



Leading Through Innovation

# Ammonia Energy Association Annual Conference

Phoenix (Nov-22)



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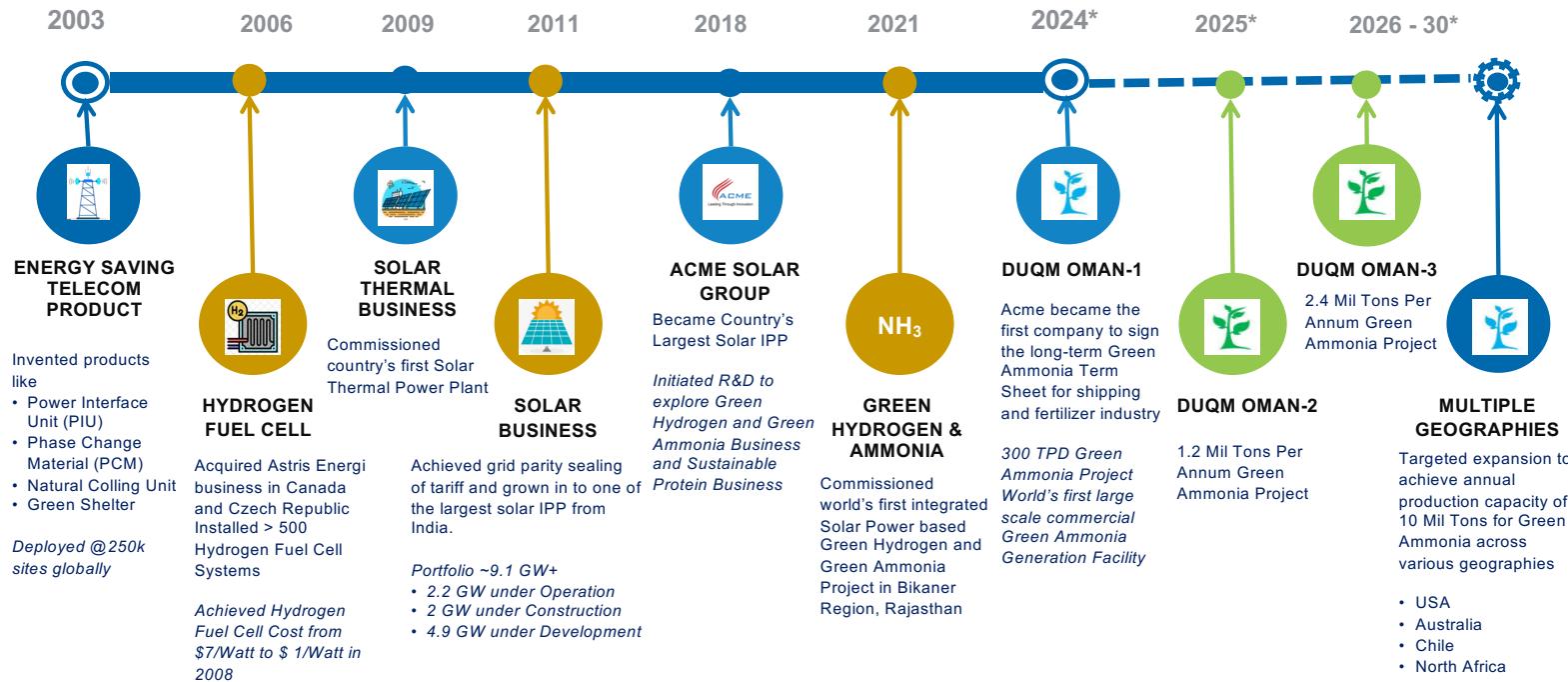
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# ACME Group – a leading solar IPP developer diversifying into Green Energy



**ACME has commissioned world's first integrated Solar Power, Green Hydrogen & Green Ammonia facility in Rajasthan, India**



[Bikaner Plant](#)

**Vision: Portfolio of 10 MTPA Green Ammonia and Hydrogen by 2030 and be amongst the top 3 Green Energy producers in the World**

# ACME Green Hydrogen and Ammonia – OMAN Project

ACME – Scatec JV  
Announcement  
(March 2022)

50:50 JV FOR AMMONIA



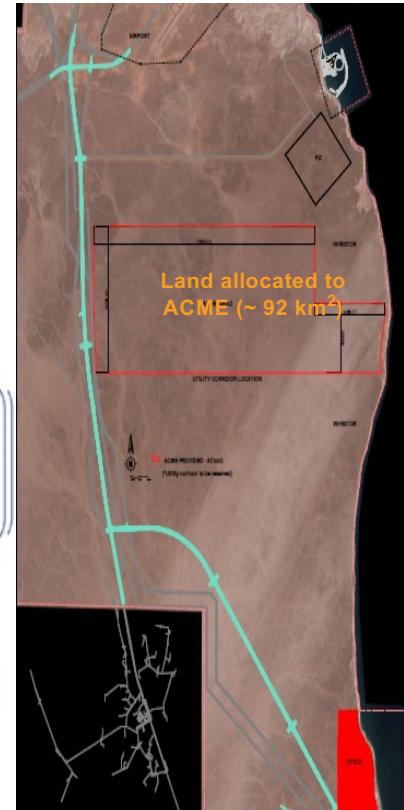
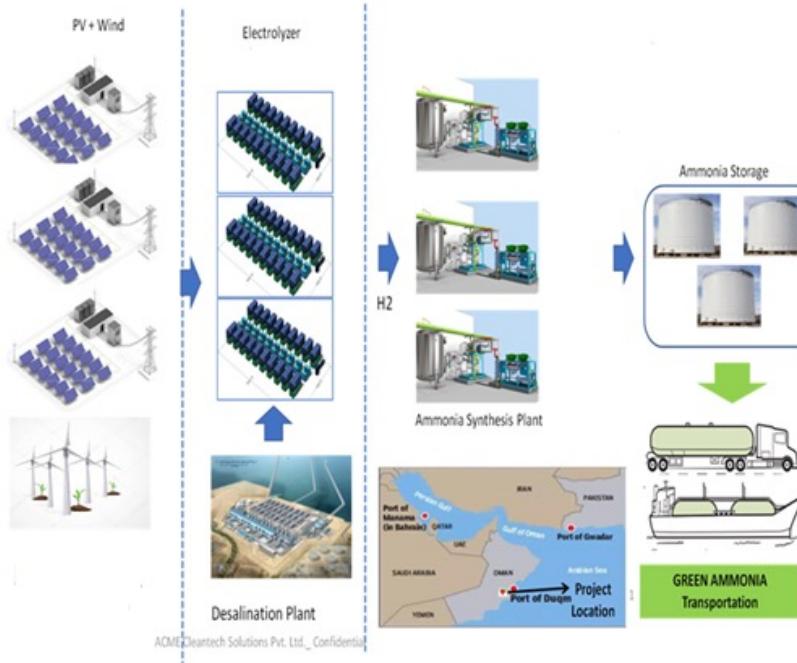
The Companies will design, develop, build and operate a large-scale green ammonia facility in Oman. The facility is located in the Duqm Special Economic Zone of Oman. Potentially, the facility can be further expanded in later phases at the same location.

ACME – Scatec is developing the WORLD'S BIGGEST Green Ammonia Project at Duqm, Oman

- ✓ Land Acquired-Usufruct Signed
- ✓ Statutory approvals in place
- ✓ Off-take Term sheet Signed, Agreement in Final Stage
- ✓ Ammonia Technology Order Placed
- ✓ Jetty Order Placed
- ✓ Ammonia Storage Tank Order Placed
- ✓ ESIA approved
- ✓ Construction permit granted

**Green NH<sub>3</sub> capacity – ~ 1.2 MTPA\***  
Phase I – 100,000 TPA | Phase II – 1.1 MTPA

Investment – USD 6 billion



\*Million Tonne per Annum

# ACME Green Hydrogen and Ammonia – OMAN Project

Project Partners	
AMMONIA LICENSOR	
GREEN AMMONIA CERTIFICATION	
ELECTRICAL SYSTEM STUDY	
BASIC ENGINEERING	
GAP ENGINEERING	
ENVIRONMENT AND SOCIAL IMPACT STUDY	
METOCEAN STUDY	
HYDROLOGY & DRAINAGE STUDY	
JETTYLESS FLOATING TERMINAL TECHNICAL EVALUATION	
TOPOGRAPHY SURVEY	
GEOTECHNICAL INVESTIGATION	
LEGAL CONSULTANT	
TAXATION/ACCOUNTING CONSULTANT	

## Signing of Land Lease 'Usufruct Agreement' (June – 2022)



# ACME Green Hydrogen and Ammonia – OMAN Project

## Green Certificate

### CERTIFICATE

Certificate-ID: C01-2022-03-21255363

Applied Standard/Criteria: TÜV Rheinland Standard H2.21 for Green Hydrogen, and Carbon neutral processing to Green Ammonia

Certificate Holder: Green Hydrogen & Chemicals SPC  
The Special Economic Zone Duqm  
Al-Duqm Al Wusta Governorate 111  
Oman

Certificate valid until: 31.03.2023

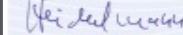
### Production of Green Hydrogen and Green Ammonia

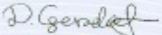
TÜV Rheinland confirms that the holder of this certificate is planning, as a Greenfield Project, a PV powered hydrogen-ammonia plant that meets all criteria for the production of Green Hydrogen as an Intermedia product, as well as Green Ammonia as the final product.

The following criteria have been assessed as fulfilled for the entire Greenfield Project:

- Electrolysis for hydrogen production is planned to be exclusively powered by electricity generated from an affiliated PV plant, as renewable electricity source.
- The hydrogen is further synthesized to ammonia via Haber Bosch process in a carbon neutral way.
- During daylight hours, surplus electricity of the PV plant will be fed into the grid for banking purposes. Its amount will be higher than the power consumption needed for the entire plant during night times, also considering transmission and distribution losses (conservative approach).
- The technical setup of the project plant maintains carbon neutrality of hydrogen and ammonia in their boundaries cradle to gate. Since renewable electricity for electrolysis is applied, the products can additionally be declared as Green Hydrogen and Green Ammonia.

Cologne, 01.03.2022

  
Norbert Heidemann  
TÜV Rheinland Group  
Carbon Services

  
Daniel Gersdorf  
TÜV Rheinland Group  
Carbon Services



 **TÜVRheinland**  
Genau. Richtig.

ACME has been issued world's first Green Ammonia Certificate by TUV Rheinland, Germany

Through its project in Duqm, ACME Company  
receives the world's first accredited international certificate  
for commercial clean hydrogen production



### The Public Authority for Special Economic Zones and Free Zones (OPAZ)

commended the announcement of ACME, a leading company in the renewable energy sector for receiving the first-ever international certificate accredited for commercial production of green hydrogen and ammonia in the world

through its project in Duqm. The company obtained this certificate from  
the German technical services company TÜV Rheinland.

عُمَان .. بُنْيَوْ مَعَ  
Building Oman Together

الهيئة العامة للمناطق الاقتصادية الخاصة والمناطق الحرة  
Public Authority for Special Economic Zones and Free Zones  
Sultanate of Oman  
سلطنة عمان

## Green Ammonia Offtake Signing of 'Term Sheet' with Yara

July 15, 2022

Yara, ACME and Scatec sign term sheet for sale of green ammonia from Oman

Geneva, Gurgaon and Oslo, 15 July 2022: ACME group ("ACME") a pioneer in cleantech sector such as solar, green hydrogen and ammonia development, Scatec ASA ("Scatec") a leading renewable power producer and Yara International ASA ("Yara") a leading global ammonia player, have signed a term sheet for offtake from the first phase of green ammonia from Oman.

**Scatec**

Yara, ACME and Scatec sign term sheet for sale of green ammonia from Oman

July 15, 2022 02:30 ET | Source: Release

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# ACME Green Hydrogen and Ammonia – Other Projects

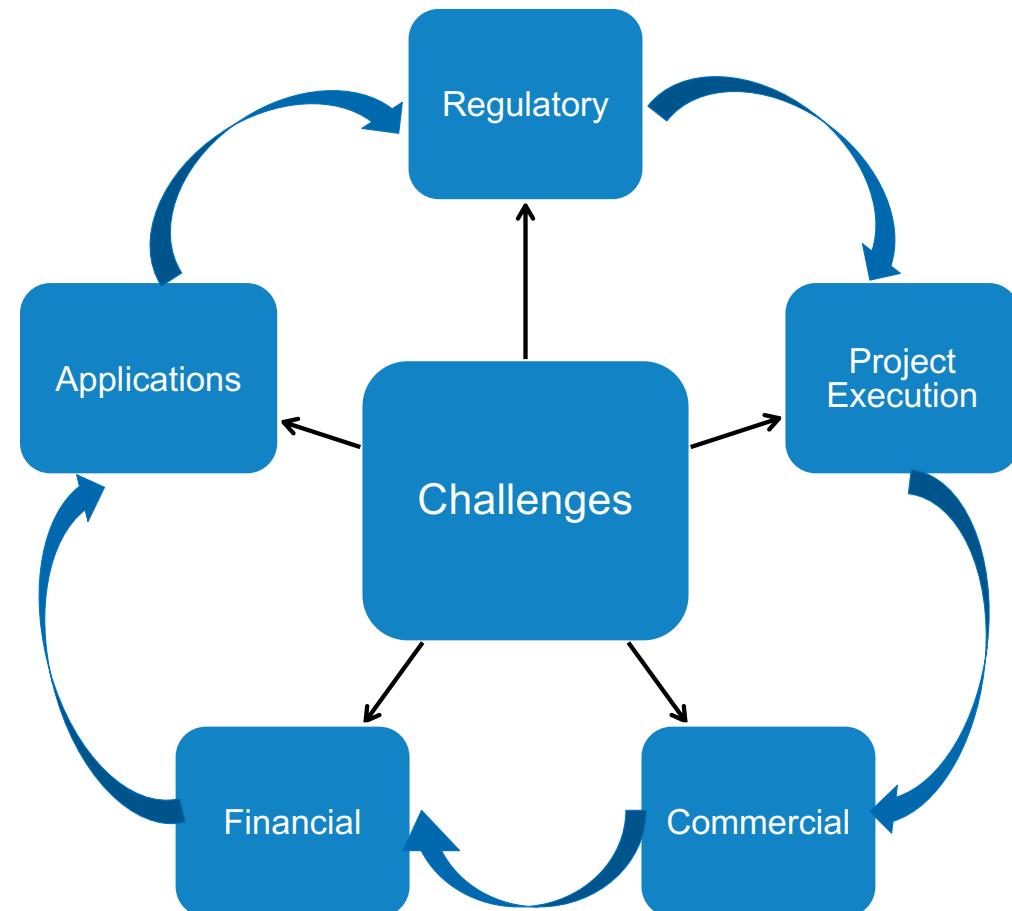
## Signing of MoU to setup a 1.2 MTPA Green Ammonia Project in Tamil Nadu – India



## Signing of MoU to setup a 2.2 MTPA Green Ammonia Project in Egypt



# Challenges in Developing a Green Ammonia project



## Regulatory Challenges

- Non – Uniformity of Green Product Specification
- Tradability for cross border trade

## Project Challenges

- Availability of resources (Land, Water & Firm Power)
- Storage and Logistics

## Commercial Challenges

- Benchmark Pricing of Green Ammonia
- Commercial terms
- Competition with Blue / Grey Products

## Financial Challenges

- Lender's perception to the new Sector
- Long term offtake, Buyer's rating and Bankability

## End Use Applications Challenges

- Existing - Price Sensitivity and Premium w.r.t conventional products
- New. - Development of Retrofitting technologies

# What are Green Fuels – EU Criteria for RFBNO....<sup>2</sup>

## Renewability

- As a principle, liquid and gaseous fuels of non-biological origin are considered renewable when the hydrogen or Intermediary Product component is produced in an electrolyser that uses with renewable electricity.
- This renewable electricity may be supplied by an installation that is directly connected to the installation that produces renewable liquid and gaseous transport fuels of non-biological origin or may come from the grid.

## Additionality [Applicable from 01.01.2027]

- The installation generating renewable electricity should have come into operation not earlier than 36 months before the installation of producing RFBNO

## Temporal Correlation

- RFNBO should be produced during the same calendar month Quarter as the renewable electricity [till 31.12.2026 31.12.2029]
- RFNBO should be produced during the same one-hour period [Month / Quarter / Year – as decided by the Commission] as the renewable electricity [From 01.01.2027 01.01.2030]

## Geographical Correlation

- Installation producing Renewable Energy is located in the same bidding zone Country as the electrolyser
- In a neighboring bidding zone Country and electricity prices in the relevant time period on the day-ahead market in the neighboring bidding zone is equal or higher than in the bidding zone where the RFBNO is produced
- The installation generating renewable energy is located in an offshore bidding zone adjacent to the bidding zone where the electrolyser is located

**Note:** Bidding Zone means the largest geographical area within which market participant are able to exchange energy without capacity allocation

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## Geographical Correlation

- Installation producing Renewable Energy is located in the same ~~bidding zone~~ Country as the electrolyser
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# Thank you

