

# Baker Hughes Climate Technology Solutions

Chris Barkey, CTO, Industrial & Energy Technology

Alessandro Bresciani, SVP – Climate Technology Solutions

Tom Harper, VP – Commercial Development, Climate Technology Solutions

January 30, 2023

This presentation (and oral statements made regarding the subjects of this release) may contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, (each a “forward-looking statement”). The words “anticipate,” “believe,” “ensure,” “expect,” “if,” “intend,” “estimate,” “project,” “foresee,” “forecasts,” “predict,” “outlook,” “aim,” “will,” “could,” “should,” “potential,” “would,” “may,” “probable,” “likely,” and similar expressions, and the negative thereof, are intended to identify forward-looking statements. There are many risks and uncertainties that could cause actual results to differ materially from our forward-looking statements. These forward-looking statements are also affected by the risk factors described in the Company’s annual report on Form 10-K for the period ended December 31, 2021 and those set forth from time to time in other filings with the Securities and Exchange Commission (“SEC”). The documents are available through the Company’s website at: [www.investors.bakerhughes.com](http://www.investors.bakerhughes.com) or through the SEC’s Electronic Data Gathering and Analysis Retrieval (“EDGAR”) system at: [www.sec.gov](http://www.sec.gov). We undertake no obligation to publicly update or revise any forward-looking statement.

# Decades of experience working with natural gas, H<sub>2</sub> & CO<sub>2</sub>

Uniquely placed to play a leading role in the decarbonization of the energy & industrial sectors

## Baker Hughes Today

**#1** provider of liquefaction equipment and services

**60 years** of experience working with Hydrogen

**Leading provider** of compression equipment for all gases

Condition monitoring specialist – driving equipment reliability & efficiency

## Early Life of CTS

**~\$400M** of New Energy orders in 2023

Deploying existing equipment in **CCUS, H<sub>2</sub>, Clean Power & Emissions Management** applications

Leveraging relationships with energy companies to play a leading role in early-stage projects

## Future CTS

**\$6-7B** New Energy orders opportunity by 2030

Global leader in energy efficiency and carbon abatement technologies

Successfully incubated and commercially deployed technology investments

Diverse customer base across energy & industrial sectors

# CTS – our approach

Leveraging our existing technologies and market presence, while we build for the future

## OUR APPROACH

### Enter new markets & penetrate existing customer base

#### Decarbonize existing O&G customer operations with existing technology

- Leverage installed base
- Emissions Abatement leveraging proven technologies

#### Enter new industrial markets

- Create new cross-industry partnerships
- Build new industrial sales

#### Building new business models & offerings for a “forming” market

- Creating a differentiated position as the market evolves



### Invest in future, innovative technologies



### Leverage technology expertise to commercialize investments

#### Focused on adding capabilities in areas of CCUS, H2 & Clean Power



The future of gas fired power generation



Low LCOC<sup>1</sup> for small emitters



Net-zero H2



Gen II Solvent for large scale Carbon Capture



MOFs<sup>2</sup> platform for Direct Air Capture

+ Additional 7 investments

#### World leading R&D capability

- Advanced manufacturing & materials engineering
- Turbomachinery, Fluid dynamics, Roto dynamics & combustion

#### Global network of test centers

- Bench Scale , Full Scale & Field Pilot testing facilities

#### Global supply chain and manufacturing scale

# Market activity – strategic collaborations

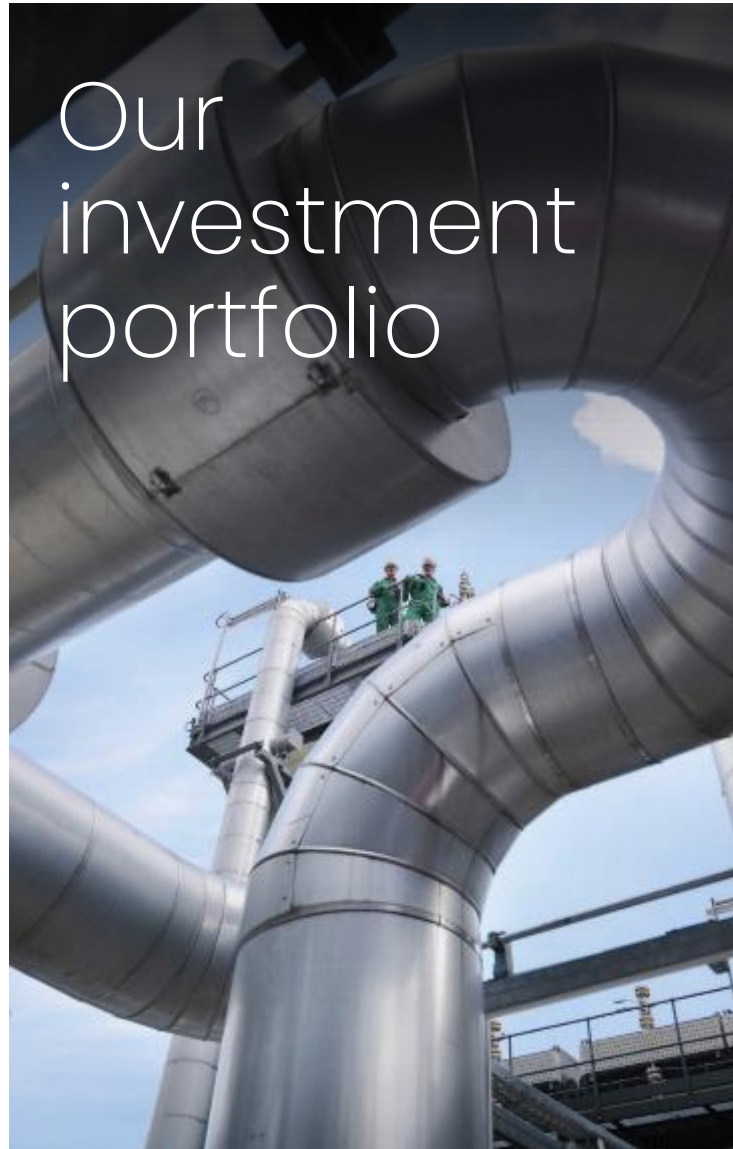
A sample of our successes so far



- Green Hydrogen, NEOM, Saudi Arabia – Providing **advanced hydrogen compression** technology
- Blue Hydrogen, Edmonton, Alberta, Canada – Providing **100% hydrogen fueled NovalT 16** gas turbine technology to APD



- CCUS, Kasawari, Sarawak, Malaysia – Separate and compress **3.3 MTPA of CO2** at the offshore CCS platform, the **worlds largest offshore CCS** facility



# Our investment portfolio

## Carbon capture



Solvent-based post-combustion carbon capture technology



Carbon capture process intensification technology



Advanced next-gen CO<sub>2</sub> capture for low-purity streams



Exclusive license for mixed salt capture

## Carbon utilization



Biomethanation technology to produce renewable methane, recycle of CO<sub>2</sub>



Creating E-fuels – utilizing green H<sub>2</sub> & CO<sub>2</sub>

## Hydrogen



Methane pyrolysis technology to produce industrial scale clean and cost-efficient hydrogen



Several hydrogen technologies, including electrolyzer, fuel cell, metal hydrides, plasma SMR



Low-pressure, low-temperature, high-value graphene production system

## Clean energy



Next-gen energy network delivering efficient, compact system



Converts natural and renewable gas into zero-emissions power

## Energy storage



Highly-efficient long duration energy storage technology

# Leveraging our capabilities to incubate technologies >>

## World class labs and testing facilities globally

- Advanced Manufacturing & Engineering
- Materials & Process Engineering
- Digital & Emerging Technologies
- Technology Testing Labs & Scales
- Data Science



### Florence / Massa, Italy

Materials & Additive Technologies

Adv. Machining, Welding & Powder Metallurgy

VR, Robotics & Metrology

Fluid Dynamics, Roto Dynamics & Combustion

### Oklahoma City / Houston, US

Edge, Machine Learning, High Performance Computing

Bench Scale, Full Scale & Field Pilot Testing Facilities

Energy Technology Evaluation

Additive Technologies

### Bangalore, India

Materials & Additive Technologies

Energy Technology Evaluation

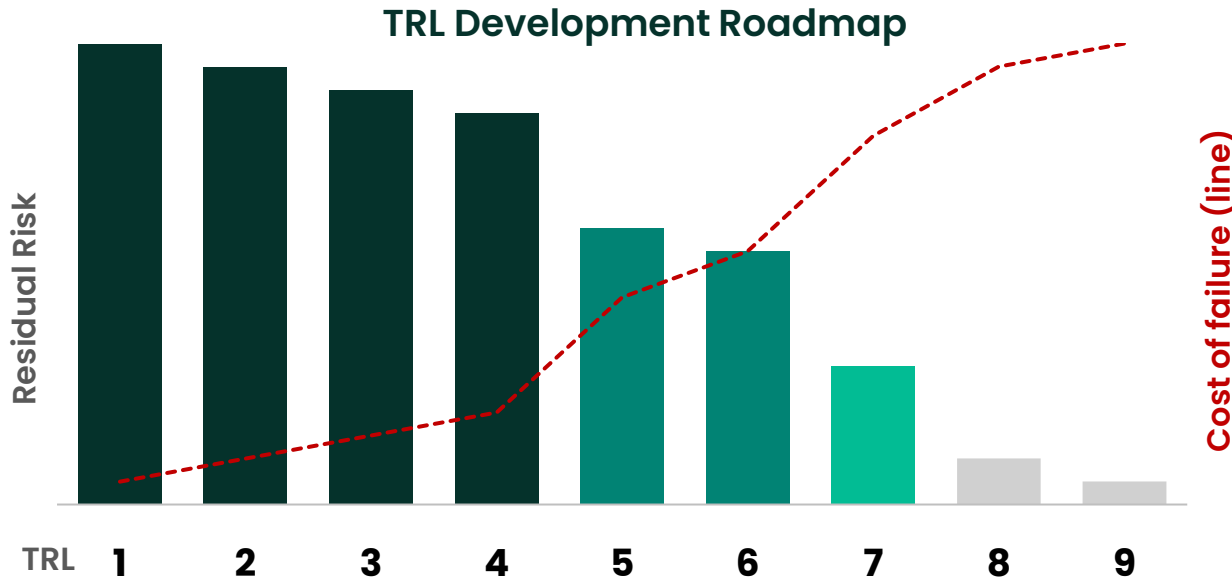
### Queretaro, Mexico

Sensors & Data Science

Artificial Intelligence

# Technology Readiness Level (TRL)

Understanding the framework to commercialize new technologies



<b>TRL 1</b>	Basic principles observed
<b>TRL 2</b>	Technology concept formulated
<b>TRL 3</b>	Experimental proof of concept
<b>TRL 4</b>	Technology validated in lab
<b>TRL 5</b>	Technology validated in relevant environment
<b>TRL 6</b>	Technology demonstrated in relevant environment
<b>TRL 7</b>	System prototype demonstration in operational environment
<b>TRL 8</b>	System complete and qualified
<b>TRL 9</b>	Actual system proven in operational environment

## Technology Readiness Assessment

Risk reduction starts with the definition of the TRL milestones along the development roadmap

## Risk reduction process

Risk reduction is a consequence of each step forward in TRL level, due to testing or simulation activities



Produce emissions-free and low-cost electric power

2022

- Equity investment
- Utility scale supplier agreement
- Industrial scale exclusive license

## NET Power

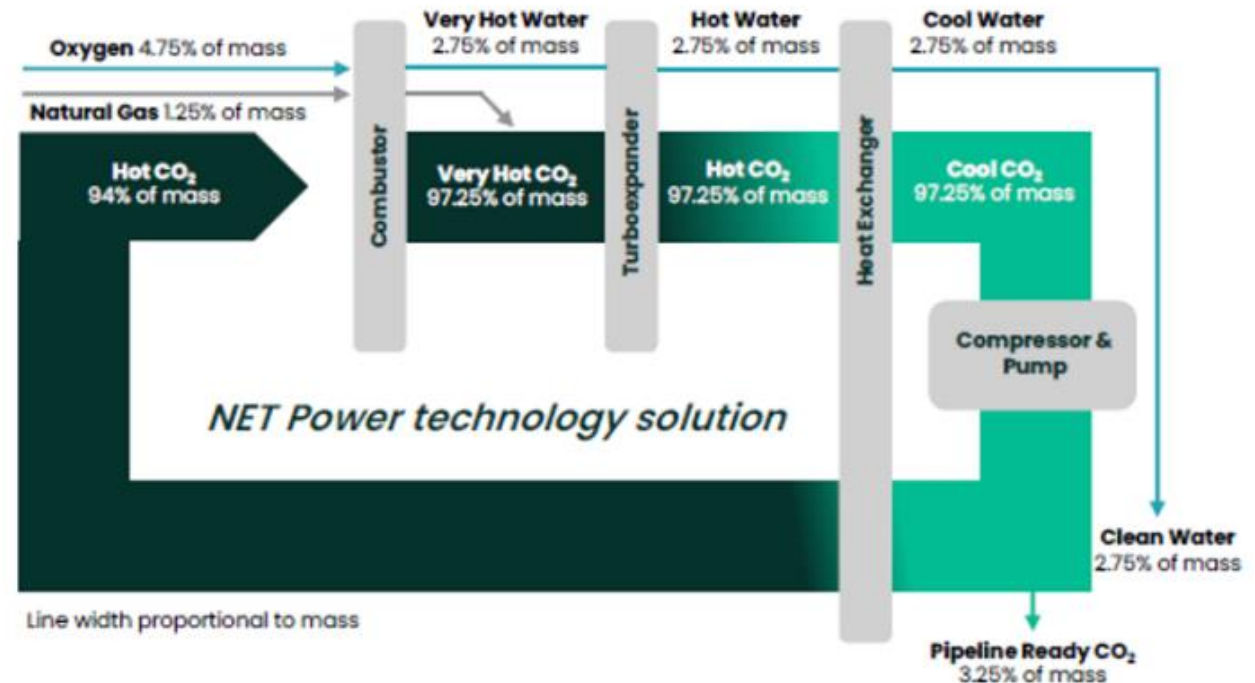


Gas-to-power technology with integrated carbon capture for industrial and O&G energy generation. Natural gas and oxygen fuel a supercritical CO<sub>2</sub> cycle that generates electricity, while capturing CO<sub>2</sub>.

High efficiency power plants to produce electricity, water, and pipeline or sequestration-ready CO<sub>2</sub>, locked away from atmosphere.

BKR developing supercritical CO<sub>2</sub> Turbo Expander for power generation and will provide pumping and compression technology,

BKR bringing system integration and process knowledge to accelerate solution for market deployment



# Direct Air Capture of CO<sub>2</sub> for Utilization and Storage

## 2022

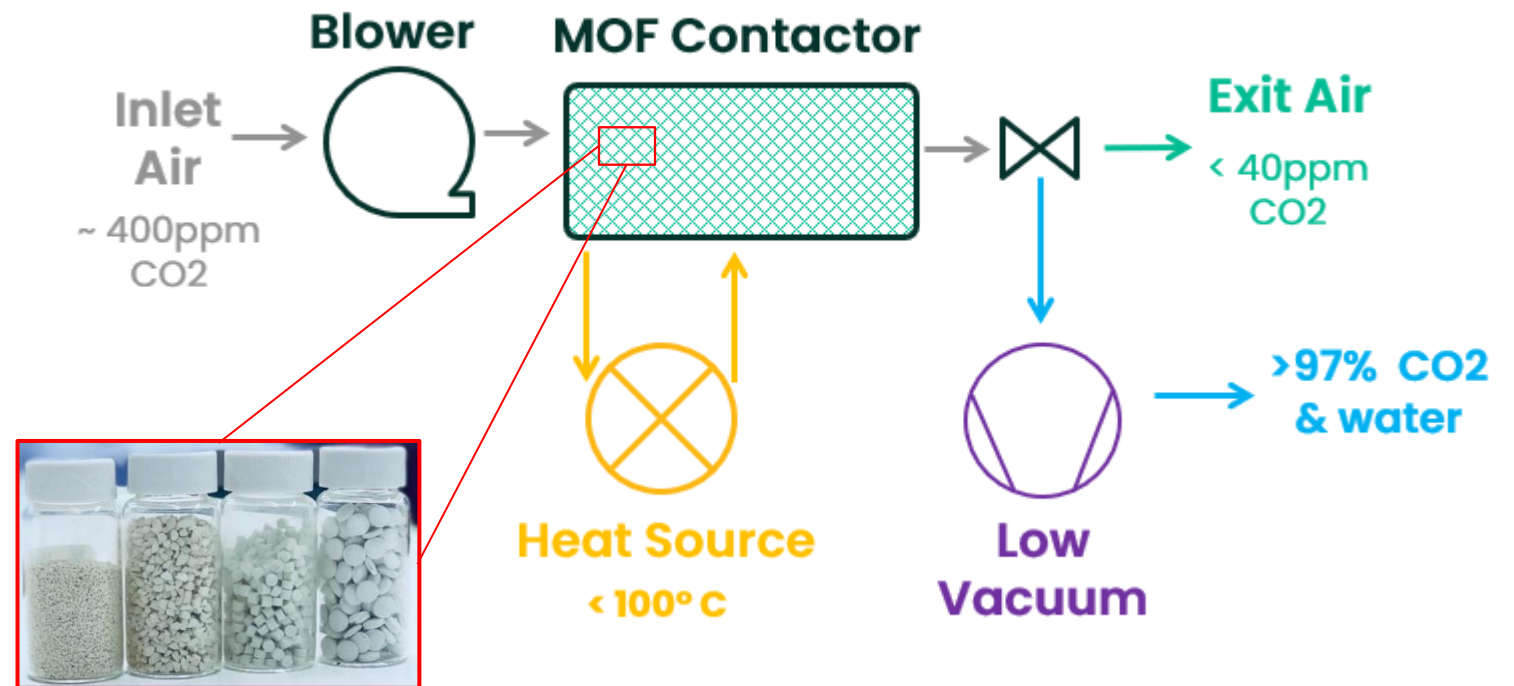
- Full acquisition
- High-capacity and high-selectivity for capturing CO<sub>2</sub>
- Proprietary metal-organic framework (MOF)

## Mosaic Materials



Mosaic Materials proprietary amine appended metal-organic framework (MOF) sorbent technology features leading capacity, selectivity and energy efficiency for CO<sub>2</sub> separation from air, or other low concentration sources

Further development of Mosaic's technology creates a pathway towards achieving lower carbon removal costs. This will help enable CO<sub>2</sub> utilization and carbon circularity, as well as CO<sub>2</sub> storage with negative carbon emissions



**Baker Hughes** 