

INNOVATIVE TECHNOLOGIES FOR THE PLANET



ANDRITZ AS A COMPANY

ANDRITZ EPC OFFERING

03

TECHNOLOGIES:

1. GREEN HYDROGEN
2. CARBON CAPTURE
3. KRAFTANOL

04

RENEWABLE FUELS

ANDRITZ

ENGINEERED SUCCESS



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WORLD MARKET LEADER WITHIN OUR FOUR STRONG BUSINESS AREAS



ANDRITZ GROUP 2023

Order intake **8,552 MEUR**

Backlog **9,873 MEUR**

Revenue **8,660 MEUR**

EBITA **742 MEUR**

PULP & PAPER



46%*

Revenue 3,987 MEUR



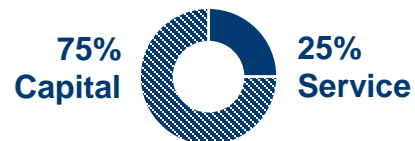
Pulp: **#1**
Paper: **#3**

METALS



21%

Revenue 1,840 MEUR



Forming: **#1**
Processing: **#1-2**

HYDROPOWER



18%

Revenue 1,522 MEUR



#1-2

ENVIRONMENT & ENERGY



15%

Revenue 1,311 MEUR



#1-3

METRIS - THE OPEN AND SCALABLE DIGITAL PLATFORM

The foundation for autonomous operation

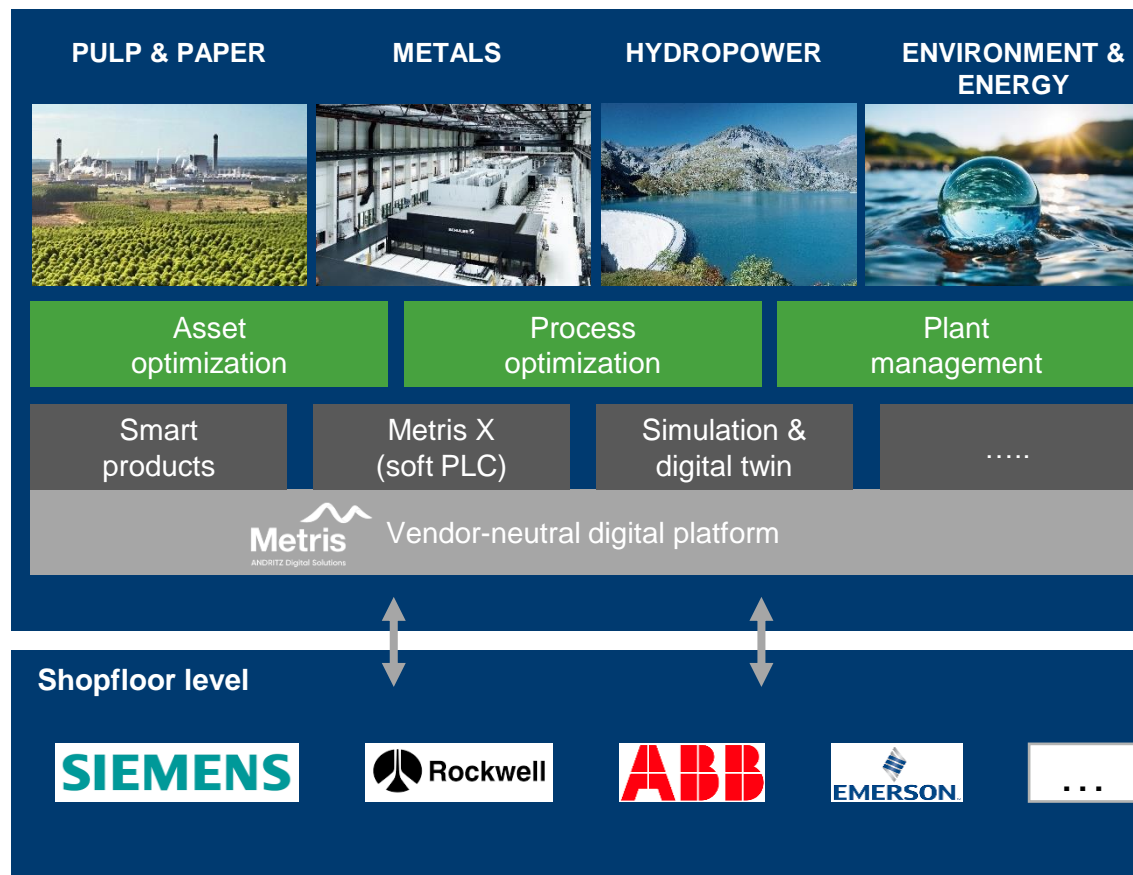
Autonomous operation

Cyber Security
built in

Latest Gen.AI
models leveraged

Best in-class
3rd party technology
integration

- Human enabled
- Tailored to customer's vision
- Continuously improving



200+ customer references

CLOSE TO OUR CUSTOMERS, IN MORE THAN 80 COUNTRIES



Employees Worldwide

around **30,000**



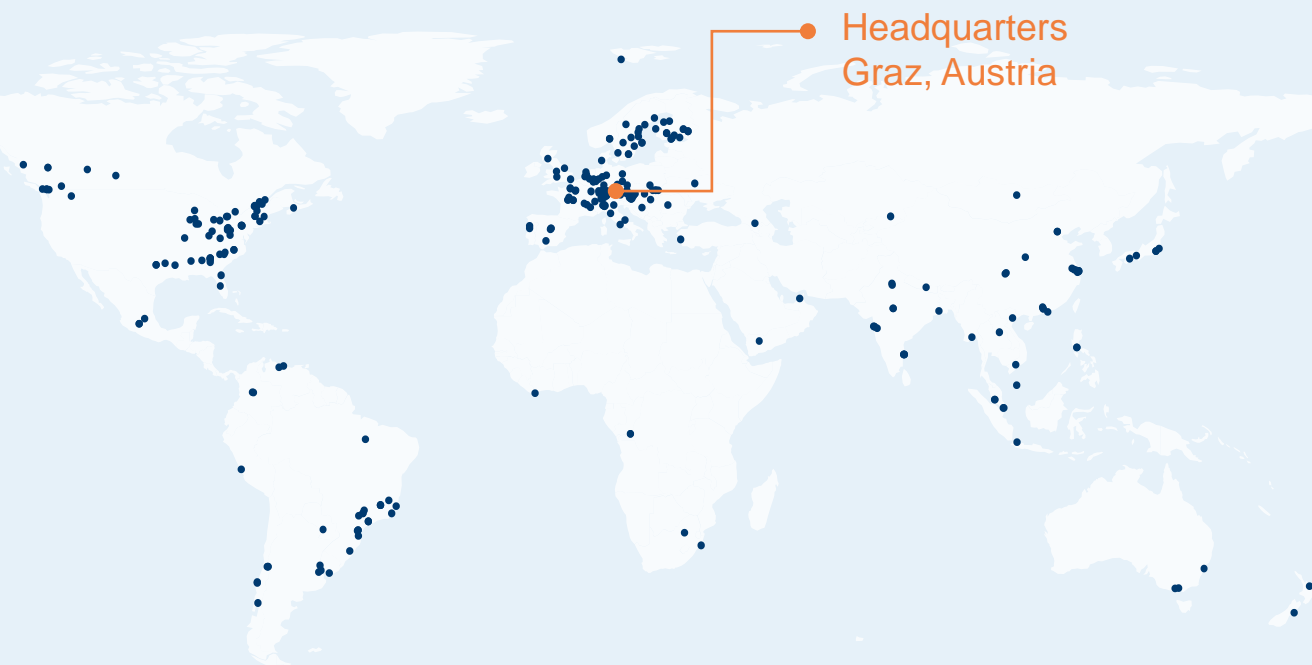
Locations –
144 with manufacturing

over **280**



Countries

over **80**



OUR GOAL IS ZERO OCCUPATIONAL INJURIES AND ILLNESSES



TARGET 2024

Reduce the LTAFR* **BY FURTHER 30% to 1.9**

We are **constantly improving** and **monitoring** our safety performance

- LTAFR* **reduced** from 10.2 in 2016 to **2.7** in **2023**
- Have all employees working under ISO 45001 certification
- Guarantee a safe, healthy and comfortable working environment for all

* The lost time accident frequency rate (LTAFR) is the number of accidents, causing more than one day absence, per one million working hours





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FROM AN IDEA TO AN OPERATING PLANT



ANDRITZ serves customers from an idea
to a fully operating plant with life-cycle services



LIFE-CYCLE
SERVICES

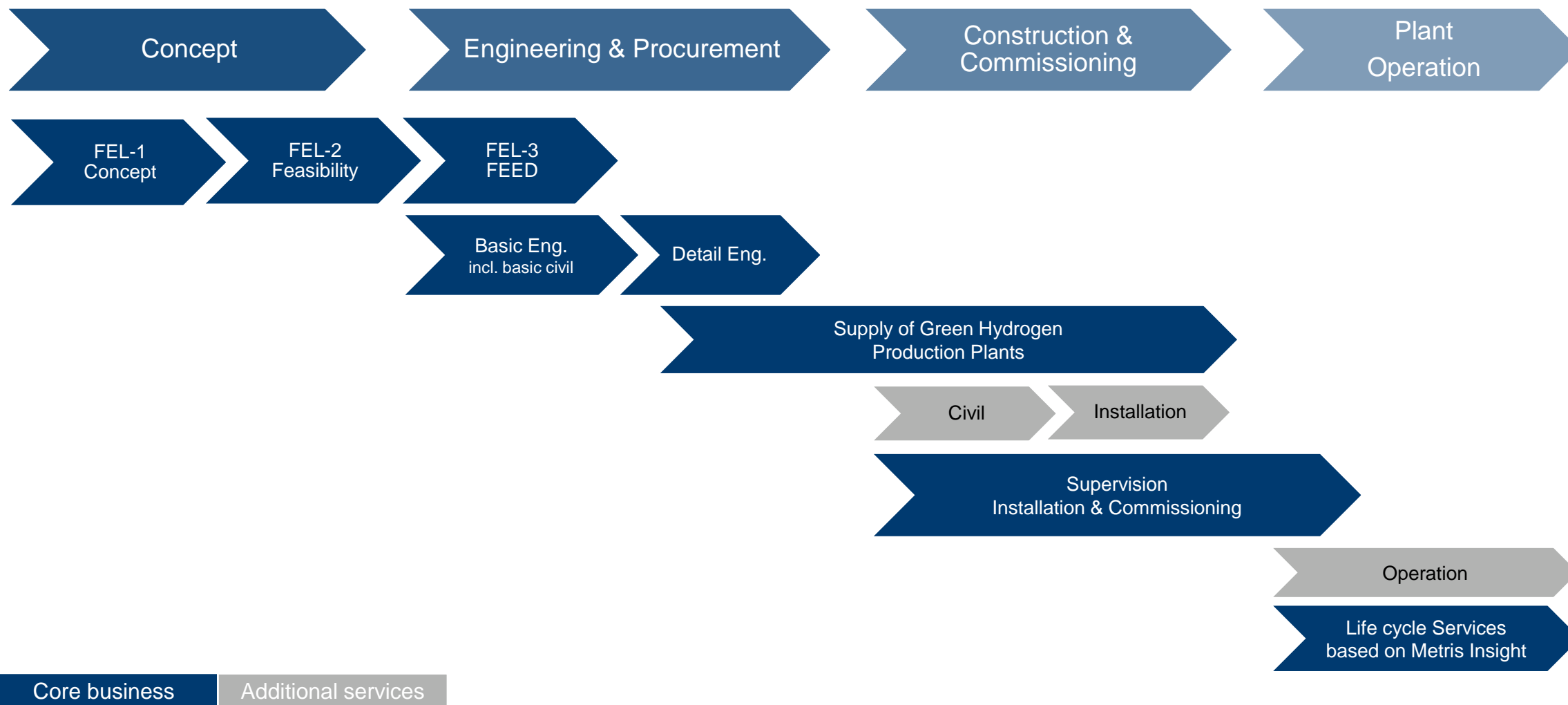
Our offering's three early engineering phases:

- Early concept engineering for your PtX plant design and concept study services for your business case assessment
- Feasibility study for EPC tendering process with integration engineering
- Translation of feasibility into detail engineering and ready for procurement of equipment and FID.

ANDRITZ EPC OFFERING



Andritz cover from the basic design up to the operation of the plant





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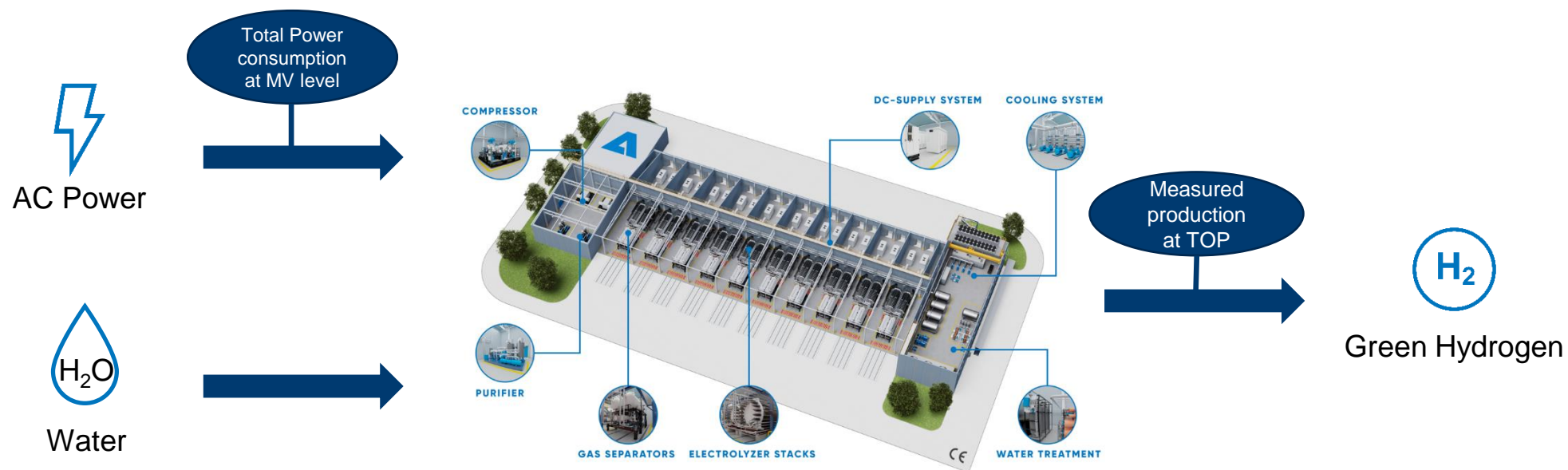
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ANDRITZ PROVIDES WARRANTIES FOR THE WHOLE, AN EXAMPLE WITH A GREEN HYDROGEN PRODUCTION PLANT



Warranty: specific energy consumption for the full plant based on measured values

THE ELECTROLYZER SYSTEM IS THE HEART OF ANDRITZ' 100 MW BUILDING BLOCK

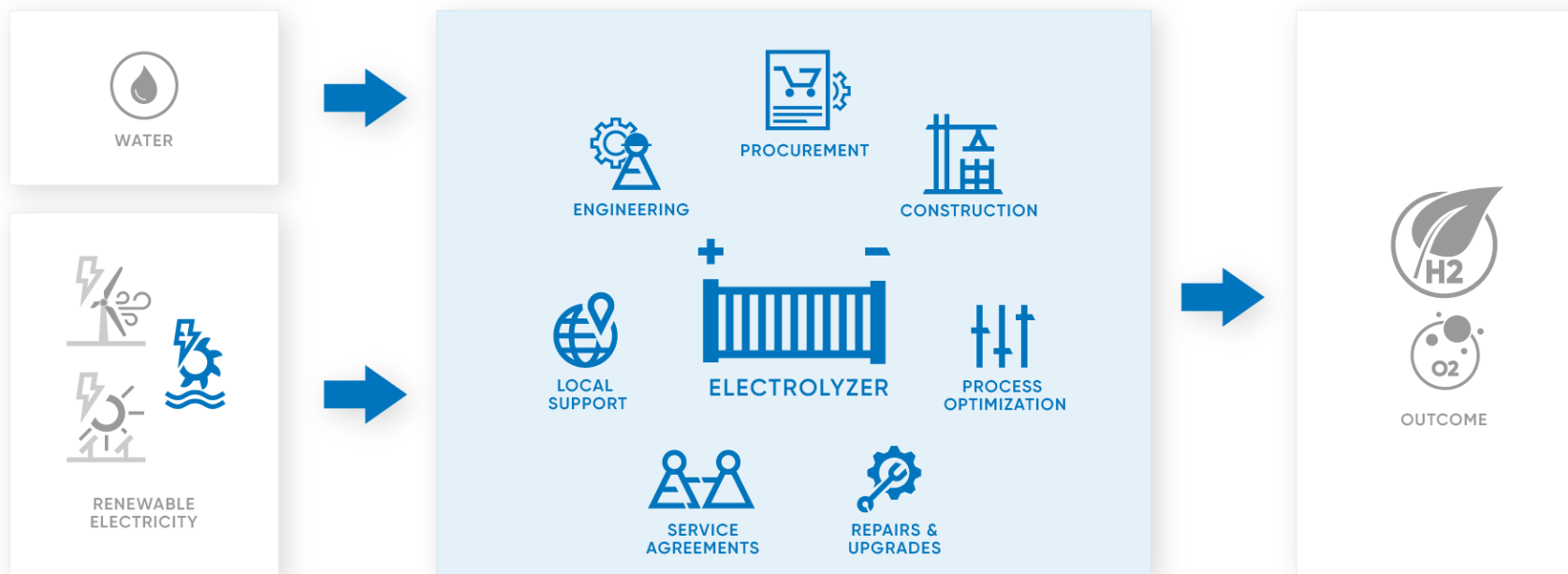


ANDRITZ IS A PLANT SOLUTION PROVIDER WITH ALL COMPETENCES FOR EPC AND SERVICES



YOUR HYDROGEN PLANT

ANDRITZ technologies and services



A LARGE GREEN HYDROGEN PLANT FOR SALZGITTER

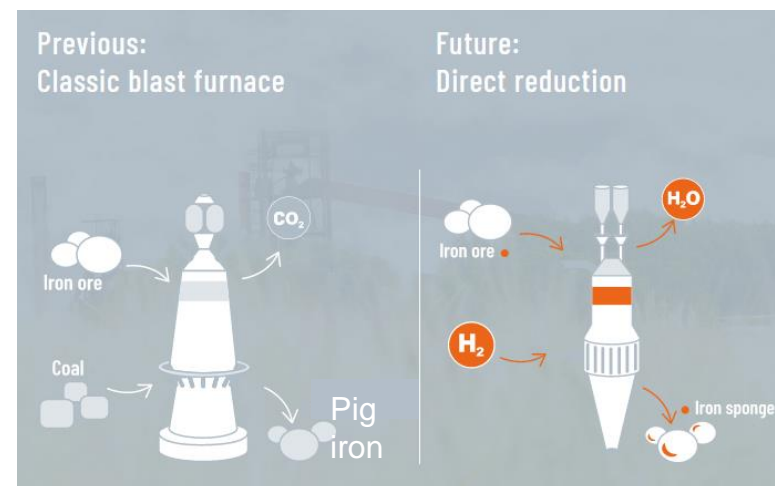
One of Europe's largest green hydrogen plants

SALZGITTER FLACHSTAHL GMBH SITE, GERMANY

The plant will produce green hydrogen, which will be used to produce green steel reducing the CO₂ emission. Salzgitter's target is to reduce CO₂ emissions by 30%, and the green hydrogen project will contribute in achieving the target. This is part of the first stage of Salzgitter's SALCOS® sustainable transformation program.



	Capacity	100 MW
	Scope	EPC
	Start-up	2026



Source: <https://salcos.salzgitter-ag.com/en/salcos.html>



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ANDRITZ CLEAN AIR TECHNOLOGY PORTFOLIO



DEDUSTING

Dry & Wet
Electrostatic
Precipitator

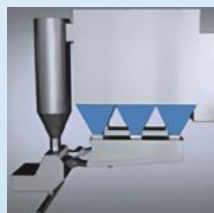


Fabric Filter
(incl. Hybrid
Filter)

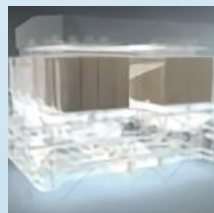


MULTI-POLLUTANTS CONTROL

TurboSorp /
Turbo-
CDS



Novel Integrated
Desulfurization
(NID)



Spray Dryer
Absorber
(SDA)



Multi-stage cleaning
(Dedust, DSI, DeSOx,
DeNOx and FGC)



SeaSOx
dual / multi-
filtration



**The most
comprehensive
APC portfolio**

DESULPHURIZATION (DeSOx)

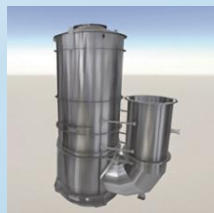
Limestone /
gypsum wet
FGD



Sea
Water
FGD



SeaSOx
Scrubber



DENITRIFICATION (DeNOx)

Selective Non-Catalytic /
Catalytic Reduction (SNCR /
SCR) / DeNOx Scrubber



DECARBONIZATION (DeCarb)

Absorption /
desorption & membrane
technologies



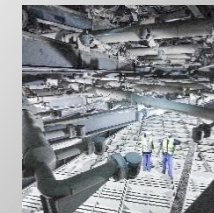
HEAT RECOVERY

Flue gas
Condenser



SERVICE, RETROFIT, MODERNIZATION

Inspections, field service,
spare parts, upgrades /
retrofits, LTSA, digital
solutions



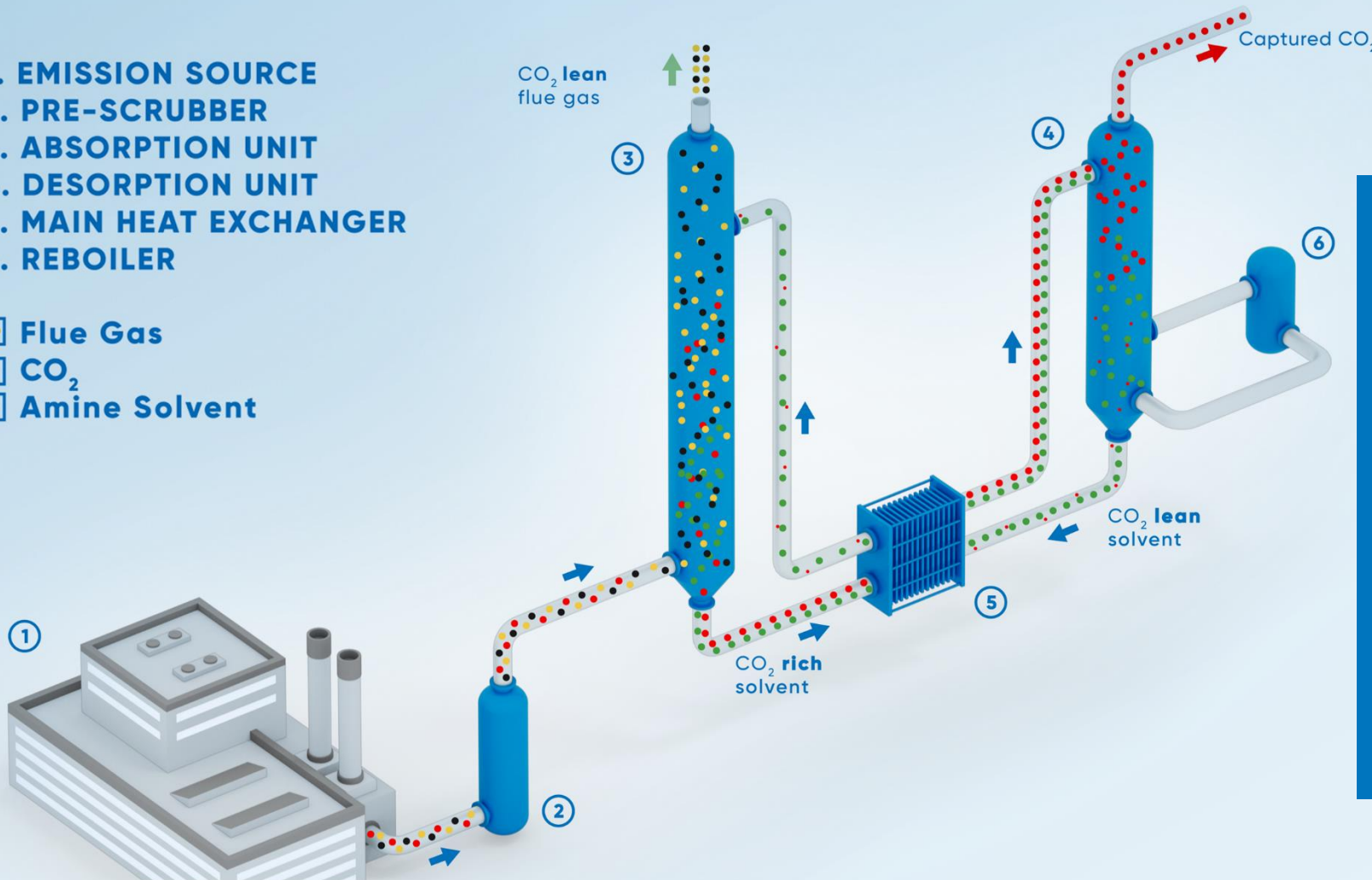
ANDRITZ CCS– TECHNOLOGY



Chemical absorption

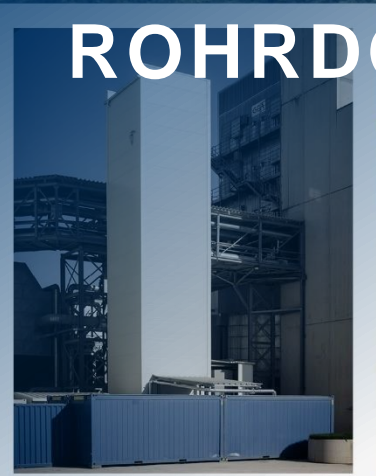
1. EMISSION SOURCE
2. PRE-SCRUBBER
3. ABSORPTION UNIT
4. DESORPTION UNIT
5. MAIN HEAT EXCHANGER
6. REBOILER

- Flue Gas
- CO₂
- Amine Solvent



- CO₂ removal efficiency > 95%
- CO₂ purity > 99.5% up to food grade
- Advanced amines for reduced energy consumption
- Pre-Treatment for quenching, removal of acidic pollutants and particles
- Complete Carbon Capture plants including CO₂ compression and/or liquefaction on EPC basis as required by customers

AMINE PROCESS FOR ROHRDORFER CEMENT



CARBON CAPTURE TECHNOLOGY

Rohrdorfer Plant, Germany

The amine process for this carbon capture technology is installed after the cement (kiln 1Mton clicker/year). Testing and production of CO₂ for the food industry, breweries etc. The next plant size will be 48 t/a (design stage) and the full plant size will be 1 500 t/a (in preparation).



Measured CO₂ purity was

> 99.95 %



CO₂ capture rate of

> 2 t/d



Operation

30 wt% Monoethanolamine or advanced amines



Start-up

08-2022



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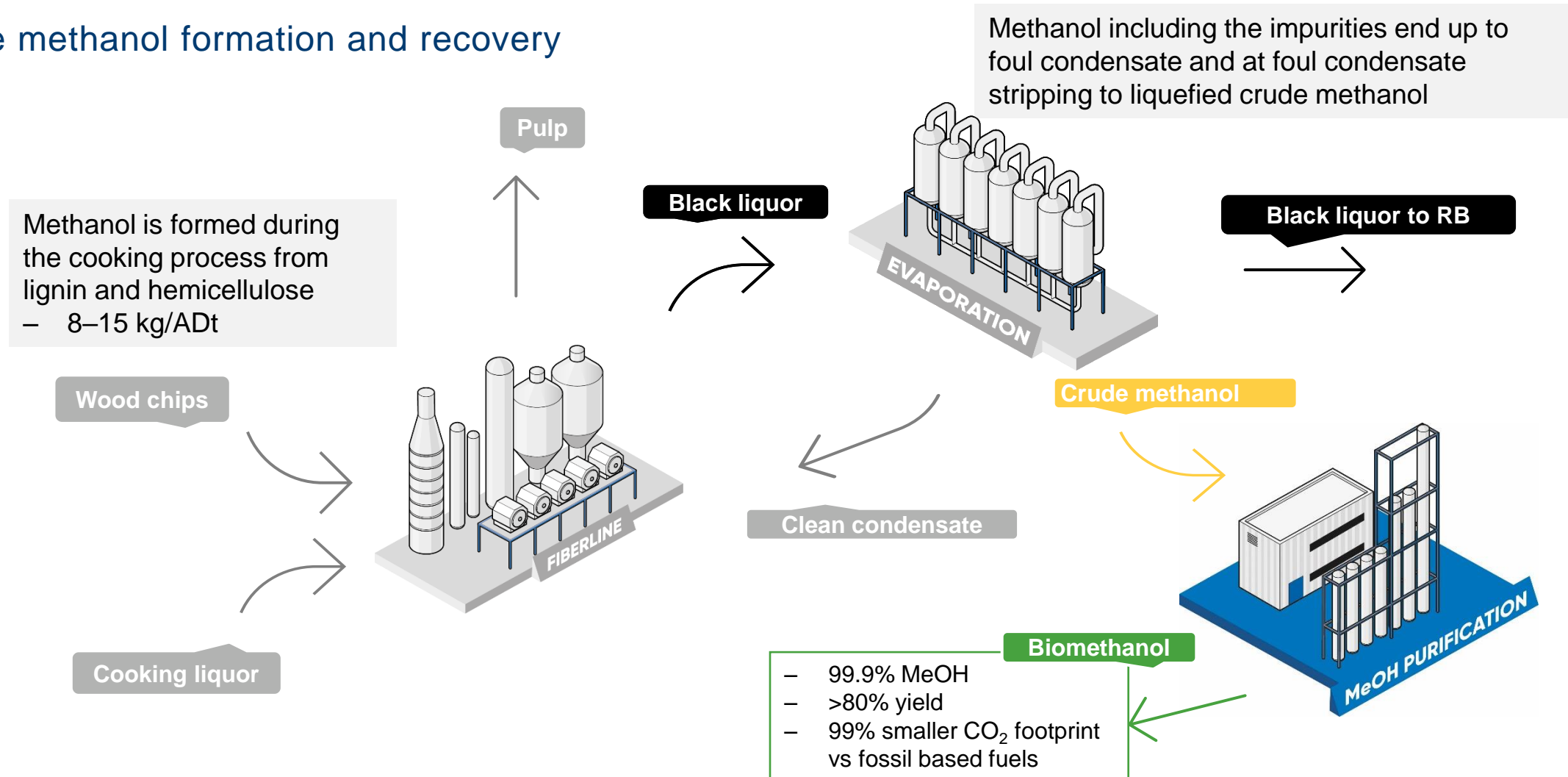
ANDRITZ

ENGINEERED SUCCESS

BIOMETHANOL FROM A PULP MILL



Crude methanol formation and recovery



WORLD'S FIRST FOSSIL-FREE BIOMETHANOL PLANT IN A PULP MILL



IMAGE: SÖDRA



PURIFIED BIOMETHANOL

Mösterås, Sweden & Äänekoski, Finland

The plant produces commercial grade biomethanol by using a patented extraction process.



Total capacity

~ 20,000 t/a



Feedstock

Liquified methanol (SW/MW)



Product usage

As fuel /Bio-methanol



Start-up(s)

2020 & 2024



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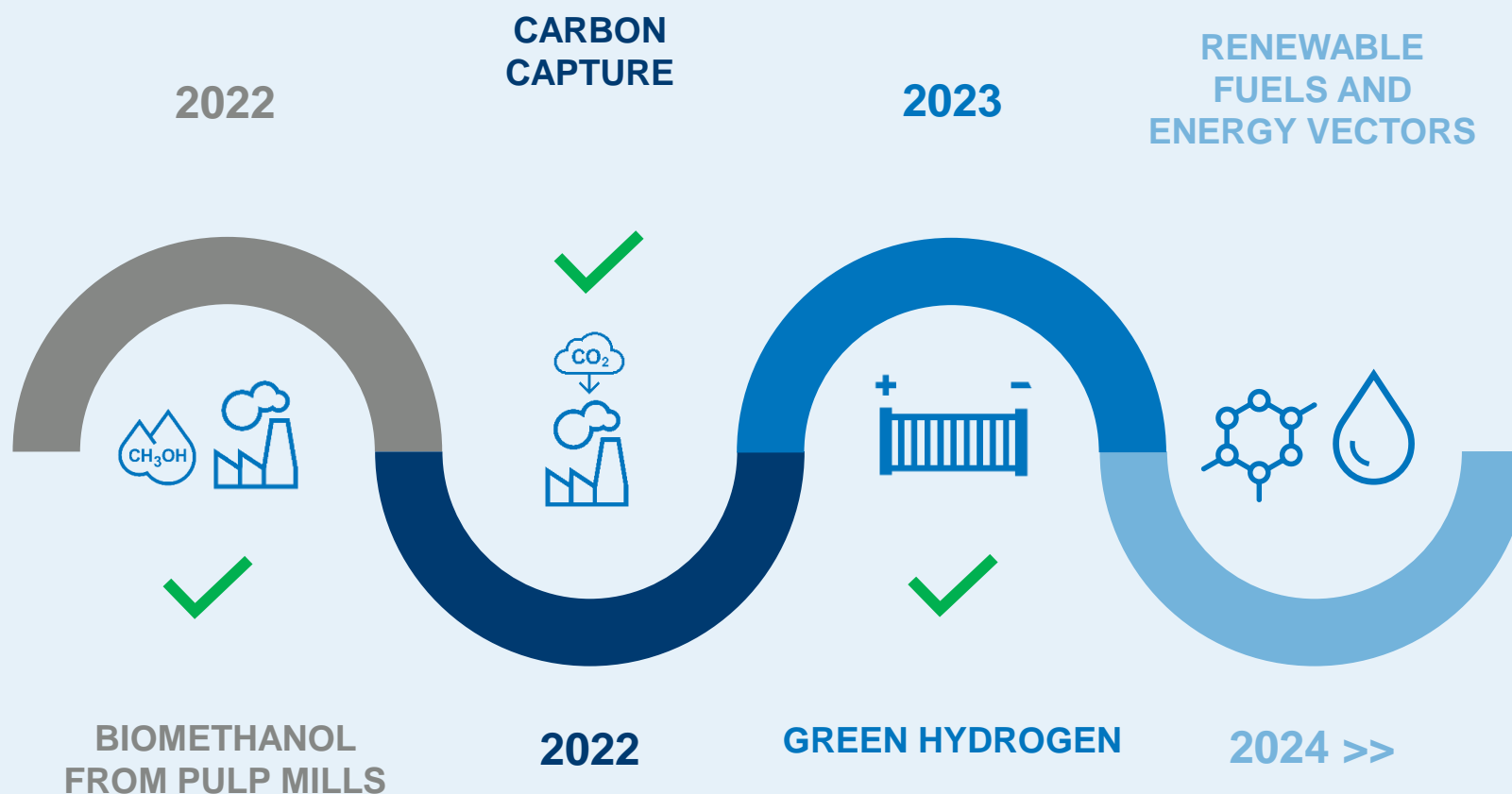
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OUR VISION IS TO BECOME A LEADING GLOBAL P2X SOLUTION PROVIDER



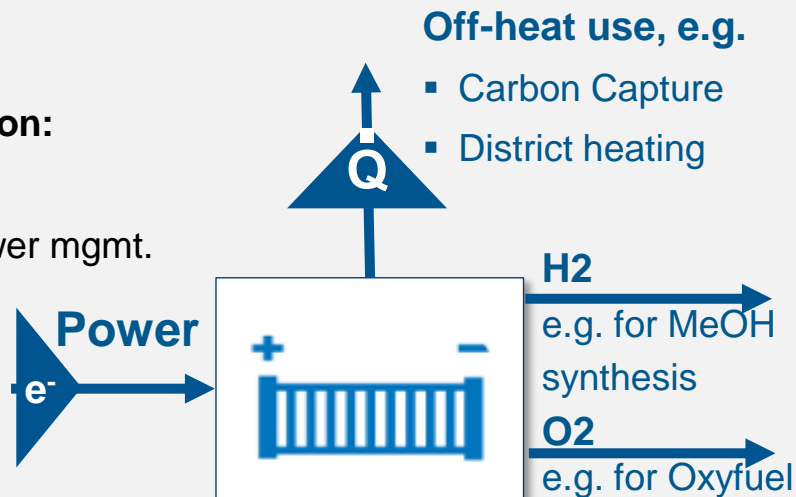
ANDRITZ OFFERS INTEGRATION ENGINEERING, WHERE THE FULL PTX VALUE CHAIN IS ASSESSED FOR OPTIMIZATION.



Subject to project requirements, the Levelized Cost of Product is optimized with consideration of all options, considering up-stream and down-stream integration .

1. LCOE optimization:

- i. Grid-services
- ii. Curtailed power mgmt.
- iii. Arbitrage



2. H2 demand driven operation optimization

- i. With consideration of power supply
- ii. Buffer integration

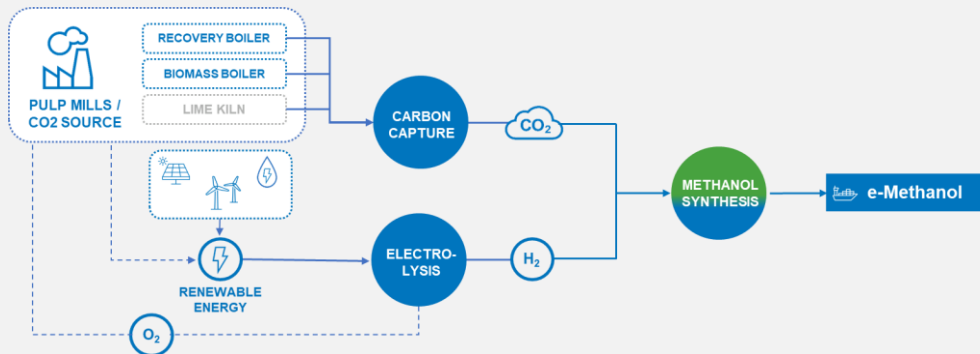
3. Additional revenues from by-product use or cost savings from operational mode:

- i. O2 for oxyfuel application
- ii. Off-heat use for CO2 Amine Wash Desorption
- iii. Optimizing levelized cost of electricity

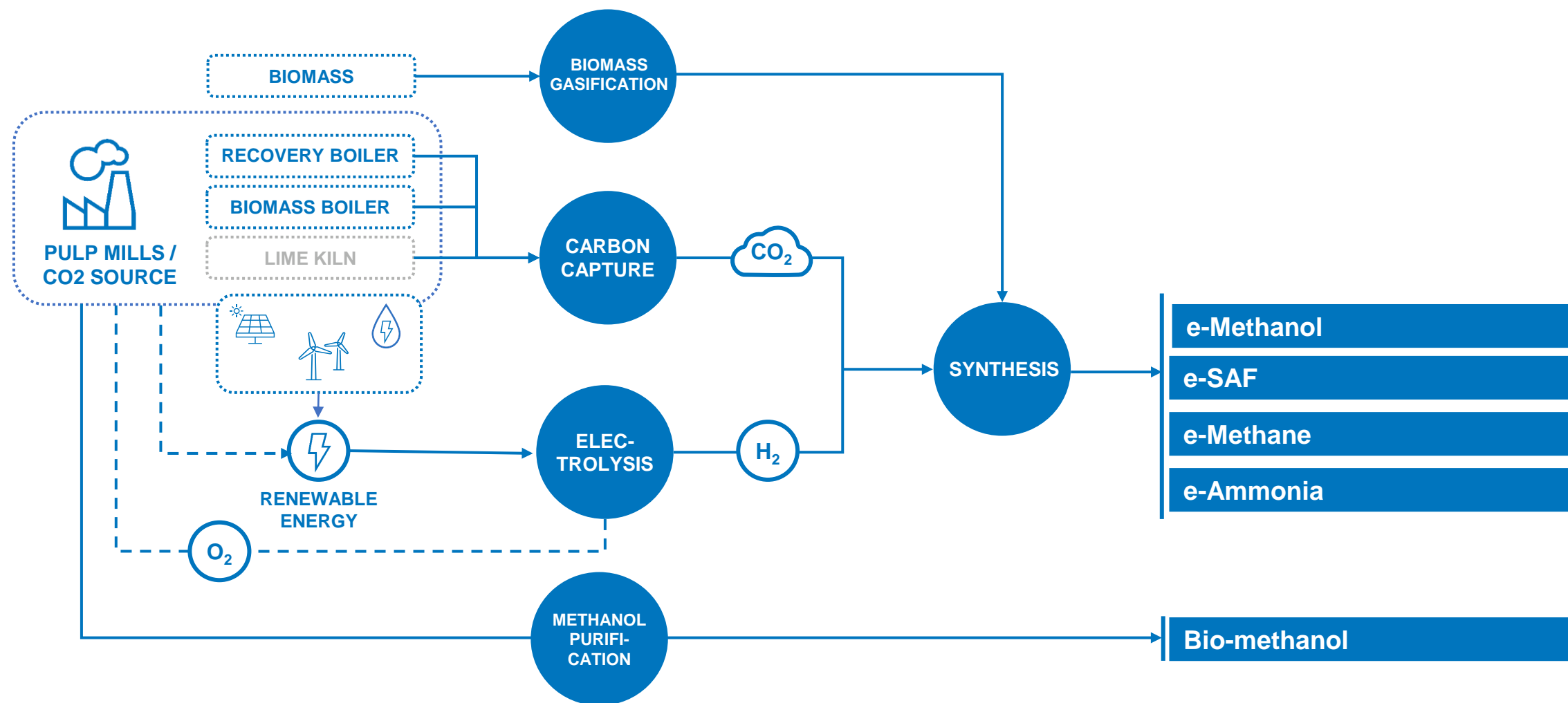
4. Cost base improvement via value eng.'g

- i. ISBL / OSBL integration
- ii. Integration eng.'g along full PtX value chain to determine options for best CapEx / OpEx, incl. buffer / storage requirements

5. Additional funding exploiting from EU by implementing more innovative edges



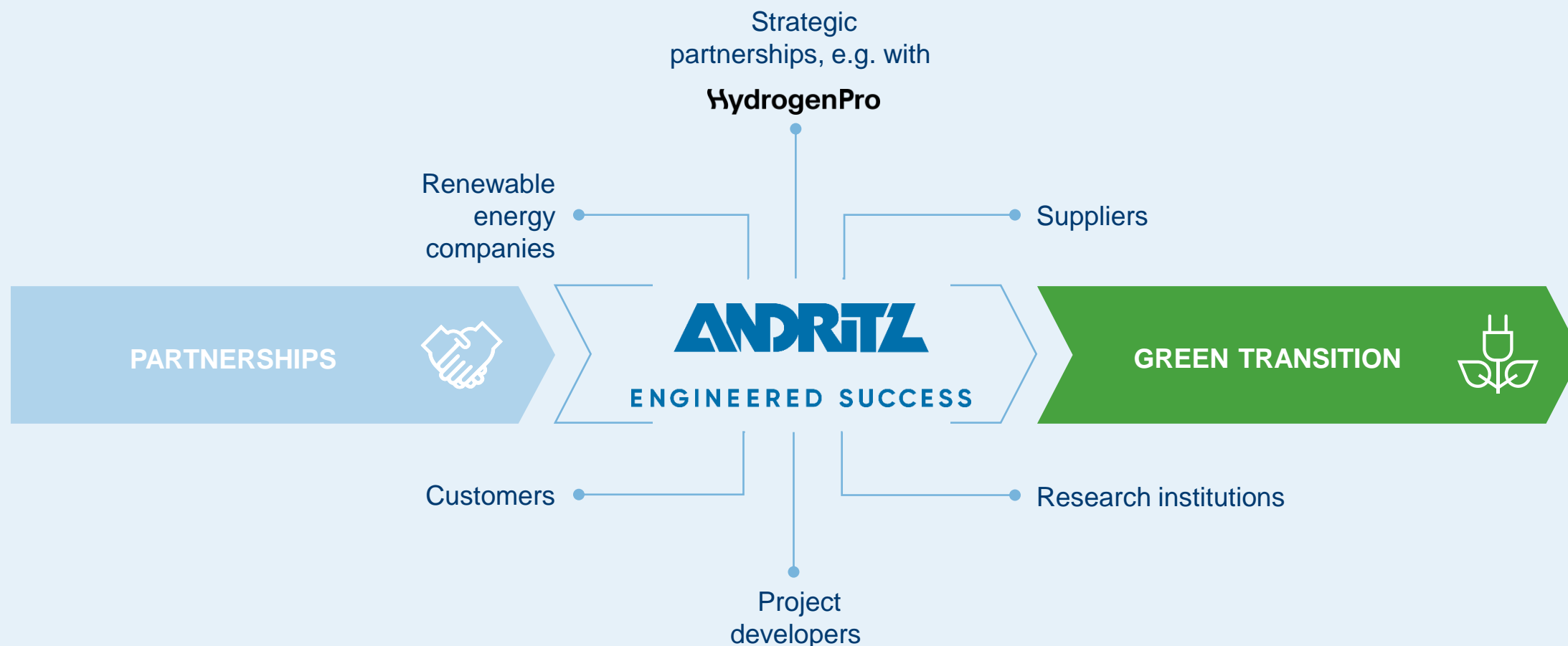
FULLY INTEGRATED CONCEPT FOR PRODUCTION OF CO₂-BASED RENEWABLE FUELS



NOBODY CAN DO THIS ALONE



Partnerships are required to reach best levelized cost of product



CONTACT INFORMATION





Green
hydrogen

FOR THE CHANGE

WE ENABLE THE
GREEN TRANSITION

ANDRITZ

ENGINEERED SUCCESS

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