

## **AUSTRALIA CAN INCREASE ANNUAL EXPORT REVENUES BY \$35 BILLION WITH CLEAN HYDROGEN FROM COAL**

A feasibility study commissioned by Low Emission Technology Australia (LETA) reveals how Australia could increase annual export revenues by 71 per cent with a potential value of \$35 billion.

The study outlines the contribution the revolutionary Allam-Fetvedt (Allam) Cycle technology could make in positioning Australia as a world-leading net-zero energy exporter and at the same time providing necessary daily energy storage and firming capacity to complement increasing levels of renewables entering the electricity grid.

“This feasibility study makes a compelling case for continuing to develop low emission technologies which are critical to a net-zero carbon emissions future, energy reliability and Australia’s prosperity,” said LETA Chief Executive Officer, Mark McCallum.

“This technology’s use at scale would introduce on demand and near-zero emission hydrocarbon and biomass power for Australia — complementing renewables’ increasing role in the energy mix — and can also produce clean hydrogen and ammonia.

“Unlike a peaking power gas plant that operates only from time to time and still produces carbon emissions, or an ammonia plant that consumes but cannot produce electricity, the Allam Cycle can do both — and cleanly.

“This unique, game-changing technology, working with carbon capture utilisation and storage (CCUS), can enhance Australia’s GDP as well as decarbonise and power hard-to-abate industries we rely on every day, like steelmaking and plastics manufacturing.

“Importantly, it can also create competitive, zero-emission industries like hydrogen and fertiliser using CCUS and coal, and pave the way for new technology jobs as we transition to a low carbon economy.”

Using black coal as the fuel in Queensland, Allam Cycle plants could produce both clean hydrogen at or below the government’s targeted \$2 per kilogram for domestic consumption and global export, and clean electricity to balance and firm renewable generation domestically.

“With this technology, Australia could export the equivalent thermal coal exports as clean hydrogen and increase annual export revenues by 71 per cent,” said Mr McCallum.

“We have the opportunity for high quality Australian coal to be a net-zero resource exported around the world, as hydrogen and ammonia.

“What our feasibility study shows, is that aside from the domestic application, the Allam Cycle can unlock lucrative new, clean industries and assist our regional trading partners — for example, Korea, Japan and Singapore — meet their own emissions reduction aspirations and energy needs.

“Now that we know there is a strong business case for the Allam Cycle as a producer of hydrogen, hydrogen as ammonia, or electricity on its own, potentially there could be a baseline plant-scaled facility operational this decade.

“I’m very excited about this possibility and the strategically significant role the Allam Cycle could play for Australia economically and environmentally.”

The Allam Cycle has been identified in the Australian Government's recently released second Low Emissions Technology Statement as a potential technology for energy storage and CCUS application.

The feasibility study complements LETA's Allam-Fetvedt (Allam) Cycle Syngas Combustor Project which is being progressed through a cooperative agreement with the US Department of Energy (US DoE) as a cost-sharing partner.

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### About LETA

LETA is a \$550 million fund established by the Australian black coal industry to invest in technologies that can significantly reduce emissions and support the transition to a low emission global economy, in line with the Paris Agreement. We partner with government and industry locally and internationally to develop projects that reduce and remove carbon emissions from large-scale industrial processes such as power generation, steel and cement manufacturing, mining, and future energy sources such as hydrogen. Our investment in low-emissions technologies demonstrate and support global action to lower industrial emissions in Australia and overseas.

### About LETA projects

LETA's projects include Australia's first carbon hub in Queensland, the Carbon Transport and Storage Company CCUS project, clean hydrogen production and the Allam Cycle – a near-zero emission power generation technology for coal.

### Notes to editor:

1. The Allam Cycle is unique, game-changing technology which has the potential to produce electricity at a lower cost than conventional fossil fuel generation with inherent carbon capture and zero air emissions, and can also produce clean hydrogen and ammonia.
2. It can deliver electricity from coal that, unlike conventional coal-fired power, co-produces clean hydrogen, captures its CO<sub>2</sub>, and can quickly ramp up and down at a similar rate to natural gas, enabling the grid to manage higher levels of intermittent renewable sources.
3. At the same time, because of its inherent carbon capture, it avoids CO<sub>2</sub> emissions to the atmosphere.
4. The Allam-Fetvedt Cycle is an advanced supercritical CO<sub>2</sub> power cycle that burns fuel with pure oxygen and uses the CO<sub>2</sub> by-product to drive a turbine, allowing for high efficiencies to be reached with inherent CO<sub>2</sub> capture, near-zero air emissions, high flexibility, and zero required water use.
5. The Zero-Emission Supercritical Carbon Dioxide Syngas Oxy-Combustor Development and Testing project (the **Allam-Fetvedt (Allam) Cycle Syngas Combustor Project**) will design, build and test the world's first syngas-fuelled supercritical carbon dioxide (sCO<sub>2</sub>) combustor for the Allam-Fetvedt Cycle. Specifically, it will develop a syngas-fuelled 50 MWth combustor designed to be utilised with high-pressure, high-temperature, oxy-fuel, supercritical carbon dioxide (sCO<sub>2</sub>) power cycles, with particular focus given to the conditions required by the Allam-Fetvedt (AF) Cycle, in order to lower the cost of coal power with near-100 per cent carbon capture below that of current state-of-the-art power systems
6. This allows for clean hydrogen production, as hydrogen is separated from syngas for export, before the syngas enters the combustor for power generation.
7. The Allam Cycle Prefeasibility Study explored the feasibility of deploying the Allam Cycle technology to Australia and establishing a business case for:
  - a new power station that must co-exist alongside renewables
  - an ammonia production-focused facility that also generates electricity, and
  - a 'blue' hydrogen facility that generates electricity.
8. There are strong synergies between the Allam Cycle projects and LETA's plans to establish a carbon hub in Queensland.

9. Carbon storage is a critical part of the equation when it comes to enabling a net-zero emissions future and establishing new, clean industries, including hydrogen.
10. Queensland has world-class carbon storage sites capable of permanently and safely storing potentially billions of tonnes of CO<sub>2</sub> from many sources. Access to this and the infrastructure needed for world-class export industries in Gladstone makes Queensland an ideal site for a multi-industry carbon hub and regional hydrogen export hub.