8th RD20 Conference
Eskom Green Hydrogen Research: Perspectives from an electricity utility

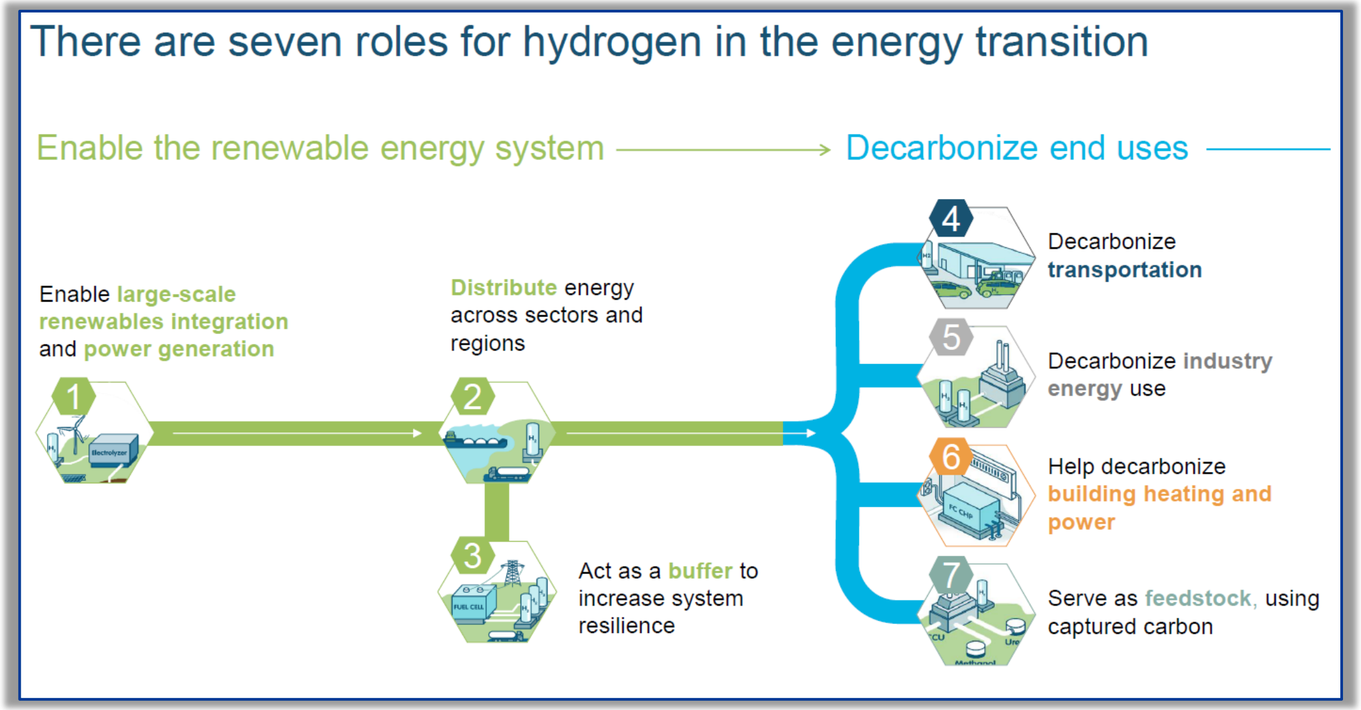
Shaun Pershad [Research, Testing and Development]

21 October 2026



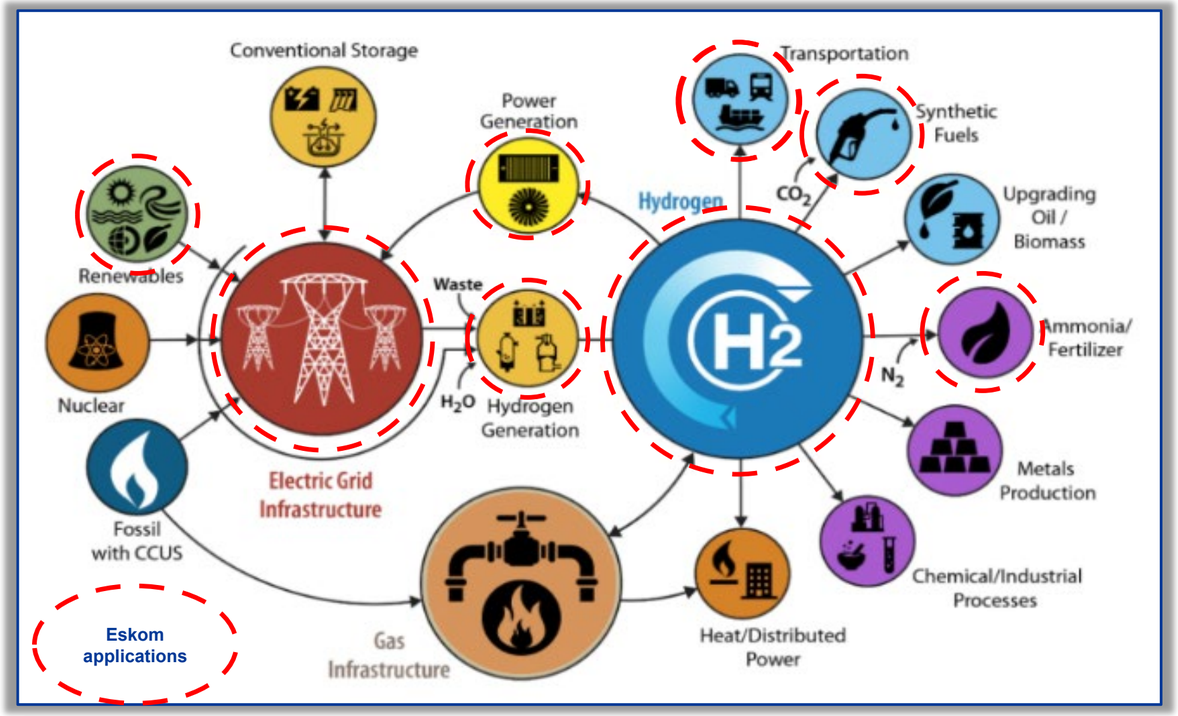
1. Global & Eskom context – why green hydrogen?

Seven roles for hydrogen in the energy transition



Source: Hydrogen Council, 2017

Green hydrogen role and potential within an energy system

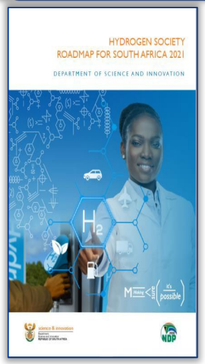


** Synthetic fuels and ammonia are intermediate steps to power generation and transportation applications.*

- Decarbonisation and geographical movement of renewable energy.
- Decarbonise "***hard to abate***" sectors – chemicals & fertilisers, steel, cement, long range heavy transport, aviation, shipping.

2. South African National Green Hydrogen Context

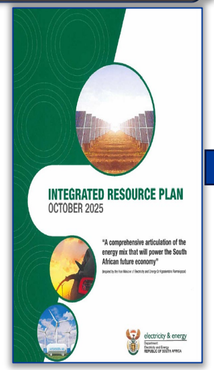
Green hydrogen is anchored in the following national plans









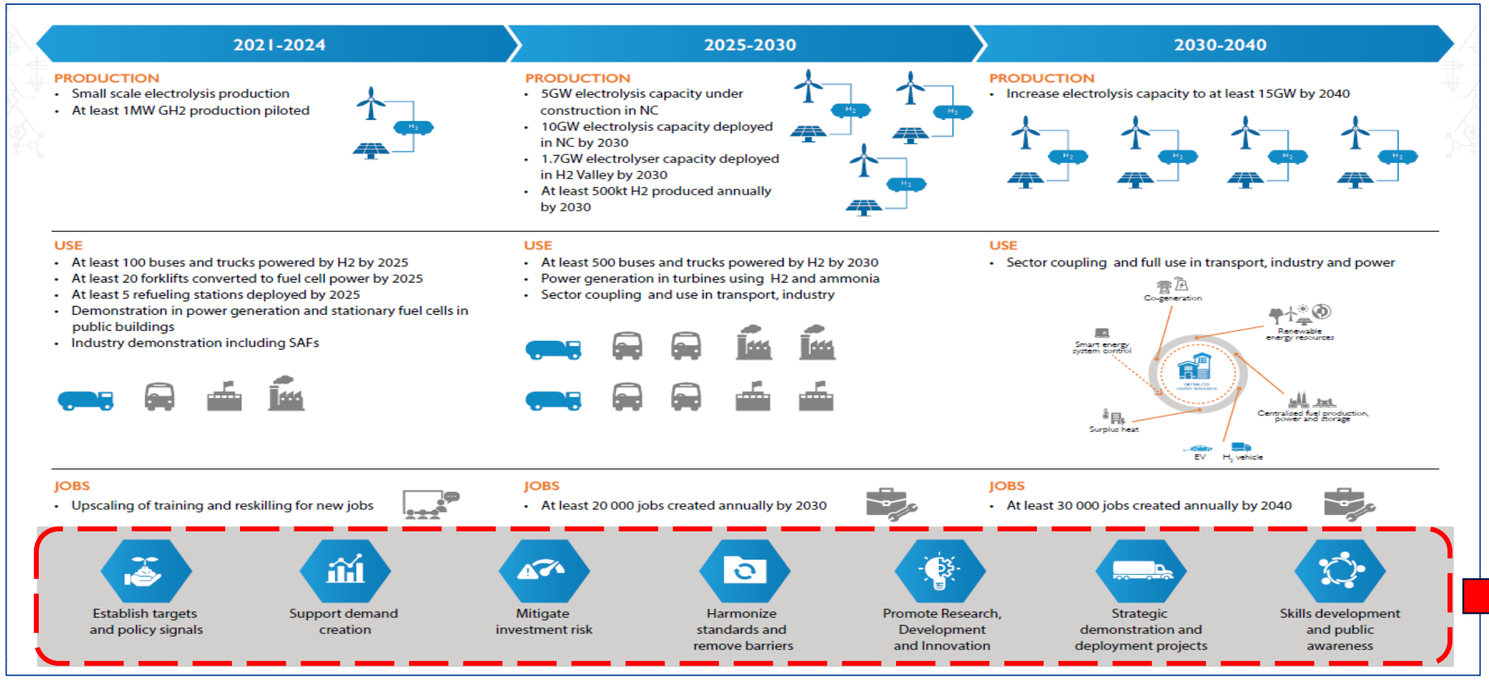


* *Hydrogen society roadmap is basis of subsequent national plans*

South African Context

- **Eskom participation and support of all SA plans since 2020.**
- Beneficiate and increase use of excellent renewable resources for decarbonisation
- Target exports and hard to abate sector use
- Advance industrialization, employment and a just energy transition
- Countries in Africa advancing green hydrogen are South Africa, Namibia, Morocco and Egypt.

DSTI - SA Hydrogen Society Roadmap (HSRM, 2021)

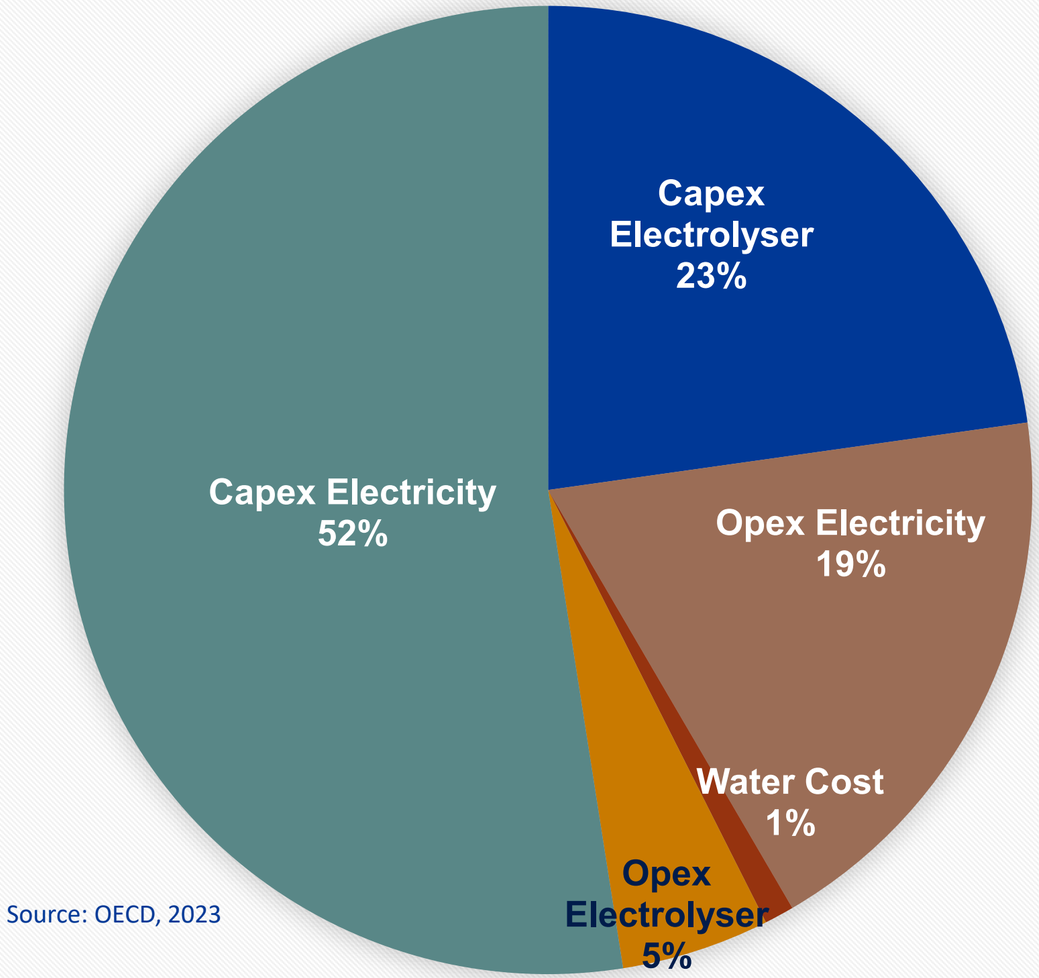


Eskom green hydrogen research and position in support of national roadmap objectives of:

- Promote research, development and innovation
- Strategic demonstration and deployment
- Skills development and public awareness
- Harmonise standards and remove barriers
- Support demand creation

3. What goes into making green hydrogen?

Green Hydrogen Cost Breakdown at Low Cost Location



Source: OECD, 2023

Electricity = 71% of final hydrogen cost/kg

Capex = 75% of final hydrogen cost/kg

4. Eskom's Green Hydrogen Technology Position

Eskom Green Hydrogen Opportunities and Position

Renewable energy growth via green hydrogen/derivative

1. Production for Sale/Own Use
Beneficiate renewable energy (RE) into green hydrogen/derivative for export/internal use. Focus on hard to abate sectors (fertilisers, aviation fuel, cement, steel)
New RE revenue streams from local and export renewable energy conversion to molecules

2. Power Wheeling
Use and grow NTCSA & Dx wires business to transport renewable electricity to South African green hydrogen production sites.



Eskom consumption-related applications

3. Blending
Hydrogen cofiring and blending into gas/fuel networks

4. Grid Services
Electrolysers for grid balancing, energy storage and ancillary services

5. Mobility
Decarbonise internal heavy fleets of Gx, NTCSA, DX, ERI

6. Off-Grid Solutions
Remote power, backup and niche applications (e.g. data centers)

Eskom Position

- Adopt a phased green hydrogen approach, aligned with evolving technology readiness, cost trajectories, and market dynamics.
- Implement selective pilot and demonstration projects to validate priority applications and progressively define commercially viable use cases, providing a clear pathway for future deployment once economic and technical viability is achieved.
- Maintain flexibility to capture emerging hydrogen opportunities, technologies, partnerships, and market signals.

5. Eskom's Hydrogen Roadmap – Five Year Progressive Plan

Eskom Hydrogen Research
- Strategic analysis of Eskom line division applications – identified 6 end uses for Eskom

Eskom Hydrogen Position Paper
- Support the development of South African hydrogen roadmap and develop Eskom's position in supporting national hydrogen objectives

RHF: Proof of Concept – Hydrogen Production
- Preparation of RT&D green hydrogen production

RT&D PV Plant
- Refurb and bring online RT&D PV plant

RT&D Cofiring Research
- Research and pilot combustion testing

1

Prior to FY27

2

FY27

Hydrogen Fuel Cell Pilot Plant
- Installation of hydrogen fuel cell at RT&D offices for testing

Renewable Hydrogen Facility (RHF) Pilot Plant
- Installation of a hydrogen electrolyser at RT&D offices for green hydrogen production

Hydrogen Fuel Cell Pilot Plant
- Integrate fuel cell to receive hydrogen supply from RHF electrolyser for operation.

RT&D PV Plant
- Integrate PV plant to power RHF electrolyser, to generate green hydrogen

Hydrogen use case testing
- Production, Mobility, Fuel Cells, Synthetic Fuels, Other

CCUS Demo Plant
- CO_2 capture and utilisation

3

FY28

4

FY29

Green Hydrogen Strategy
- Development and approval of Eskom's strategy based on research and pilots

Distributed Energy Resources (DER) Lab
- Install of DER lab, and integrate hydrogen fuel cell to plant to test alternative sources

Hybrid Renewable Energy System (HRES)
- Incorporate pilot green hydrogen (RHF) into HRES future plans.

CCUS Demo Plant
- CO_2 storage

5

FY30

6

FY31

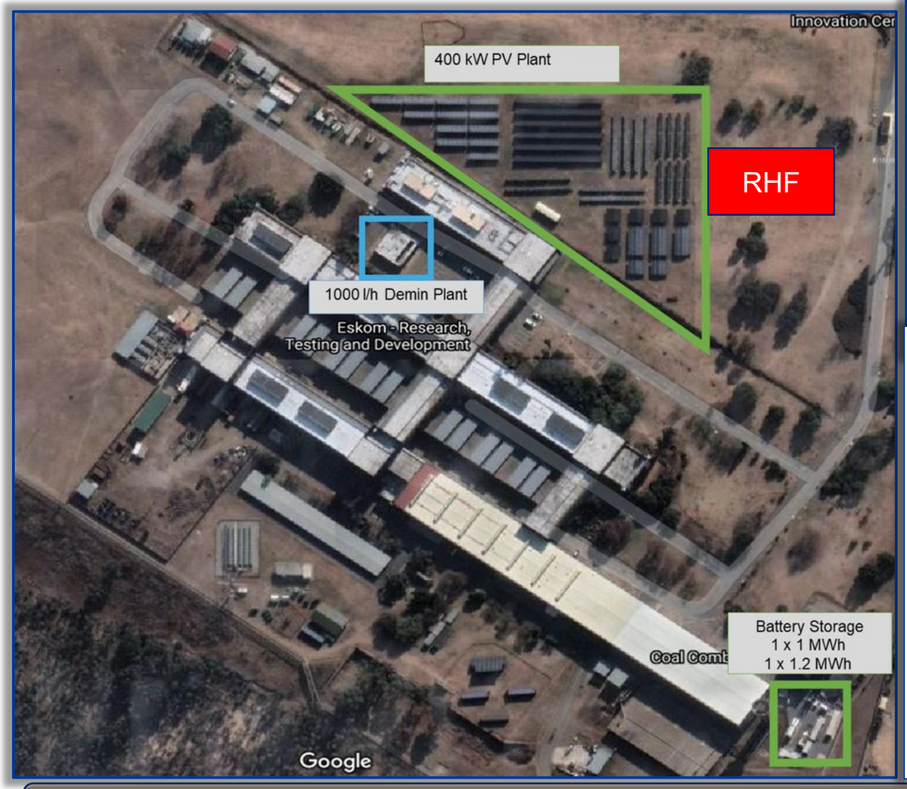
5 Year plan In support of and linked to Eskom:
- Clean coal strategy
- FY27 Corporate Plan

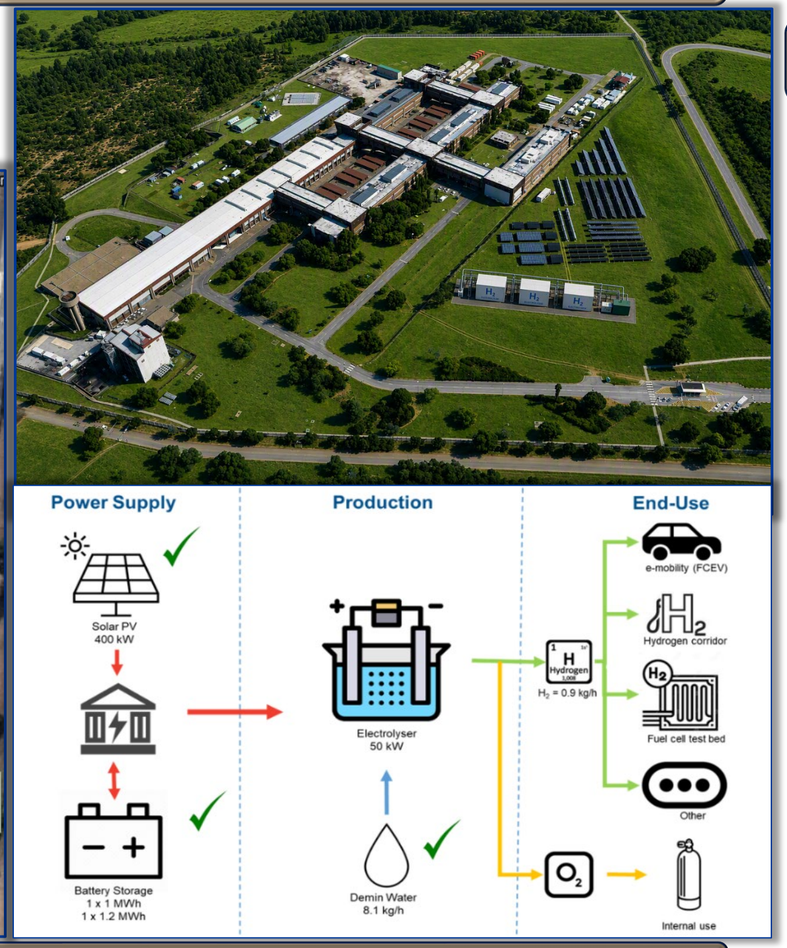
Eskom generating and pioneering green hydrogen as a power source.

** Grey hydrogen being used for current cofiring and fuel cell testing. Once in proof-of-concept production at RT&D, green will be used from 2028.*

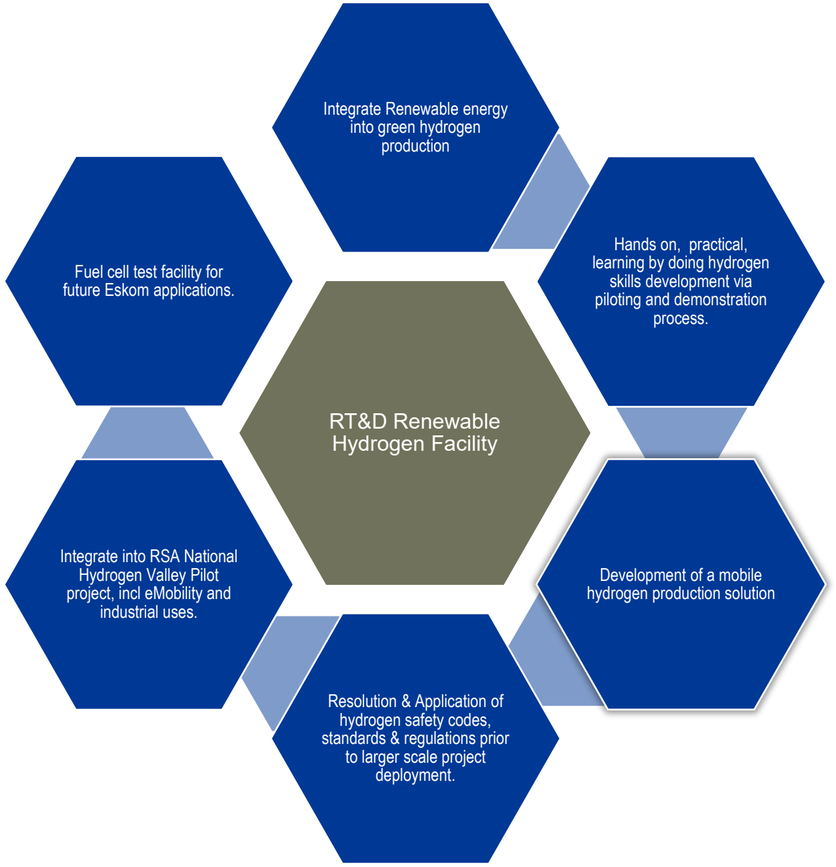
6. Pilot Eskom RT&D Renewable Hydrogen Facility

Eskom Research, Testing and Development, Rosherville, Johannesburg





Pilot RHF Objectives and Benefits



Construction: 2027; Commissioning and Testing: 2028