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Fostering a Smarter Energy Transition - From Cleaner Hydrocarbons to Cost-Competitive Carbon-free Energy

Patrice Laporte | Siemens Oil & Gas

DHL Energy Conference

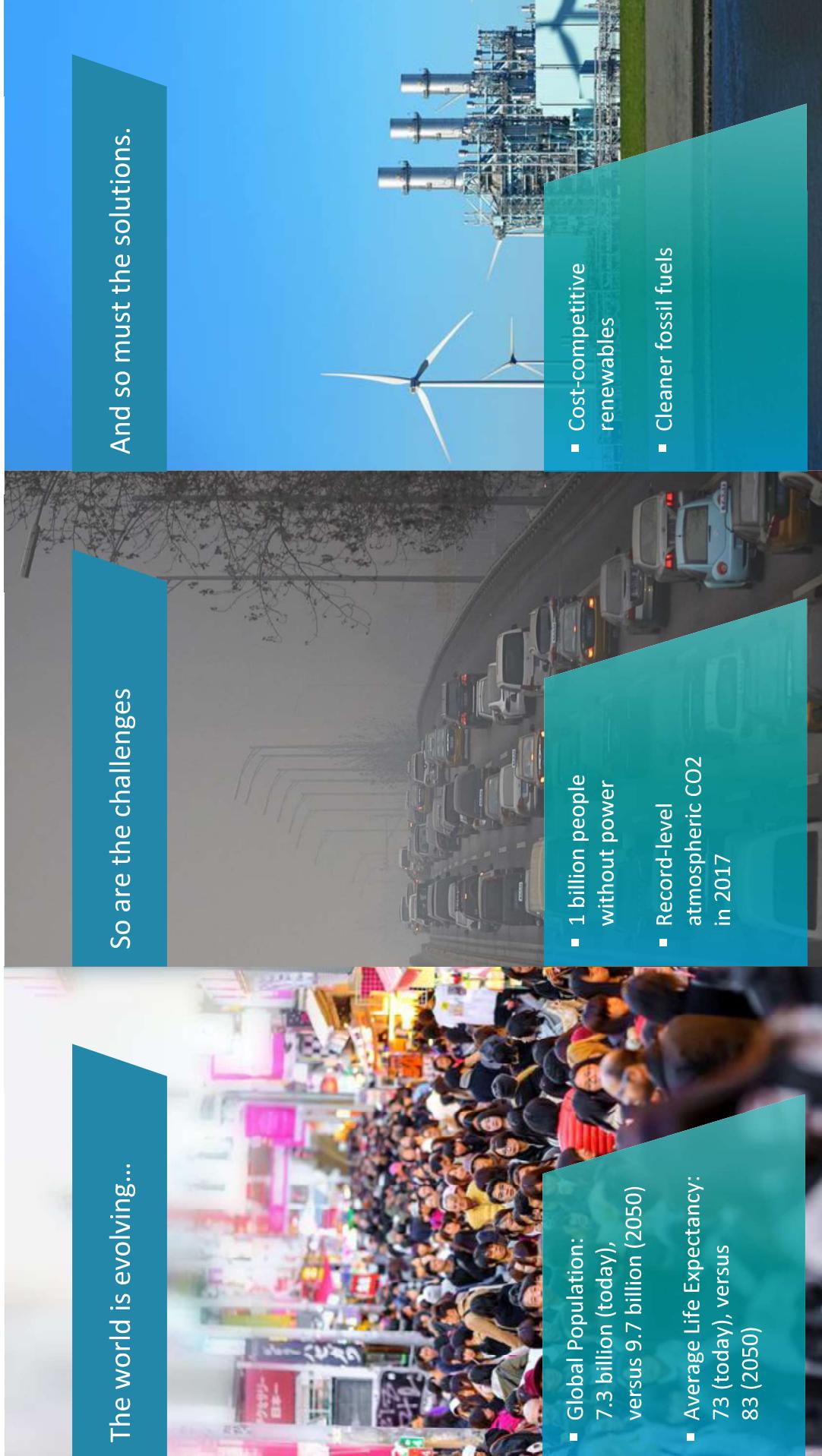
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The world is evolving...

So are the challenges

And so must the solutions.



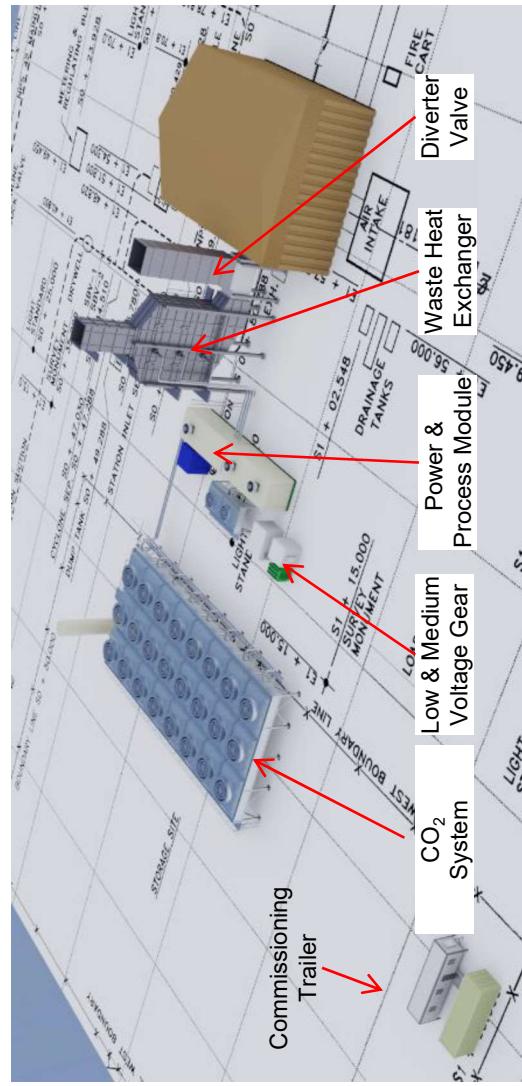
Energy Mix of the Future: Fossil Fuels and Renewables

It's about coexistence, not competition

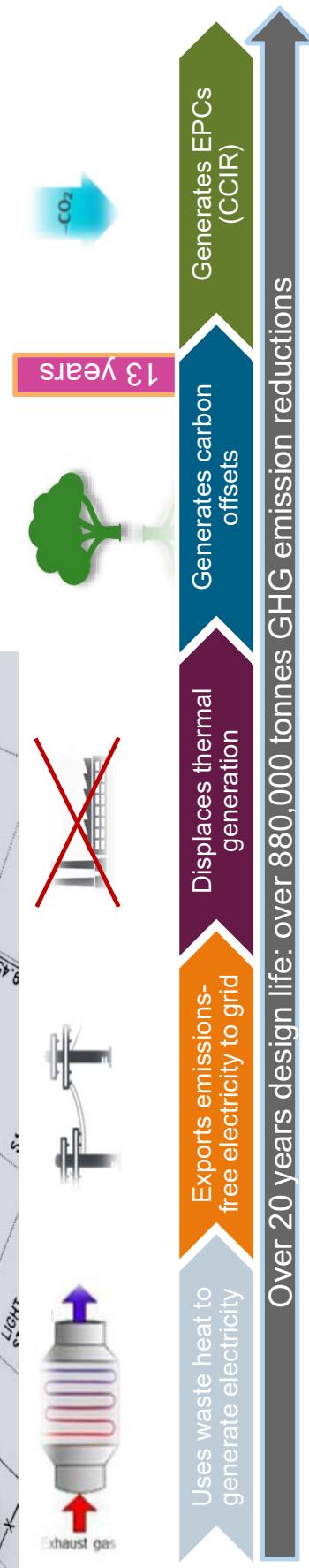
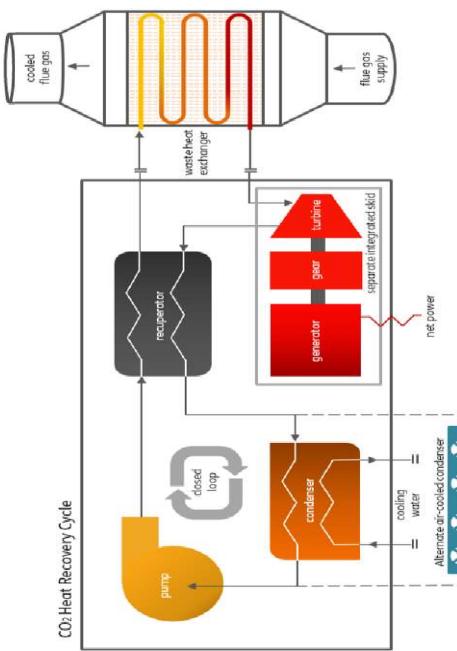
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Supercritical CO₂ Pilot Project in Canada – The Echogen solution



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Electrification of Shale O&G

Pressure Pumping Applications

Incumbent – Frac
1.0

Crew

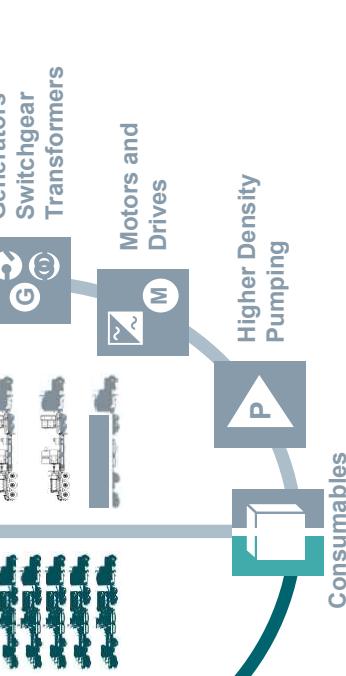


- Digital Layer
 - Cloud and edge analytics
 - Automation

Fleet



Transmission



Pump (2k HHP)

Higher Density Pumping

Consumables

Higher Density Pumping

Consumables

Pollution emissions to air



Traffic pressure

Noise levels

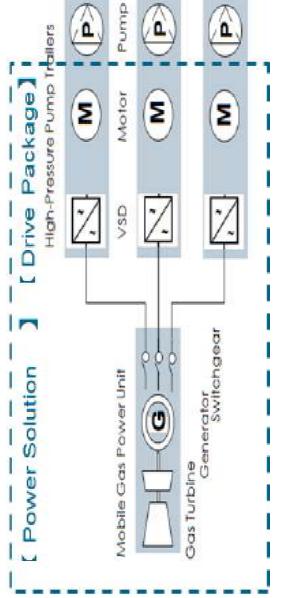


Environmental Metrics

Energy efficiency



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Fulcrum BioEnergy Inc., Abengoa, USA



Customer



Fulcrum BioEnergy Inc.

Location



Washoe County, Nevada,
USA



Project

- Production of biofuels from municipal solid waste in a biogas plant near Reno, Nevada
- Compression of synthesis and recycle gas

Scope

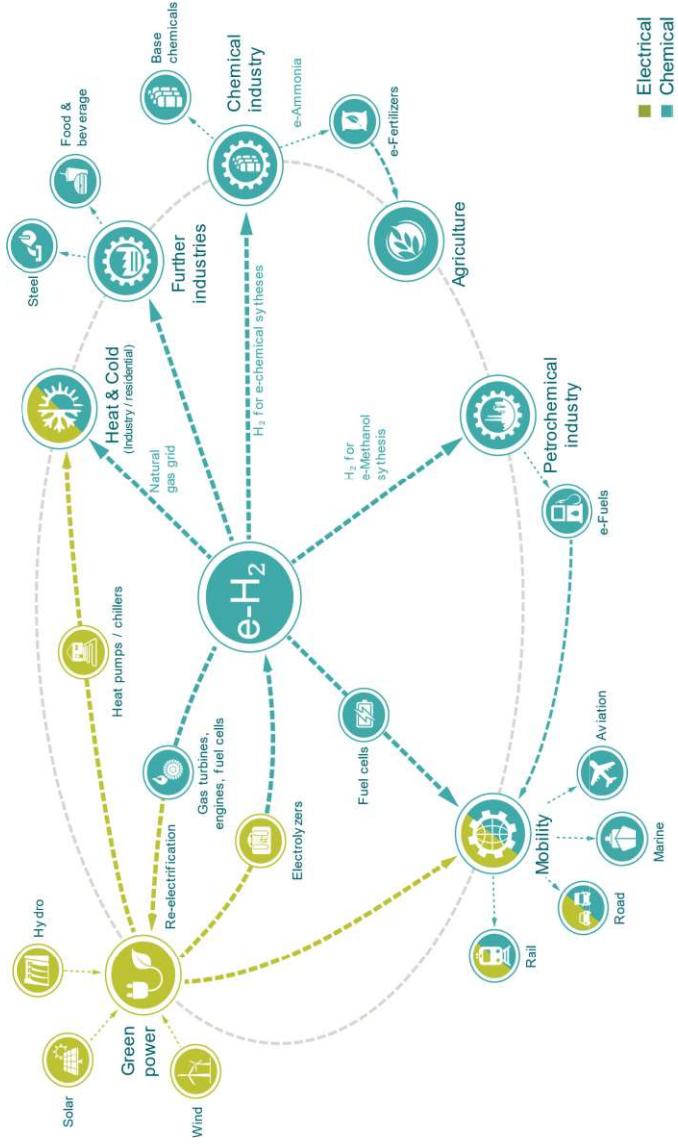
- Compressor train: Three DATUM centrifugal compressors driven by a steam turbine SST-150
- Compressors to be manufactured in Olean
- Steam turbine to be manufactured in Huludao
- Train to be packaged and tested in Olean
- Balance of plant incl. coolers, filters and valves

Key process factors

- High efficient compressor technology
- Minimal downtime

'Sector Coupling' is the key lever for deep decarbonization of all end-user sectors

Sector Coupling and Power-to-X landscape



Sector Coupling

Definition

- Link between power sector and energy-consuming sectors (industry, mobility, residential, etc.)
- Crucial to reach deep decarbonization of the energy sector (-80 ... 95%)

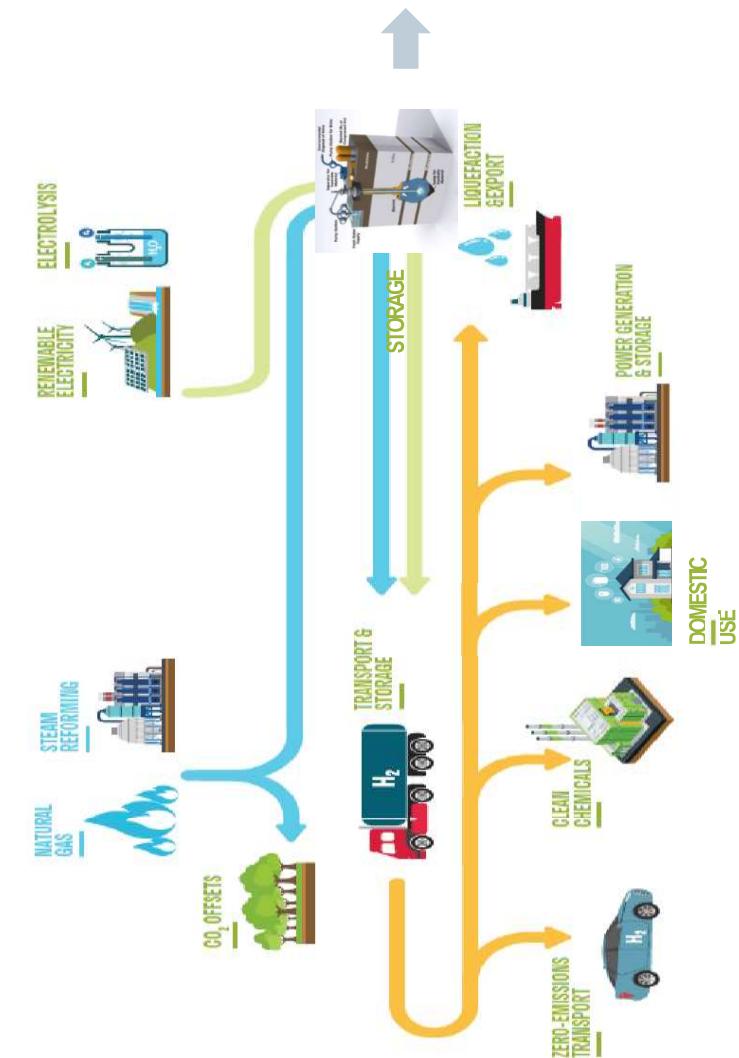
Value Proposition

- Higher overall energy efficiency
- Supports supply/load balancing in case of high share of intermittent renewable generation
- More diverse and interdependent energy supply

Drivers

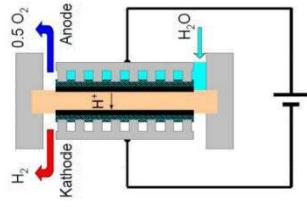
- Reduction of GHG emissions
- Energy efficiency improvement
- Reduction of energy import dependency
- Integration of volatile Renewables
- Technology development (e.g. e-mobility, battery, electrolyzer, synthetic fuels)

Hydrogen will be provided as "green" H₂ produced from renewables and as "blue" H₂ produced from natural gas



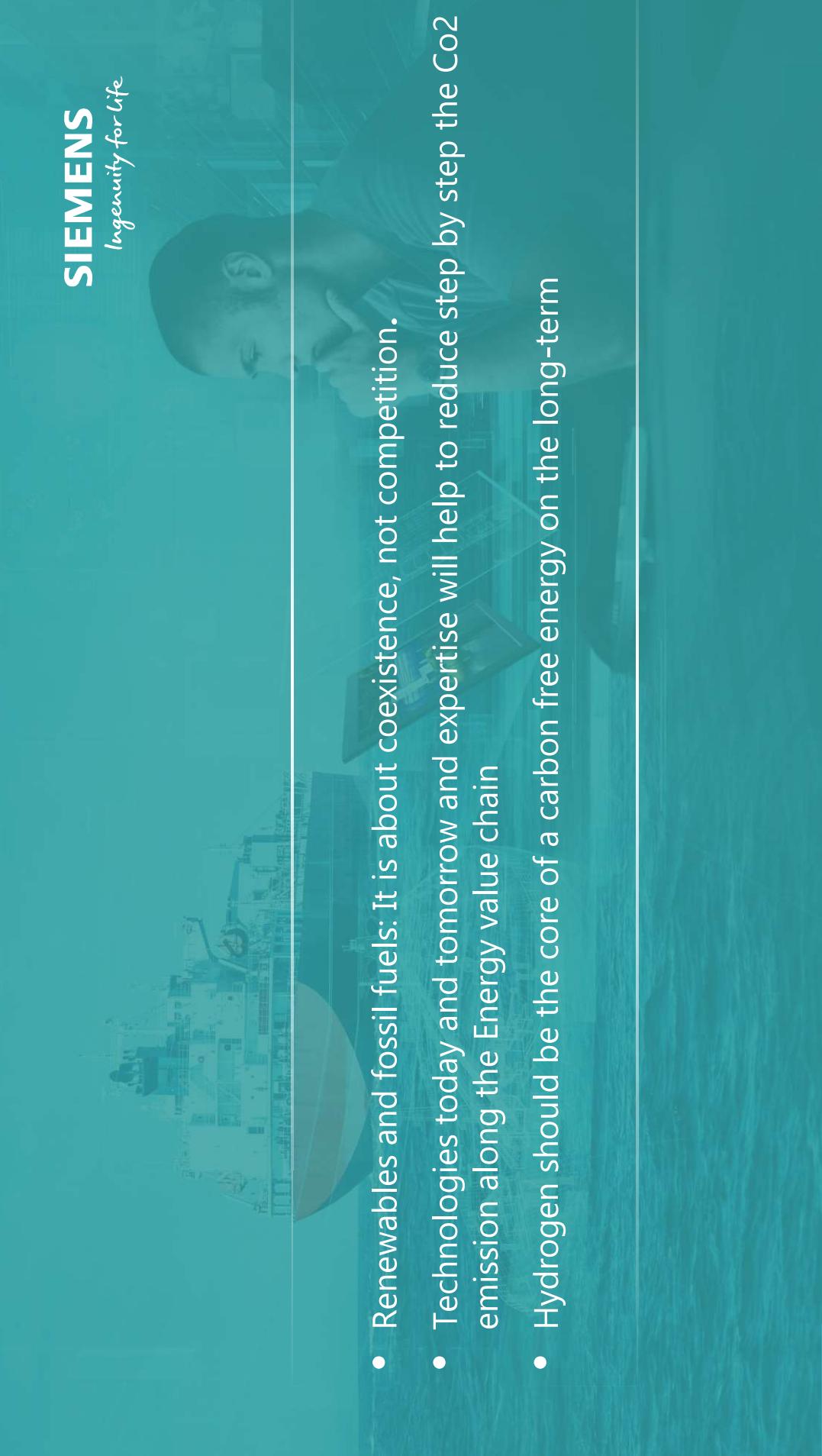
PEM¹⁾ electrolysis (Siemens focus)

Electrolysis of water in a cell equipped with a solid polymer electrolyte that is responsible for the conduction of protons, separation of product gases, and electrical insulation of the electrodes.



- Larger power density (+)
- Faster start-up (+)
- No chemicals or impurities (+)
- Costly platinum based electro catalysts (-)

Player: NEL, Hydrogenics, Giner ELX, H-TEC



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- Renewables and fossil fuels: It is about coexistence, not competition.
- Technologies today and tomorrow and expertise will help to reduce step by step the Co2 emission along the Energy value chain
- Hydrogen should be the core of a carbon free energy on the long-term

[Contact page](#)



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