TOP END ENERGY
THE ENERGY OF TOMORROW

# MCARTHUR BASIN HYDROGEN AND HELIUM POTENTIAL

## SEAAOC CONFERENCE PRESENTATION

SEPTEMBER 2023

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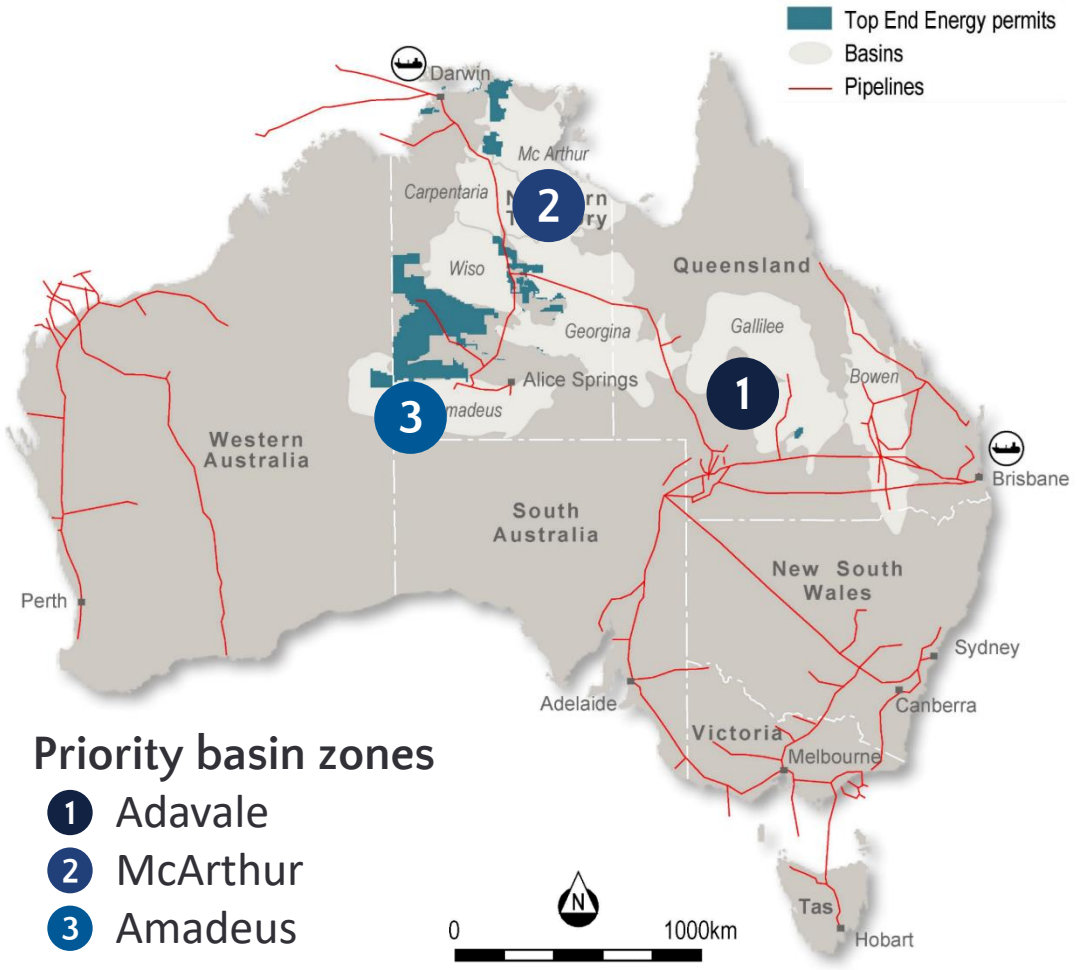
# ACKNOWLEDGEMENT OF COUNTRY

Top End Energy acknowledges Traditional Owners of country including the lands of the Larrakia people where we meet today

We pay our respect to Aboriginal cultures, and to Elders past, present and emerging

# LARGE, PROSPECTIVE AUSTRALIAN ACREAGE POSITION

- ~170,000km$^2$ total acreage postion[1]
- **Three technically independent high-graded focus areas**
  - Targeting basin margins
- High equity positions :
  - **ATP 1069** (100% interest), Queensland
  - **30 exploration permit applications** (~58% interest), Northern Territory
  - Permit application **Area L22-6** (100% interest), Western Australia
- Play opening potential for **natural gas, helium and gold (natural) hydrogen**
- **Close to existing infrastructure,** with access to 87% of Australian population and 38 mmtpa of LNG export capacity[2,3]



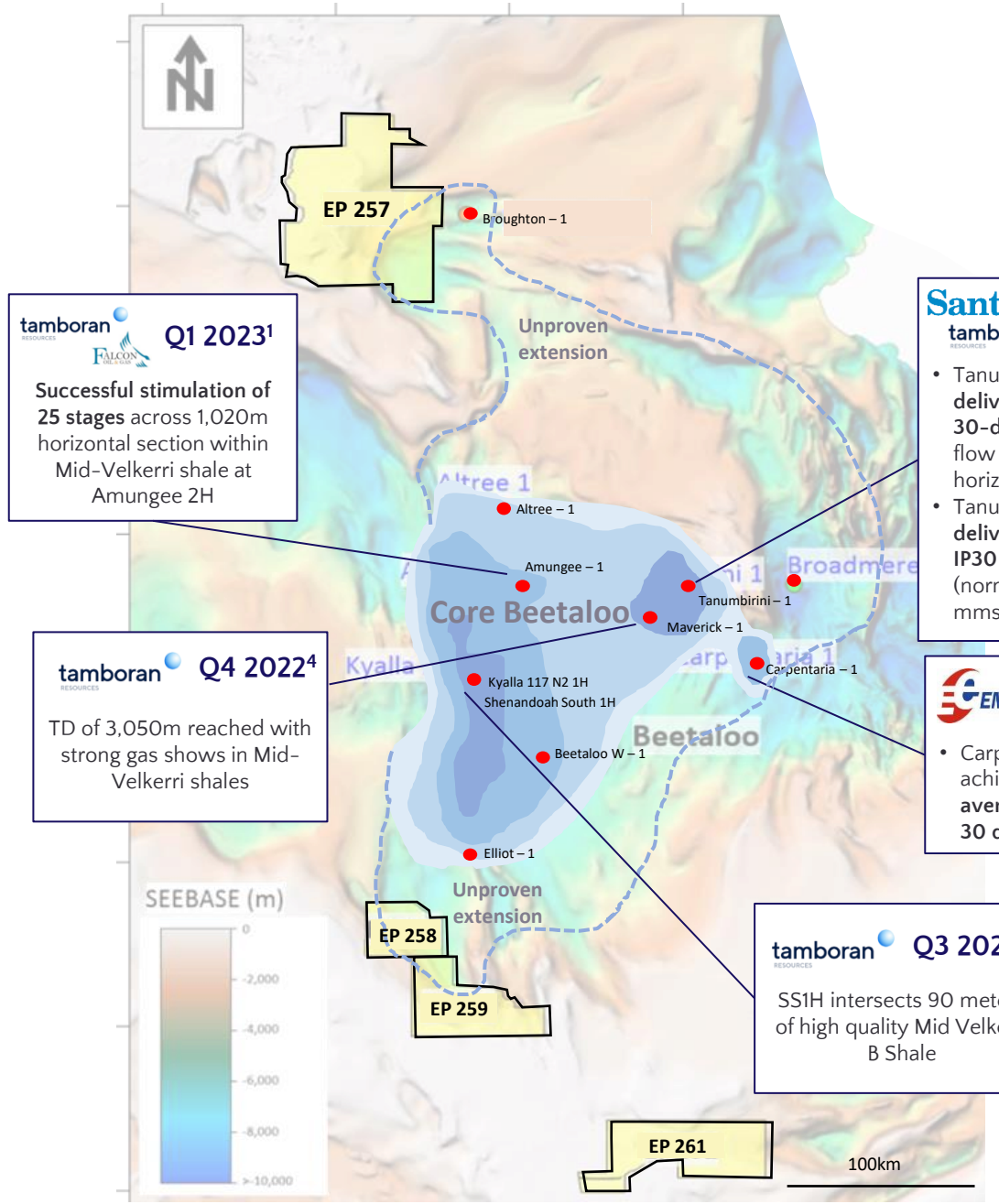

1. Acreage is a combination of granted and in-application permits
2. Australian Bureau of Statistics (population statistics at 30 September 2022)
3. Department of Industry, Science, Energy and Resources (Resources and Energy Quarterly December 2021)

# GREATER MCARTHUR BASIN

## TOP END IS TARGETING BASIN MARGINS

- **Potential basin margin extensions** of the Beetaloo are interpreted
  - Unconventional and conventional plays possible

- **Natural Hydrogen and Helium Prospectivity**
  - McArthur Basin suited to the generation of Natural Hydrogen & Helium
  - Well results elsewhere in the NT indicate potential for commercial recovery
  - Basin margins may be conduits for Natural Hydrogen migration
  - Existing (and expanding) natural gas infrastructure provide realistic avenues to commercialisation
  - Ability to leverage existing skillsets and exploration techniques to minimise additional fixed costs




tamboran Q1 2023[1]

**Successful stimulation of 25 stages** across 1,020m horizontal section within Mid-Velkerri shale at Amungee 2H

tamboran Q4 2022[4]

TD of 3,050m reached with strong gas shows in Mid-Velkerri shales

Santos tamboran Q3 2022[3]

- Tanumbirini 3H **delivered 3.1 mmscfd 30-day (IP30)** average flow rate of over a 600m horizontal section
- Tanumbirini 2H **delivered 2.1 mmscfd IP30 over a 660m** (normalised at 5.2 mmscfd over 100m)

EMPIRE energy Q3 2023[2]

- Carpentaria-3H achieved **3.3 mmscf average flow rate over 30 days**

tamboran Q3 2023[4]

SS1H intersects 90 meters of high quality Mid Velkerri B Shale

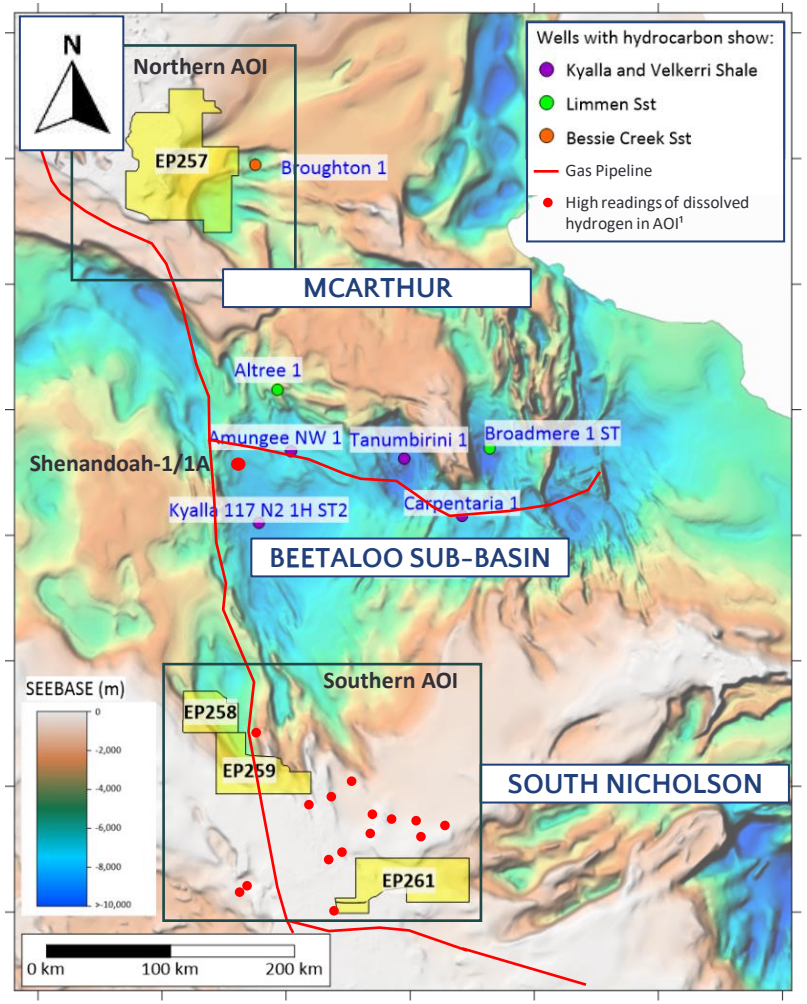
1. Refer to Tamboran Resources (ASX: TBN) announcement 22 March 2023, "EP 98 Operational Update - A2H Stimulation Complete"
2. Refer to Empire Energy Group (ASX: EEG) announcement 5 September 2023, *"Increased flow rates reported C-H3"*
3. Refer to Tamboran Resources (ASX: TBN) announcement 15 August 2022, *"TBN: Operational Update – EP161 Flow Results Update"*
4. Refer to Tamboran Resources (ASX: TBN) announcement 30 August 2023, *"EP 117 Operational Update"*

# MCARTHUR BASIN ZONE

## HYDROGEN AND HELIUM PLAY SYSTEMS ELEMENTS

| | | | | | |
|---|---|---|---|---|---|
| Basement Terrane | Archean to Early Proterozoic Craton ✓ | | | | |
| Basement Lithologies | Granites ✓ | Mafic Volcanics ✓ | Iron Rich Metamorphics | | |
| Migration and Focus | Fault Zones ✓ | Lithospheric Boundaries | Basement Lineaments ✓ | Lamproite Pipes ✓ | |
| Leakage & Retention | Shallow Depth (<1000m) ✓ | Hydrogen Escape Features | Permo-Carboniferous aquifers | Volcanic Seal ✓ | Salt Seal |

✓ Evidence of being present in the AOI



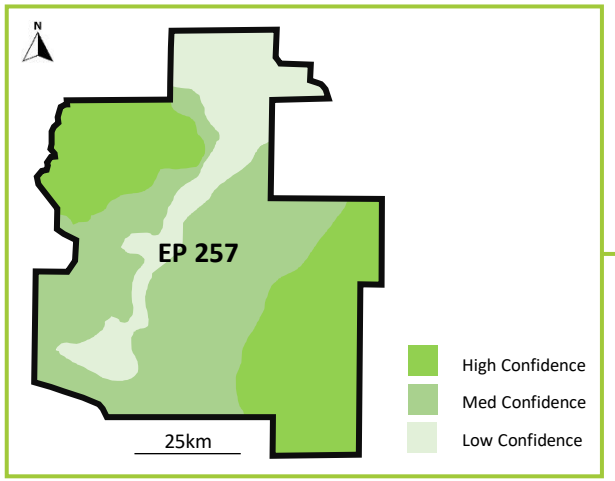

- Play fairway mapping across AOIs of the McArthur Basin
- High Helium concentrations measured at Shenandoah-1A well
  - Radiolysis of groundwaters is occurring in the McArthur Basin
- A Geoscience Australia hydrogeochemical survey sampled high concentrations of dissolved natural Hydrogen and Helium in groundwater in the greater Tennant Creek area[1]

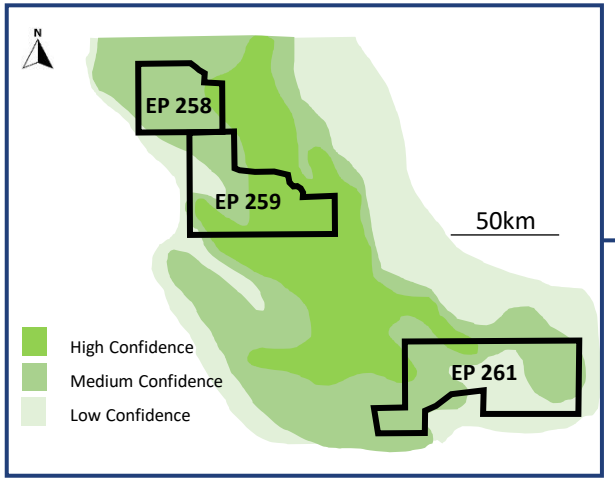
[1] Schroder, I., Caritat, P. de, Wallace, L., Trihey, J., Tobin, J., Boreham, C., English, P., Sohn, J., Palatty, P., Coghlan, R., Flower, C., Maher, P., Thorose, M.D., Long, I., Byass J. and Jinadasa, N. 2020. *Northern Australia Hydrogeochemical Survey: final data release and hydrogeochemical atlas for Exploring for the Future*. Record 2020/15. Geoscience Australia, Canberra. http://dx.doi.org/10.11636/Record.2020.015

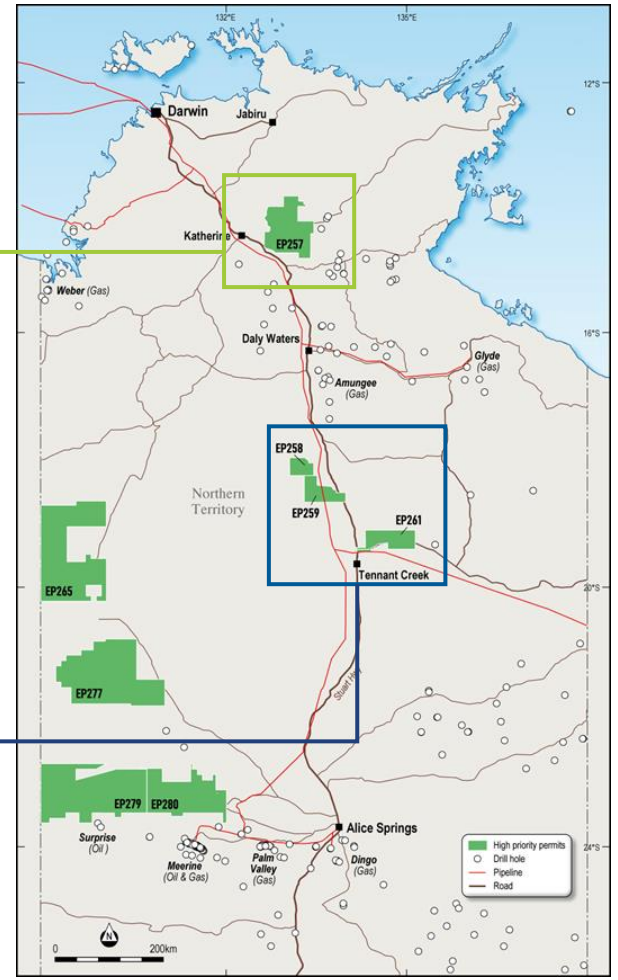
# NATURAL HYDROGEN AND HELIUM POTENTIAL

## RESULTS OF PHASE 1 PLAY FAIRWAY MAPPING

- TEE study indicates all the natural Hydrogen play systems elements are present on the margins of the McArthur Basin
- Highly prospective play fairways which will be a focus for future exploration work programs
  - Acquisition of 2,500km of Falcon airborne gravity gradiometry data over EP 258 to be integrated into further natural Hydrogen studies
  - Soil sampling and complimentary on ground exploration being considered alongside hydrocarbon activities
- **Focus on EP 258 initially with activities tailored to the exploration of natural Hydrogen and Helium in parallel with natural gas exploration programs**



# THANK YOU

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