

New Uses for "old" Radioisotopes Bryn Jones, entX Limited

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entX has assembled a world-class team of scientists specialising in tomorrow's energy technologies. By combining this exceptional skill base with leading-edge technology, strong financial backing and highly experienced management, entX aims to identify, develop and commercialise clean energy solutions.

The Company's over-arching strategy is to utilise its exceptional intellectual and technical property to deliver energy which is more sustainable, efficient, effective and reliable than anything offered today.



Using clever science and cutting-edge technology to create tomorrow's clean energy solutions



Four Distinct Areas of Opportunity



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

Carbon Transition Technologies

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

Medical Isotopes

 Developing secure Australian supply chains for vital and emerging medical isotopes

Team - Our People





Mr Bryn Jones Managing Director









Dr Julian Kelly Chief Technical Officer



AdvanCell



Dr Massey de los Reyes Principal Scientist



EPA

South Australia

Government of South Australia

Attorney-General's Department



Dr Scott Edwards General Manager -Space and Defence





Mr Damien Connor CFO & Company Secretary





Mr Leigh Whicker Commercial Manager





Mr Glenn Toogood

General Manager

Hydrogen and Clean

Fuels

ExonMobil QANTAS Santos



Team - Our Board





Mr Anthony Kiernan Chairman









Mr Bryn Jones Managing Director











Ms Lucy Gauvin Non-Executive Director



Piper Alderman



Mr Tim Goyder Non-Executive Director











Mr Tim Wise Non-Executive Director





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Technology Structure and Partnerships





Development Strategy and Technology Synergies









- Betavoltaics
- Radioisotope Heating Unit (RHU)
- Radioisotope Thermoelectric Generator (RTG)



GenX – Disruptive Betavoltaic Technology



- Development using a volume manufacturing approach and methodology
- CRC-P with total project value of \$6.2 million to develop the GenX product suite 2022-2025
 - UniSA, University of Adelaide and University of WA
 - Duromer and Ascension as industry partners
- Contracted by another entity to undertake accelerated prototyping for delivery in June 2024

Project Highlights

- Patented, third party sponsored technology
- Fully funded through delivery of commercial, tested prototypes ahead of commercial sales
- Flexible, platform enabling technology



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Radioisotope Heater Unit (RHU) for Lunar Night Survival



Develop an RHU-supported technology platform for providing thermal solutions for lunar products to ensure multiple night survival (eg. Lunar beacon)

- RHUs have been used in the global space industry for many years to provide internal heat to keep electronics warm in extreme environments
- Previously funded by the Australian Space Agency, entX conducted a feasibility assessment on an Australian-sourced, beta-emitting RHU concept
- entX to now partner with iLAuNCH Trailblazer to develop and launch an RHU, focused on lunar night survival
- Launch to sub-orbit a low-powered, RHU-supported thermal switch by 2025
- FSA, approval and launch of a radioactive payload from Australia
 - Position RHU at TRL6, ready for lunar commercialisation project from Q2-2025
 - Australian capability for radioactive payload launches

Project Highlights

- Secure IP for RHU core material and form-factor development
- Other radioisotopes will be reviewed in parallel



Radioisotope Thermoelectric Generators (RTG)



entX to develop new, high-performance thermoelectric materials and components for RTG technology

- Funded by iLAuNCH in collaboration with the University of Southern Queensland (UniSQ)
- Development of high-performance materials and synthesis methods.
 - Development and scale of fabrication methods
 - Utilising existing fabrication methods at UniSQ
- Design and Assembly of Thermoelectric Components for RTG Technology
 - Synergies with RHU to be explored
- Demonstration and validation of these components in simulated RTG system by March 2025





Carbon Transition Technologies

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CLEAN ENERGY TECHNOLOGIES

- CarbonX betacatalysis
- PhosEnergy



CarbonX Betacatalytic Technology On-board Energy for CO₂

Conversion



 CO_2 represents a potential source of revenue for industrial emitters. An innovation priority is reducing the energy needed to convert CO_2 waste to fuels and chemicals, through advanced conversion routes

The CarbonX Process is a technology for the conversion of waste CO₂ into catalysed, commercial organic compounds without prohibitive energy input.



- CarbonX is currently being scaled through TRL4 to 6 in collaboration with our partners at ANSTO and RMIT
- Patents granted in South Korea and South Africa, and pending in US, Europe, Japan and across all major markets



CTT | PhosEnergy Process



The PhosEnergy process extracts Uranium from phosphate fertilizer streams. The PhosEnergy process has the potential to unlock U_3O_8 production equivalent to 15% of current global production.

Market Size and Opportunity

- A 2014 PFS on a small facility (~350klb/a) in the USA indicated cash costs in the low US\$20/lb range and an incentive price near recent spot uranium prices
- Much larger facilities exist in the USA and globally which should offer superior pricing structures



Strategic Partners

- Cameco Co-Owner (75%) of IP vehicle and significant uranium company
- ANSTO Early-stage development partner and royalty holder
- Two major US based phosphate producers technology development partners

Major Phosphate Production Locations

- USA
- Morocco
- Tunisia
- · Saudi Arabia
- China

Next steps: Development of 'new' marketing strategy to engage and unlock opportunities across USA and global phosphate production facilities to allow first scale project



Medical Isotopes

Developing secure Australian supply chains for vital and emerging medical isotopes via two specific projects



Medical Isotopes





entX is developing processes and technologies to feed the exponential growth of the Theragnostic and Targeted Alpha Therapy cancer treatment markets.

Key Developments



- Lutitium-177 (177 Lu) is currently the most used radiometal for targeted radionuclide therapy due to its commercial availability and the clinical success of a 177 Lu-based peptide for the treatment of neuroendocrine tumors and prostate cancer
- Lead-212 (212 Pb) is an emerging Targeted Alpha Therapy isotope which is projected for rapid uptake in the nuclear medicine sector due to its favourable inbody chemistry

Project Highlights



- 177-Lu Supply Chain Development underway at UniSA, proof of concept ' completed and aiming for a commercial demonstration in Q4 2023
- **212-Pb Supply Chain –** Joint Development Agreement with Tellus Holdings Ltd to source up-stream components from waste material
- The Company intends to generate commercial qualities of these medical isotope precursors sometime in 2025



Fusing science and commerce to generate tomorrow's energy









