

8 Rivers in Texas: deploying 8RH2 technology for carbon capture beyond 99%



Steve Milward
Chief Operating Officer
8 Rivers
8 RIVERS



Maulik Shelat
VP Product Development
8RH2, 8 Rivers
8 RIVERS



AMMONIA ENERGY
ASSOCIATION

Wednesday, April 3, 2024
9AM EST • 4PM CET



Carbon capture

- Steam Methane Reforming (SMR): About 2/3 of CO₂ is captured in existing ammonia plants (utilized for urea production or emitted), remainder 1/3 of CO₂ in the flue gas



ELSEVIER

International Journal of Greenhouse Gas Control

Volume 105, February 2021, 103239



Beyond 90% capture: Possible, but at what cost?

[Patrick Brandl](#)^{a c}, [Mai Bui](#)^{a c}, [Jason P. Hallett](#)^b, [Niall Mac Dowell](#)^{a c}  

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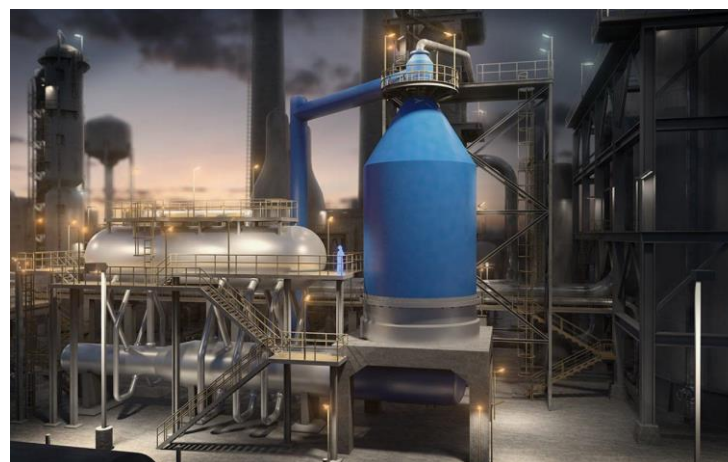
Link: <https://www.sciencedirect.com/science/article/abs/pii/S1750583620306642>



Decarbonization toolkit for gas-based ammonia production

Steam methane reforming (SMR) Autothermal Reforming (ATR)

8RH₂



SMR & ATR Figures: Courtesy



>99% carbon capture rates possible

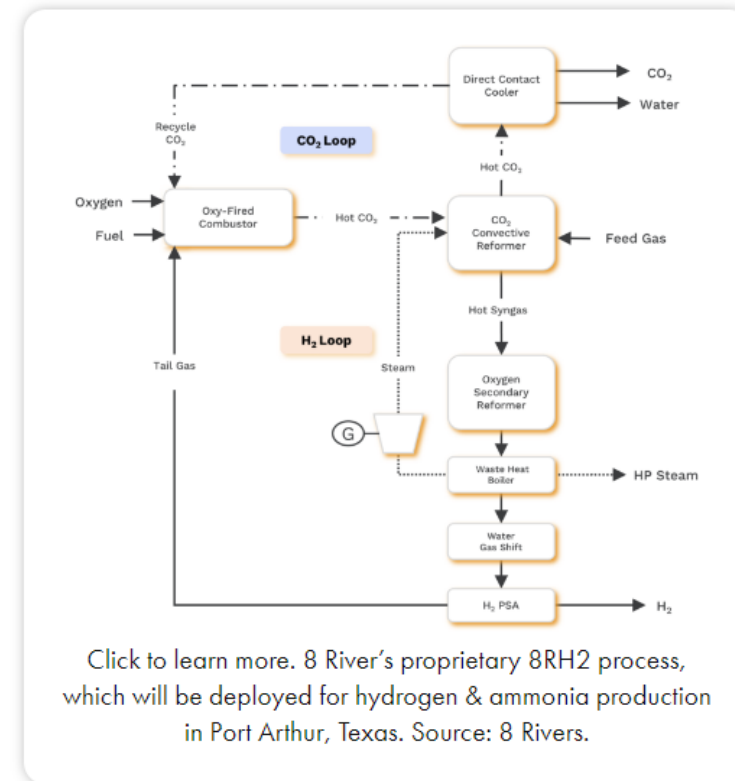
Increasing carbon capture rate / decreasing carbon capture cost



Project Cormorant

8 Rivers to debut “ultra-low carbon” 8RH2 technology

8 Rivers will develop an **880,000 tonnes-per-year production facility in Port Arthur, Texas**. Utilizing the proprietary 8RH2 hydrogen production process, “Project Cormorant” aims to complete construction by 2027, producing ammonia for local use & export to international markets. In an interview with Bloomberg, 8 Rivers’ COO Steve Milward confirmed that ammonia produced by Project Cormorant would be **sold for power generation in South Korea**, particularly co-firing in coal power plants. 8 Rivers investor SK Materials will support development of Project Cormorant.



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8RH₂

From Problem to Solution: How CO₂ Enables Affordable Clean Hydrogen

Steve Milward, Chief Operating Officer
Maulik Shelat, VP Innovation & Product Development



We believe in a net-zero world where clean energy powers human prosperity.

8 RIVERS

Pioneering the Clean Energy and Climate Future

Innovation | Commercialization | Deployment
Hands-On Execution Experience in Technology and Project Development

15 Years

In Clean Energy Development

>500

Patents Granted

>\$1B

Invested into 8 Rivers &
Our Past/Present Technologies

>\$75M

Grants Awarded

TECHNOLOGY DEVELOPMENT

8 Rivers has invented and partnered with a robust set of technologies to meet a diverse set of low-carbon energy challenges.

PROJECT DEVELOPMENT

The 8 Rivers project development engine specializes in marquee deployment of low-carbon projects.

SERVICES

8 Rivers is a net-zero services & solutions provider aiding project conceptualization & engineering design.

8 RIVERS

8 Rivers' Unique Place in the Energy Transition Market

8 Rivers has a pipeline of energy transition technologies under development and a business model that supports continuous innovation.

 **Biome**



Zero-Emissions Power
from Solid Fuels

 **8RH₂**



Zero-Emissions
Hydrogen and
Ammonia

 **Calcite**



Direct Air Capture of
CO₂ (DAC)

 **TarT**



H₂S Sour Gas to
Sweet Gas



8 Rivers founded NET Power in 2010 and remained as a minority shareholder as it went public on the NYSE in June 2023.



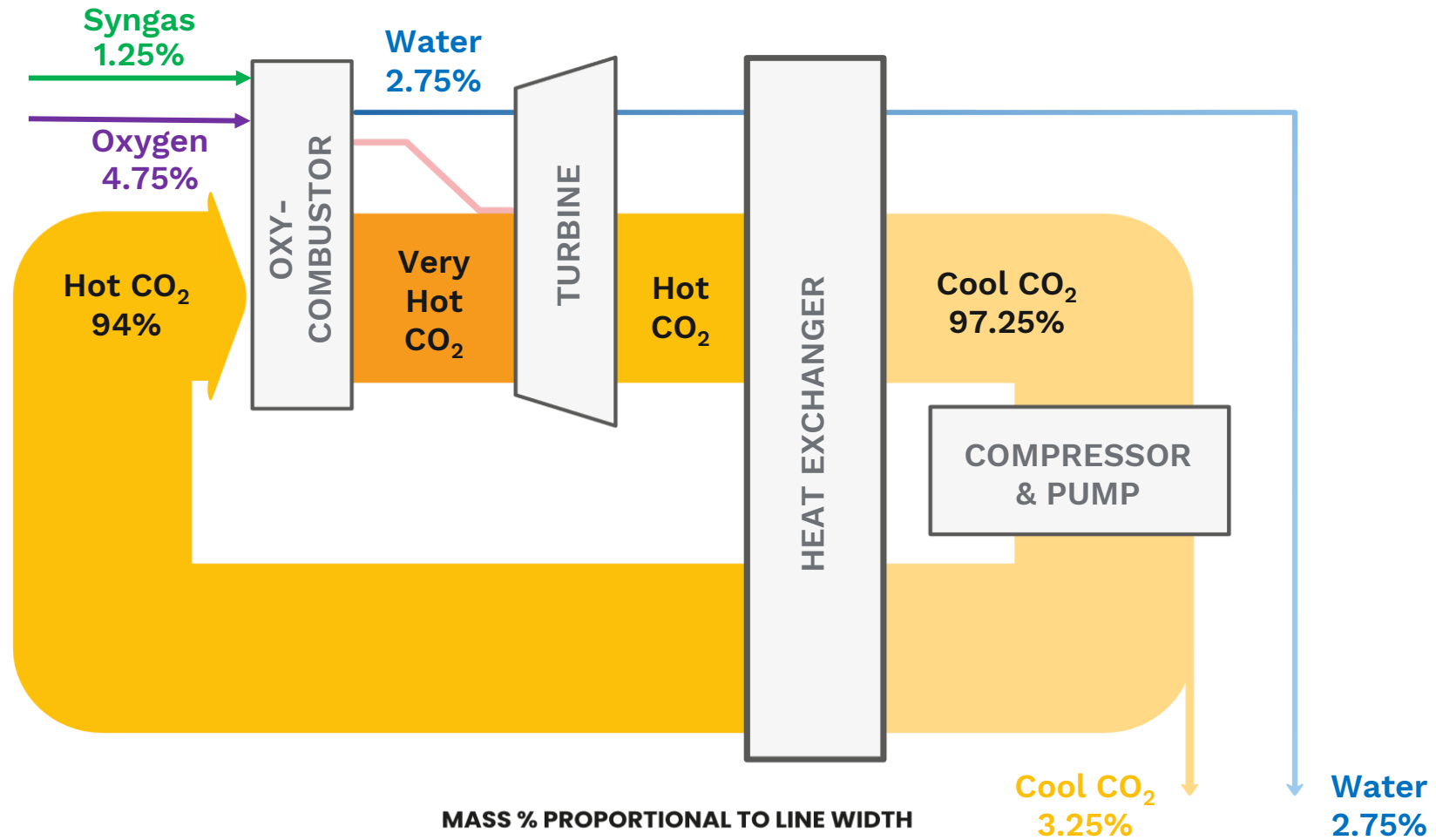
Rodney Allam MBE

Nobel Laureate
8 Rivers Chief Inventor

“I began work on developing cleaner energy systems in 1979.

I became obsessed with how you remove CO₂ emissions from industrial processes.”

Utilize the CO₂ - The Allam-Fetvedt Cycle



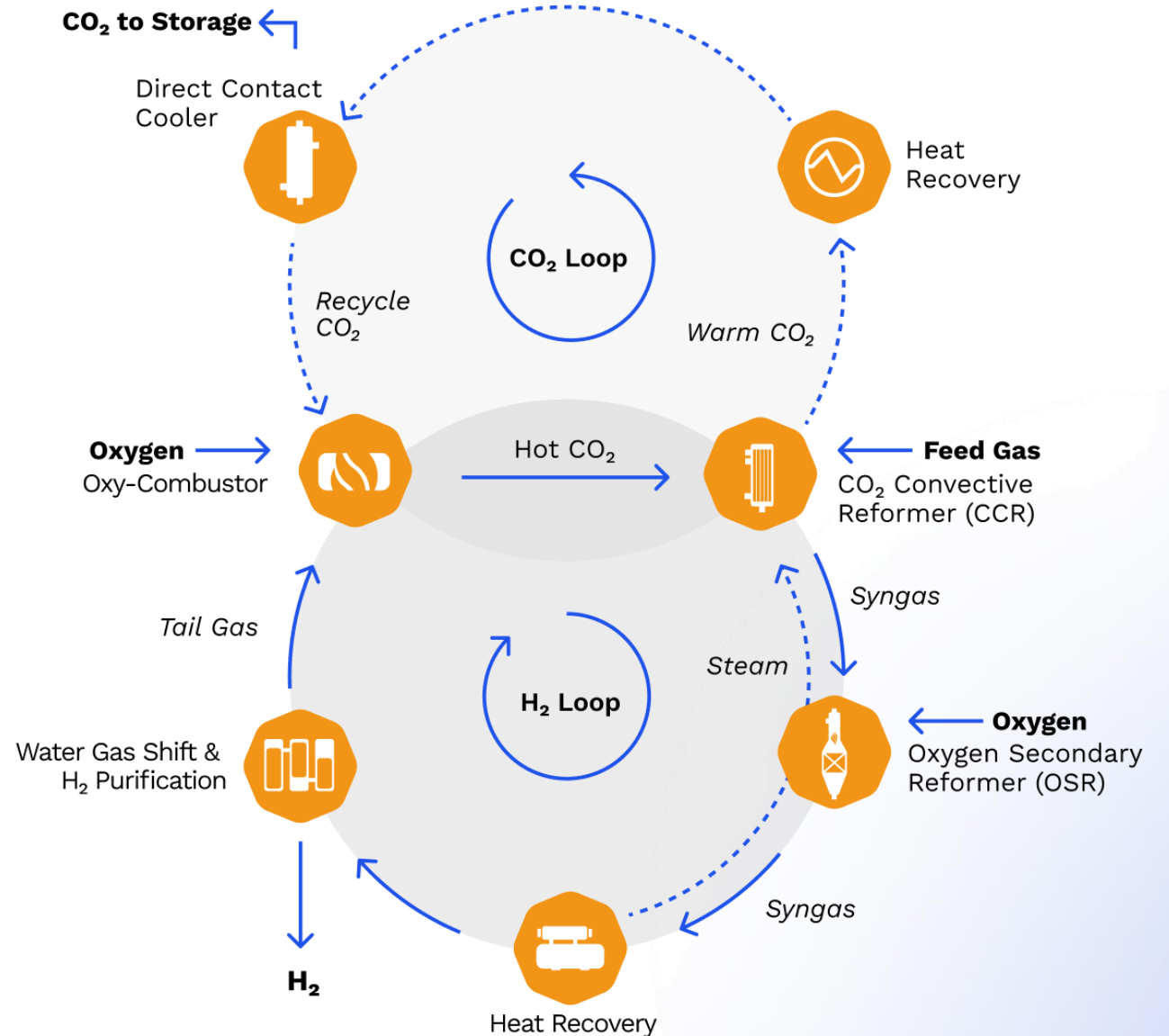
8RH₂ Hydrogen Production

8RH₂ vs ATR+95% CCS

10-15% Lower levelized cost

15-20% Lower carbon intensity

5-7% More thermally efficient

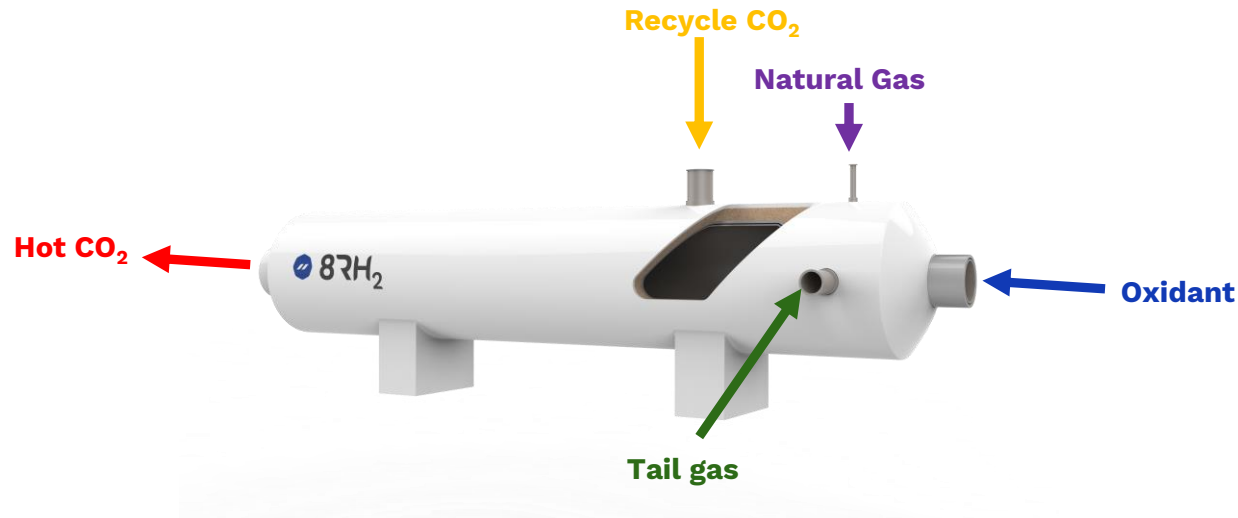


8RH₂ Differentiating Technologies

Oxy-Fired Combustor and CO₂ Convective Reformer innovate steam methane reformation

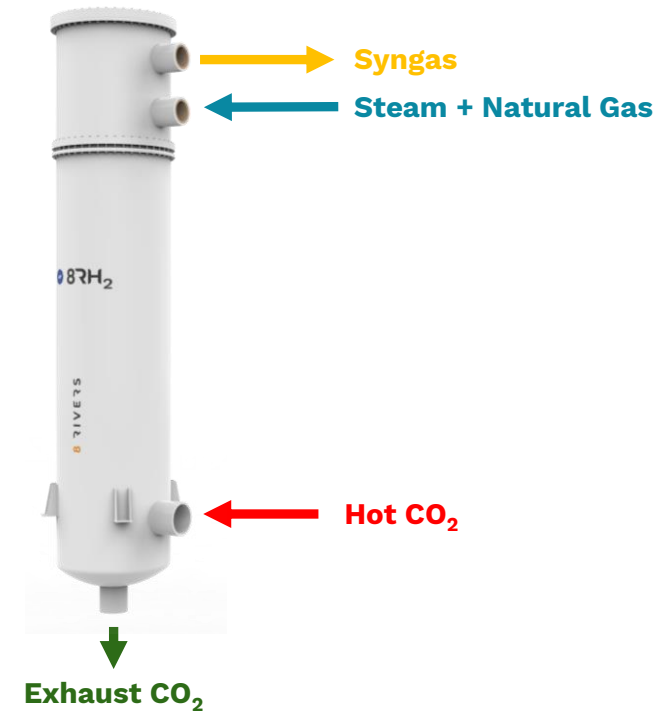
Oxy-Fired Combustor

Oxy-fuel combustion replaces air in the typical combustion process with pure oxygen diluted with CO₂. By eliminating the impurities of air, oxy-fired combustion results in an exhaust stream of high-quality CO₂ and water, **eliminating the need for costly back-end carbon capture equipment.**



CO₂ Convective Reformer

8 Rivers proprietary CO₂ Convective Reformer for hydrogen production reforms natural gas and steam mixture utilizing heat delivered by CO₂ from oxy-combustor.



Clean **Fuels**

Clean **Air**

Clean **Jobs**

Cormorant Clean Energy

Port Arthur, Texas

Cormorant Clean Energy



'Cheaper and cleaner' | First giga-scale project using novel 'ultra-low-carbon' blue hydrogen tech announced

8 Rivers plans to build a billion-dollar ammonia complex in Texas, with more than 99% of CO₂ captured

9 January 2024 14:06 GMT *UPDATED 9 January 2024 15:34 GMT*
By **Polly Martin**



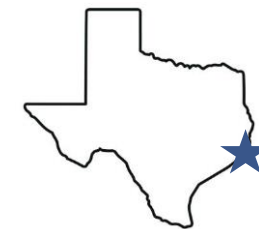
Ammonia production annually
880,000 tonnes

CO₂ captured annually
~1.5 million tonnes

Permanent Jobs Created
95+

CO₂ capture rate
>99%

Location
Port Arthur, TX



Key Partners



8 RIVERS

