

Siemens Energy Company Update

Siemens Financial Services

January 26th, 2023



Siemens Energy is a global leader in the energy business

~ 1/6

of global electricity generation
is based on our technology.

92,000

employees work as a team
to energize society.¹

We are present in

> 90 countries.

We invest around

€1bn annually in
research and development.

¹ Number of employees as of September 30, 2022

Siemens Energy is a registered trademark licensed by Siemens AG.



As an integrated energy
technology company

we support our customers along the energy value chain



Low- or zero-emission power generation

- Gas Services
- Siemens Gamesa Renewable Energy

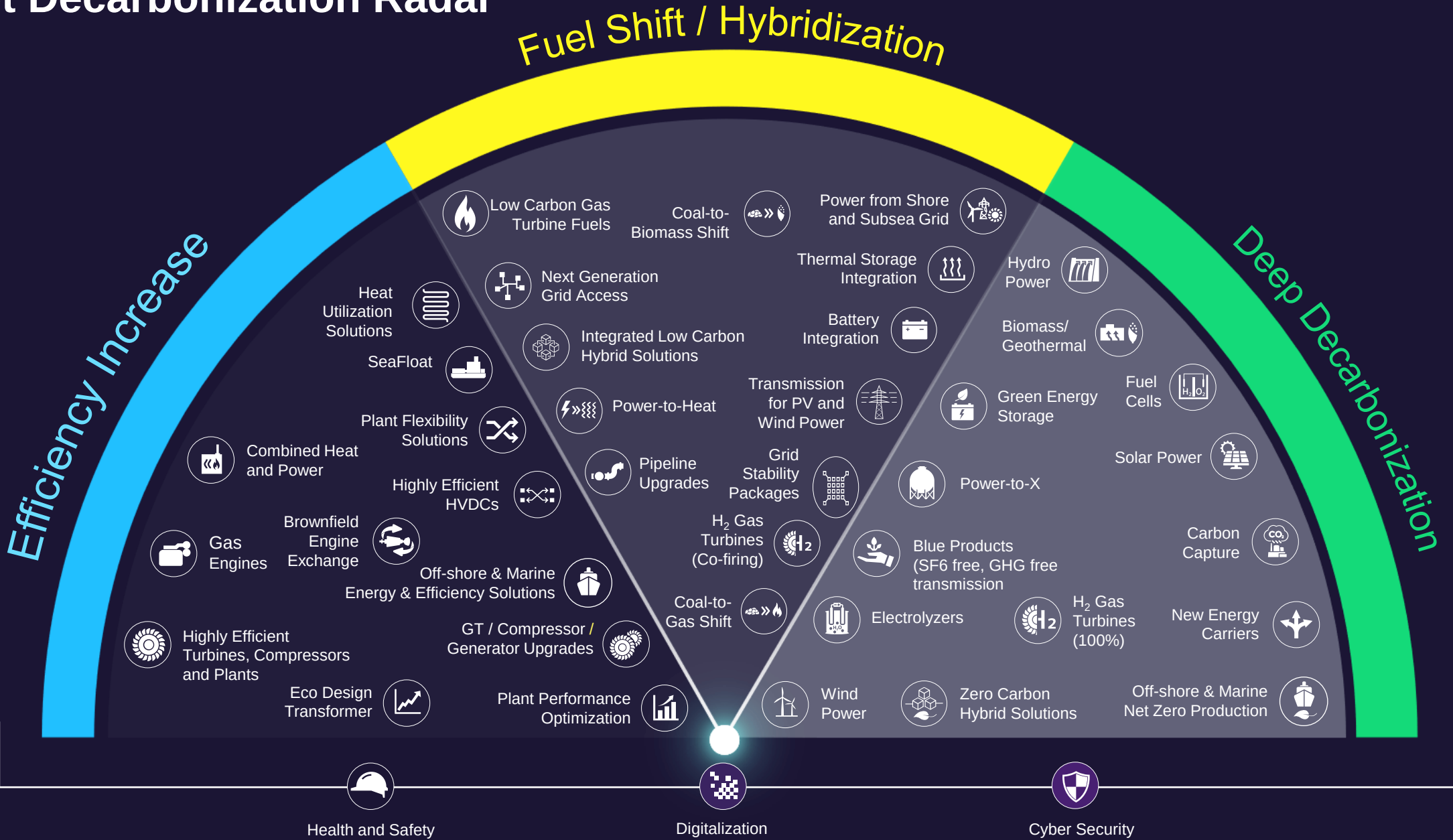
Transport and storage of energy

- Grid Technologies

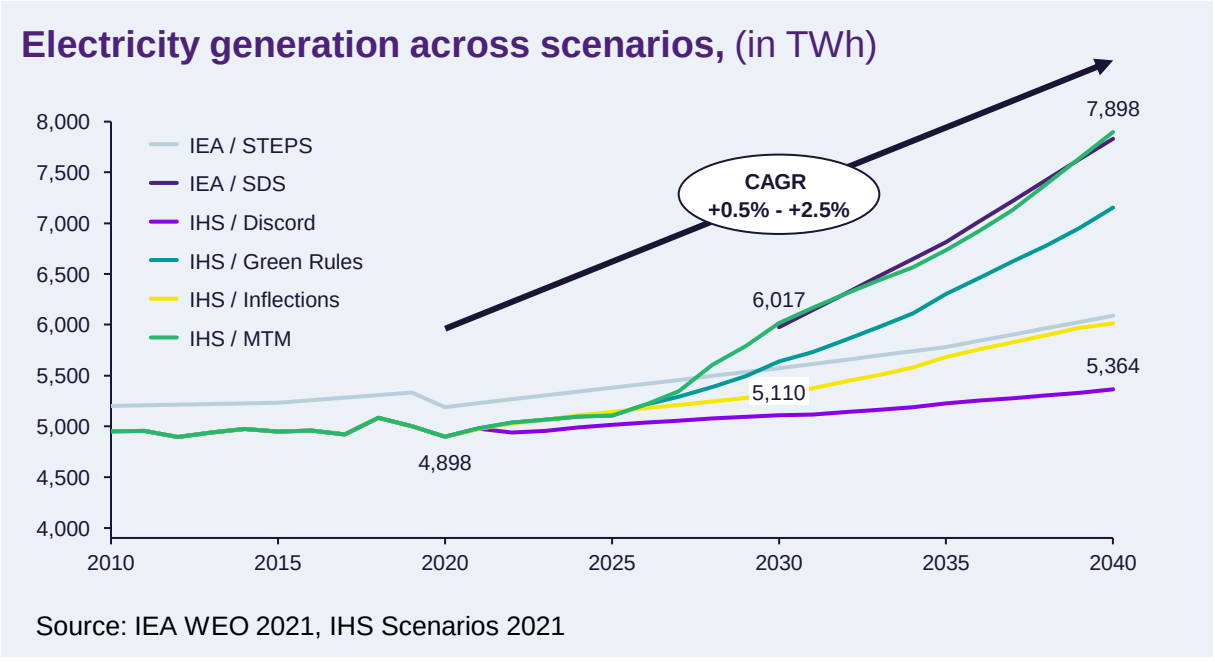
Reducing GHG emissions and energy consumption in industrial processes

- Transformation of Industry

Fleet Decarbonization Radar



North America Electricity Market growing at least with 0.5% through 2040



- **Delivered electricity** from IEA WEO 2021 and IHS 2021 across scenarios in same range
- **Growth**, across all scenarios, between +0.5% and +2.5%; for planning scenario (IHS Inflections) at +1.1% in years 2020-2040
- Even stronger growth expected after 2022 IEA and IHS updates
- Growth is driven by economic growth, electric vehicles, hydrogen demand and heating electrification and offset by energy efficiency and behind meter solar



Up to
+5.4%
Natural Gas



Up to
+890%
Wind



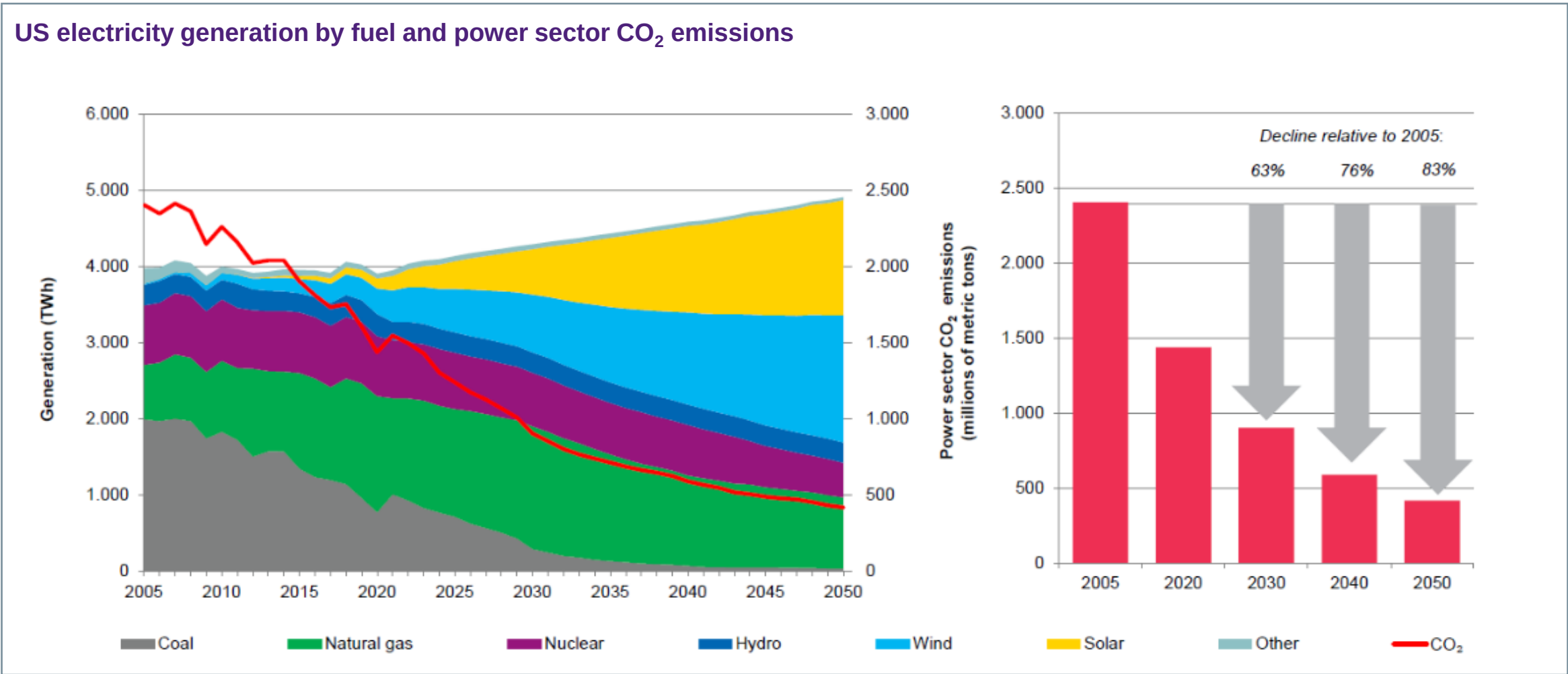
Up to
+1640%
Solar

Lowest case
-98%

Lowest case
+140%

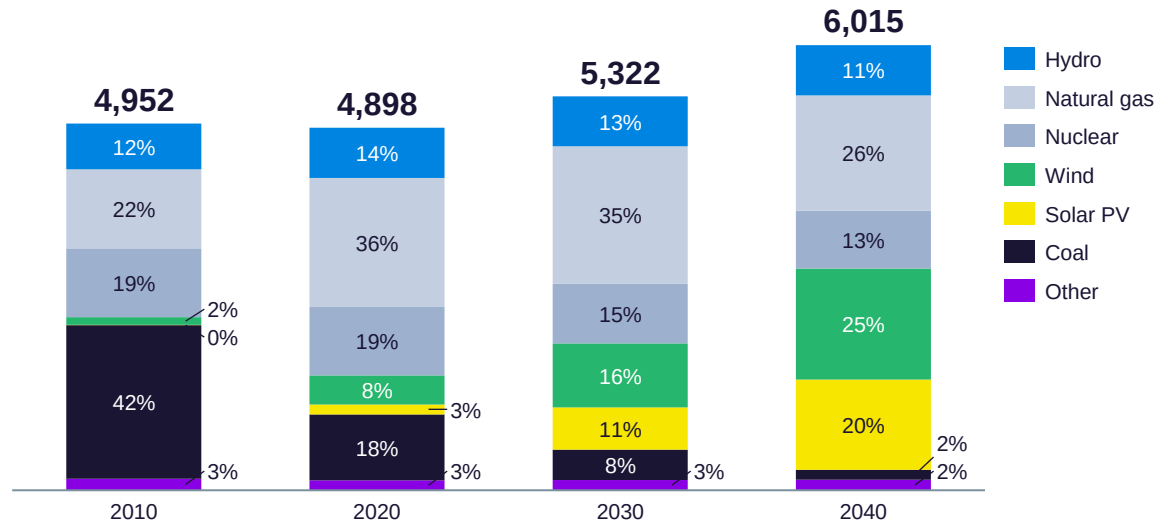
Lowest case
+400%

US generation and power sector CO₂ emissions



North America Market Drivers Impacted by Global Challenges

Power generation dispatch by fuel, (in TWh)



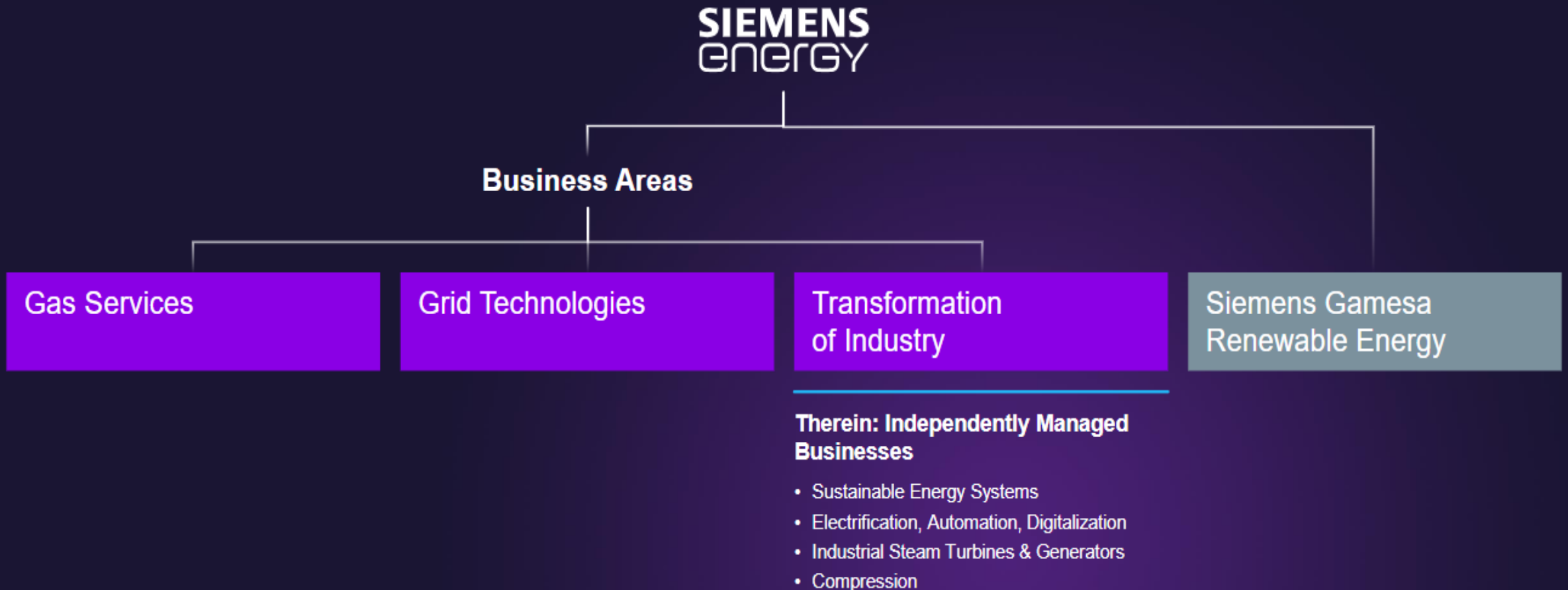
Source: IHS Scenarios 2021, Inflections (planning scenario) – Fast transition

- Last decade, NA market experienced **coal to gas shift**. This and next decade market is **shifting drastically to renewables**
- **Gas generation remains the leader in generation** for the foreseeable future
- With all intermittent renewables including prosumers, **grid demand & complexity on an aging infrastructure** will continue to increase

- Ukraine war driving many topics (e.g., EU/Russia relation), geopolitics shifts, threat to economic/trading system, rising populism and nationalism
- New COVID variants is expanding the pandemic, driving supply chain/logistics challenges, record prices with supply/demand imbalance, significant delays in many industries
- War, COVID, worst commodity shock/price volatility in 50 years, may rebalance energy security with decarbonization pace in both US & RoW
- On-going extreme weather events and GHG reduction pressures (154 markets commitment at COP26 + large corporations pledge to net-zero) are still key drivers
- Energy mix in US is following the global pattern of change – renewables drive growth, but NG serves as backup to renewables. Coal is diminishing faster in US than the rest of the world.

Our company structure

supporting our customers along the entire energy value chain



New group structure (effective October 1, 2022) to increase customer focus, transparency and accountability...

Siemens Energy						
SE Executive Board		Reporting Segments				
CEO	CFO	Gas Services	Grid Technologies	Transformation of Industry	Global Functions	SGRE
						

...and a new operating model aiming at

Clear Structures

Unified go to market

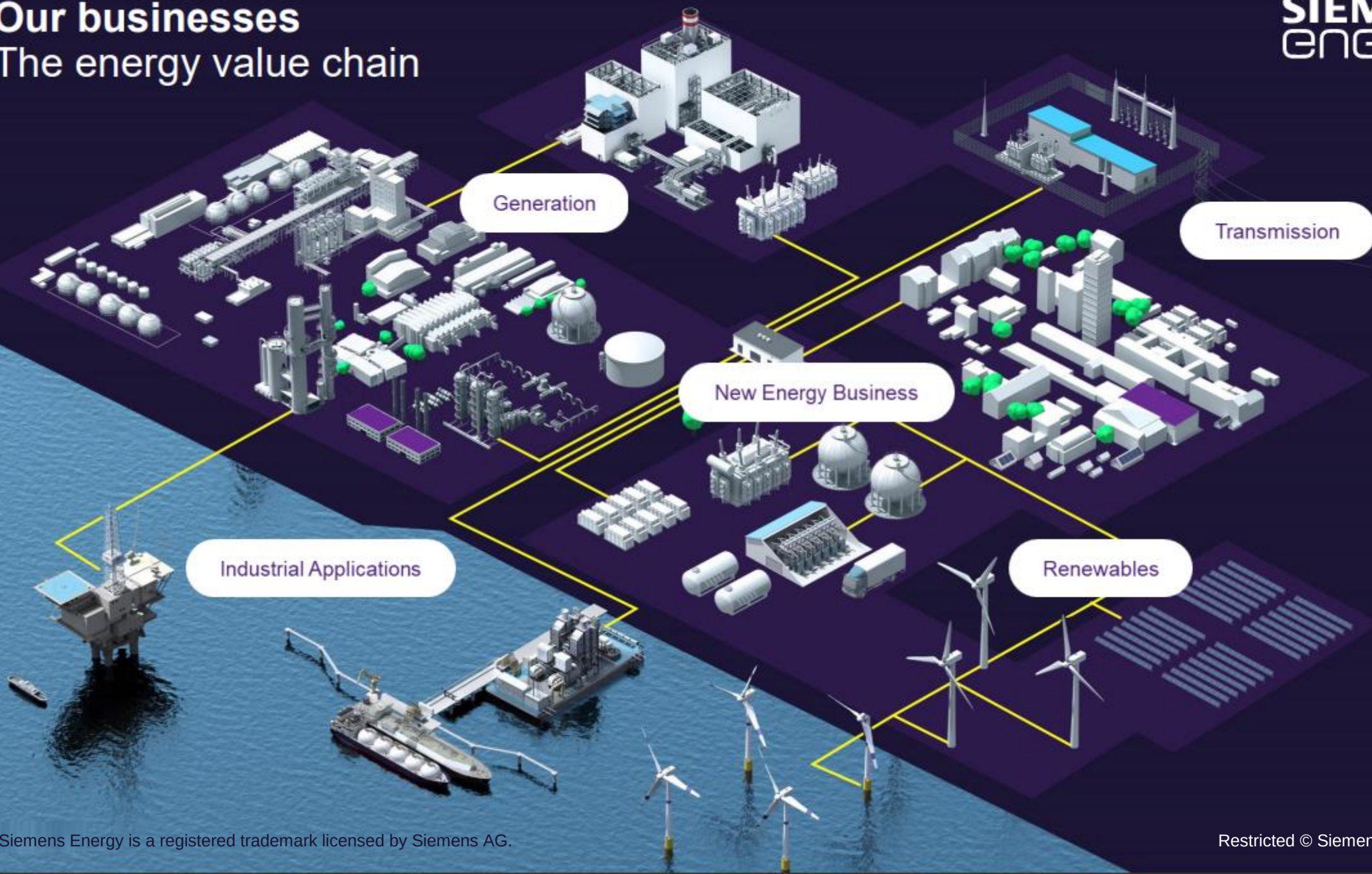
Operational excellence

Focused innovation

Our businesses

The energy value chain

SIEMENS
energy



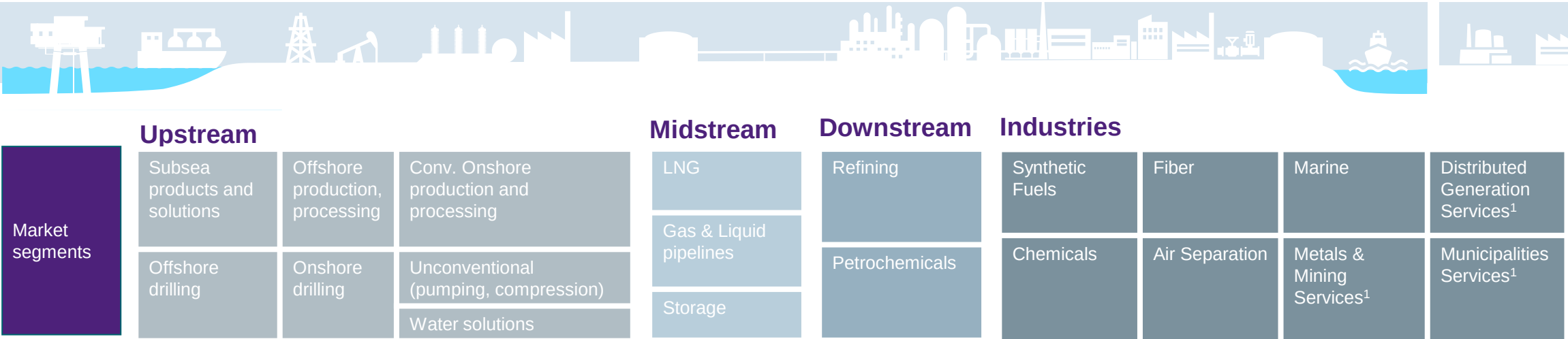
Where we compete

More customers are crossing all relevant segments of the energy market

Gas Services	Grid Technologies	Transformation of Industry	
Generation	Transmission	Independently Managed Businesses	
Utilities & Municipalities 	Transmission (TSO/DSO) 	Electrification, Automation & Digitalization (EAD) 	Sustainable Energy Systems (SES) 
Independent Power Producers 	Generation and Transmission 	Compression (CP) 	Industrial Steam Turbines & Generators (STG) 
Engineering, Procurement, Construction 	Industry / Infrastructure 		
Verticals 			

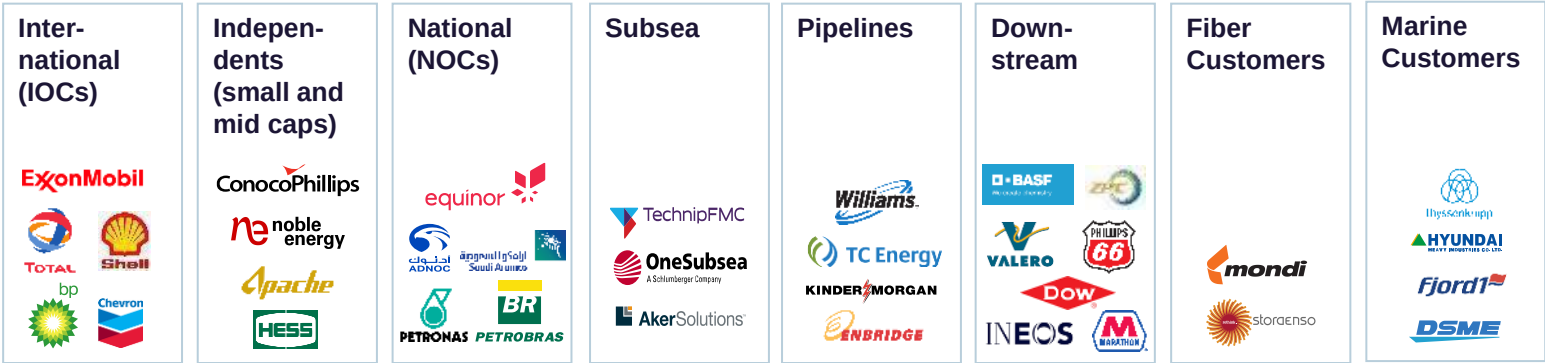
Industrial Applications

Creating value for customers across the energy value chain



Service

Customer segments and key customers



Addressing common customer needs

- Safe operations** supporting "zero harm"
- Reliable production** with high return on investment and capital efficiency
- Sustainable solutions** leading to lower carbon footprint
- Increased productivity** along entire value chain
- Reduced risk and operational complexity**

¹ Services: Delivers service for all portfolio elements described in the business mandate for Distributed Generation to industrial customers and IPPs/municipalities

First customer projects in North America demonstrate the implementation of SE's three strategic pillars



Green H2 Power Generation

- **H2 capable F-Class Peakers** complementing renewables
- Helping universities reaching their decarbonization targets & **DOE collaboration**



Green e-LNG Solution

- World's **lowest-emission LNG** facility utilizing hydro powering gas refrigeration for LNG
- **GHG emissions reductions** exceeding 80%, compared to fossil fuel to run LNG refrigeration systems



Green Diesel Refinery Conversion

- **Renewable diesel** to support California regulations on diesel fuel
- **Modernize & upgrade** facility and equipment



Grid Stabilization with ARESS*

- **Stabilize the grid** with reactive power, short circuit power and inertia
- Scope: asynchronous generator and **transmission equipment**



Gas Services

Share of Siemens Energy
total revenue¹

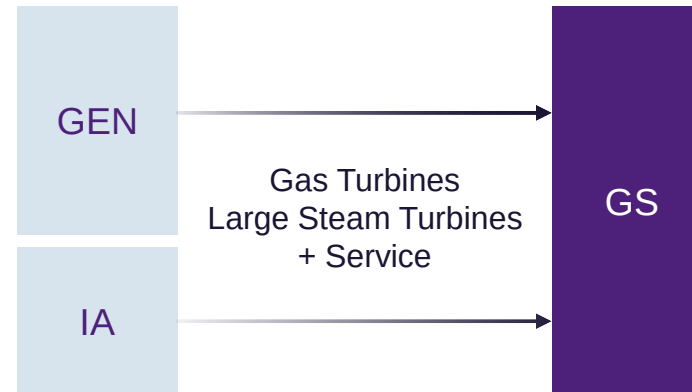


Revenue¹

€9.0bn

Monetize on installed base through service and decarbonization

What has changed
in the new group structure?



Business Drivers

- Decarbonization of power generation and district heating
- Service, Mods and Upgrades to increase efficiency and lower emissions
- Decentralization of energy infrastructure

Portfolio Elements

- Large and Industrial Gas Turbines from 4 – 600 MW
- Large Steam Turbines
- Large Generators
- Heat Pumps
- Modernization and Upgrades

¹ FY21 pro-forma restated figures reflecting new reporting structure, partially approximated. The pro-forma revenue numbers are rounded to the nearest 50 million and the profitability number to the nearest half percentage point.



> Gas Services

Low- or zero-emission power generation through service and decarbonization

In 2021, CO₂ emissions from electricity and heat production reached an all-time high of more than **14 gigatons**. If every coal-fired power plant were to switch to natural gas, CO₂ emissions could be cut **in half**.

Our offerings

- Low- or zero-emission power generation
 - All gas turbines under one roof: from 4 MW to 600 MW; steam turbines from 90 to 1,900 MW and generators from 25 to 1,300 MVA.
 - Highly efficient and low-emission gas turbines with higher ramp-rates enable compensation of fluctuating renewables.
 - Clean fuel burning capabilities for low to zero emissions and leading hydrogen co-firing capabilities: Up to 75% hydrogen co-firing capability today and 100% by 2030.
 - Decarbonization opportunities through service offerings, modernization and digitalization of the fleet.
- Decarbonization of heat generation with unique heat pump innovations in high temperature and high MW segment.

[Visit the website](#)

Siemens Hydrogen Gas Turbines for our sustainable future

The mission is to burn 100% hydrogen

Gas turbine model		Power Output ¹	H ₂ capabilities in vol. %	CO ₂ reduction ² [%]
50Hz	 SGT5-9000HL	595 MW	50	23%
	 SGT5-8000H	450 MW	30	11%
	 SGT5-4000F	329 MW	30	11%
	 SGT5-2000E	187 MW	30	11%
60Hz	 SGT6-9000HL	440 MW	50	23%
	 SGT6-8000H	310 MW	30	11%
	 SGT6-5000F	215 to 260 MW	30	11%
	 SGT6-2000E	117 MW	30	11%
50Hz or 60Hz	 SGT-800	48 to 62 MW	75	47%
	 SGT-750	40/34 to 41 MW	40	17%
	 SGT-700	33/34 MW	75	47%
	 SGT-A35	27 to 37/28 to 38 MW	15 100	5 / 100%
	 SGT-600	24/25 MW	75	47%
	 SGT-400	10 to 14/11 to 15 MW	10 65	3 / 36%
	 SGT-300	8/8 to 9 MW	30	11%
	 SGT-100	5/6 MW	30 65	11 / 36%
	 SGT-A05	4 to 6 MW	2 15	1 / 5%

 DLE burner
  WLE burner
  Diffusion burner with unabated NO_x emissions
 Heavy-duty gas turbines
  Industrial gas turbines
  Aeroderivative gas turbines

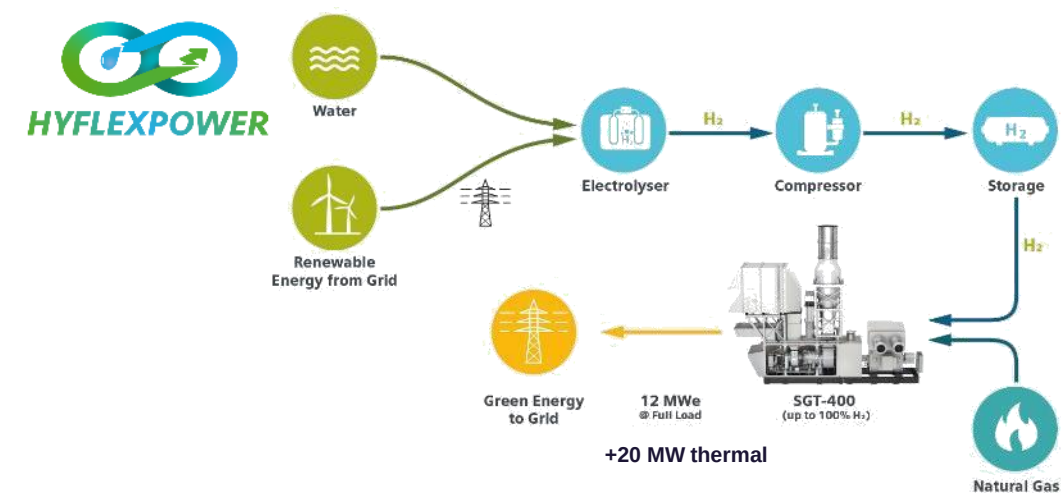
1 ISO, Base Load, Natural Gas; Version 5.1, May 2021 2 Compared with 100% natural gas operation

Values shown are indicative for new unit applications and depend on local conditions and requirements. **Capability to operate on 100% natural gas is maintained (full fuel flexibility).** Some operating restrictions/special hardware and package modifications may apply.

Higher H₂ contents to be discussed on a project specific basis

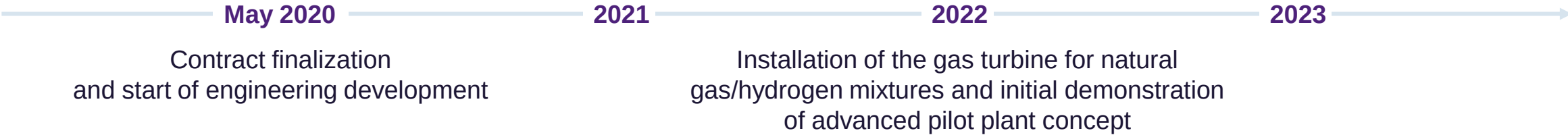


EU funded HYFLEXPOWER Project



Installation of the hydrogen production, storage and supply facility at pilot demonstration site

Pilot demonstration with up to 100 percent hydrogen for carbon-free energy production from stored excess renewable energy



Source: <http://www.hyflexpower.eu/>

Grid Technologies

Share of Siemens Energy
total revenue¹

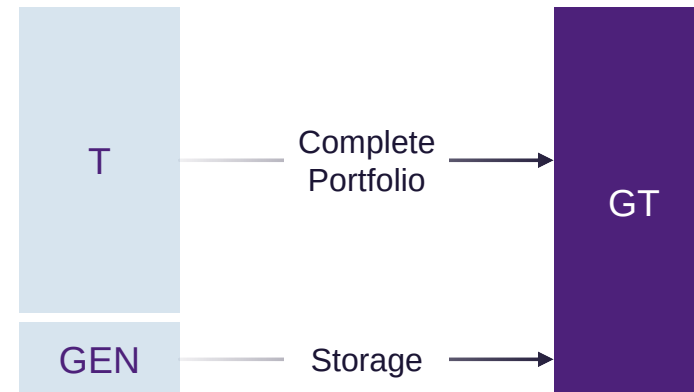


Revenue¹

€5.8bn

Leverage market leadership to benefit from accelerating investment

What has changed
in the new group structure?



Business Drivers

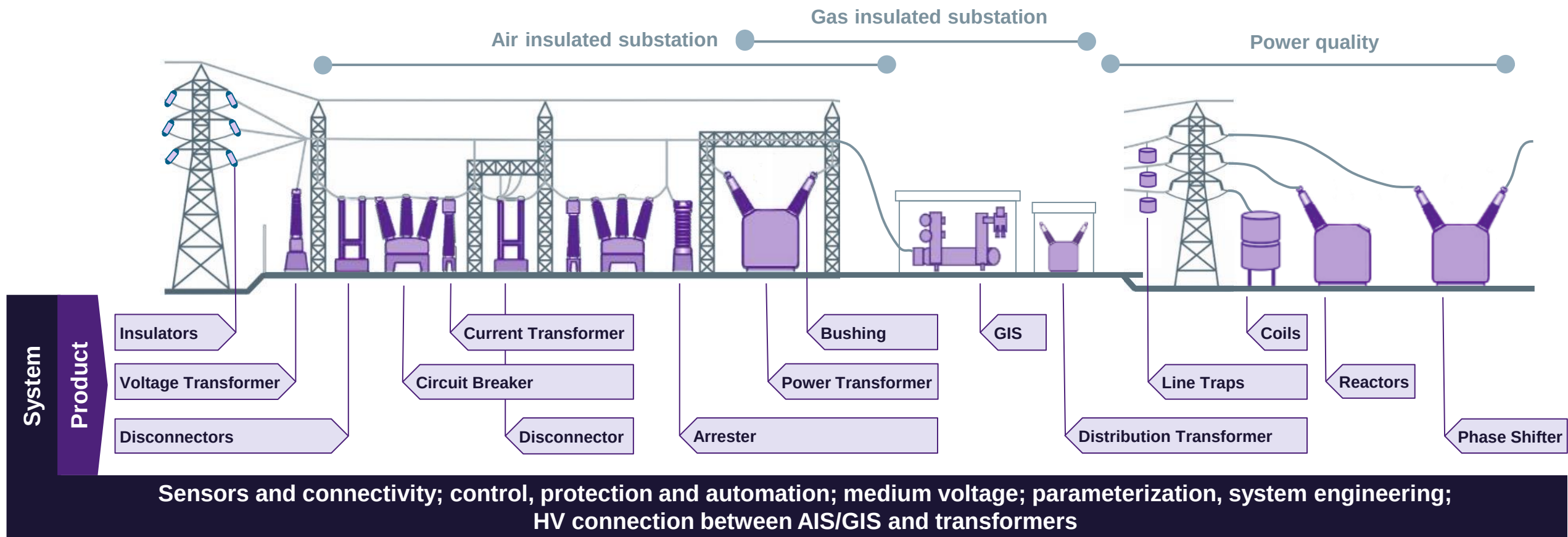
- Growing electricity demand
- Connection of increasing amount of renewable energy
- Modernization of aging transmission grid
- Grid reliability and resiliency in increasing network complexity

Portfolio Elements

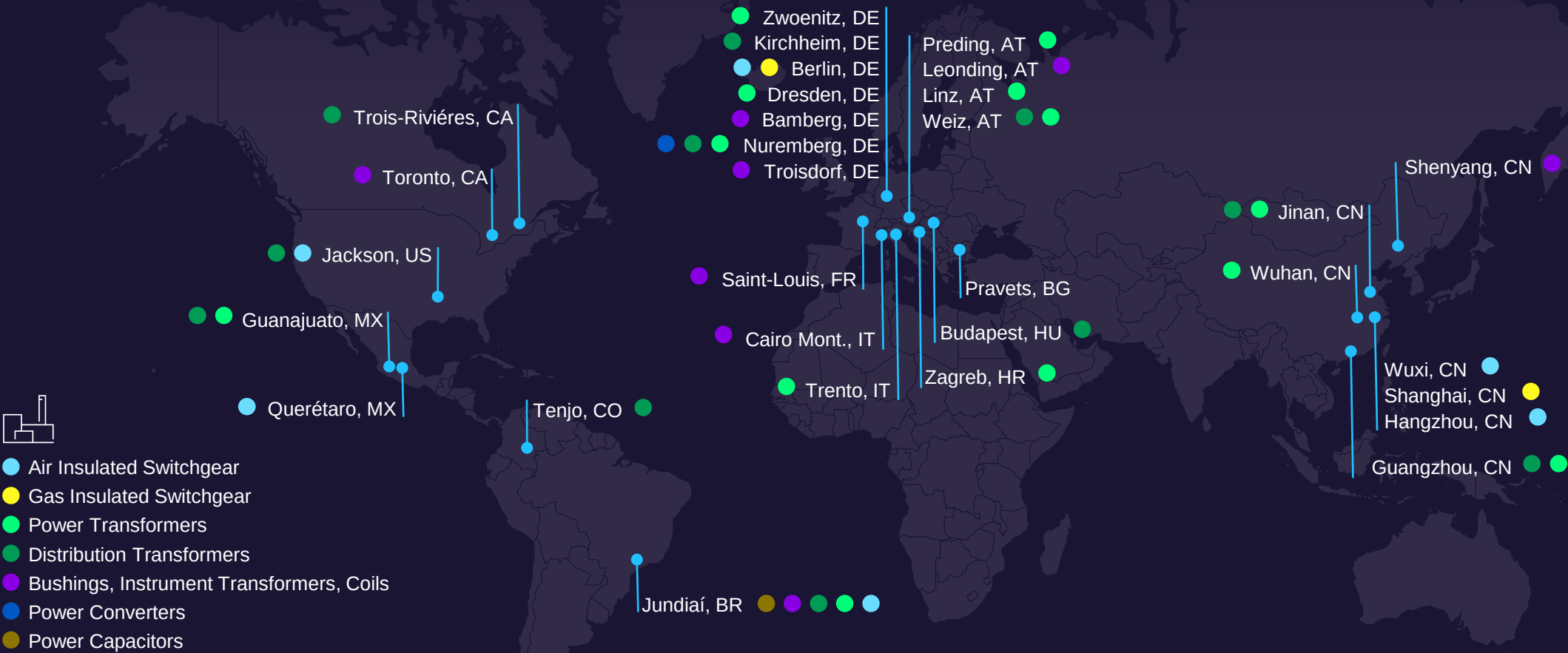
- HVDC transmission
- Grid Stabilization and Storage
- High voltage switchgears and transformers
- Grid automation & digitalization

¹ FY21 pro-forma restated figures reflecting new reporting structure, partially approximated. The pro-forma revenue numbers are rounded to the nearest 50 million and the profitability number to the nearest half percentage point.

Comprising all products of HV substations including their electrical integration to systems



The current Grid Technologies (GT) manufacturing footprint comprises 43 factories at 34 locations¹



¹ Toronto, Nuremberg and Guangzhou have two locations each

Embrace system complexity

Our portfolio



Grid access

Connecting offshore renewables to the grid and electrifying industrial offshore sites, thus making green energy available where it is really needed.



Frequency stabilizer

Supporting stability of the grid by compensating voltage and frequency fluctuations.



Prefabricated power solutions

Plug and play solutions ensuring maximum flexibility of design and utilization, excellent reliability, and a high return on investment.

Transmission in action

New York, U.S.

First offshore HVDC connection in U.S. to reduce transmission losses

- We will connect New York State's first utility-scale offshore wind farm to the grid.
- First offshore HVDC grid connection project in the U.S., deploying a technology that will reduce transmission losses over long distance.
- Green energy for nearly 600,000 homes in New York State.
- Sunrise Wind will support New York's goal of 100% clean electricity by 2040.



Transformation of Industry

Share of Siemens Energy total revenue¹

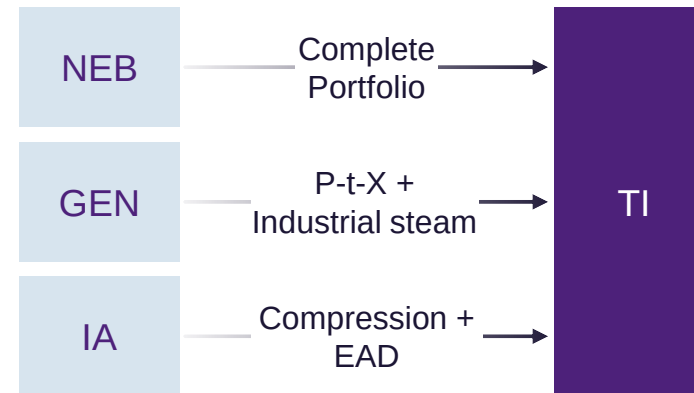


Revenue¹

€3.9bn

Decarbonize industrial sector through focus on hydrogen and EAD

What has changed in the new group structure?



Business Drivers

- Growing demand for green hydrogen and derivative fuels
- Increasing electrification and efficiency of industrial processes
- Optimization demand of heat & power processes incl. waste heat utilization
- Need for reliable production, transportation and processing of gas and fuels

Portfolio Elements

- Hydrogen electrolyzer systems and Power-to-X solutions
- Integrated EAD solutions and services
- Industrial steam turbines and generators
- Turbo & Recip compressors and service; compression systems

¹ FY21 pro-forma restated figures reflecting new reporting structure, partially approximated. The pro-forma revenue numbers are rounded to the nearest 50 million and the profitability number to the nearest half percentage point.

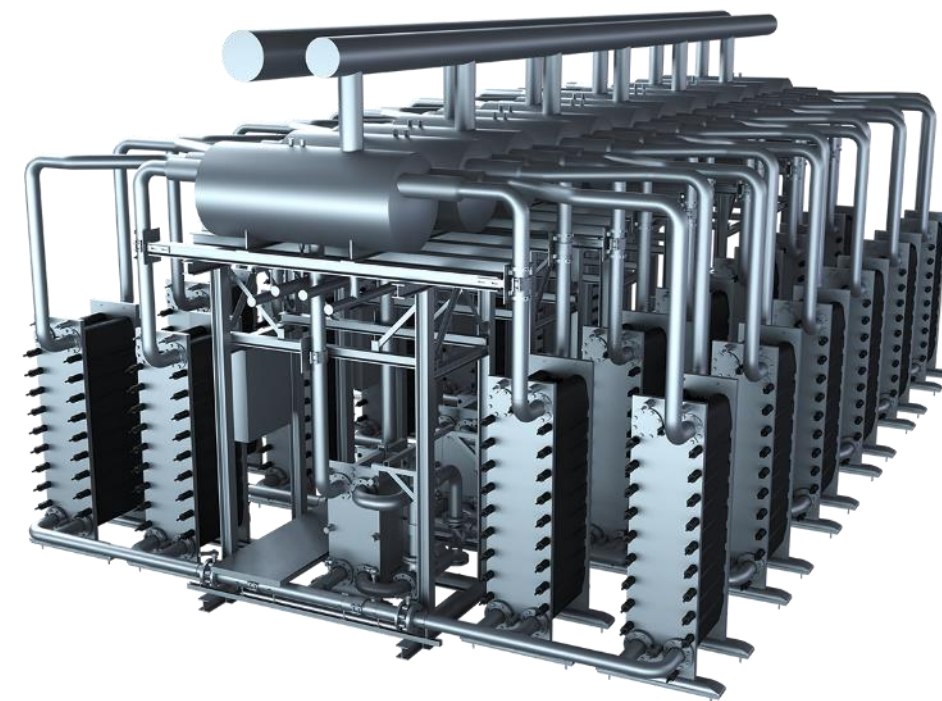
Silyzer 300

Fact Sheet

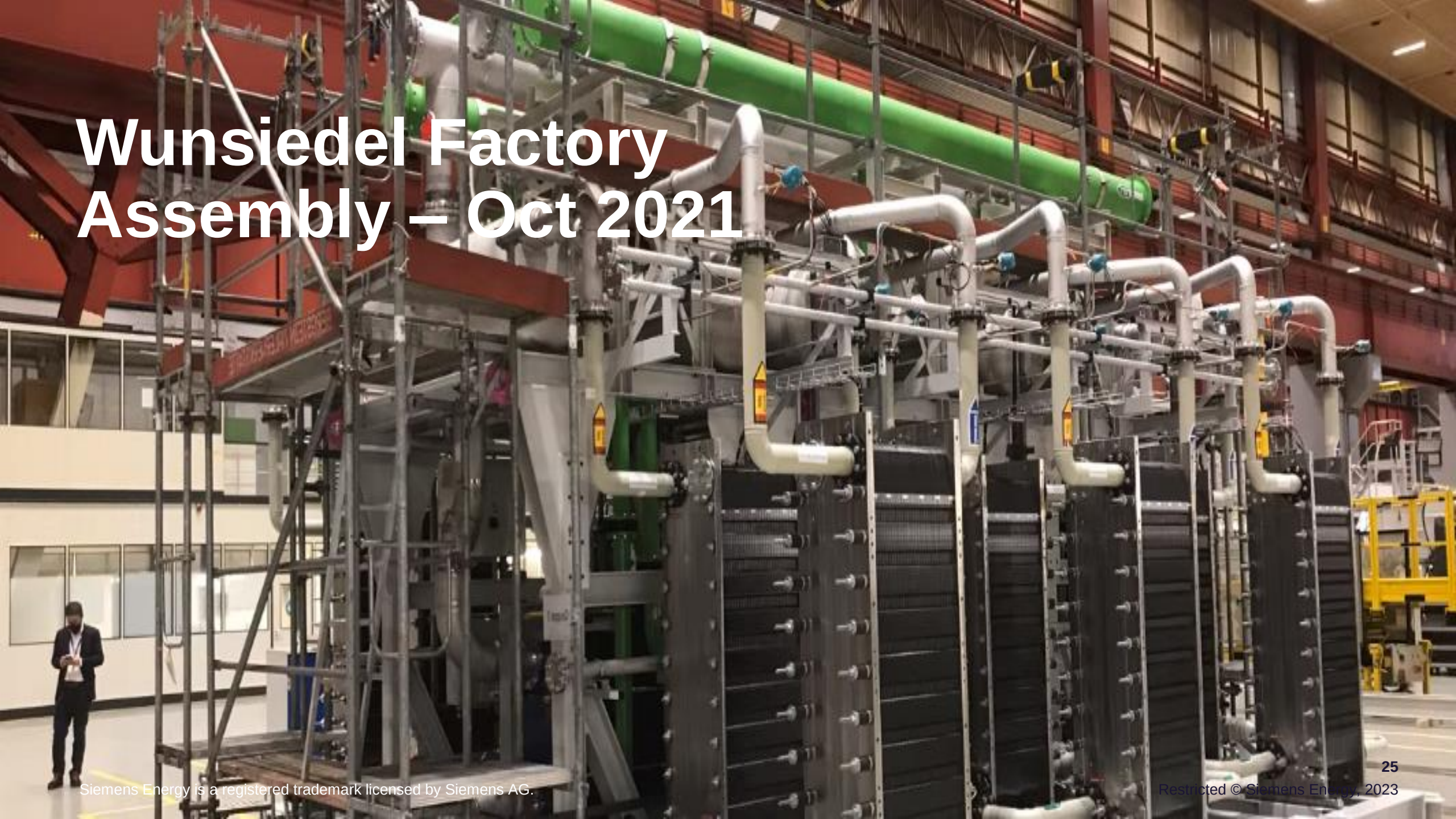
	Hydrogen production	335 kg/h
	Plant efficiency (HHV¹)	>75.5%
	Power demand	17.5 MW
	Start-up time	<1 min, enabled for PFRS ²
	Dynamics in range	10%/s in 0 – 100%
	Minimal load	20% single module
	Dimension full Mod. Array	15.0 x 7.5 x 3.7 m
	Module design lifetime	Optimized for 80 kOH ⁴
	Plant availability	~95%
	Demin water consumption	10 l/kg H ₂
	Dry gas quality³	99.9999%
	Delivery pressure	Customized

1 Plant efficiency includes rectifier, transformer, transformer cooling and gas cooling

2 Primary Frequency Response Service | **3** With DeOxo | **4** Operating Hours



Wunsiedel Factory Assembly – Oct 2021



Service for complete application over the entire life cycle

Concept and programs to be developed



Silyzer core

- NEB SV

Maintenance and service
on Silyzer
Silyzer modules and
system
Gas analytics system



EAD

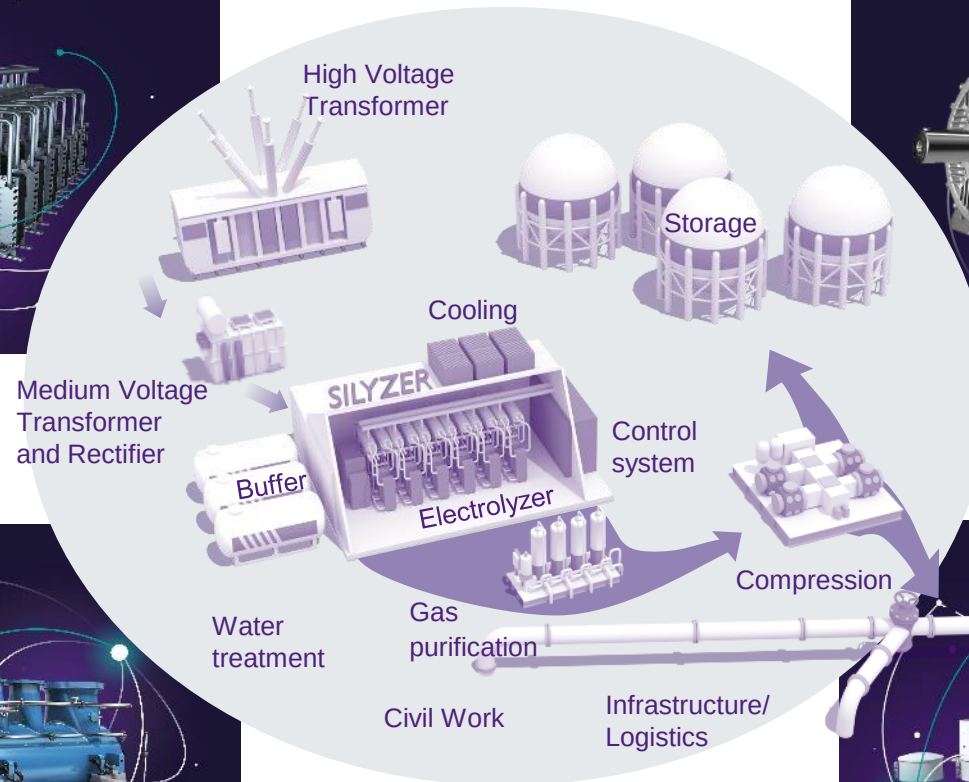
- I SO

Maintenance and service
on electrical, I&C as well as
digital enabled services
Compressor motor and
drive system (PR)
Transformers and rectifier

Compressor

- I SV

Maintenance and service
on compressor and
auxiliary systems

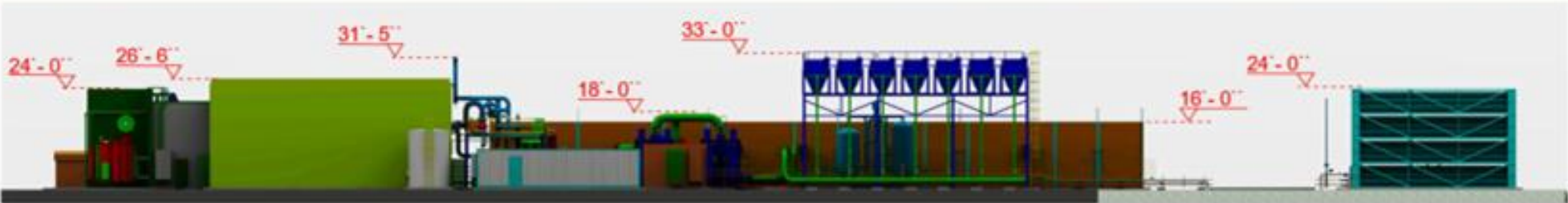
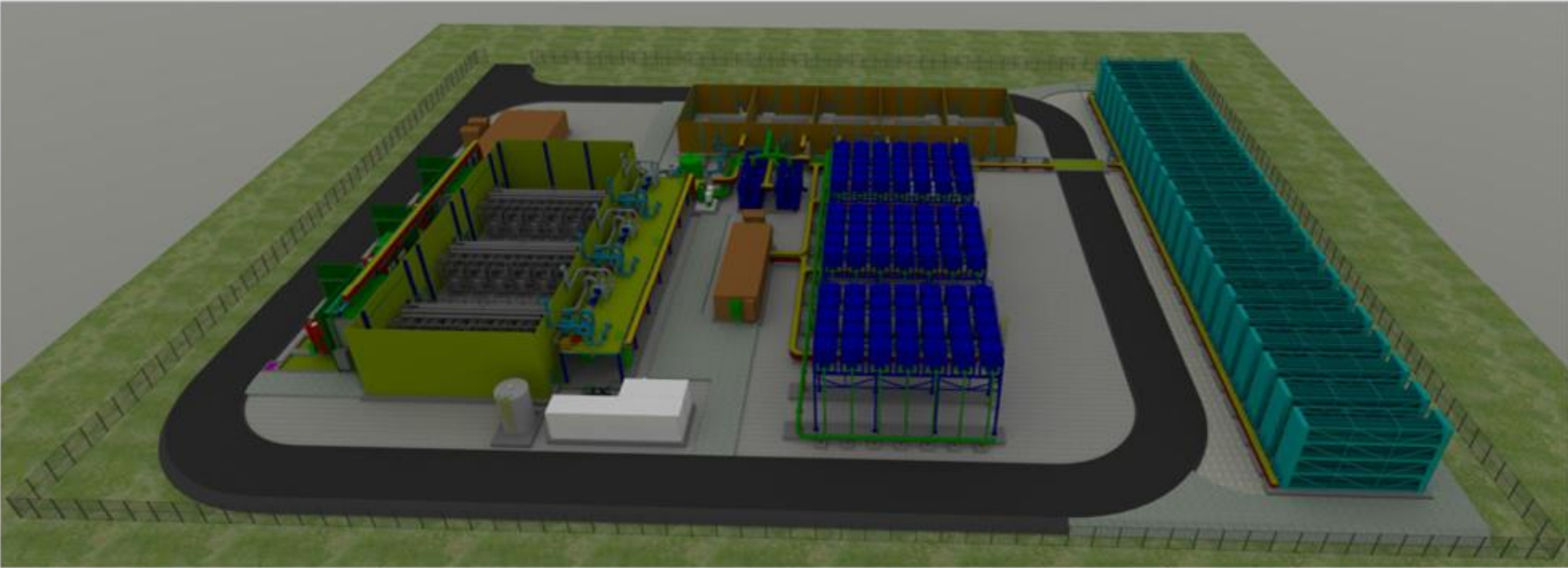


BOP

- I SO

Maintenance and
service on BoP Systems

Example of Customizable Production Island Solution: Non-Phased 3 x S300, Air-Cooled with optional HP compression and optional modular storage





6 MW

Power demand based
on Silyzer 300

1,200 Nm³

of green hydrogen per hour



H₂FUTURE

A European Flagship project for
generation and use of green hydrogen

Project

- Partner: VERBUND (coordination), voestalpine, Austrian Power Grid (APG), TNO, K1-MET
- Country: Austria
- Installed: 2019
- Product: Silyzer 300

Challenge

- Potential for “breakthrough” steelmaking technologies which replace carbon by green hydrogen as basis for further upscaling to industrial dimensions
- Installation and integration into an existing coke oven gas pipeline at the steel plant
- High electrolysis system efficiency of 80%

Use cases



Hydrogen for the steel making process



Supply grid services

Solutions

- Operation of a 12-module array Silyzer 300
- Highly dynamic power consumption – enabling grid services
- State-of-the-art process control technology based on SIMATIC PCS 7



This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 735503. This Joint Undertaking receives support from the European Union's Horizon 2020 research and innovative programme and Hydrogen Europe and NERGHY

Producing green fuel from wind and water

Punta Arenas

Chile

- The first commercial facility to produce climate-neutral fuels is currently under construction in the Magallanes province.
- Electrolyzers from Siemens Energy will produce CO₂-neutral fuel using low-cost green wind power.
- Production will be increased to more than 550 million liters of e-fuels annually by the middle of the decade.
- Synthetic fuels emit 90% less CO₂ than fossil fuels and can make a key contribution to the decarbonization of transportation.
- In addition to Siemens Energy, Porsche and HIF (project lead), Enel, ExxonMobil, Gasco and ENAP are participating in the Haru Oni project.

➤ Learn more

Siemens Energy is a registered trademark licensed by Siemens AG.



Siemens Gamesa Renewable Energy

Share of Siemens Energy
total revenue¹



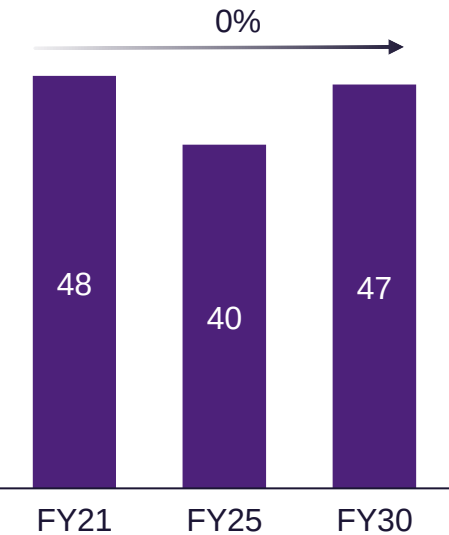
Revenue¹

€10.2bn

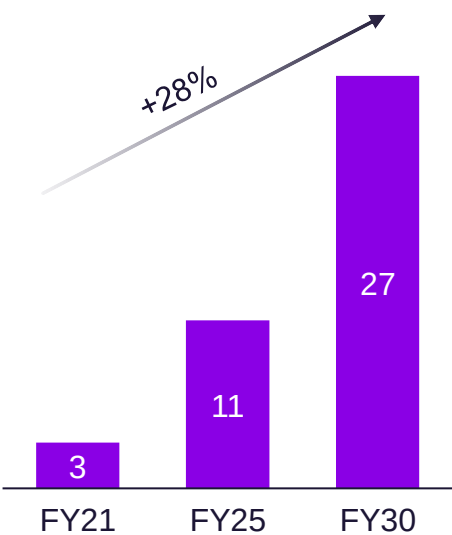
Secure turnaround

Wind market shows exceptional future growth

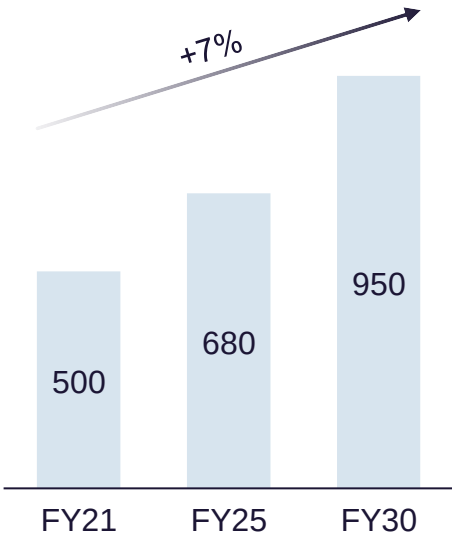
Annual global onshore wind
installations² (GW, excl. China)



Annual global offshore
installations² (GW, excl. China)



Global installed capacity
in wind³ (GW, excl. China)



¹ FY21 | ² BloombergNEF, 2H 2021 Global Wind Market Outlook; excl. China | ³ BloombergNEF, Wind Cumulative Installed Capacity and Forecast by Country (2022); excl. China

A leading position along the entire spectrum of wind

Wind energy will provide up to **20%** of the world's electricity **by 2030**.¹

Our offerings

- Leading supplier of wind turbine technology and service solutions for onshore and offshore wind.
- Versatile product portfolio, covering a wide range of customer requirements and wind conditions. Output: Up to 15 MW offshore and 7 MW onshore.
- Siemens Gamesa turbines generate more than 127 GW of wind power all over the world – enough clean energy to power 117 million households.
- 335 million tons of CO₂ are avoided each year through installed wind turbines from Siemens Gamesa, compared to fossil fuel power generation.
- Service provided for more than 82 GW of installed capacity – on site or through digital and remote solutions.

¹ Source: Global Wind Energy Council

✦ [Visit the website](#)

Key SFS Contacts into Siemens Energy (SE Treasury & Corporate Finance, Project & Export Finance) In the Americas



SE TCF Projects and Regions/Project & Export Finance



Tobias Behringer – Global Head
+49 9131 17 36767
tobias.behringer@siemens-energy.com

SE TCF PR AM



Jeffrey Cain – Head of Americas
+1 (732) 590-2580
jeffrey.cain@siemens-energy.com

USA / Canada



John Beltran Velasquez
+1 (407) 736-3768
john.beltran_velasquez@siemens-energy.com



Jacobus Vlok*
+1 (832) 3148452
jacobus.vlok@siemens-energy.com
First point of contact for,
EDC Canada

Brazil



Manuel Carlos Celestino Blesa
+55 11 3908-1663
manuel.blesa@siemens-energy.com



Leandro De Jesus Furquim
leandrofurquim@siemens-energy.com

Colombia



Diana Patricia Garcia Abella
+57 (1) 2942402
diana.garcia@siemens-energy.com

Mexico



Humberto Arturo Olvera Flores
+52 (555) 329-5498
humberto.olvera@siemens-energy.com

Thank You!



Dave Inman/ Power Systems Development

P: +1 (781) 856-2521

E: dave.inman@siemens-energy.com

<https://www.siemens-energy.com/global/en/offerings/renewable-energy/hydrogen-solutions.html>