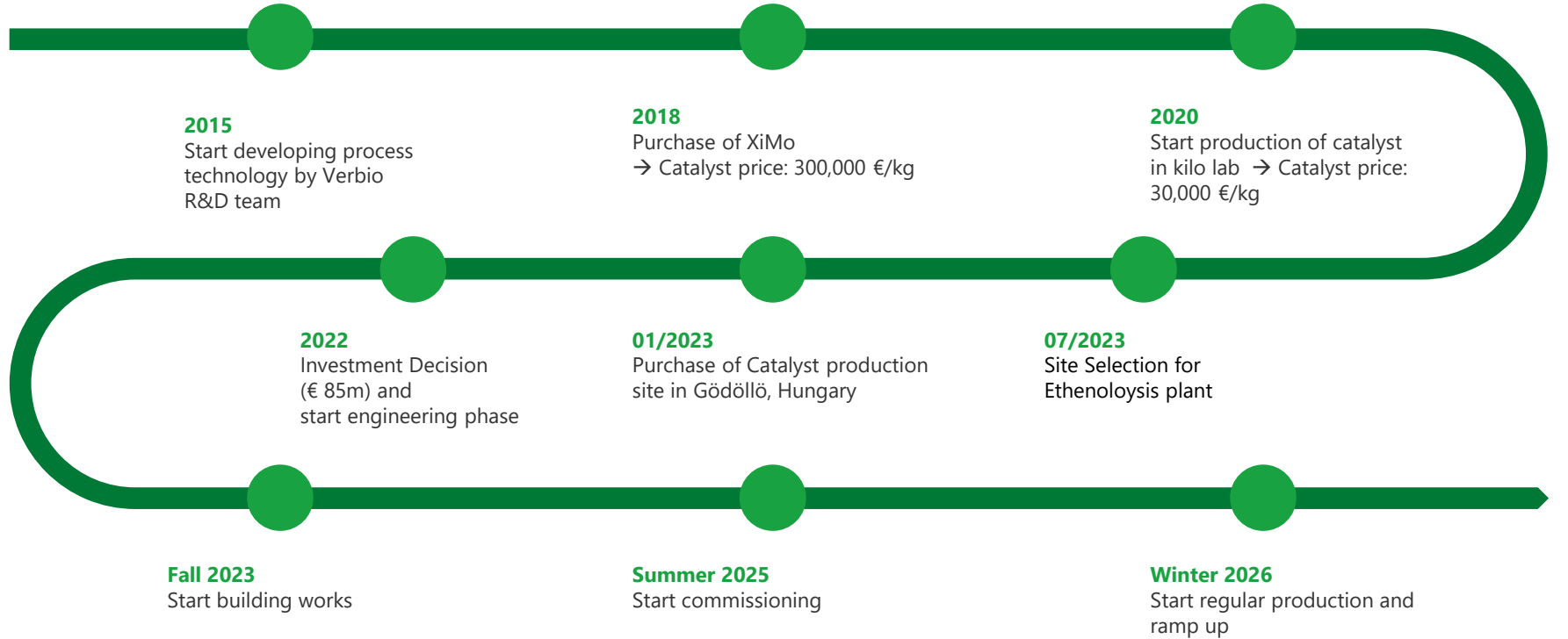
ID	X211
Structure	
CAS	1817807-15-0
Formula	$C_{48}H_{52}Br_2Cl_2N_2O_2SiW$
MW	1123.56

ID	SRCat4
Structure	
CAS:	2750918-03-5
Formula	$C_{46}H_{52}Cl_2N_2ORuS_2$
MW	999.12

XiMo's Applications and Markets

Industry 	Applications 	Product 	Reactions 
Renewables	<ul style="list-style-type: none"> • Cosmetics • Lubricants • Fracking Solvents 	<ul style="list-style-type: none"> • Decene • Methyl Decenoate • Polyols / Diacids 	<ul style="list-style-type: none"> • Ethenolysis • Homo Cross Metathesis
Flavours & Fragrances	<ul style="list-style-type: none"> • Cosmetics • Household Chemicals • Detergents 	<ul style="list-style-type: none"> • Musk 	<ul style="list-style-type: none"> • Z-Selective Cross Metathesis • Optically Active • Ring Closing Metathesis
Pharmaceuticals	<ul style="list-style-type: none"> • R&D / Production 	<ul style="list-style-type: none"> • Active Ingredient 	<ul style="list-style-type: none"> • Stereoselective Cross Metathesis • Optically Active • Fluorine Chemistry
Agrochemicals	<ul style="list-style-type: none"> • Insecticides 	<ul style="list-style-type: none"> • Pheromones 	<ul style="list-style-type: none"> • Z-Selective Cross Metathesis
Specialty Chemicals	<ul style="list-style-type: none"> • Automotive • Speciality Polymers 	<ul style="list-style-type: none"> • High-performance polymers • Functional Base Oils • Gas Additives • Amino-acids 	<ul style="list-style-type: none"> • Syndiotactic Polymerization • Z-Selective Cross Metathesis • Cross Metathesis

Milestones



Facts and Figures

Production capacity:	32,000 t p.a. 9-DAME 17,000 t p.a. 1-Decene 6,000 t p.a. 1-Heptene 5,000 kg p.a. Catalyst
Estimated revenue in 2027:	€ 116m (40% Capacity usage)
Estimated EBITDA in 2027:	€ 4.4m
Estimated revenue in 2030:	€ 293m (90% Capacity usage)
Estimated EBITDA in 2030:	€ 50m



Highlights

- Business Case based on actual price level for „grey“ Decene and comparable chemicals for 9-DAME
→Potential upsides for green chemicals on growing demand
- Price of catalyst will decrease to 7,000 €/kg
→Growing demand from other applications
- Exclusivity for catalyst and own technology for production process provides unique competitive advantage
- Access to Raw Materials
- Logistics



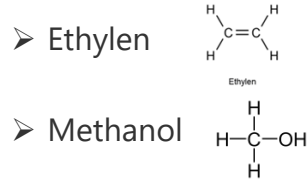
New Technology Deployment: Chemical Feedstocks from Starch and Sugars

Prof. Dr. Oliver Lüdtkke

Overview: Basic Organic Chemicals

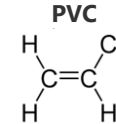
Basis Organic Chemicals are the Backbone of the Entire Chemical Industry!

Basic chemicals



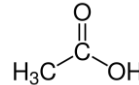
Products from basic chemicals (global demand)

Polyethylen (135 Mio.to)* / PVC (50 Mio.to) / Ethylenoxid (32 Mio.to)*/....



Formaldehyde (25 Mio.to)* / Acetic Acid (21 Mio.to)* / Methylchlorid (3 Mio. to)* /....
 Dimethylether (10 Mio.to) → Ethylen + Propylen (catalytic-process)

➤ Acetic Acid and higher carboxylic acids (C3 – C6)



.... others

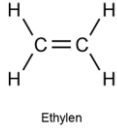
*(...) = market size

For 1 ton of Ethylen, 1.5 tons of Ethanol is needed. The entire US Ethanol Production of 50m tons of Ethanol is equivalent to c. 33m tons of Ethylen.

Basic Chemicals based on Verbio Products

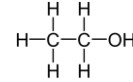
Basic Chemicals

➤ Ethylen



Process / Technology

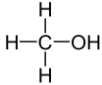
catalytic process by ethanol (technology available)



Market/ Attractiveness

Close to market price / existing

➤ Methanol

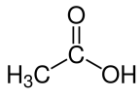


synthesis gas route by RNG / CH₄ (technology available)
by CO₂ / CO and renewable H₂ (technology available)



Premium for biomethanol
needed

➤ Acetic Acid



catalytic process by ethanol or
by fermentation (technology pilot scale)

Premium for bio carboxyl
acids needed

➤ Higher carboxyl acids by fermentation (technology pilot scale)

Special Chemicals from Verbio

Raw Material

- Fusel Oils
- Fusel Oils
- Ethanol
-

Products / Technology

- Esterification to C3-C5 Ester-mixture (R&D)
- Hydrocarbons / Separation & Fractionation of oils
- Ethyl acetate / Reaction between ethanol & acetic acid

Market

- Solvent industry
- Niche markets
- Solvents for coatings

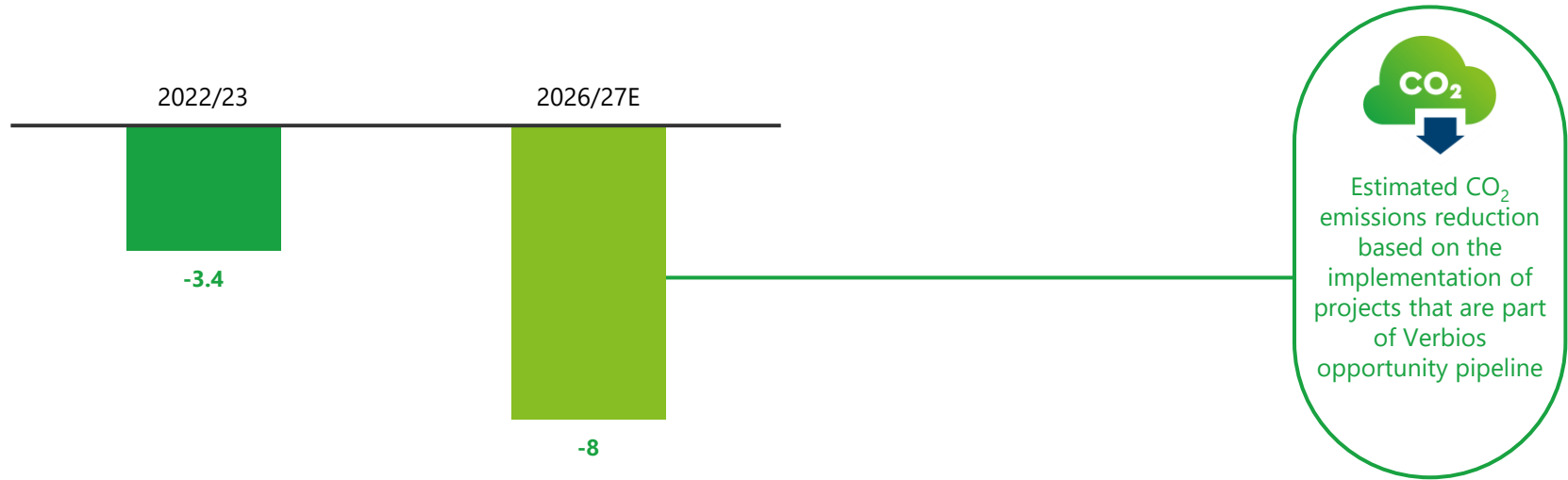
Fusel Oils are By-products of Ethanol Production (0.4%).

Bringing it all together: Impact and Implications

Olaf Tröber

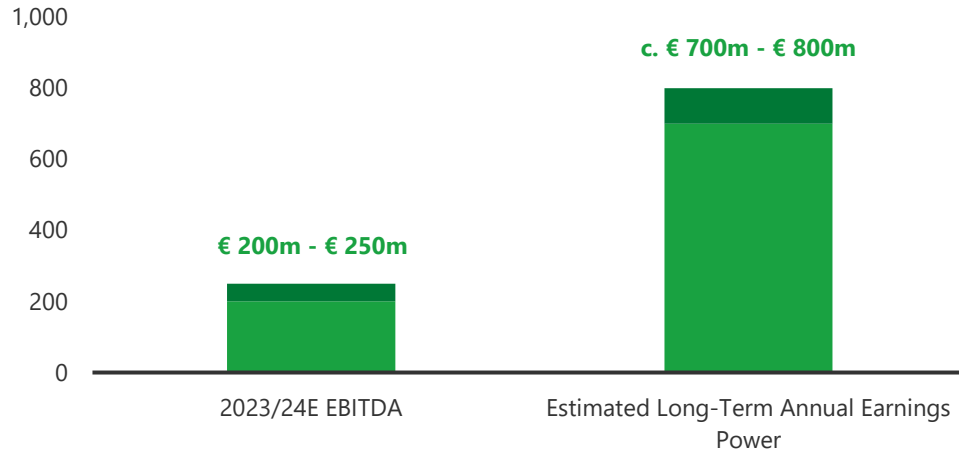
Green Customer Impact

CO₂ Emissions Reduction in million tons according to German Regulation



Opportunity Pipeline to drive Dynamic Growth in Earnings Power

Meaningful progress on mid-to-long-term Strategic Vision in € m

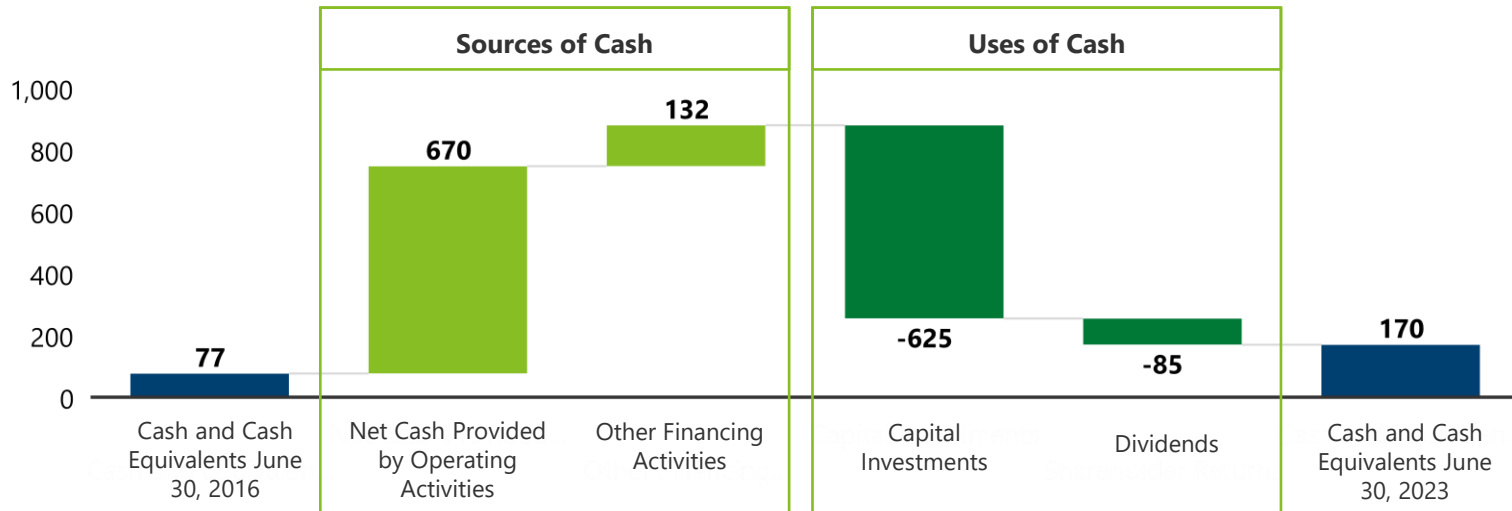


- Current estimated mid-to-long-term annual earnings power of € 700m - € 800m after completion of attractive opportunity pipeline*
- Earnings power assumes same price levels as 2023/24 guidance
- Estimated additional capex of > € 1bn

*projects are at various stages of maturity. Individual projects may advance to a final investment decision by the company based on a number of factors.

Asset Base generates significant Cash to support Growth

Sources and Use of Cash: Cumulative in €m June 30, 2016 to June 30 2023



Summary and Q&A

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