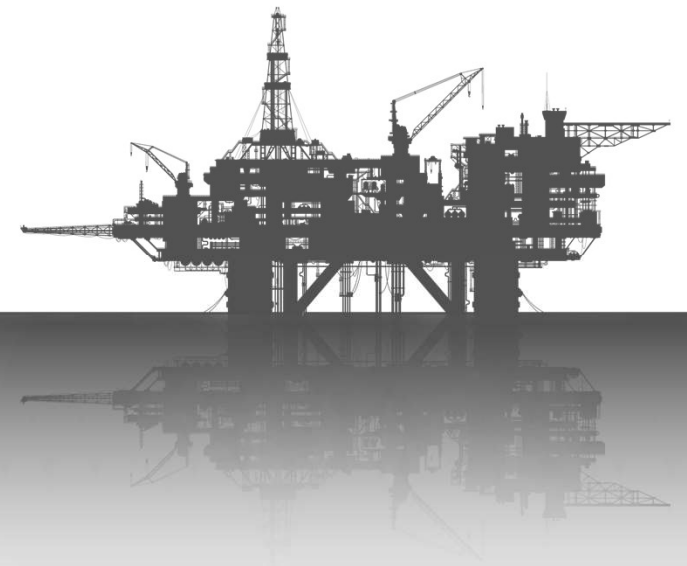


ENERGY TRANSITION MARKETS

- Geothermal Energy Recovery – Pump Systems
- High Pressure Skid-Based Hydrogen Solutions
- High Pressure CO₂ Injection
- Marine Propulsion Green Fuel Injection
- Power-to-X Pump Systems (P2X)



Geothermal Energy Recovery – Pump Systems

Experience:

- Designed, built and tested pump units for closed loop, downhole heat exchanger system for a geothermal heating units. An image of this unit is shown below.

Achievable duty points

- 4,000 bar & flow rates of 3,500 m³/hr

Design:

- PED compliant
- ATEX zone 1 & 2 compliant
- Material suitability
- Life cycle cost & low life time operating cost
- Containerized or modular solutions



High Pressure Skid-Based Hydrogen Solutions

Applications:

- hydrogen PEM electrolyzer
- hydrogen fuel cell

Typical pressures for application:

- 350 bar
- 700 bar

Design:

- PED compliant
- ATEX zone 1 & 2 & NORSOK compliant
- Material suitability
- Life cycle cost & low life time operating cost
- Containerized or modular solutions



High Pressure CO₂ Injection

Experience:

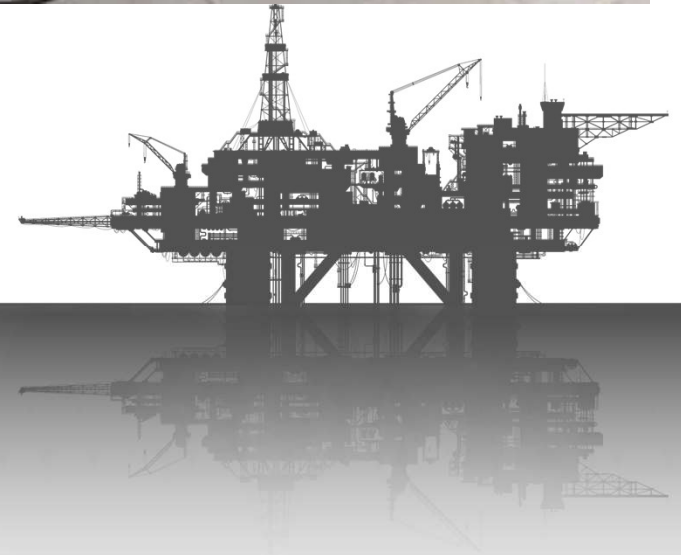
- Similar to our cuttings re-injection, produced water, MEG/Methanol and chemical injection packages
- Continuous duty at high flow and pressure

Typical duty points & conditions for application:

- 350 bar
- 150 m³/hr
- Liquefied media (integral heaters to maintain)

Design:

- PED compliant
- ATEX zone 1 & 2 & NORSOK compliant
- Material suitability
- Life cycle cost & low life time operating cost
- Containerized or modular solutions



Marine Propulsion Green Fuel Injection

Application & Experience:

- 20 + years experience delivering methanol, ethanol and ammonia injection packages to the offshore sector, also current contracts and installations in marine propulsion
- Fuel injection for marine combustion engines & dual-fuel engines

Typical duty points & conditions for application:

- 600 Bar and flows of 50lpm
- High efficiency pumping (95% efficient)

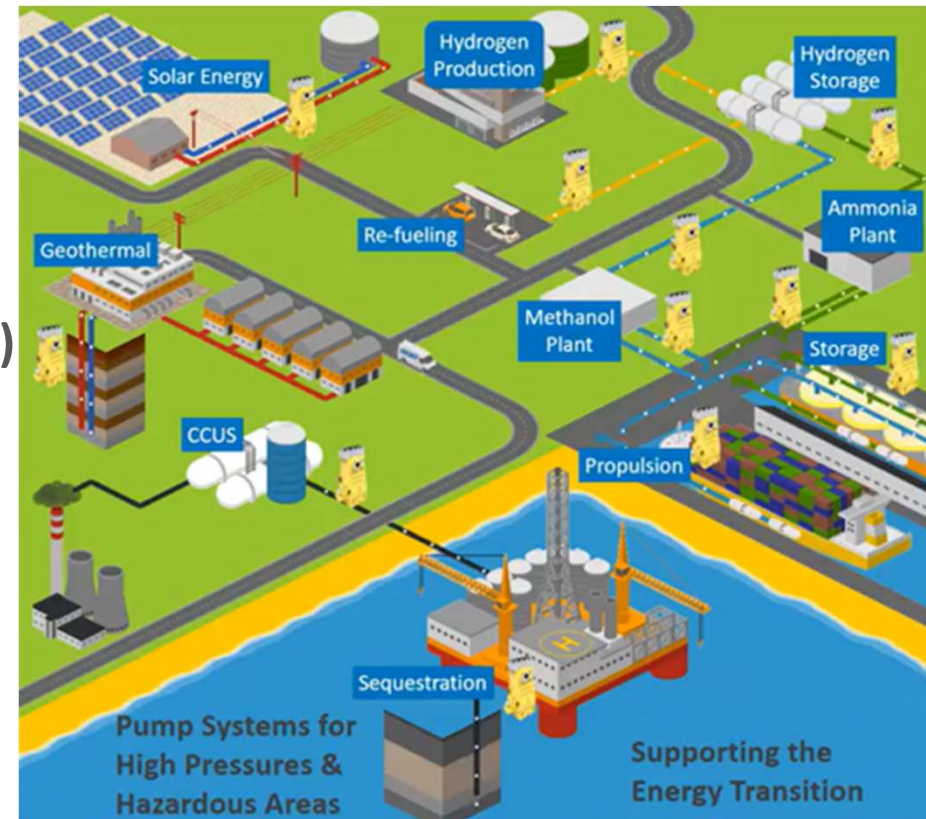
Design:

- PED compliant
- ATEX zone 1 & 2 & NORSOK compliant
- Material suitability & Life cycle cost & low life time operating cost
- Containerized or modular solutions
- Zero emission pump design (no emissions in any operating condition)



Power-to-X Pump Systems (P2X)

- Electrolysis
- Hydrogen Compression and Storage
- Methanation (Power-to-Gas)
- Synthetic Fuel Production (Power-to-Liquid)
- Carbon Capture and Utilization (CCU)
- Transport and Distribution
- Reaction Kinetics and Efficiency
- Safety and Containment



For more information on these subjects visit:
<https://www.calderltd.com/applications/energy-transition/power-to-x-pump-systems-p2x/>

