Compact Carbon Capture
A process intensification technology

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Compact Carbon Capture - A Baker Hughes Venture

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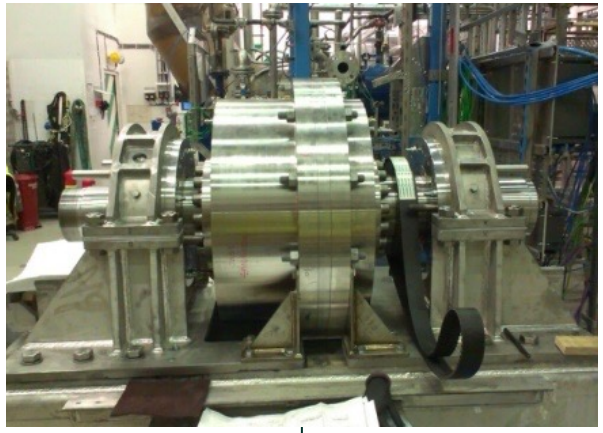
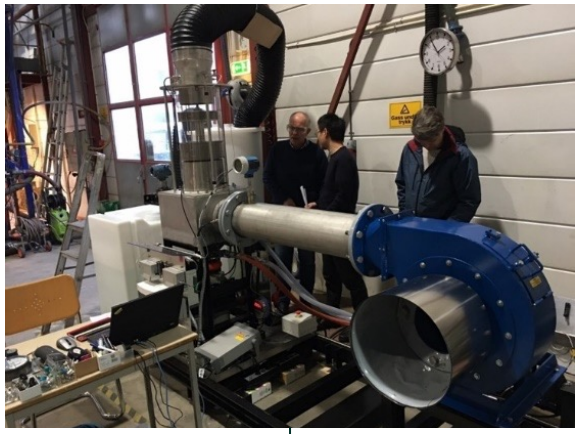
Journey of Compact Carbon Capture Development





2008 – 2010

RDW 1.0
First rotating Desorber wheel concept

2012 – 2014

New **RDW 2.0** conceptual design
Built and validated in tests

2016 – 2018

CFA
Development of **C**ross **F**low **A**bsorber with RPBs

2017 – 2021

TRL5
Pilot plant
5 TPD
validated:
integrated unit
CFA + RDW 2.0

2022 – 2024

Demo Plant
15 TPD
EPC on going

2024+

TRL 7 - 15 TPD
Demo tests on industrial flue gas & Commercial phase

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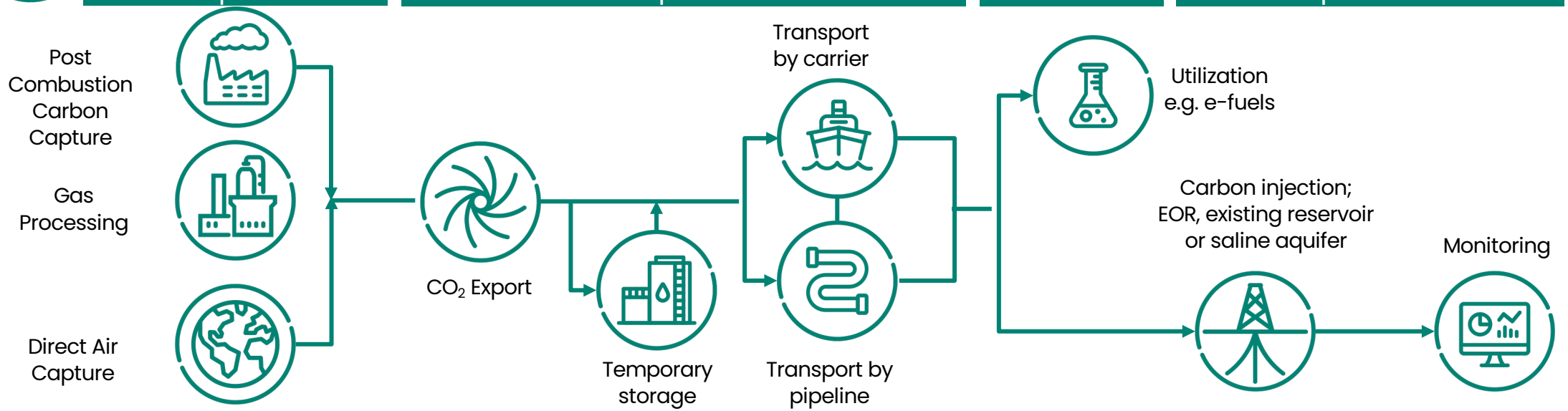
Baker Hughes positioning in the CCUS value chain

CCUS VALUE CHAIN

Digital platform and services, asset performance & inspection, emission management

Consulting services: GaffneyCline, ioConsulting

Capture	Transportation	Utilization	Sequestration



BH PLAY

Post-Combustion, DAC	Measurement and sensing	Compression, pumping	Liquefaction	Flexible, non-metallic pipes	Digital solutions	Carbon utilization	Drilling, completions, chemicals	Lifetime monitoring	Reservoir intelligence

SRI International · Compact Carbon Capture · ICS · mosaic · Electrochaea

Broad portfolio of technologies & expertise derived from core O&G business and inorganic investments in innovative technologies across all or parts of the CCUS value chain

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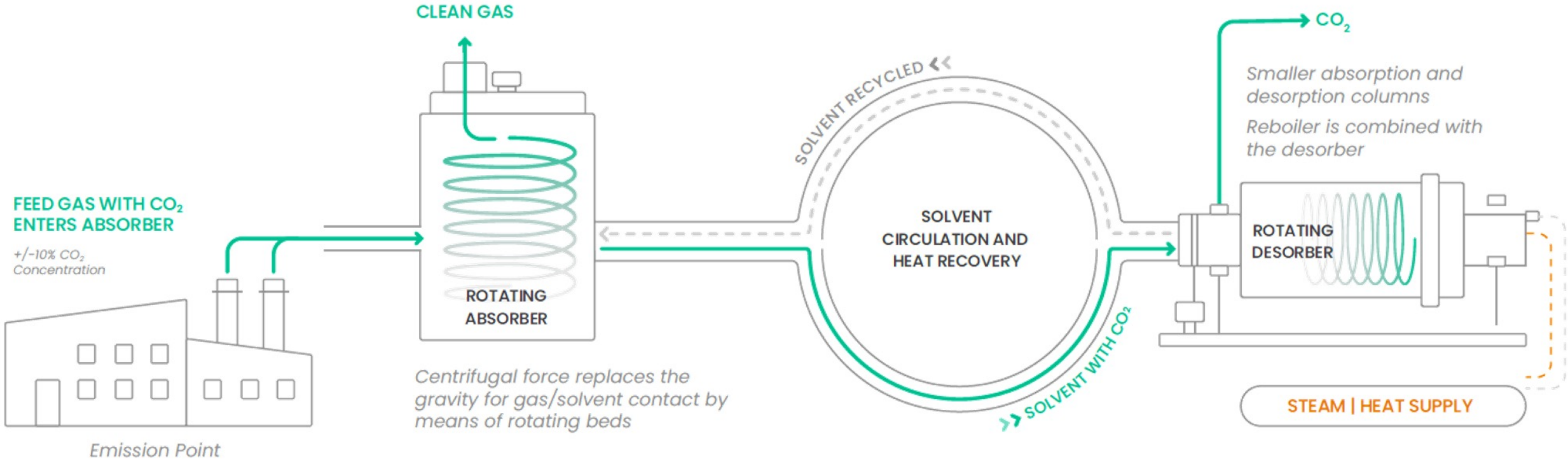
Compact Carbon Capture (CCC) Focuses on Process Intensification

- Novel designs of the absorber and the desorber with rotating packed bed technology
- Increased vapor-liquid contact and surface renewal for enhanced mass transfer with reduced residence time
- Absorption and desorption columns are substantially smaller than traditional ones



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Value Propositions

- Minimum 95% CO2 capture rate for a flue with 10% CO2 concentration
- Up to 50% reduction in CAPEX compared to the conventional CO_2 capture plants
- High size reduction compared to the conventional CO_2 capture plants
- Reduction of operating expenses by lower solvents inventory
- Lower electricity consumption for compression as CO2 is regenerated at higher pressure

CCC Pilot Plant Main Features

- Installed at Equinor's Research Centre in Norway
- Nominal flowrate: 5 ton per day
- Feed gas: Air with CO_2
- Can test different solvents
- Two operating modes: batch & integrated
- Fully instrumented
- Control room operation
- Lab analysis facilities on site
- Environmental monitoring

Image provided courtesy of Equinor

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CCC Pilot Plant : TRL 5 Main Results

- Successful 100-hours continuous closed loop test
- Feed CO_2 concentration: 4-10 %
- CO_2 capture achieved: Up to 95 %
- Promising energy numbers in stripping
- Stable and acceptable MEA emissions
- Demonstrated stable operation and mechanical functionality
- Controlled and low emissions'
- Carried out parametric study tests and obtained data for numerical model validations

Image provided courtesy of Equinor

CCC Main Take Aways

- CCC is a promising technology for Carbon Capture focused on process intensification
- More than 15 years of experience developing Rotating Packing Beds for Carbon Capture
- Developed to be compact with smaller footprint and size than conventional technologies
- Designed for small to medium sizes of emissions
- Baker Hughes, thanks to its extensive experience on compressors and rotating equipment, has the ability and capacity to industrialize CCC

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