



CARBONFREE[®]

**UNIGESTION PRIVATE EQUITY FUNDS
ANNUAL GENERAL MEETING - LUCERNE**

June 10 – 12, 2024





CARBONFREE™

Profitable and Scalable Technology...

...that can be implemented today

...and permanently removes CO₂ from the atmosphere

CarbonFree's mission is to decarbonize industrial CO₂ emissions and enable the world's transition to net zero carbon emissions by producing carbon-zero chemicals



- Differentiated, decarbonization technology solution converting CO₂ into endurocal™⁽¹⁾, a carbon-zero calcium carbonate
 - Decarbonization for hard-to-abate industrials with scalable CCU and CCS solution
- Initial deployment for CCU will enable “green” steel; minimal cost to capture CO₂ for emitter
- endurocal is a cost-competitive carbon-zero disruptor to the calcium carbonate market, a \$40+bn market with broad end uses
- Future applications of CCU for lime and blue hydrogen
- Developing large scale CCS solutions (1mtpa) with economic viability (opex and capex recovery) at a sub \$100/ton price for carbon

108⁽²⁾
patents issued in 50 jurisdictions

Compelling Value Proposition
to emitter and CFRE

20
years of development

2 Consecutive Years of Profits
at SkyMine sister 50k tpa capacity facility

Strategic Partners



Executed contract to build first project (50k tpa)



Collaboration agreement to identify project by YE24



MOU

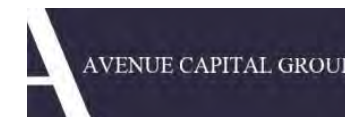
Technical Partners



Select Investors



Investment Corporation



Source: IHS, Calcium Carbonate, Fine-Ground (FGCC) and Precipitated (PCC), 2022; “SYNTHETIC CALCIUM CARBONATE”, HNY Research Focus on Global, Regional and National Market Research

(1) endurocal name trademark registration filed

(2) 68 patents issued for SkyCycle technology and 40 patents issues for SkyMine technology

(3) Pending acquisition of U.S. Steel by Nippon, subject to regulatory approvals

Experienced Leadership with Exceptional Industry Expertise



Martin Keighley
Chief Executive Officer

Joe Jones
*Chief Technology Officer &
Principal Inventor*

Scott Gardner
Chief Financial Officer

Jody Black
Chief Operating Officer

Bill Bryant
Director of Marketing

J. Brent Hagy
General Counsel

35+ years of experience

40+ years of experience

25+ years of experience

30+ years of experience

25+ years of experience

20+ years of experience

NATIONAL
PETROLEUM
COUNCIL

TATA
TATA
CHEMICALS LIMITED

arvia

BM
Brunner Mond

ICI

Skyonic

ROSS

CYPRESS
EMBEDDED IN TOMORROW

AMD

TEXAS
INSTRUMENTS

Bridgepoint
Consulting
AN ADDISON GROUP COMPANY

FLUENCE
BIOENGINEERING

Skyonic

TEXAS
INSTRUMENTS

FQE Chemicals

Linde

ALSTOM

Baker Hughes

SOLVAY

Celanese

Williams

MAGELLAN

Valero

Enogex

ENABLE
MIDSTREAM PARTNERS

Team with expertise including the original technology inventor, decarbonization chemicals operations, scaling and chemicals go-to-market strategy

CarbonFree's Solutions are Sustainable Because They are Profitable Without Carbon Credits and / or Government Subsidies

SkyMine demonstrated production of sodium bicarbonate utilizing waste CO₂ from adjacent cement factory – completed in 2016

Integrated Decarbonization Technology

- Chlor-Alkali plant coupled with a carbon capture unit (CCU)
- Produces HCl, caustic soda and bleach
- CCU: Converts untreated flue gas into high purity Sodium Bicarbonate by mineralizing caustic soda
 - Optionality for a CCU to produce baking soda or sell caustic soda depending on market prices
- One of the world's only commercial-scale carbon mineralization facilities, generating positive plant profitability in 2022 and 2023, with projected higher profitability in 2024
- Additional operational initiatives, and focusing on operational excellence should yield improved revenue and EBITDA; minimal capex going forward with 20+ year operating life



Financial Metrics	2022A	2023A	2024E
Revenue (Gross Margin %)	\$50 MM (50%)	\$40 MM (53%)	\$62 MM (55%)
EBITDA (EBITDA Margin %)	\$14 MM (27%)	\$8 MM (19%)	\$19 MM (31%)

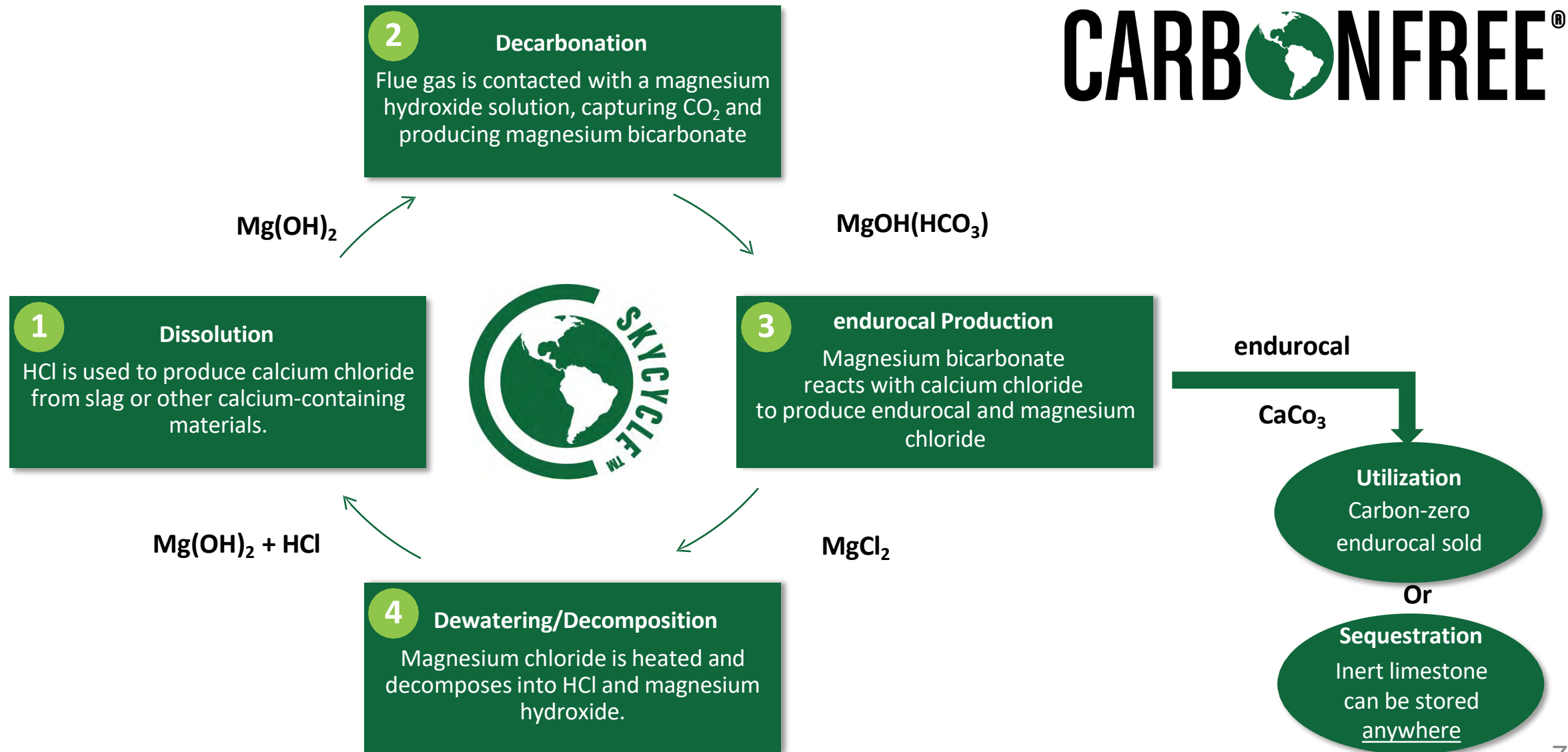


Note: SkyMine San Antonio was the winner of a \$25MM grant in a competitive process in 2012 and the first US DOE decarbonization project when starting operations in 2017
 SkyMine San Antonio was one of the first CO₂ mineralization technologies put into commercial operation globally

THE CARBONFREE® SOLUTION

Solving the World's Industrial Emissions Challenge by Profitably Creating Low Cost, High Value Zero-Carbon Calcium Carbonate (endurocal), Without the Need of Carbon Credits / Government Subsidies, and Helping Emitters Offer Green Products

Clever use of calcium/magnesium chemistry significantly reduces energy requirements compared to other mineralization technologies



Patented Technology Protected by Broad and Deep Intellectual Property Moat

CarbonFree Global Patents



108 carbon capture solution patents issued worldwide, with 40 protecting SkyMine and 68 (and counting) protecting SkyCycle

SkyCycle Patent timeline:

1st Gen – filed in 2011 and granted 2013-2021

2nd Gen – filed in 2016 and granted 2020-2024

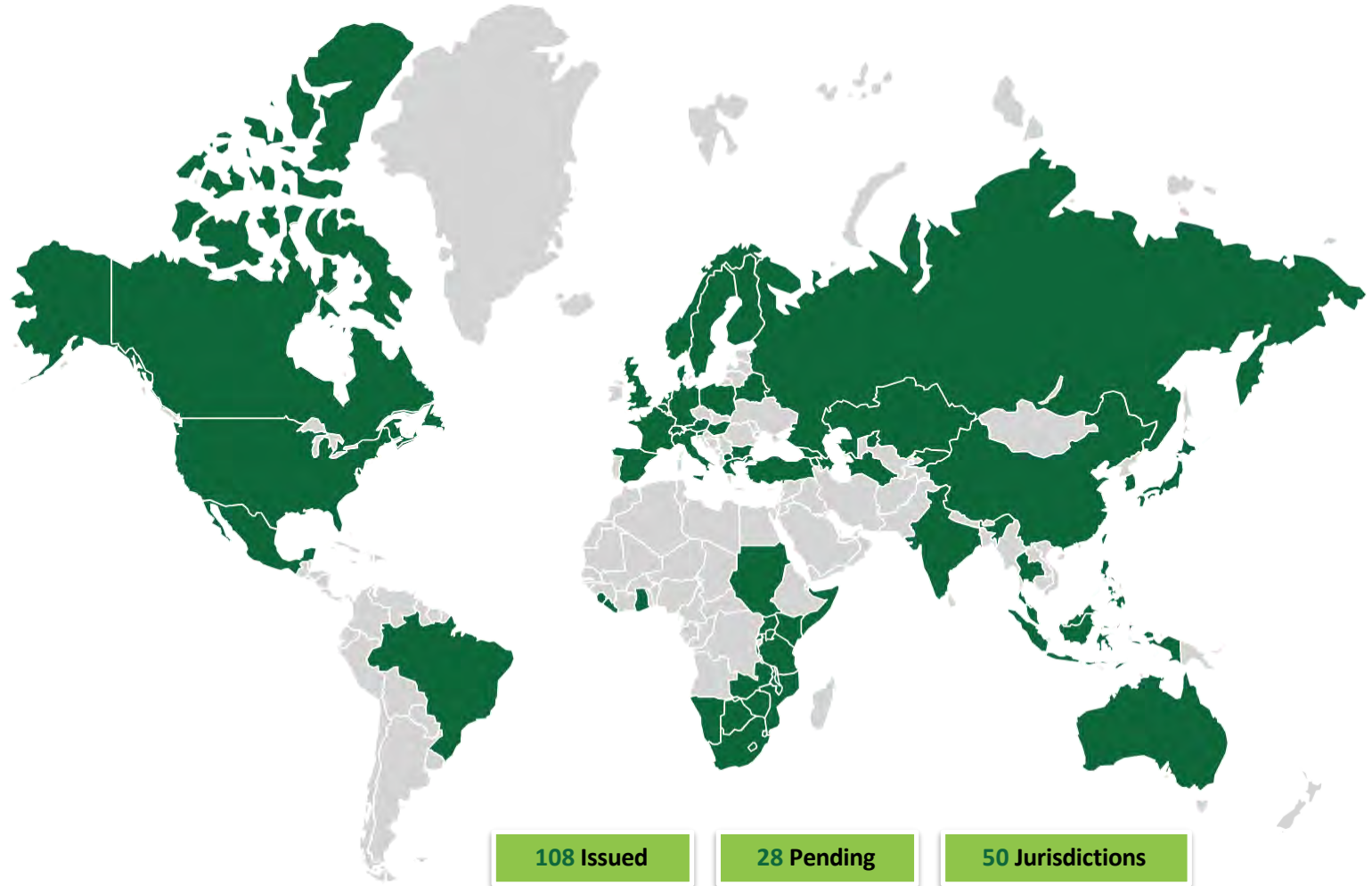
3rd Gen – filed in 2023 (all pending)



Multi-layer IP protection approach makes infringement unlikely; Norton Rose Fulbright manages patent portfolio since inception



Considerable know-how IP from industrial operations since 2005



108 Issued

28 Pending

50 Jurisdictions



CARBONFREE[®]

Disruptive Integrated Decarbonization Solution for
Steel and Industrial Emitters
Profitable Deployment #1 at Steel Mill

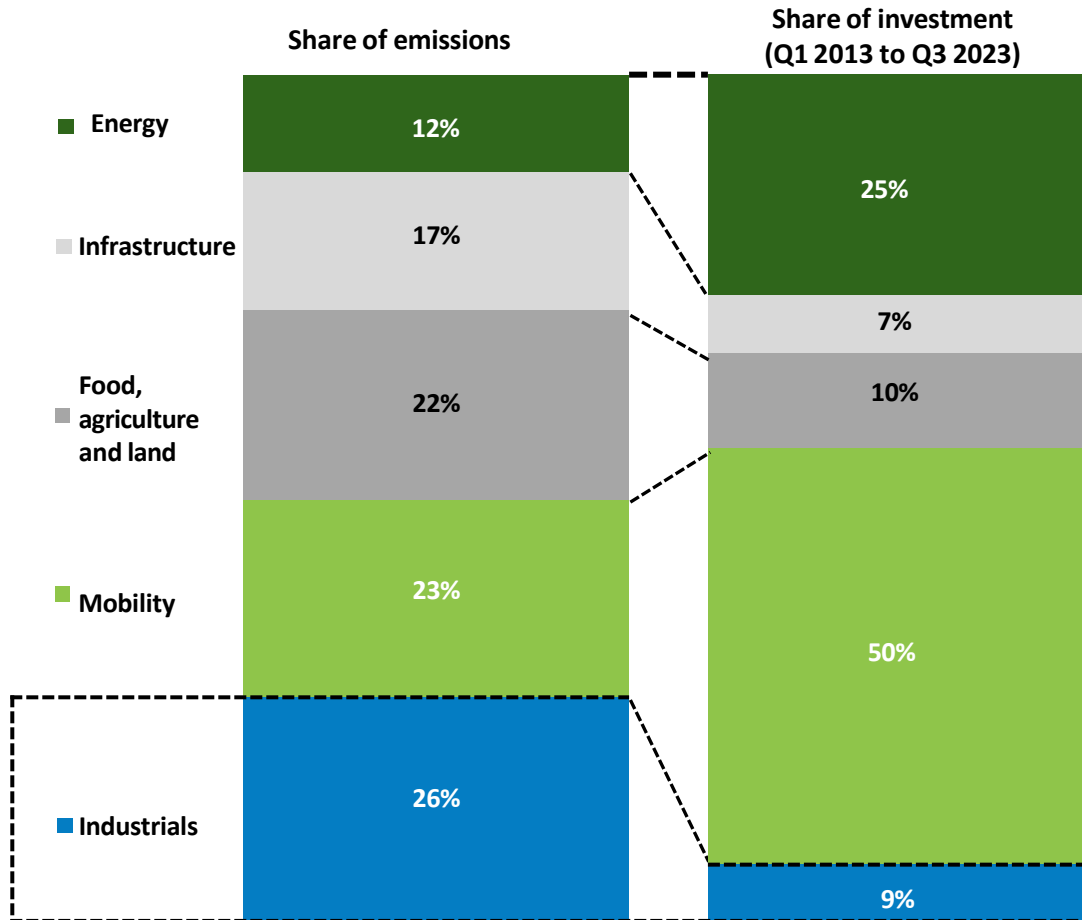


Forging a Greener Future[™]

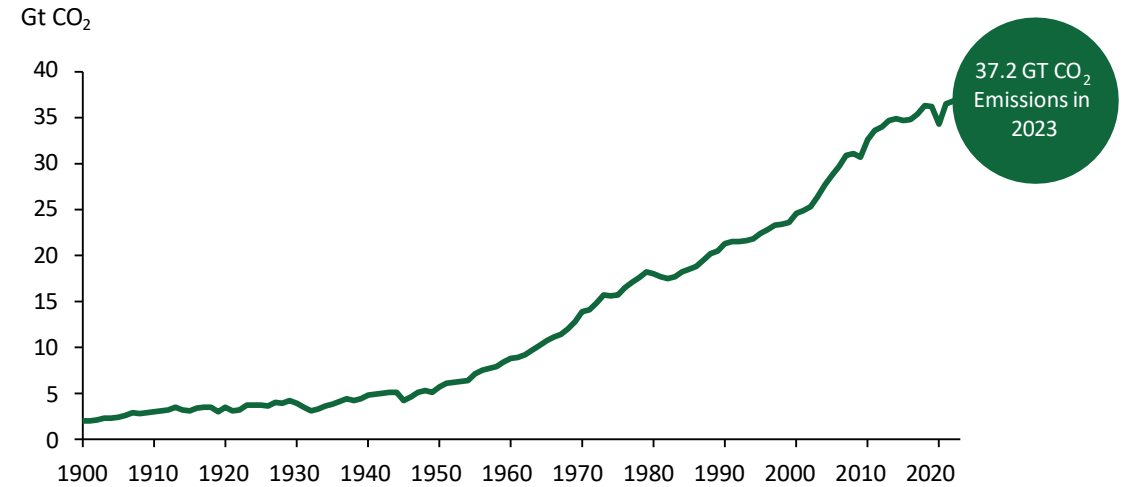
Glaring Under Investment in Technology to Address the Single Largest Source of CO₂ Emissions : Industrial Manufacturing

*While industrials generate the largest share ~26% of all emissions, industrial decarbonization has attracted only 9% share of investment
Unless addressed, industrial CO₂ emission will continue to increase rapidly due to GDP growth and a lack of viable decarbonization solutions*

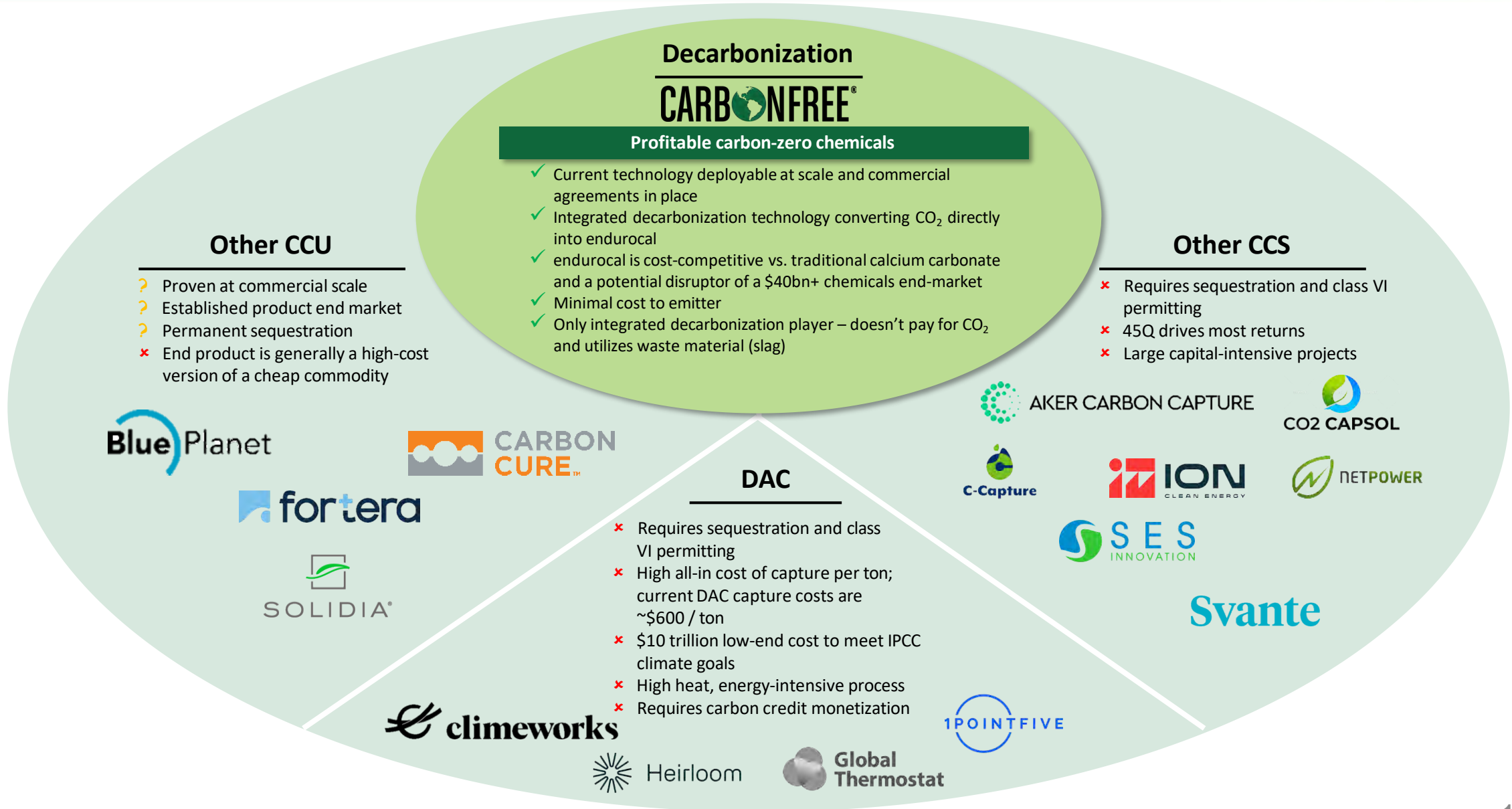
Historical CO₂ Emissions and Funding Gap by End Market



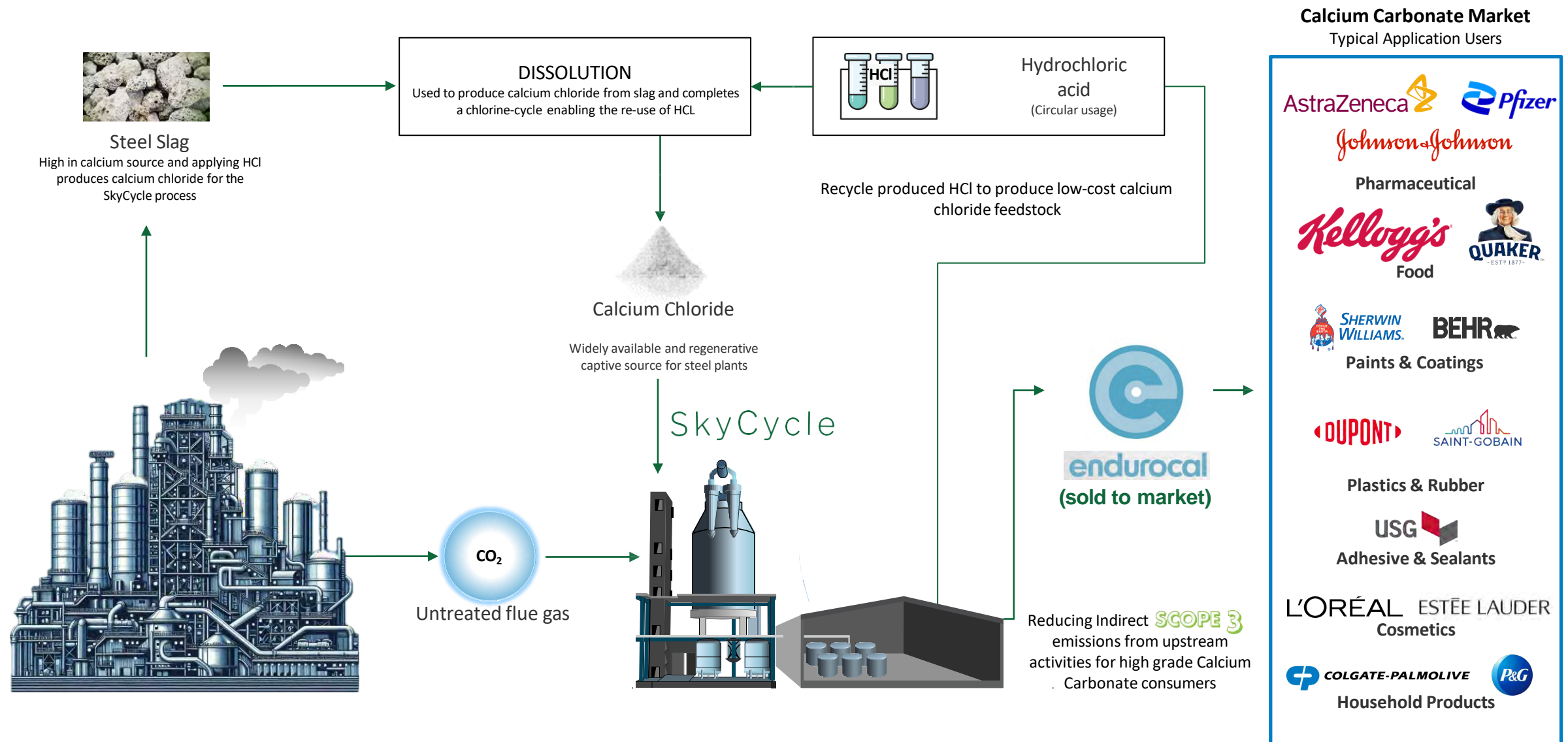
CO₂ Emissions from Energy Combustion and Industry Processes from 1900 to 2023



- ✓ Globally 37.2 Gt CO₂ emitted annually in 2023
- ✓ CFRE solution addresses majority of CO₂ emissions, capturing 80-95% of CO₂ and other particulates
- ✓ **Decarbonization of hard-to-abate industrial sectors is critical as demand is expected to continue to grow**



Decarbonization Solution for Steel Industry with Emitter producing Green Steel



CarbonFree's In-House Expertise and Capabilities



Forging a Greener Future™

CarbonFree's top process expert engineers bring expertise in commissioning each of the four key components, lowering First-of-its-Kind risk

1 Team Leader: Chris Mapes
Expertise: Dissolution plant
Metallurgist / Leaching Expert (Non-Chloride)
Metallurgical Scientist – 35 years

2 Team Leader: David Bowers
Expertise: Decomposition/dewatering plant
All Pyro Chrome-Oxide Kiln/Roaster
Chemical Engineer – 30 years+

3 Team Leader: James Roberts
Expertise: Decarbonation plant
Chemical Engineer – 5 years

4 Team Leader: Scott Schaffner
Expertise: PCC pack-out/product plant
Specialist/Expert
Metallurgy Engineering – 35 years

Senior Leadership

Technology Leader: Joe Jones
40+ years of Chemical and Mechanical Engineering experience

COO: Jody Black
30+ years of operations experience

Director of Marketing: Bill Bryant
25+ years of Marketing experience

VP of Construction: Ted Hollon
30+ years of operations experience

Key Contractors Supervised by Our Engineers

Third party lab validates all non-guaranteed reaction outcomes

Owner's Engineers: Integrator of Entire Site Design – Fast-track development

FLUOR – Multi-Projects-Group Calgary – Up to 45 engineers, managers and consulting SMEs

National Level Validation for Specific Unit Chemical Performance Surety

SwRI – Validation Lab with potential for in-source exploring
SOUTHWEST RESEARCH INSTITUTE

Sub-Contract Process Area Engineering for IP-Specific Processes

M3 – Detailed Engineering for PCC pack-out & dissolution areas

ANDRITZ **jord** – Worlds' leading roaster and evaporator units available

Zero Carbon endurocal, Carbon-Negative Process and Green Steel Production



Forging a Greener Future™



**Carbon-Negative
Process**



**Zero-Carbon
endurocal**



U.S. Steel Slag



endurocal PCC



PLASTICS

PCC Uses

Opacity, Acid Scavenger, Breathability, Surface enhancement, Blocking, Color, and Extender



PAINT

PCC Uses

Opacity, Agent to Either Reduce or Enhance Gloss, Rheology Modifier, and Finish



ADHESIVES

PCC Uses

Color, Rheology and Surface Interaction Enhancement



FOOD

PCC Uses

Acidity Control, Color, Firming Agent, Nutrient, Calcium Source Supplement, Conditioner, Preservative, Anti-Caking Agent, Stabilizer, Gum Modifier



PHARMACEUTICAL

PCC Uses

Excipient, Color and pH Adjustment

Introducing a better-performing
and more responsible, calcium carbonate.

So good you'll want to watch paint dry.



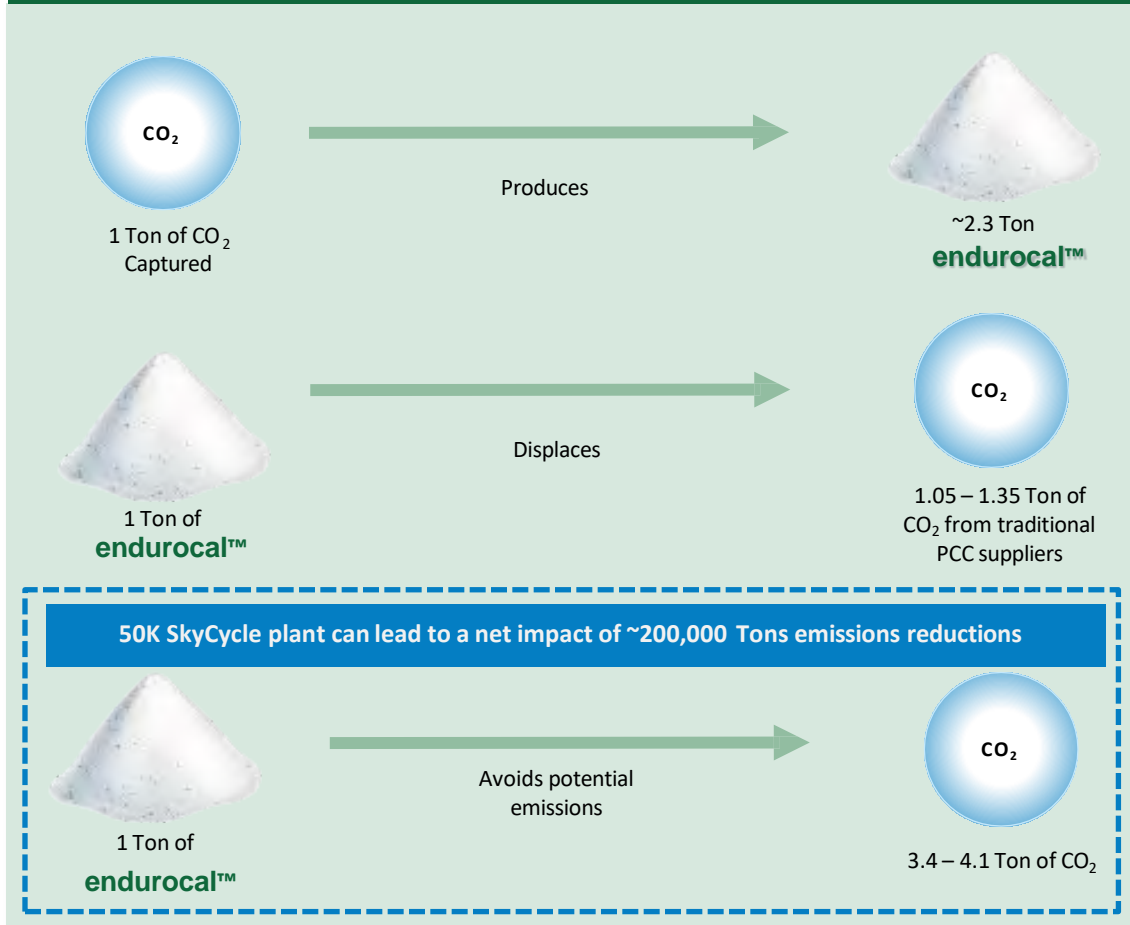
 endurocal

The world's first zero-carbon mineral.

SkyCycle reduces and displaces CO₂ emissions for the benefit of steel producers and can lead to Scope 3 CO₂ displacement for future customers up to ~200,000 Tons of CO₂ from a 50K ton plant

SkyCycle Decarbonization Impact

Net Carbon Displacement Impact (Tons of CO₂ per ton of endurocal™)



Direct Impact of SkyCycle Plant

CARBONFREE®

Direct impact of 50,000 Tons of emissions reduction

45Q Tax Credits for CO₂ captured at facility

Future 45Z Tax Credits

Helps U.S. Steel Gary Works to decarbonize their operations and expand verdeX⁽¹⁾ offering

Additional Impact for endurocal™ Customers

SCOPE 3

Impact of an additional 150,000 Tons of emissions reduction

BEHR

COLGATE-PALMOLIVE

DUPONT

ESTÉE LAUDER

Kellogg's

L'ORÉAL

P&G

SAINT-GOBAIN

SHERWIN WILLIAMS

USG

QUAKER

Note: The exact amount of calcium carbonate produced from captured carbon and the exact amount of carbon emitted from endurocal™ produced by traditional means may vary by location but will be reflected in the location specific life cycle analysis

(1) verdeX is US Steel's advanced and sustainable steel solution with 75% fewer emissions compared to blast furnace production, and is made with upto 90% recycled

Key Commentary

- SkyCycle provides a complete decarbonization solution for U.S. Steel, solving the high-cost of transportation and storage infrastructure
- Applying HCl to steel slag from Gary Works mill produces a captive source of calcium carbonate
- Impressive unit economics with scalable build out
- Low-energy technology providing a carbon-zero impact
- Compelling value proposition to U.S. Steel

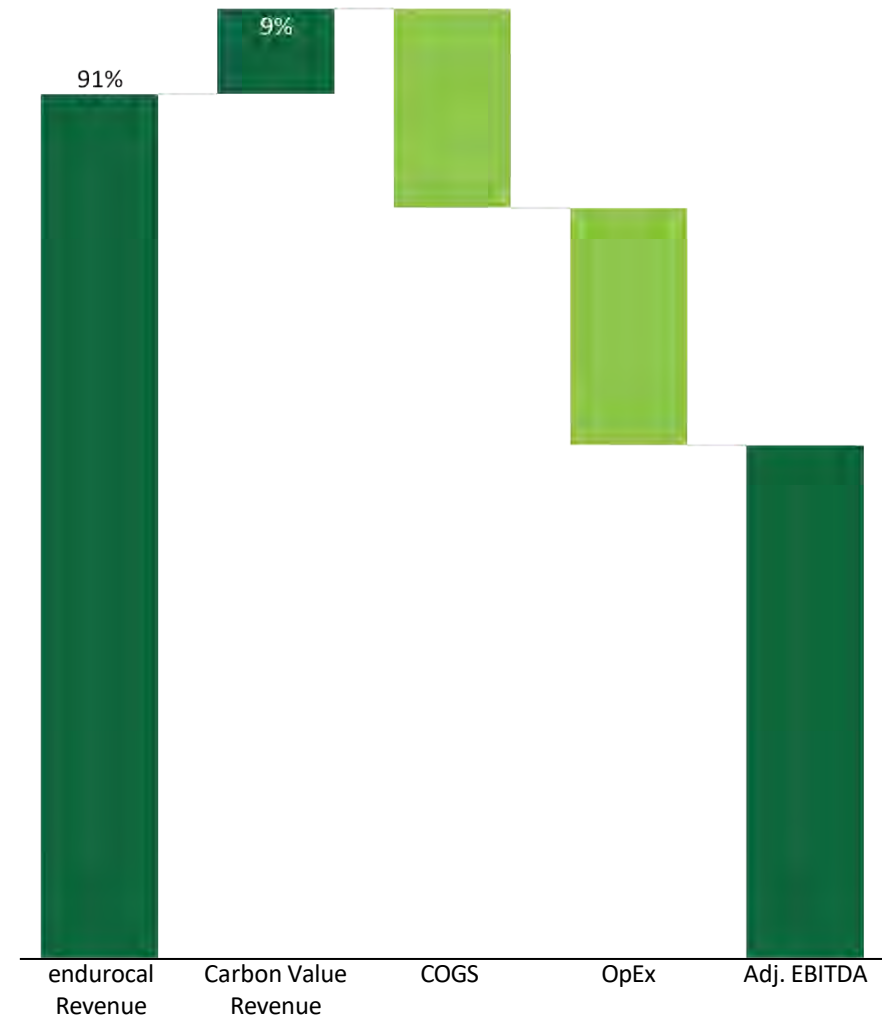
Key Metrics⁽³⁾

~\$66MM
Revenue

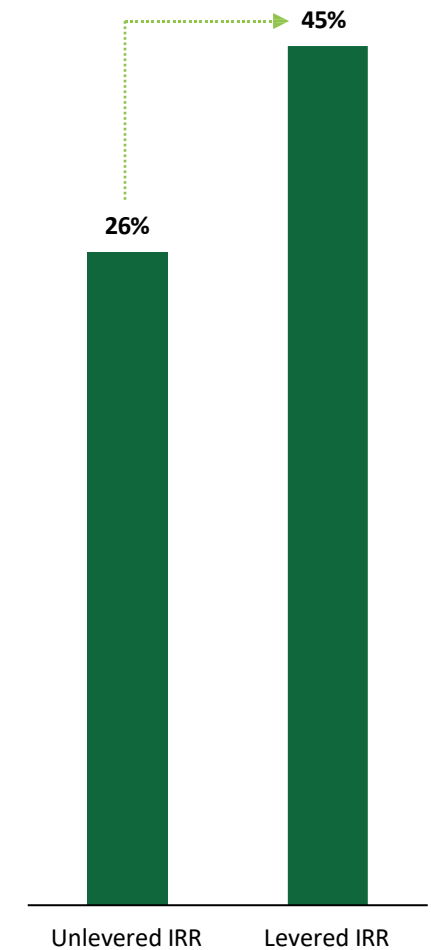
~\$36MM
EBITDA

~\$145MM
Capex⁽¹⁾

Project Economics (% of Revenue) 50k /tpy CO₂ Capture Plant



SkyCycle (U.S. Steel Gary Works) 50k IRR⁽²⁾

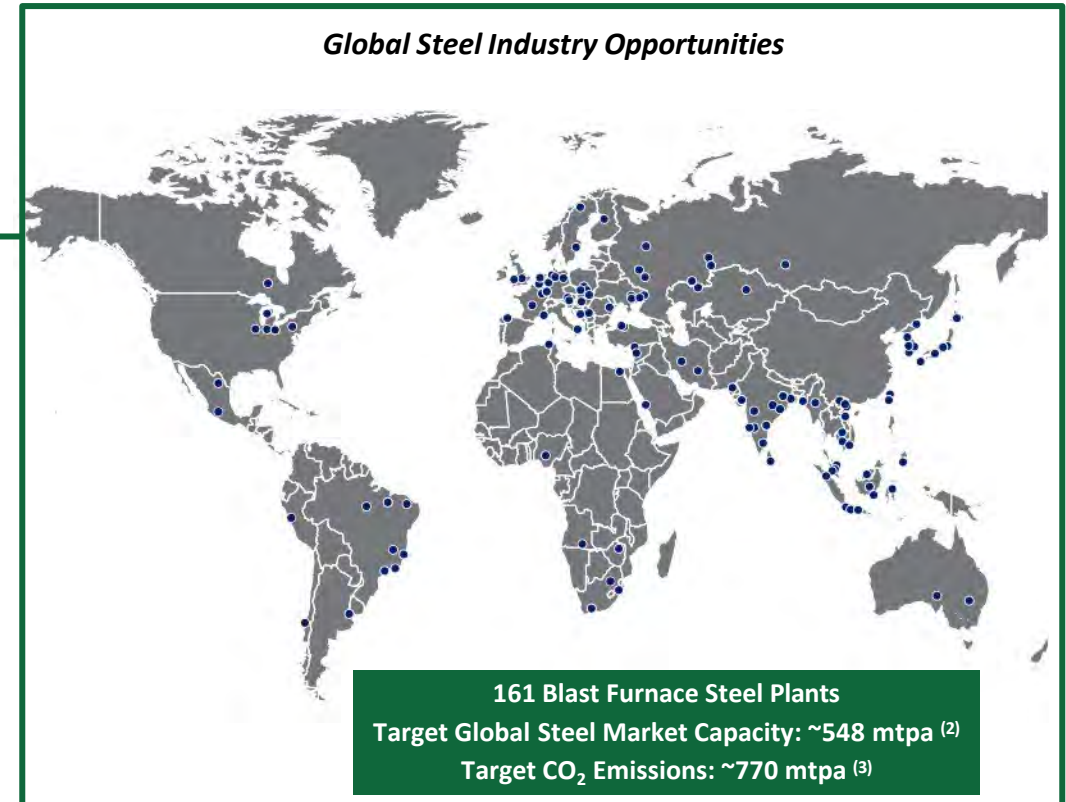
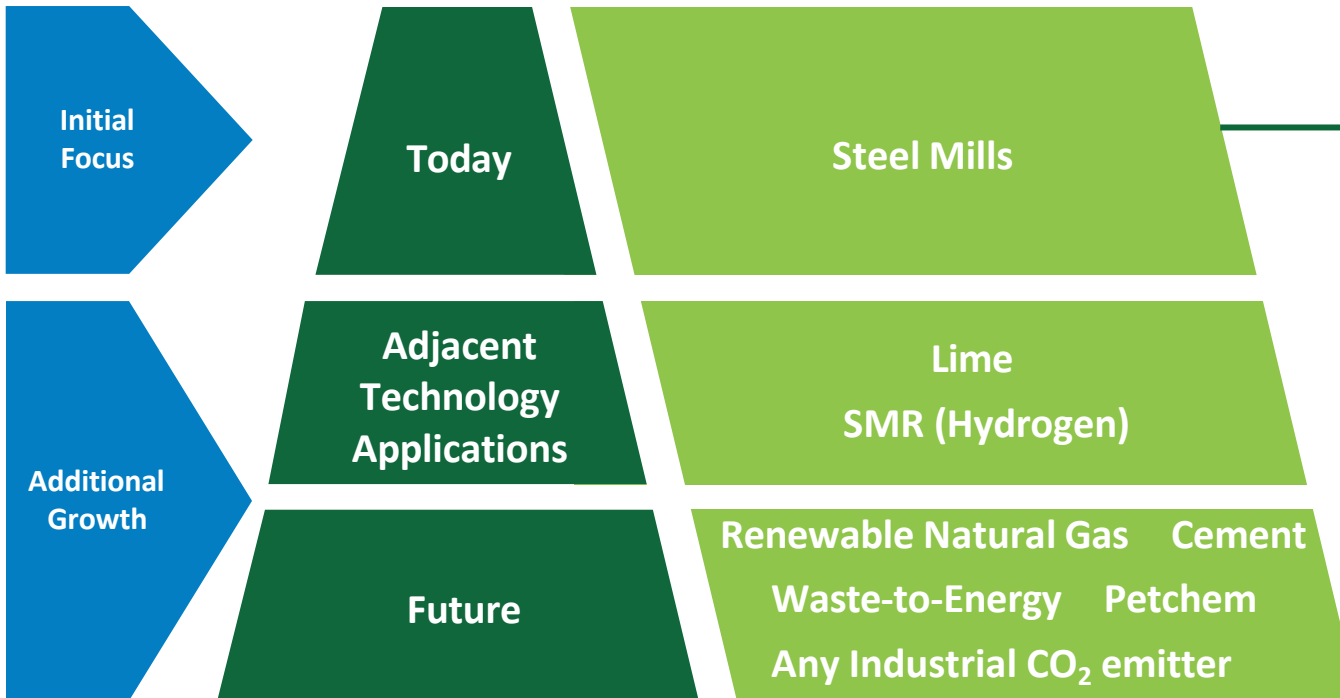


(1) Reflects upfront capex for total project
 (2) Assumes 70% debt financing, 8% interest
 (3) Based on run-rate metrics for the US Steel Plant

CarbonFree will target steel mills for its first deployment because:

- Blast furnaces will remain significant part of the steel industry, and will need to be decarbonized
- The steel industry provides ready-sources for the SkyCycle process such as waste CO₂, the waste energy and waste slag
- CarbonFree provides an alternative approach for Steel industry to bypass difficult challenges related to H₂ and DAC infrastructure

~10bn ton addressable CO₂ market⁽¹⁾



Steel opportunities represented on the map are only a small part of the opportunity set, and will provide a foundation to expand to other industries

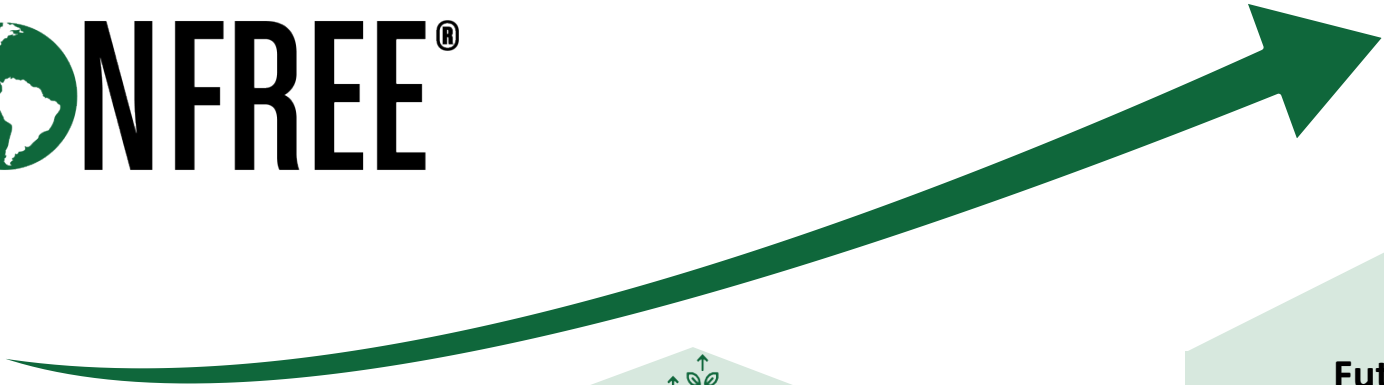
(1) Source: IEA (2018), Global Energy Monitor, global steel plant tracker; IPCC Special Report on Carbon Dioxide Capture and Storage (2005); IPCC Sixth Assessment Report (2021); Global Energy Monitor, Global Steel Plant Tracker (2/27/2024)
 Estimated addressable market based on electricity generation and industrial emissions from "IPCC: AR6 Scenarios Database hosted by IIASA release 1.0 average of IPCC C3: Likely below 2°C scenarios"; electric generation emissions refers to power plants operating on coal or natural gas; industrial emissions includes the following processes – cement production, refineries, iron and steel industry, petrochemical industry, oil and gas processing, bioethanol and bioenergy

(2) Total nameplate capacity of blast furnace steel production facilities globally

(3) Estimated as 1.4x steel production based on IEA estimate of 2.33 t CO₂ / t steel emissions in 2022

CarbonFree can scale its permanent sequestration technology to meet the sequestration demands of emitters without getting limited by the need of pipelines, geology and midstream assets

CARBONFREE®



SkyMine / SkyCycle

- Profitable SkyMine
- First SkyCycle facility starts construction in 2024
- Expand to 3 150ktpa SkyCycle hubs
- Launch endurocal – first carbon-zero mineral
- Expand into lime and blue hydrogen

Execute Technology Licensing Strategy

Development 1

- Large scale deployment of 250K-1MM ton units at reduced CAPEX and OPEX
- License technology for CCS applications
- First CCS hub

Future R&D and Technology Innovations

Technology offshoots

- Waste into low carbon cement without limestone route
- Develop mineralization technologies beyond endurocal to additional application
- Recovery of rare earth metals from slag and high contact mixers

NOW



FUTURE



Martin Keighley, CEO
CarbonFree



Questions

CARBONFREE



Dr. Michael Steigerwald

Corporate Profile

RAITH

Facts & Figures

RAITH

Global Network

HQ's in Dortmund, NRW, Germany



9 Offices, 3 Demo Labs,
Representatives across 15 countries

Global market
position*

#1

Total revenue in €

>120M€

Founded in

1980

Employees
worldwide

~400

Instruments
installed

1,200+

Users globally

10,000+

Raith History

Experience since 4 decades

SEM component provider

1980 - 1994



Specialist for SEM components

- Product focus on special ancillary developments for SEM
- Core expertise: SEM stages with extra-large adjustment range

E-beam solution provider

1995 - 2013



Transformation & expansion

- Transformation into an EBL solution provider along with strong internationalization (staff, production and admin infrastructure)
- Product development with focus on “turnkey” solutions

Largest Gaussian EBL system supplier

2013 - 2019



Strategic merger with Vistec in 2013

- Acquisition of Vistec Lithography to become clear #1 supplier of Gaussian EBL systems
- Widest range of nanofabrication solutions across the entire performance range

Largest maskless nanofabrication supplier

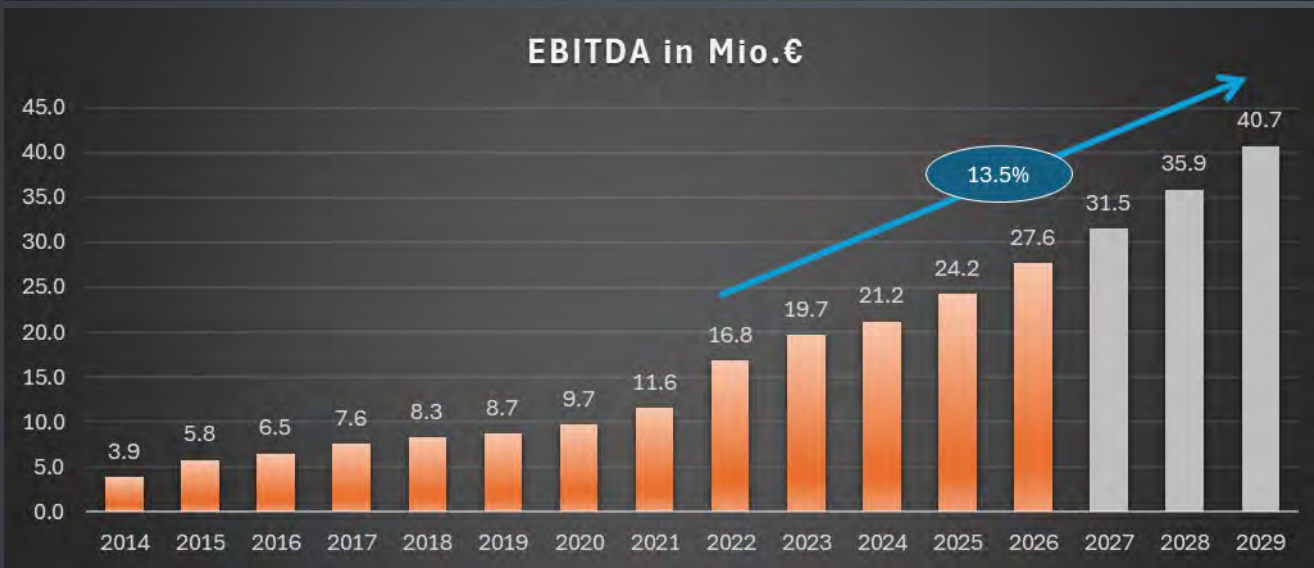
From 2019



Acquisition of 4PICO Litho in 2021

- Acquisition of 4PICO Litho, a direct write LBL company to expand product portfolio
- Launch of VELION, a new FIB-SEM system in 2019

For more information, please visit: www.raith.com/company/history



Orange Area

- Revenue realization with existing products in currently servable markets
- Average CAGR approx. 12%
- EBITDA Margin up to 18%

Grey Area

- Aspiration for further growth addressing new markets with applications in connectivity, 3D analytics & process control
- Potential new acquisitions
- Average CAGR continuous with 12%
- Profitability further improves due to supply chain optimization

Raith Group

Extension of production capabilities & capacities in 2023/2024

Dortmund, DE

- Additional 230m²
- Personnel air lock
- Material air lock
- Chemical parts cleaning



Muenster, DE

- 1200m² floor space
- High precision mechanical workshop



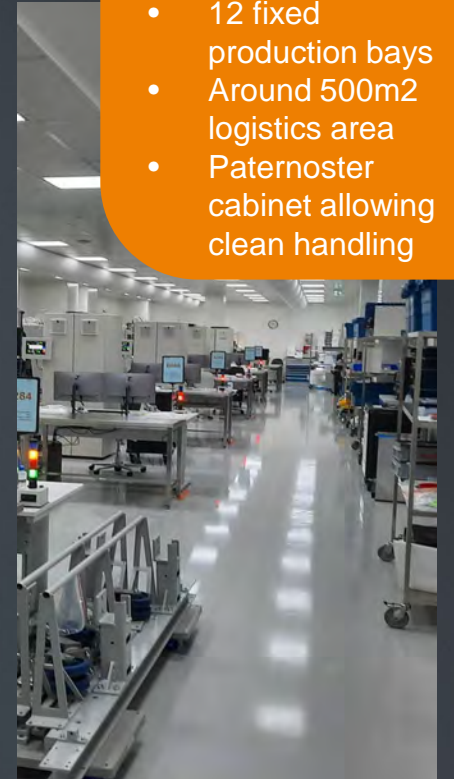
Eindhoven, NL

- Additional 1200m²
- Under construction



Best, NL

- Additional 1000m²
- 12 fixed production bays
- Around 500m² logistics area
- Paternoster cabinet allowing clean handling



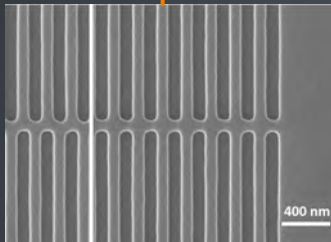
Mega Trends & Applications 4x

RAITH

Connectivity



DFB laser device



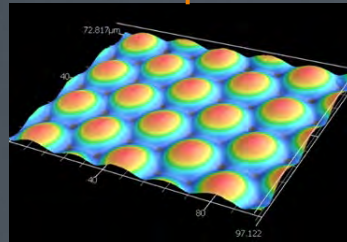
Data transfer



Mobility



Micro lens arrays



Autonomous driving



Healthcare



Nanofluidic mixer



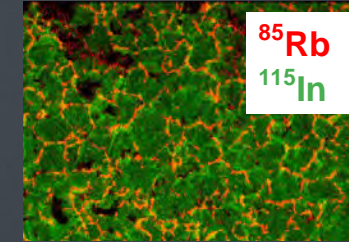
Lab-on-a-chip



Green Energy



Material analysis



Solar cells

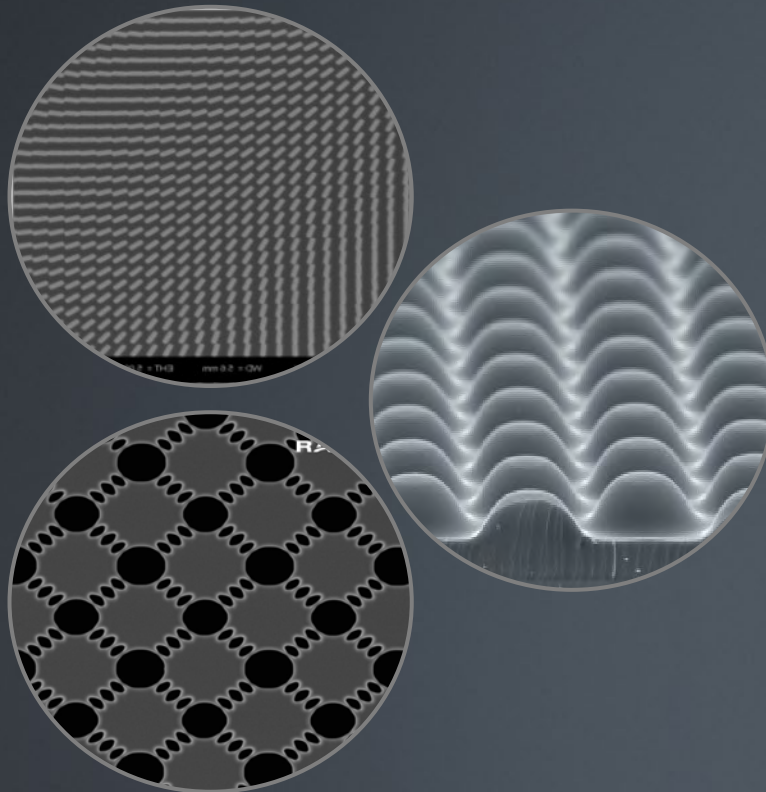


We offer solutions for Nanotechnology and Semiconductor

Use cases include academic / industrial research, rapid prototyping and compound SC production

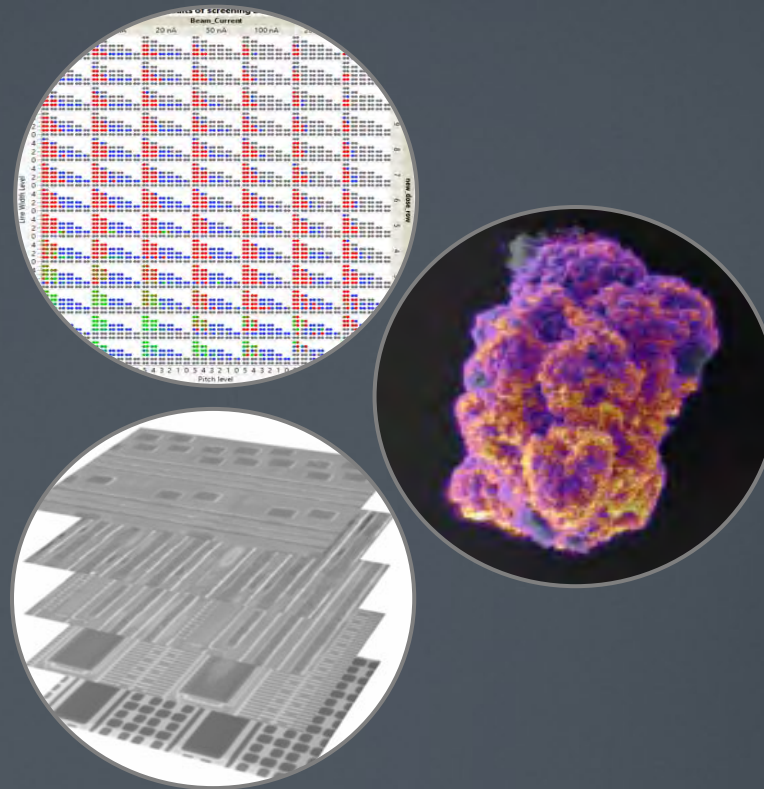
Direct Write Lithography

R&D, Prototyping, Production



Sample Information

Microscopy, Nanoanalytics



Connectivity

Yield engineering, Productivity

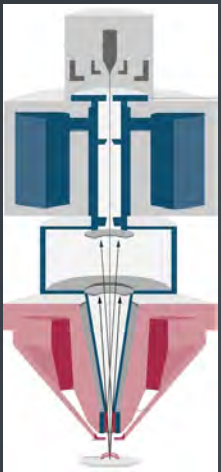


Technology is the backbone of our business ...

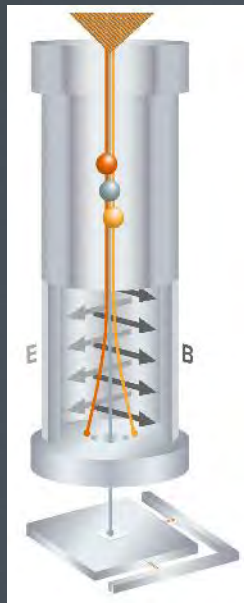
The combination of our core competencies results in a unique product portfolio ...

Charge particle & Laser optics

Distortion corrected SEM
High precision

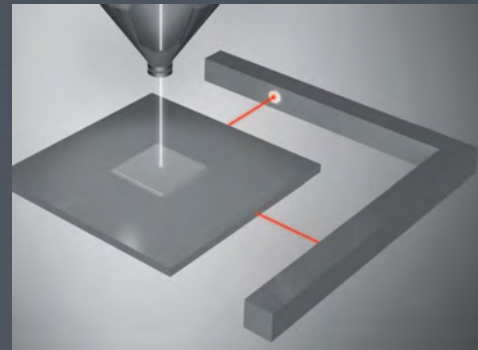


Multi species FIB
High stability

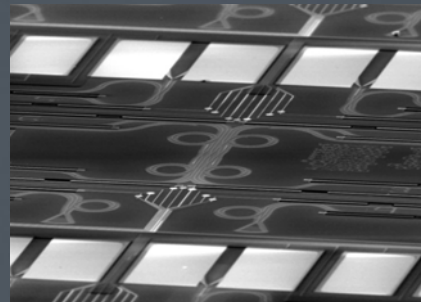


Navigation & Positioning

Laser Stage
Lateral precision



CAD file handling
Design vs Reality



Components & SW

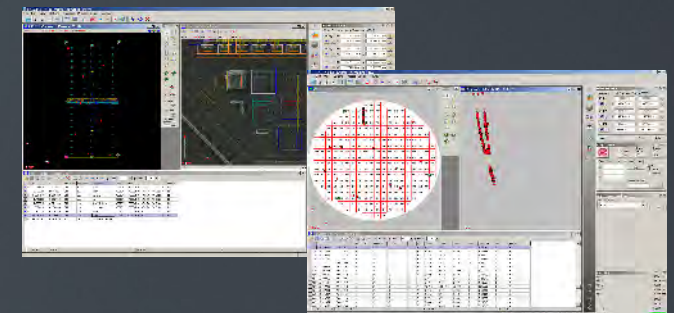
Pattern Generator
Lithography



SIMS
Material Analysis



Software solutions
Industrial applications



Product Portfolio

RAITH

Electron Beam
Lithography



FIB-SEM
Nanofabrication



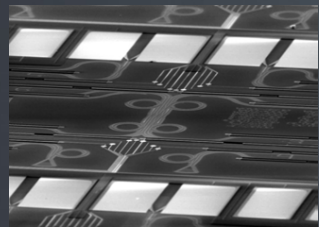
Laser
Lithography



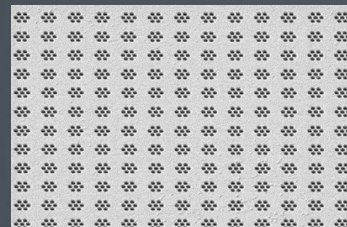
Imaging &
Analysis



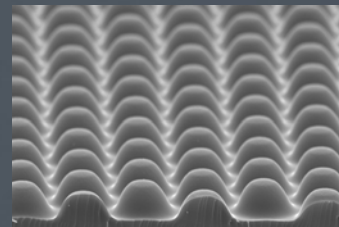
Nanolithography
Upgrades



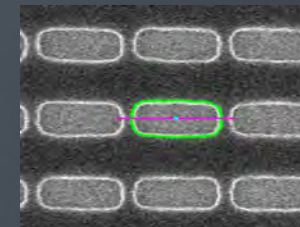
Quantum circuit



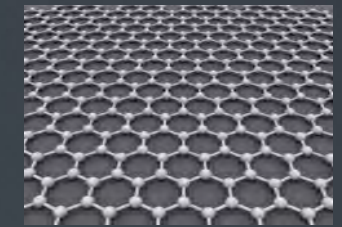
Plasmonic Array



Lens array



Metrology



Graphene

Customer Base Worldwide

RAITH



Raith Values and Brand Identity

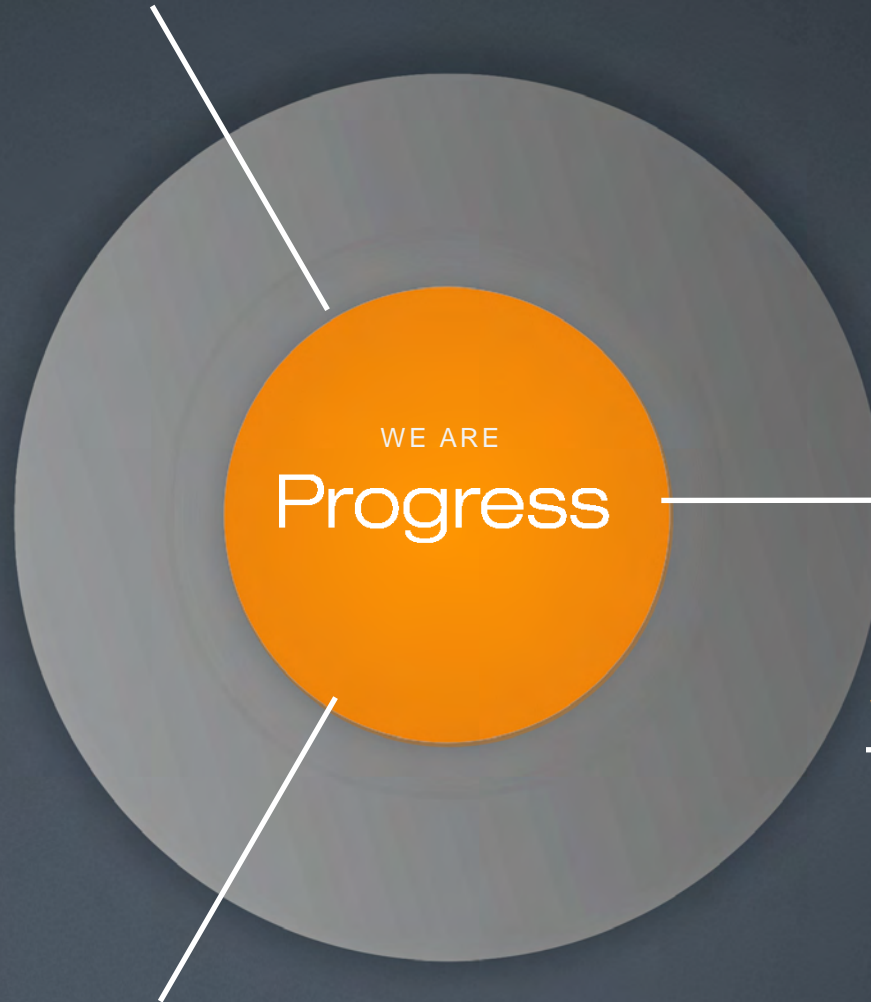
RAITH

WE LIVE

Excellence

We strive for **success** and excellent **leadership**.

We act **reliably** as a **trustful** partner.



WE ARE

Progress

WE LIVE

Passion

We aim at continuous **growth** and fully exploit our **potential**.

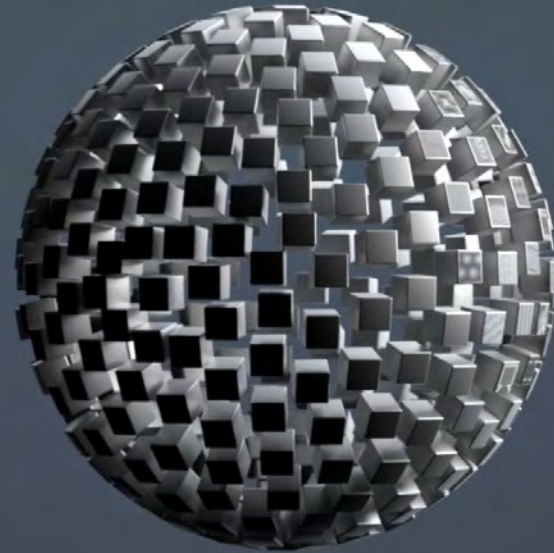
We cultivate **cooperation** and are passionate about **customer orientation**.

WE LIVE

Technology

Competence and **innovative** power are of the highest importance to us.

We create **solutions** which have a **relevant** impact on the digital future.



RAITH
NANOFABRICATION



Our Vision

Challenge the frontiers of nanotechnology

Our Mission

We enable innovation and industrial implementation of nano devices to advance the digital future.

Backup

RAITH Group
Headquarters
Dortmund, Germany

Raith New Executive Management

RAITH



Dr. Michael Steigerwald

CEO



Christian Ohm

CFO



Benjamin Oevermann

CSO



Dr. Jürgen Bremer

COO



H. Scholtz

Global Service



V. Paulmann

Global HR



Dr. Ulrich Mantz

CTO

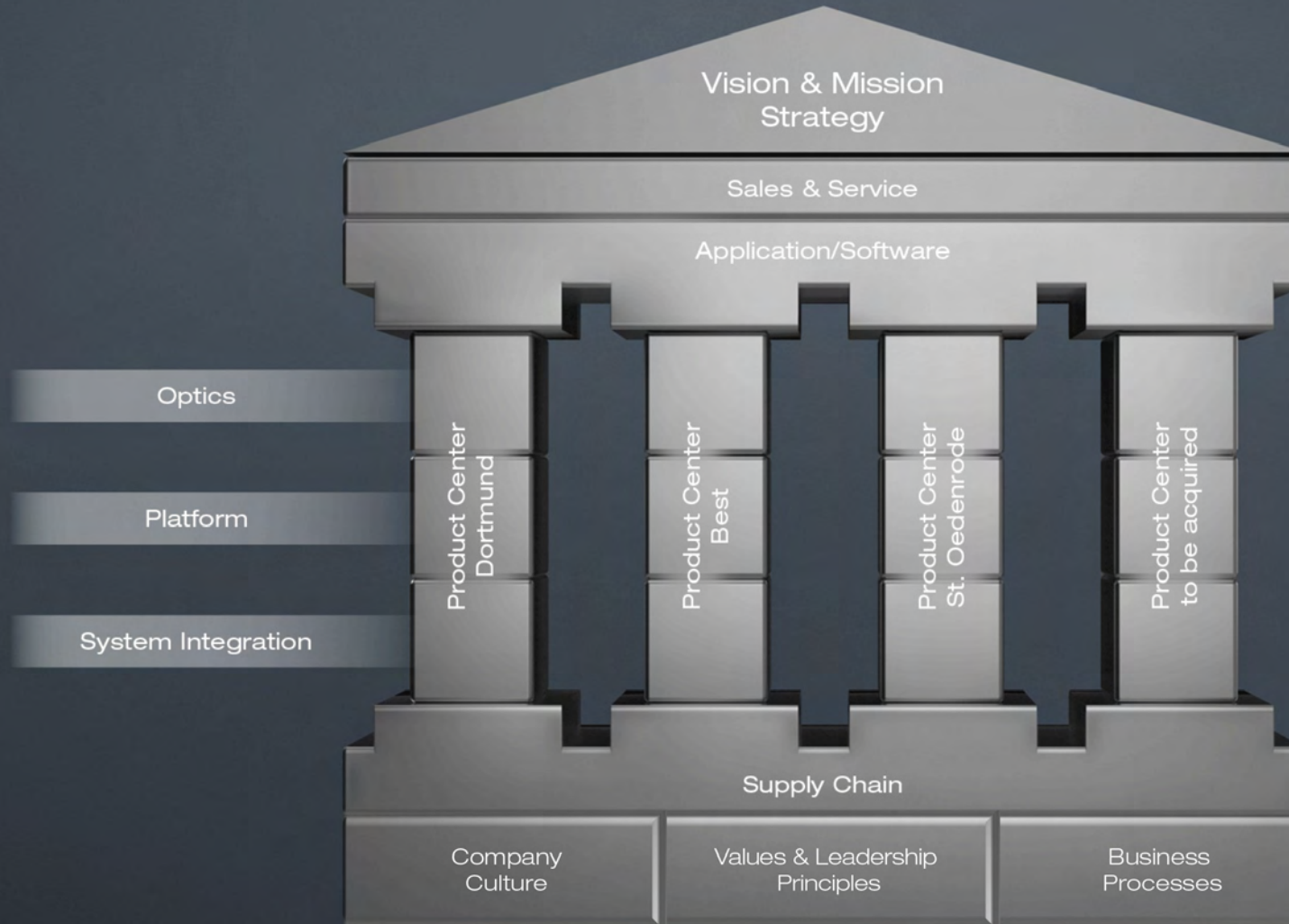


Dr. Rainer Schmid

Global Applications

House of Raith

RAITH



Matrix

RAITH

GLOBAL DEPARTMENTS

LOCAL REGIONS & FACTORIES

GLOBAL DEPARTMENTS	Sales & Market	Service	Eng	PM	Ops	Apps	Finance IT	HR	Q
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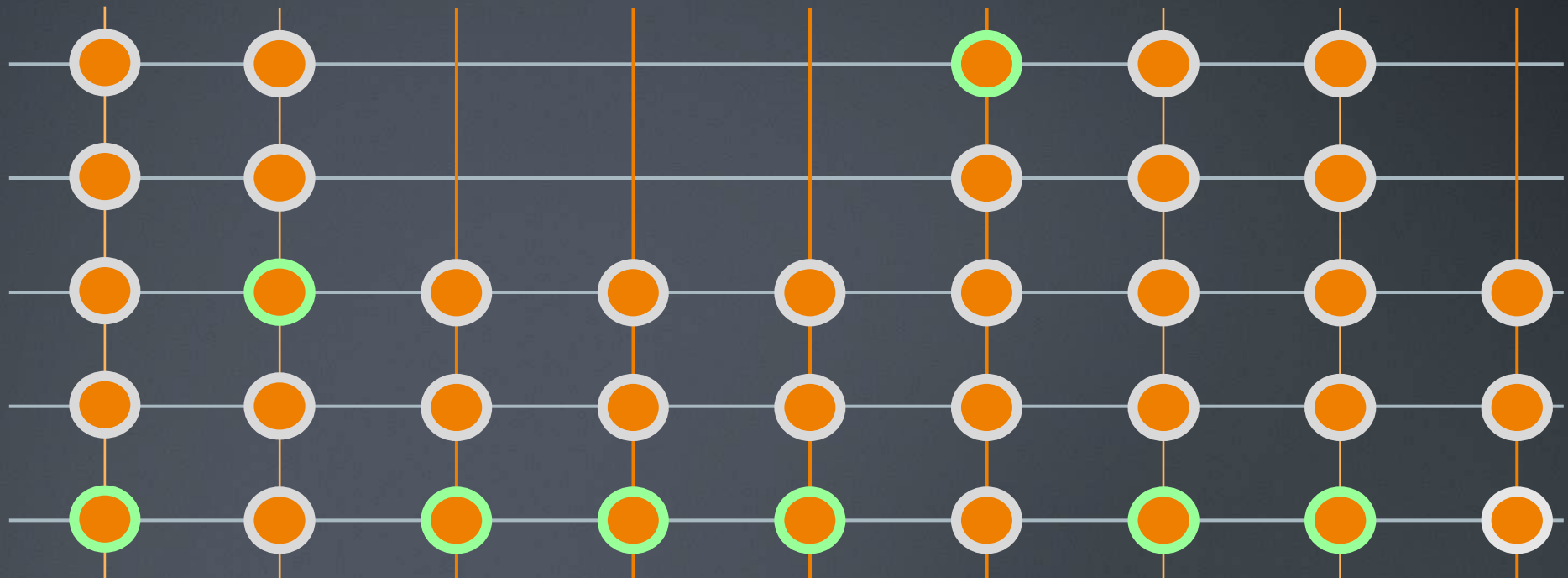
SSC AMERICA

SSC China

PC Best

PC Rode

PC / SSC Dortmund




...

INTERNATIONAL TEAMS

FIB & Analytics

TF Shutdown

Win Asia

 Global Officer

Leadership Principles

RAITH

1

As **ONE Raith TEAM Members**, we fully trust and support each other and promote cooperation across our teams and locations.

2

As **Entrepreneurs**, we drive change and innovation, act courageously and accountably, and create value for our customers and our business.

3

As **Leaders**, we serve our organization, challenge ourselves and our employees, encourage open communication, and foster an environment of excellence.



Raith Midterm Objectives

RAITH

Objective: Raith is the acknowledged global market and technology leader of nanotechnology solutions which enable innovation and efficient transition to production of nano-devices.

Structure: Raith is a well-respected global matrix structured cooperation with established business processes which respects environment, sustainability and governance

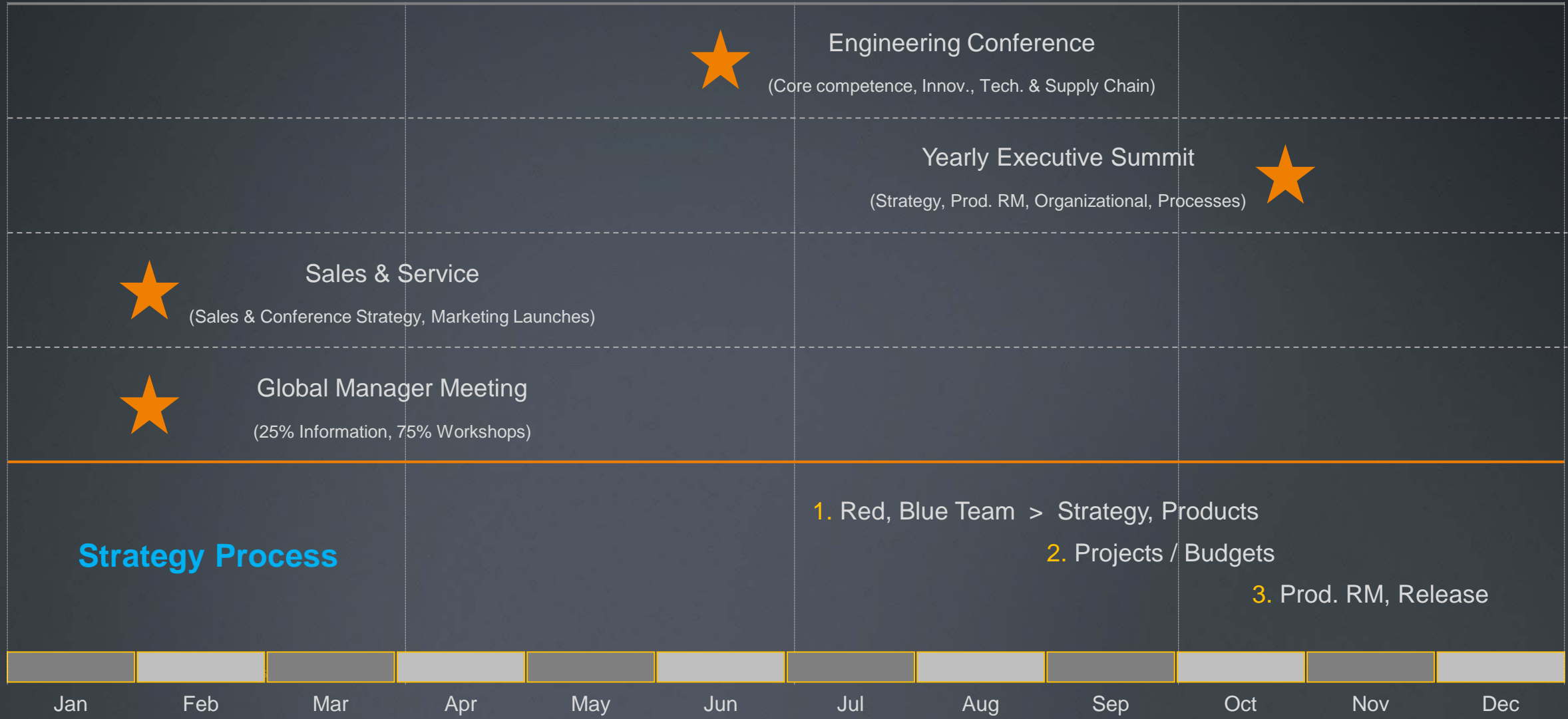
Reputation: Raith is appreciated by its customers, partners & employees and possesses an inspiring vision, mission and strategy

Profitability: Raith's profitable revenue comprises contributions from nanofabrication, service, OEM as well as from connectivity, sample information & 3D analytics

Growth: Raith possesses a solid technology & solution roadmap (MTA 15%) to generate an average year-to-year revenue growth of 12%.

Annual Strategy Cycle – St@R

RAITH



Lithography

Late 17th century method of printing that utilizes an etched stone to transfer a pattern or image

