thyssenkrupp nucera's Latest Hydrogen Initiatives

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Virtual Green Bag Seminar: Green Technologies for Accelerating Net-Zero Actions in DMCs

thyssenkrupp nucera Japan Co. Ltd.
Business Development & Sales_Green Hydrogen Group
Dr. Namiko Murayama

thyssenkrupp
nucera

Shaping the new era based on strong chemical engineering heritage

thyssenkrupp nucera

Composition

n = new/next uce = uhde chlorine engineers era = era

Meaning & access to positioning

- A new era, a new time for us and the industry
- Rethinking existing infrastructures
- High-tech, innovation, collaboration
- Transformation into a new era

8
regions

750+
employees worldwide

600+
successful electrochemical projects worldwide

3GW+
contracted green hydrogen capacity

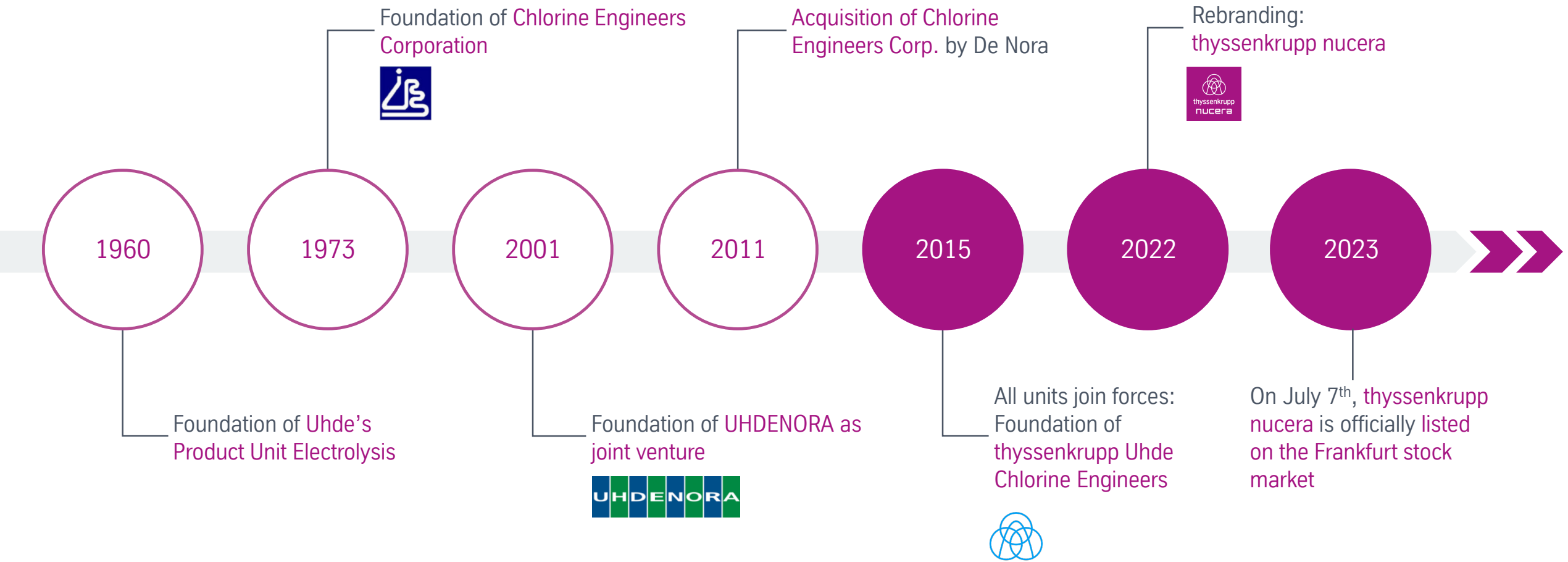
150+
modules in execution

3mio+
tons of CO2 can be saved p.a.[1]

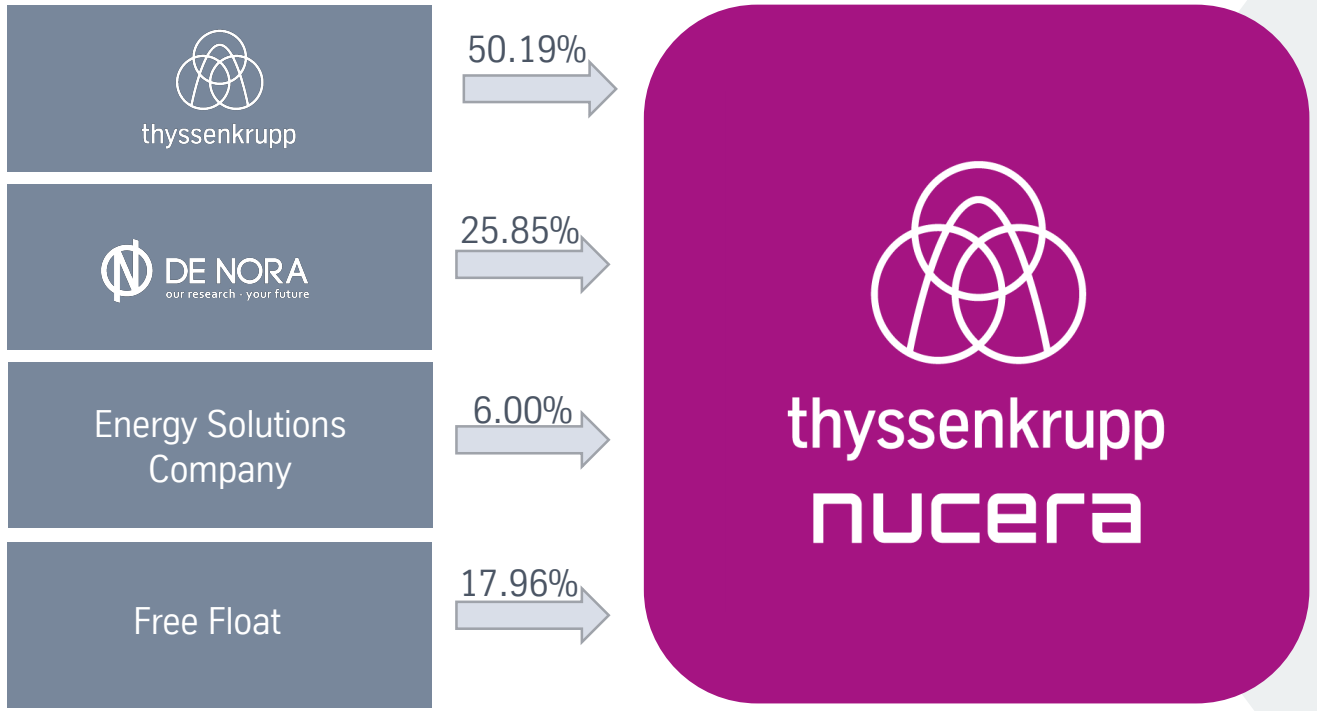
1. Based on 3GW+ contracted green hydrogen capacity.

Where we come from

Bringing together the collective expertise of three renowned global electrolysis leaders



We are the Alkaline Water Electrolysis (AWE) and Chlor-Alkali (CA) technology provider globally



AWE

Order intake FY 22/23:
~ 0.9 bn €

Select AWE Customers

AIR PRODUCTS · UNIGEL · CF

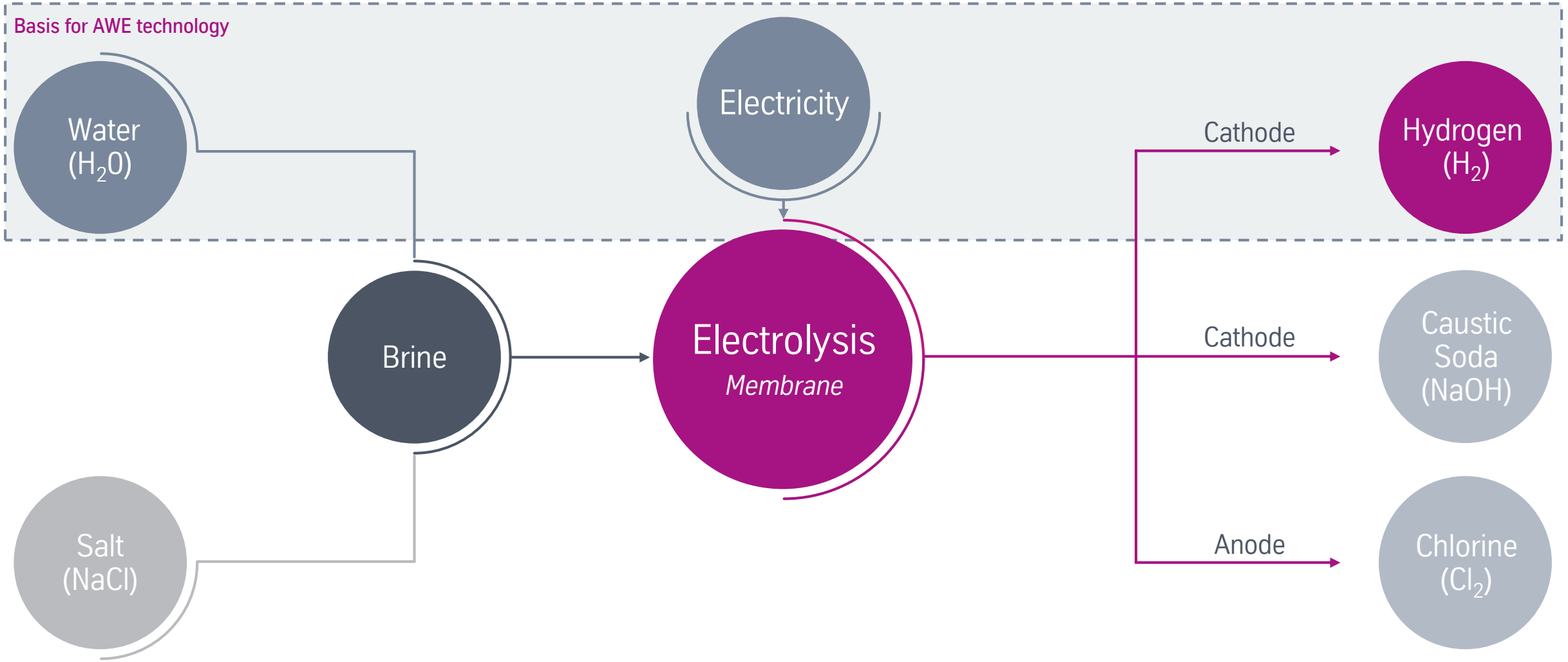
CA

Order intake FY 22/23:
~ 0.5 bn €

Select CA Customers

covestro · Olin · BASF

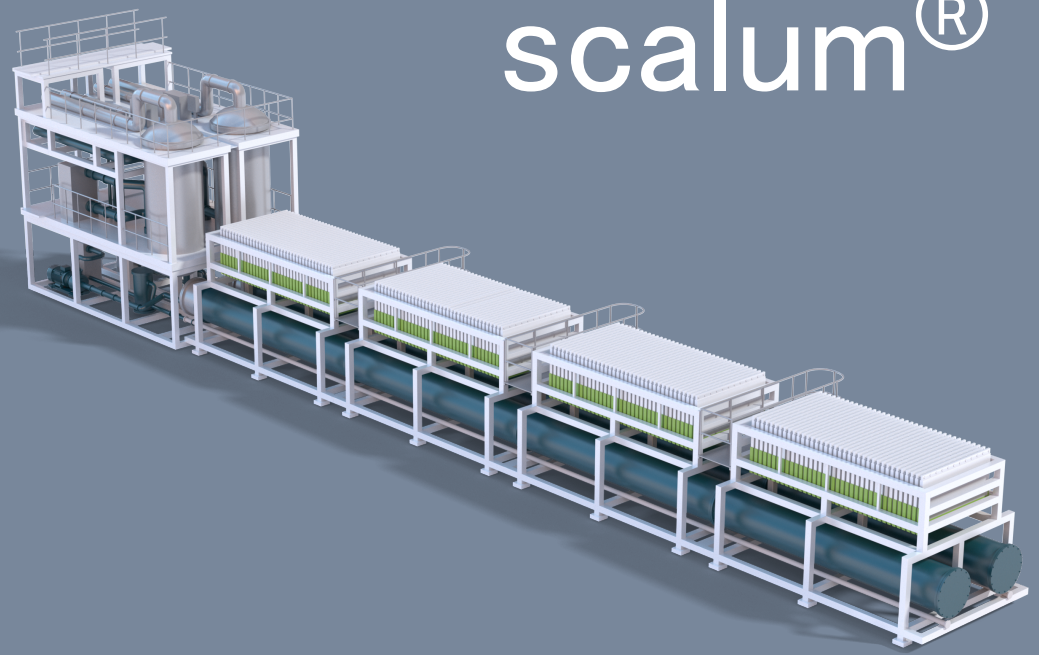
CA chemical process in a nutshell



CA chemistry describes the process of splitting salt (NaCl) and water (H2O) into Chlorine (Cl2), Caustic Soda (NaOH) and Hydrogen (H2)

Enabling green transformation

- ✓ AWE technology delivers speed and scale
- ✓ Based on proven quality, safety, reliability, and passion for innovation
- ✓ A powerful unit with ~ 300 high-efficiency cells
- ✓ Standardized modular solution with a system capacity of 20 megawatts (MW)
- ✓ Can be easily interconnected and scaled up to match highest demands, up to gigawatt plant size



Quality and Longevity

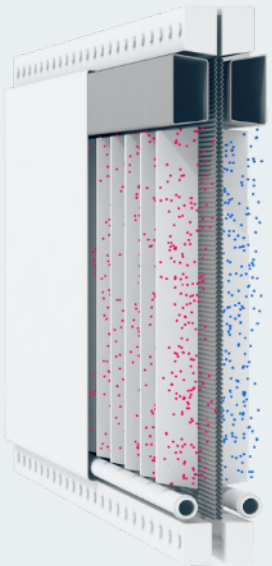
High Performance

Design Certified

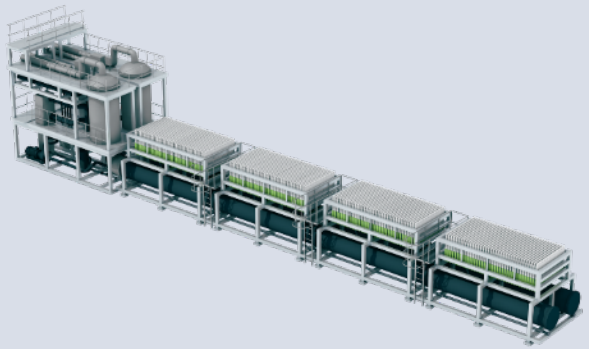
Global Service Network

thyssenkrupp nucera offers an efficient and highly scalable module concept to match market requirements

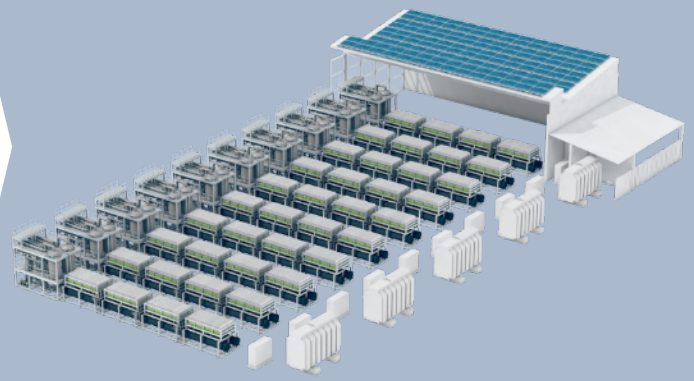
AWE single element



scalum® 20 MW electrolyzer unit



Highly scalable to GW plant size



Selected thyssenkrupp nucera green hydrogen milestones solidify our position as an industry leader[1]

NEOM

> 2 GW installation

Signed one of the largest green hydrogen projects in the world to install an over 2 GW electrolysis plant for Air Products in NEOM to produce green ammonia.

200 MW installation

Engineer, procure and fabricate Shell's 200 MW hydrogen facility in the Port of Rotterdam which will produce green hydrogen for the industry and transport sector.

H2green steel

> 700 MW installation

Signed one of the largest gH2 projects in Europe to install > 700 MW of electrolysis capacity to fuel an integrated green steel plant in Sweden

1. Selected examples, non-exhaustive.

Evolution to a product-based business to most efficiently serve growing global demand

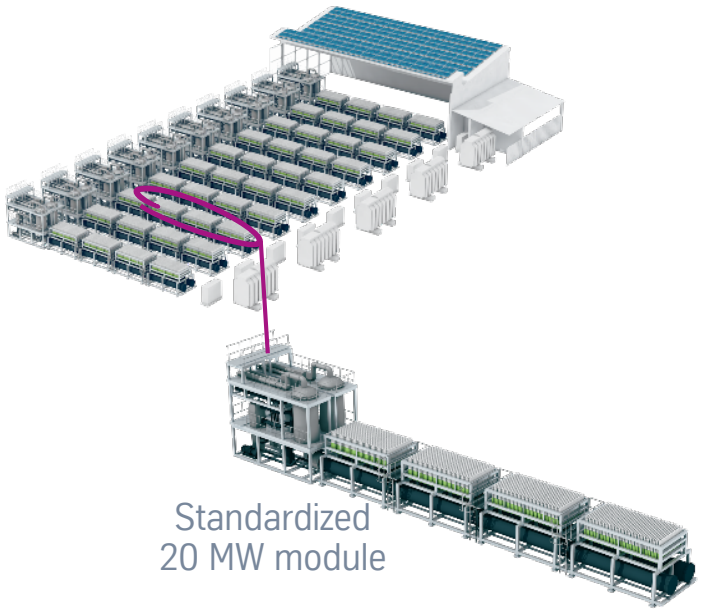
Project business

Full customization per project

Illustration

Technology provider and product business

thyssenkrupp nucera green hydrogen business delivering highly standardized 20 MW module



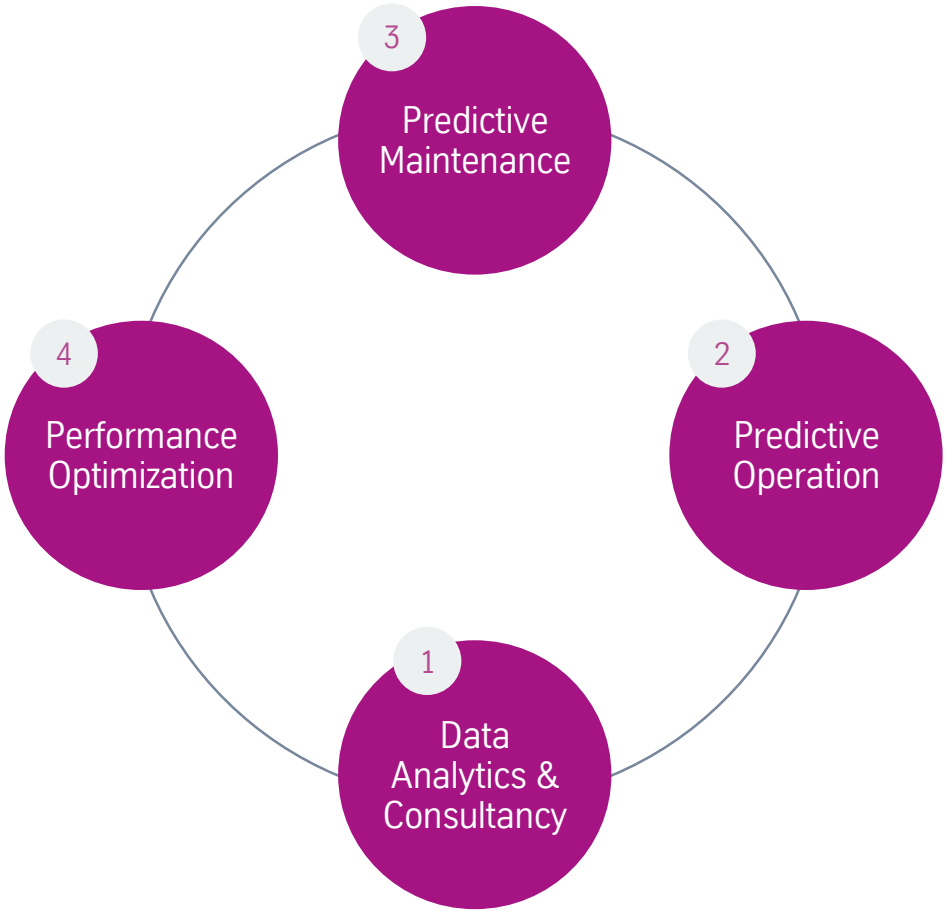
Standardized
20 MW module

Key benefits

1. Standardization and serial production to achieve GW scale ensuring quality, schedule and cost optimization
2. Establish thyssenkrupp nucera as a key technology provider
3. Reduction of complexity and risks by standardization

thyssenkrupp nucera business in transition from a classical project business to a future AWE product-based business

Digital solutions suite is core for new service business models



1 **Data Analytics & Consultancy**
- Periodic reporting & consulting
- Online dashboards
- Remote expert support

2 **Predictive Operation**
- nucera evaluator
- Operator training simulator

3 **Predictive Maintenance**
- nucera administrator
- Interactive product navigator
- Remote inspection

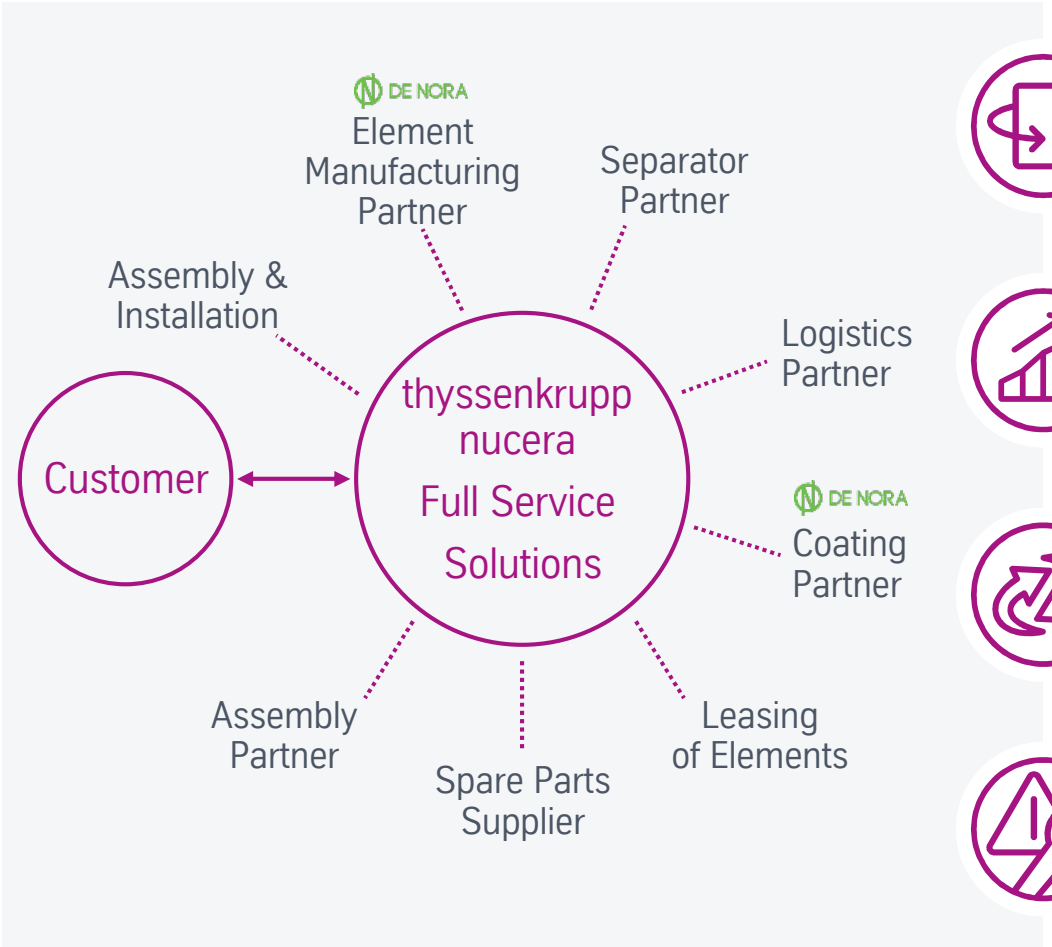
4 **Performance Optimization**
- nucera APC

thyssenkrupp nucera acts as digital industrial catalyst connecting domain expertise & digital capabilities to engineer smarter products & services

Full-service solutions from a single source

Key Characteristics

- Maintenance, revamp or refurbishment projects executed by thyssenkrupp nucera completely
- Single point of responsibility
- New system guarantee



Customers benefit from a fully integrated offering at global scale

Massage to ADB's DMCs

- With its water electrolysis technology to produce green hydrogen, thyssenkrupp nucera offers an innovative solution on an industrial scale for green value chains and an industry fueled by clean energy – a major step towards a climate-neutrality.

- DMCs have suitable locations for hydrogen production by electrolysis using renewable energy. What is also needed are appropriate legal frameworks, a financial model with international collaboration, and social acceptance by the public.

- Balancing industrial development with the transition to clean energy is not easy. But together we can make it happen.

We shape the new era.

thyssenkrupp nucera