Toolkit for Decarbonizing Existing Gas-based Ammonia Plants

AEA Annual Conference - Atlanta, Georgia

November 13-15, 2023

Agenda

01
Our offering in hydrogen and ammonia

02
Decarbonization of existing gas-based ammonia plants

01 Our offering in hydrogen and ammonia

Technip Energies at a glance

Listed on
Euronext Paris
Stock Exchange

Headquartered in
Paris

65
Years of operations

€6.4B
Full year 2022 adjusted revenue

A leading Engineering & Technology company for the Energy Transition

~€18B
Backlog at end September 2023

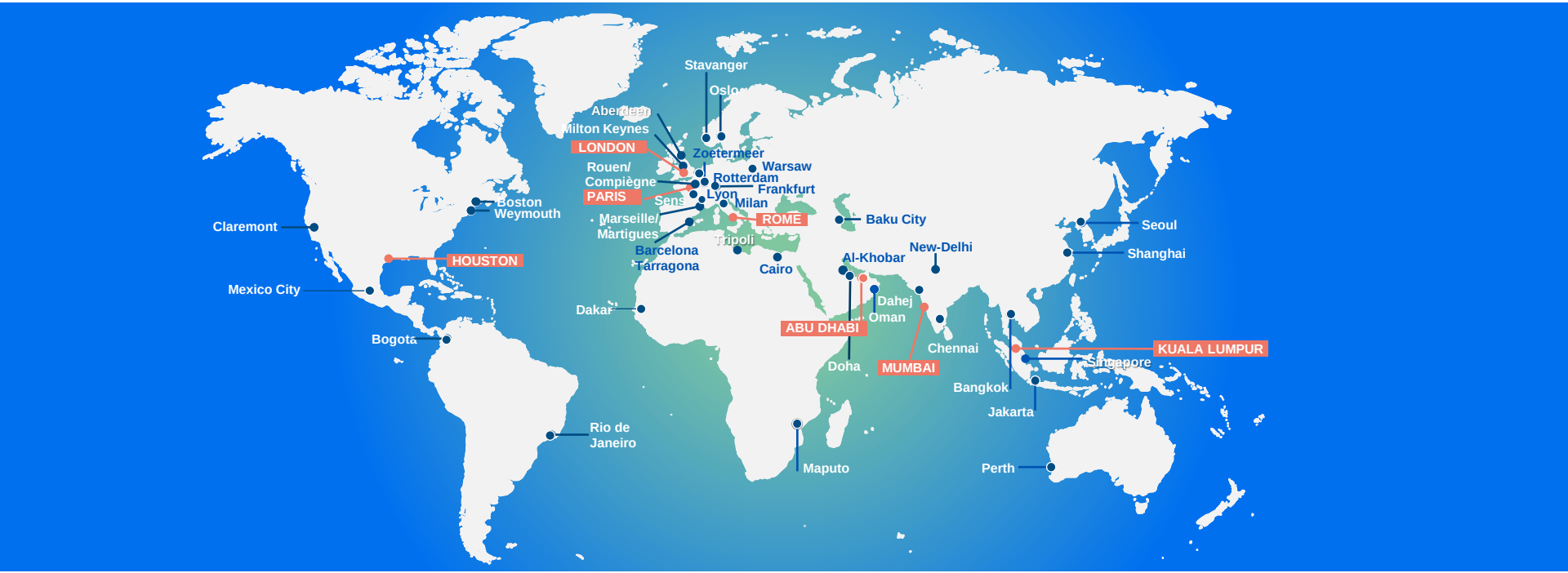
~15,000
Employees in 35 countries

25+
Leading proprietary technologies

450 projects
Under execution

Talented global workforce across 35 countries

Providing flexible execution and proximity to customers



Our hydrogen heritage

Member of Hydrogen Europe Hydrogen Council

275+
H_2 references

50+
References of carbon capture (CO_2) from H2 plants

40+
Plants for Air Products *
* Global alliance since 1992

14+
H_2 plants with TPR®

>30%
Global installed H_2 capacity

50+
Years of extensive H_2 experience

40+
H_2 plants w/ pre-reformer for multi-feedstock

3+ applications of
EARTH ®

Topsoe/T.EN long-standing alliance in ammonia

- Technip Energies has been part of Topsoe Technology Club of Contractors since the 1970s
- First general agreements executed in the 1980s
- Numerous FEED and EPC projects executed during the past 40 years

Latest ammonia/urea plants designed and built by T.EN

Contract:	EPC
Award:	2018
Delivery:	2022
Client:	Hindustan Urvarak and Rasayan Limited (JV)
Location:	Sindri & Barauni, India

Key figures

- Ammonia, single stream: 2,200 t/d
- Urea, single stream: 3,850 t/d
- Ammonia storage: 2 x 5000 t

02 Decarbonization of existing gas-based ammonia plants

Decarbonization's toolkit

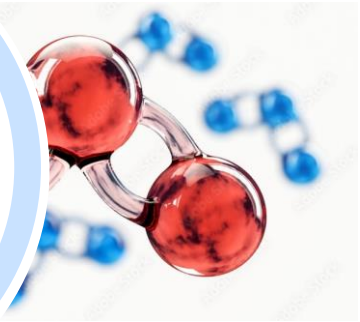
Various options are available depending on the carbon reduction objectives

1. **Pre-combustion carbon capture (for plants having no urea production)**
2. **Post-combustion carbon capture**
3. **Water electrolysis to partly replace « grey » hydrogen by renewable hydrogen**
4. **BlueH$_2$™ by T.EN solutions: a full suite of solutions for low carbon hydrogen production**
5. **Others: SMR electrification, switch from natural gas to biogas, etc.**

1-Pre-combustion technology solutions

Pre-combustion technology solutions

PRE-COMBUSTION CAPTURE TECHNOLOGIES



Absorption

Industry standard amine-based technology for CO_2 capture from natural gas processing and synthetic gases (e.g. SMR)

Membranes

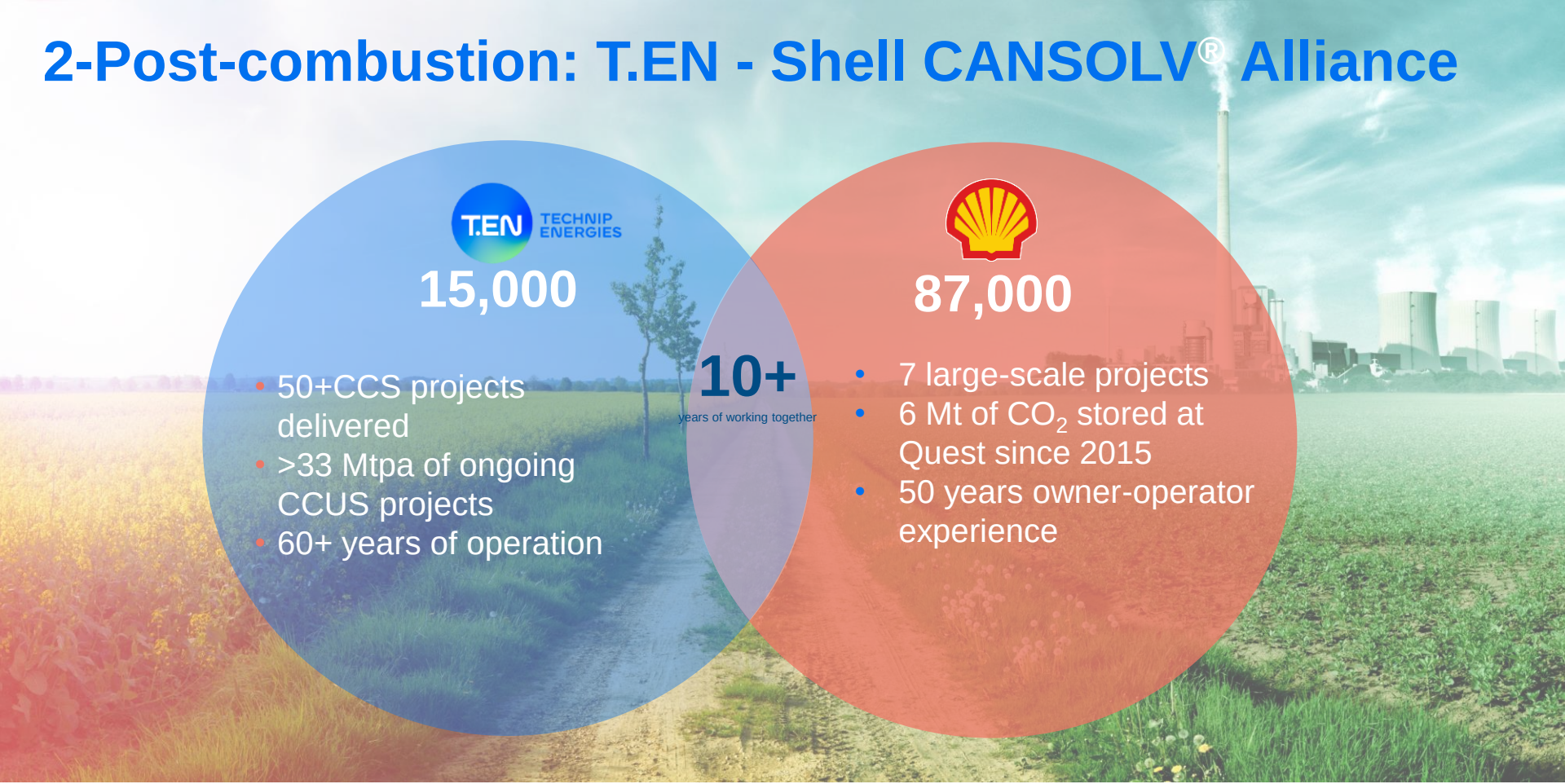
Space and weight efficient and solvent-free for treatment of high CO2 content gas offshore and onshore

Adsorption

Processes that use a solid adsorbent to separate CO_2 – an energy efficient and low emissions technology choice

High Performance Capture for all Applications

2-Post-combustion: T.EN - Shell CANSOLV® Alliance



15,000

- 50+CCS projects delivered
- >33 Mtpa of ongoing CCUS projects
- 60+ years of operation

10+

years of working together

87,000

- 7 large-scale projects
- 6 Mt of CO_2 stored at Quest since 2015
- 50 years owner-operator experience

3-Green H_2: T.EN & John Cockerill to create Rely

A new company accelerating green H_2 industrialization

- T.EN joining forces with a leading electrolyzer provider.
- Unique combination of technology, engineering, and equipment manufacturing know-how.
- Industrially and geographically complementary, cultural alignment.

An integrated solutions provider for green H_2 and Power-to-X

Asset light model	Innovation platform	Asset lifecycle offering
Preferred access to electrolyzer stack supply	Technology and proprietary equipment development to unlock green H_2 solutions	From conception to Operations & Maintenance

Building T.EN's future core aligned with net zero goals

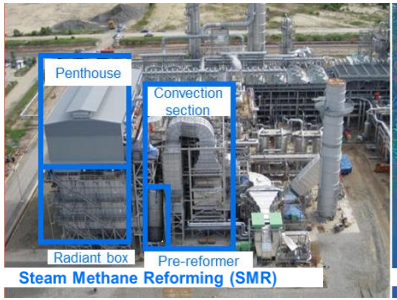
4-Blue H_2 by T.EN™ key offering

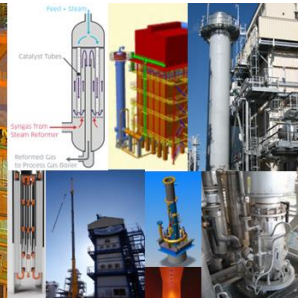
BlueH2 by T.EN

A full suite of solutions for low carbon hydrogen production

A full suite of deeply decarbonized and cost-competitive solutions including:

- Steam methane reforming (SMR)
- Oxidative reforming (ATR, POx)
- Recuperative reforming – TPR® and EARTH®
- H_2 firing - LSV® Burners





Value Proposition

Low C H_2 from small (10 kNm3/h) to mega (1,000 kNm3/hr) scale

- Technologies to achieve 98% plus CO2 capture & lowest LCOH
- Single-point responsibility from technology / licensor package to EPC for cost, performance & schedule certainty
- H_2 for decarbonizing industry, renewable fuels, mobility and chemicals

Thank you