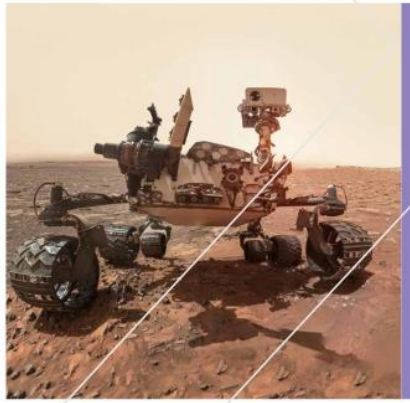
Western Eyre Green Hydrogen Project

24 October 2023

MR Glenn Toogood
GM Hydrogen and Clean Fuels



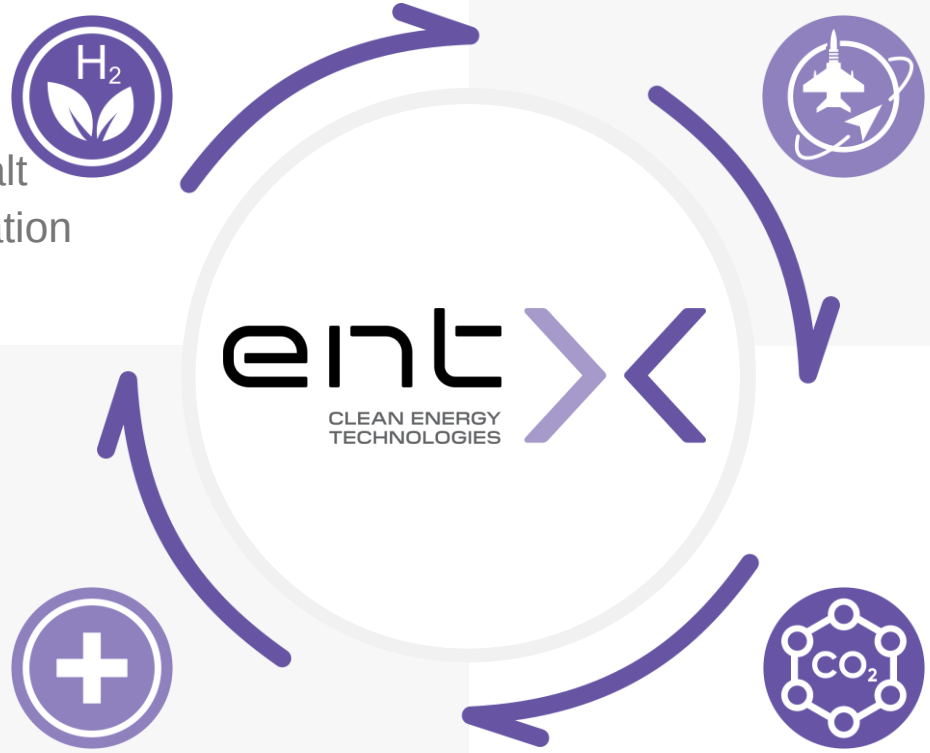
Who is entX?

Green Hydrogen

- Kimberly-Clark Green Hydrogen Supply
- Western Eyre Energy Storage
- Growth opportunities across H2 salt storage and industrial decarbonisation

Space and Defence

- Focused on energy supply
- GenX – Rapid prototyping disruptive technology
- Radioisotope Heater Unit



Medical Isotopes

- Developing secure Australian supply chains for vital and emerging medical isotopes

Carbon Transition Technologies

- CarbonX – Smart industrial decarbonisation
- PhosEnergy Process – Uranium from fertilizer streams

Western Eyre Green Hydrogen Project

- entX has identified and secured a rare opportunity in GWh-scale green hydrogen projects
- Potential for large-scale underground hydrogen storage (UHS) within engineered salt caverns
- entX holds Gas Storage exploration tenure over the entire onshore Polda Basin
- Active exploration program ongoing for salt-bearing formations suitable for cavern development

Polda Basin
Acreage Position

- Geoscience Australia publication on feasibility of UHS in salt caverns triggers interest
- Region has world class wind and solar potential
- SA has a legislative framework already in place to allow Hydrogen (as a regulated substance) to be stored under the *PGE Act,2000*

Feasibility of underground hydrogen storage in a salt cavern in the offshore Polda Basin

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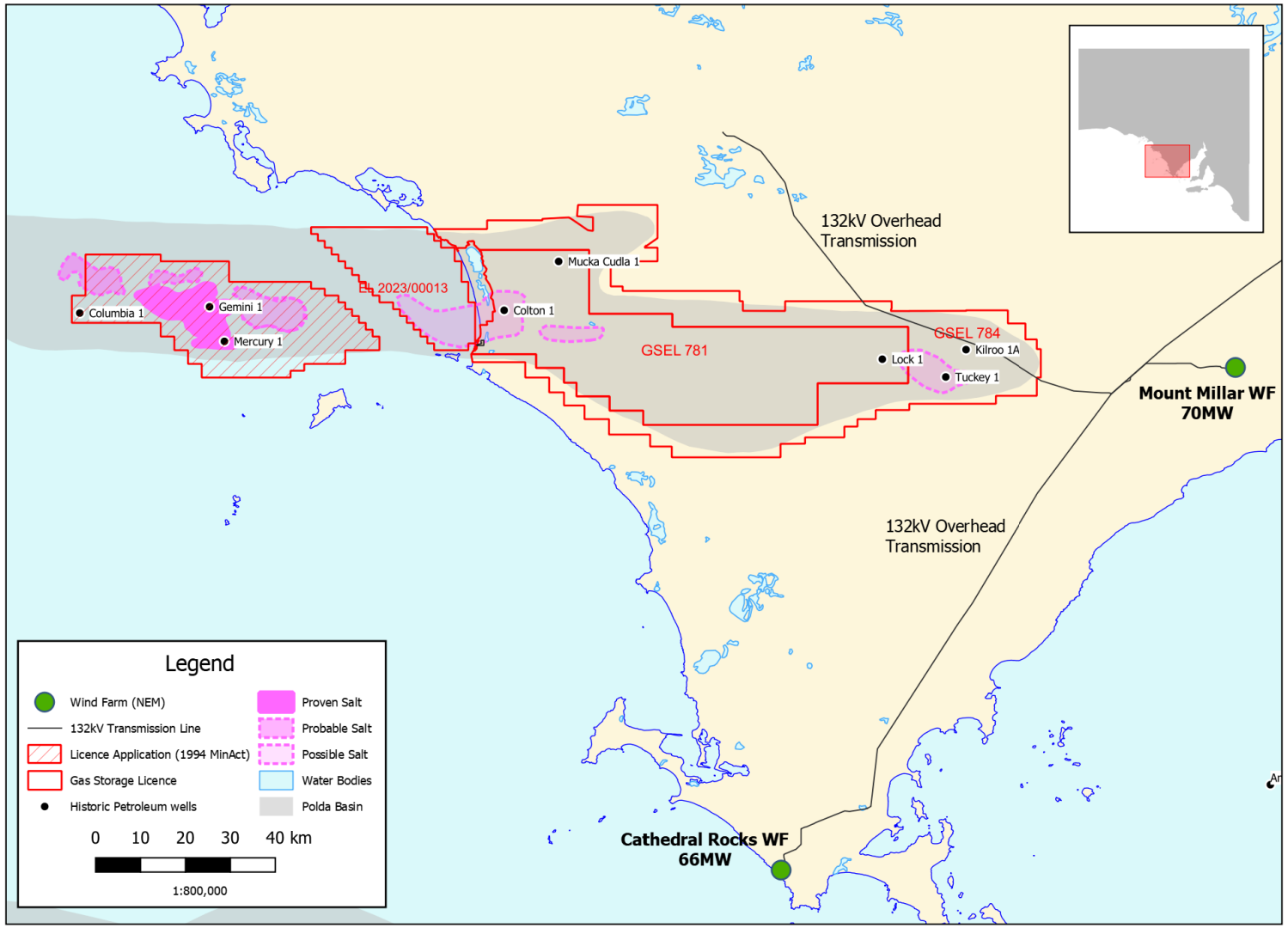
[1]Geoscience Australia

Underground hydrogen storage (UHS) in halite caverns will become an essential technology to supplement energy supply networks. This study examines the feasibility of UHS in the offshore Polda Basin by integrating previous seismic interpretation, well data and regional geology information. The Mercury structure in the central - east Polda Basin has extensive halite accumulations (both vertically and laterally) and has been identified as an area with high UHS potential. The net halite thickness is more than 1000 m, while the total potential area is about 217 km^2. Well data from the Mercury 1 well show a low thermal gradient (1.7–2.1 °C/100m) and overburden pressure gradient of approximately 18 ppg, providing effective gas operation pressure for UHS. To illustrate the feasibility of UHS, a conceptual design of a halite cavern is provided for a depth range of 1650–2000 m. Caverns with diameters of 60 m and 100 m are estimated to have storage capacities of approximately 240 GWh and 665 GWh, respectively. Multiple halite caverns could be constructed within the extensive Mercury halite accumulation. Further investigation into the potential for salt accumulations in the onshore Polda Basin is recommended.



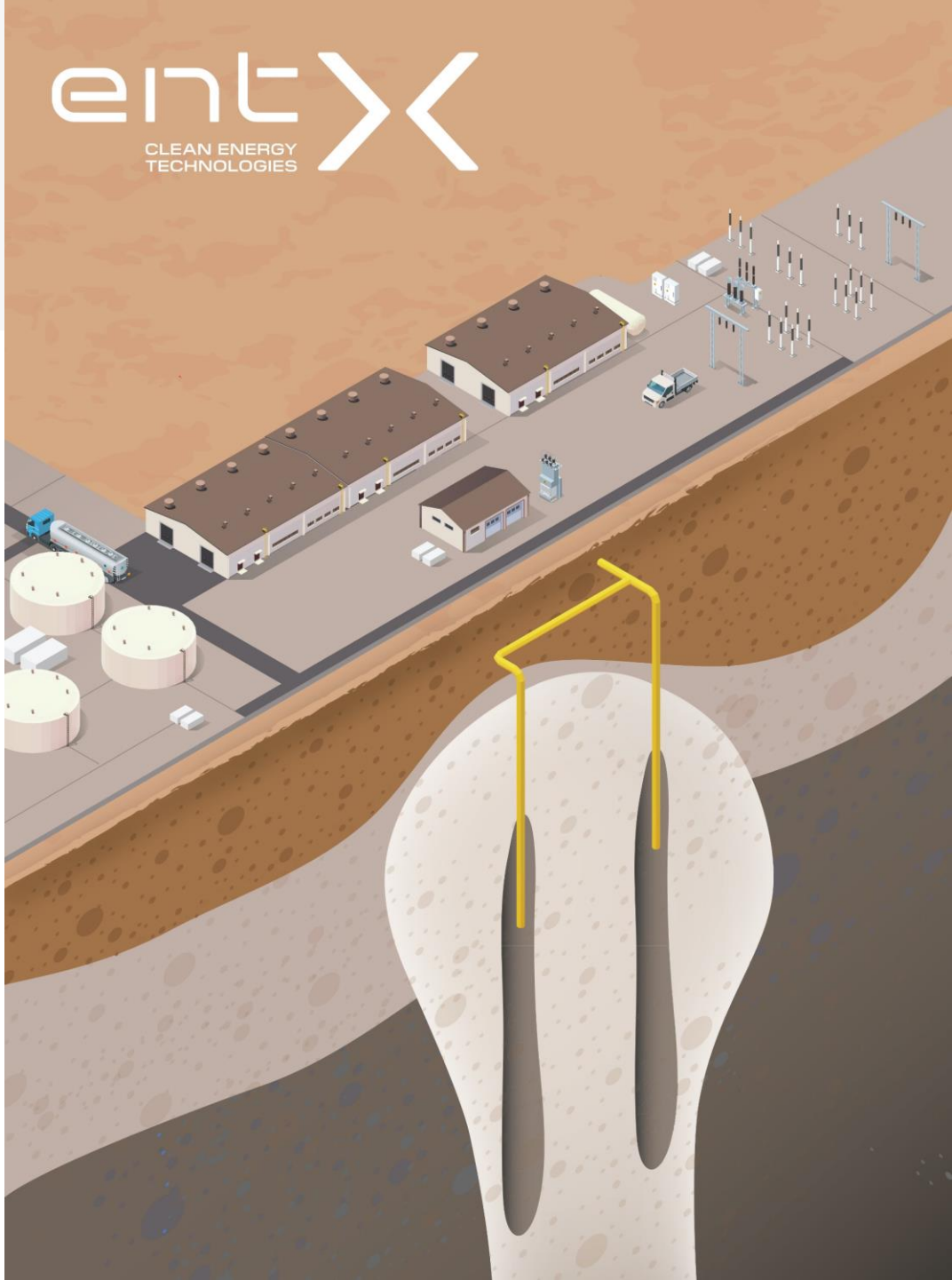
Western Eyre, SA

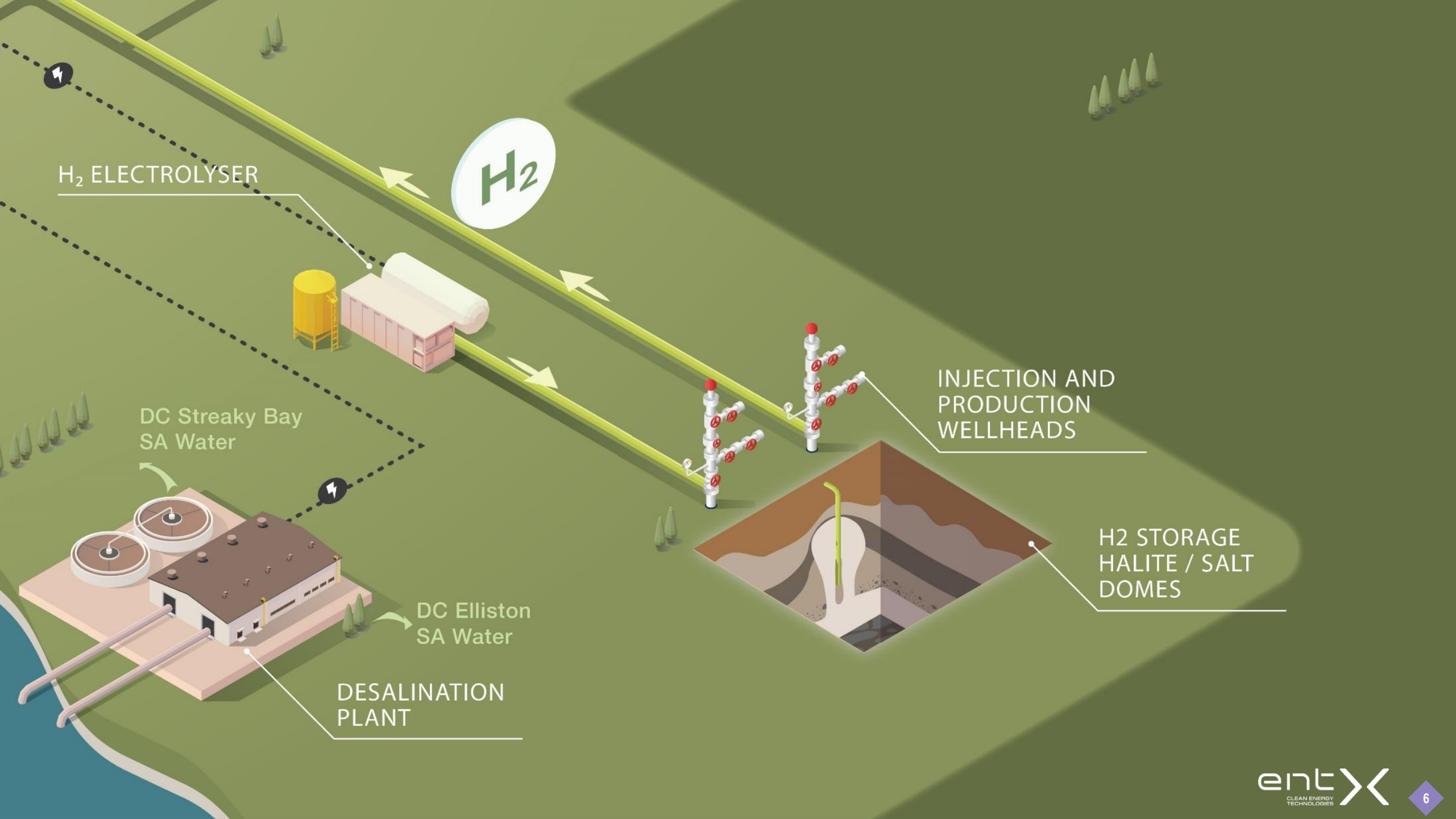
Green Hydrogen Storage

- entX holds gas storage exploration tenure over the entire onshore Polda Basin, Western Eyre Peninsula, SA.
  - *A tier-1 location for wind energy resource*
  - *High potential solar power region*
  - *Access to deepwater port, export infrastructure, local supply chain*
  - *Access to regional population centers and agricultural communities*

- The known salt in the Polda Basin holds storage capacity of up to **665GWh** (Snowy Hydro 2.0 is 350GWh)

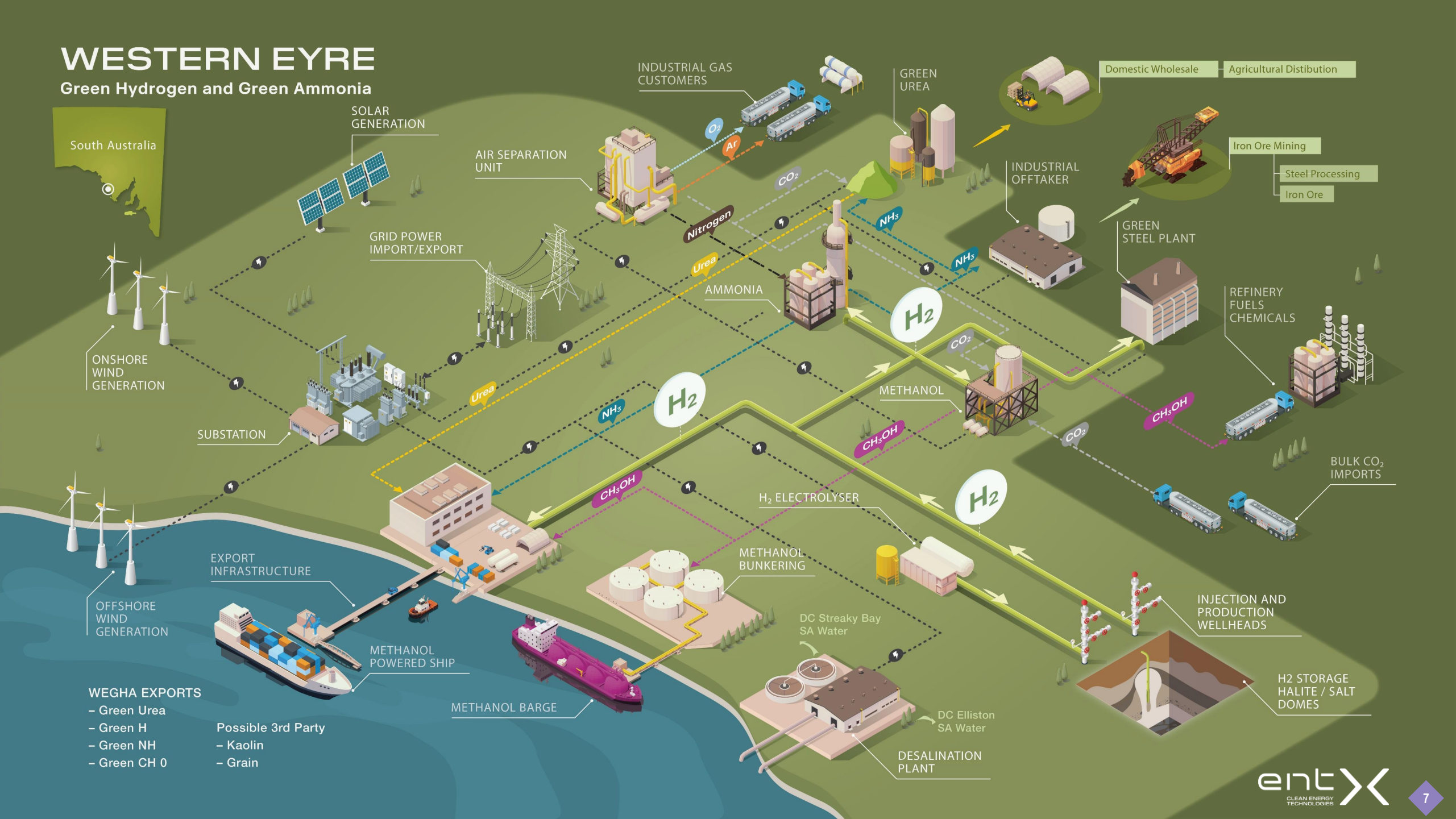
- Bloomberg NEF reports levelised cost of hydrogen storage: engineered tanks US$2.30; depleted gas field US$1.90/kg; rock cavern $1.71/kg; **salt cavern $0.23/kg**




H2
H_2 ELECTROLYSER
INJECTION AND PRODUCTION WELLHEADS
H2 STORAGE HALITE / SALT DOMES
DC Streaky Bay SA Water
DC Elliston SA Water
DESALINATION PLANT

WESTERN EYRE

Green Hydrogen and Green Ammonia



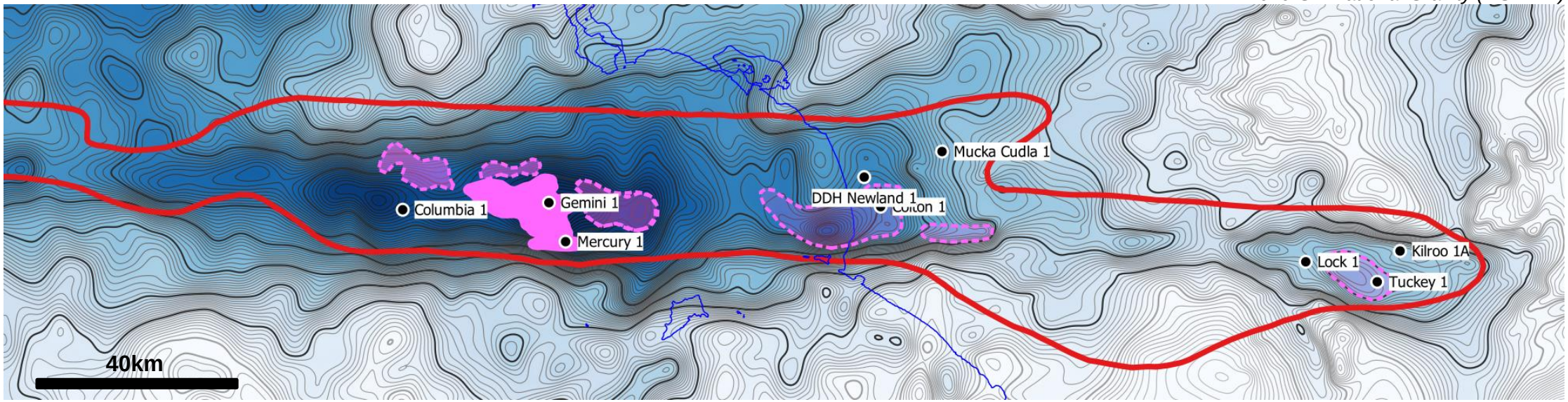
Community engagement

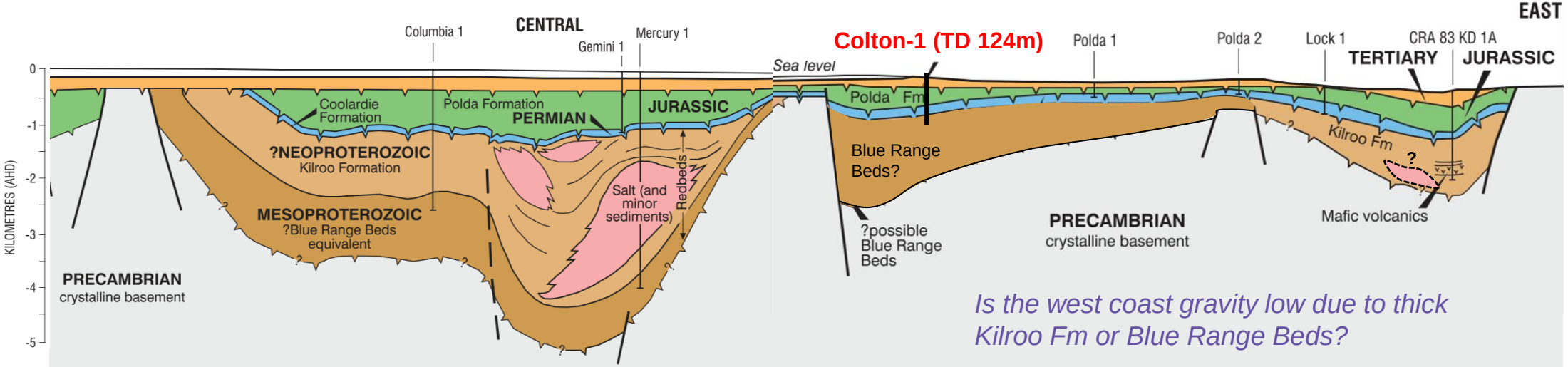
Exploration Concept:

Does the known offshore salt trend extend onshore?

The Polda Basin

2019 GA National Gravity (DGIR v2)





Is the west coast gravity low due to thick Kilroo Fm or Blue Range Beds?

Key Uncertainty:

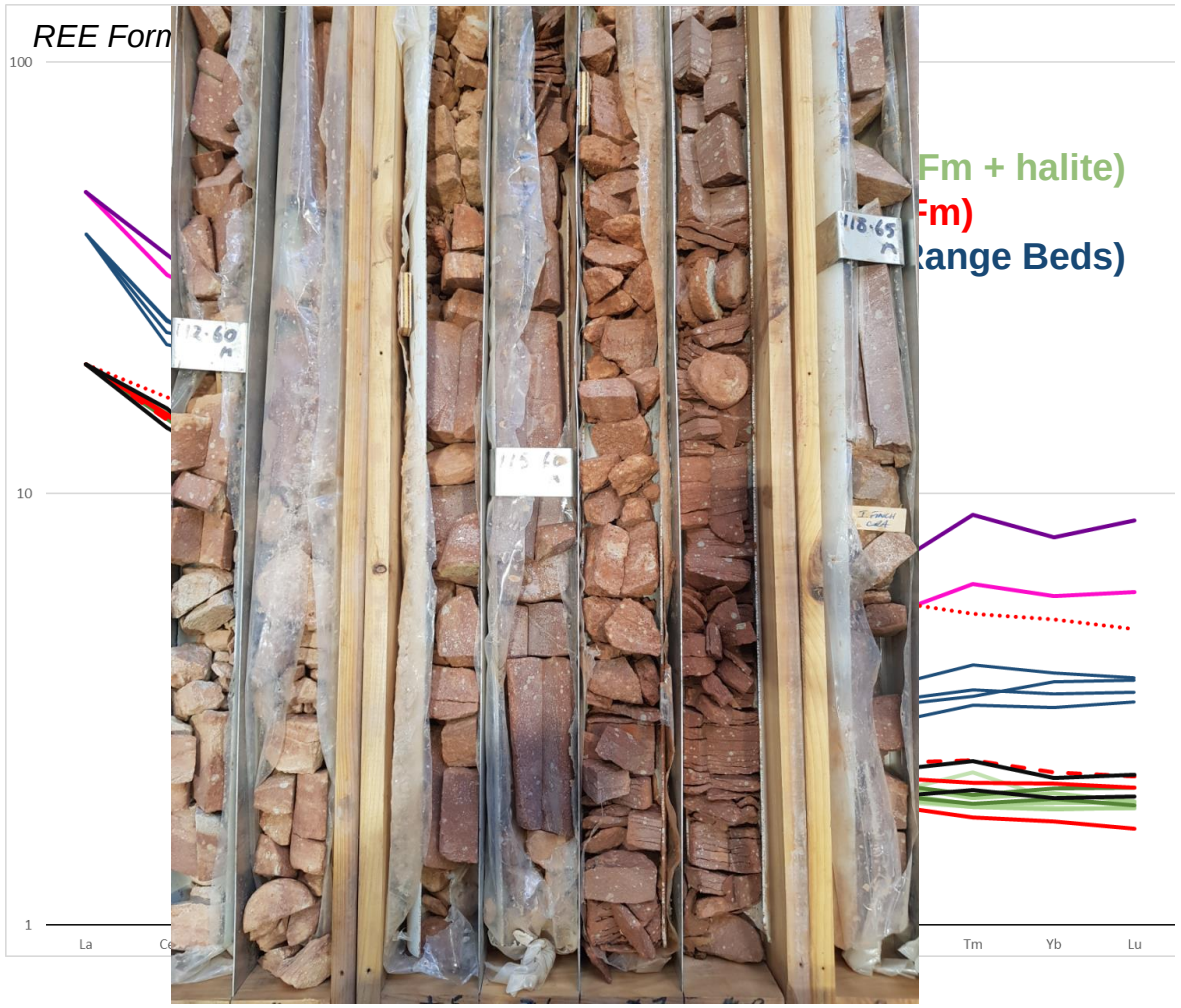
Did Colton-1 reach TD in Kilroo Fm or Blue Range Beds?

Data Analysis & Preliminary Results

Objective: confirm formation at base of Colton-1.
If Kilroo Fm, massive halite could also exist at depth.

- **Analysis**
  - Cores for Colton-1, Kilroo-1A, Newland-1 and Mucka Cudla-1 viewed in SA Core Library. **Colton-1 core formation ambiguous**
  - **ChemoStratigraphy** - 350 core chip and cuttings samples collected from 5 wells (incl. Mercury-1) for **ICP-MS/OES and XRF** analysis
  - Onshore cores processed through **HyLogger**
  - Blue Range Bed outcrops (Talia Caves) compared to Newland-1
- **Results**
  - Colton-1 samples plot on top of Kilroo-1A and separately from Newland-1 in Ti-Nb-Zr ternary space
  - Rare Earth Element assemblages closely match Mercury-1 and Kilroo-1A. Clearly different to Newland-1
  - Hylogger spectral signature and mineralogy closely resembles Kilroo-1A (moderate mafic clays and carbonates)

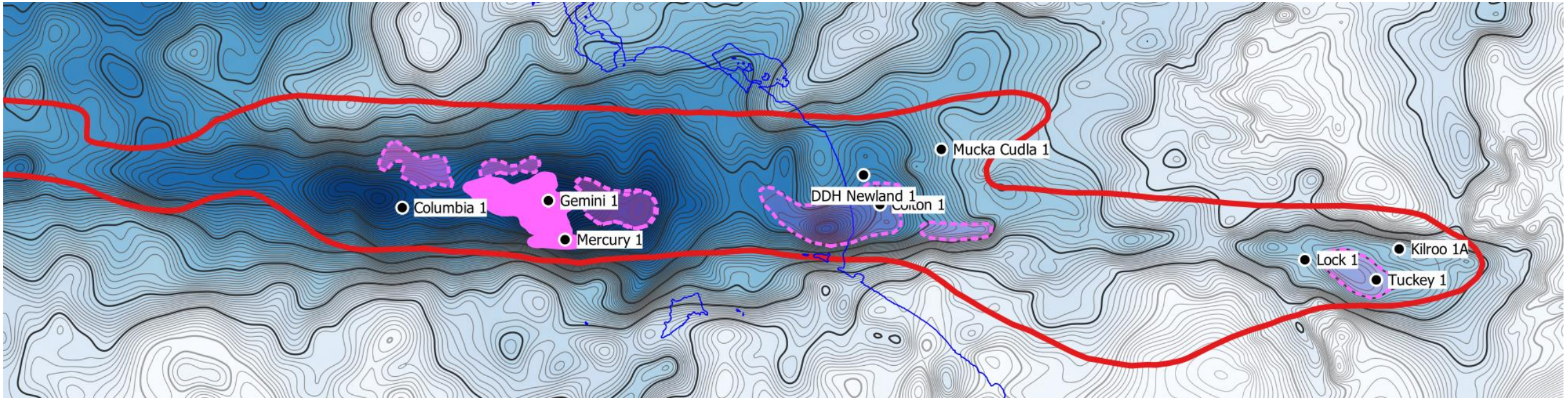
Colton-1 bottom hole core



Conclusion: Colton-1 and Mercury-1 both reached TD in Kilroo Fm, not Blue Range Beds

Future Exploration

- Reprocess offshore 2D seismic (PSDM, RTM, FWI)
- Acquire and interpret airborne FTG (full tensor gradiometry), grav-mag.
- 2D/3D seismic planning
- Drill testing high-graded exploration targets



2019 GA National Gravity (DGIR v2)

Summary

- The Polda Basin provides the potential for Australia's lowest cost green hydrogen production with an estimated 665GWh of natural storage capacity
- Underground hydrogen storage in salt caverns provides the lowest levelised cost of storage - ~$0.23/kg vs above ground tanks ~$2.30 kg
- *Petroleum Geothermal Energy Act, 2000* (South Australia) only legislative framework which allows for hydrogen as a declared substance under gas storage licencing regime

entX
CLEAN ENERGY TECHNOLOGIES

Fusing science and commerce to generate tomorrow’s energy