Submission No 29

INQUIRY INTO DEVELOPMENT OF A HYDROGEN INDUSTRY IN NEW SOUTH WALES

Organisation: LAVO

Date Received: 26 February 2021

Hon Sam Farraway MLC
Chair, Standing Committee on State Development
Parliament House, Sydney NSW 2000

Via email: state.development@parliament.nsw.gov.au

26.02.2021

Dear Mr Farraway

INQUIRY INTO THE DEVELOPMENT OF A HYDROGEN INDUSTRY IN NEW SOUTH WALES

Thank you for the opportunity to make a submission to this important inquiry.

This submission addresses some your Terms of Reference while at the same time highlighting the innovation that is already underway in New South Wales as the emerging hydrogen industry gathers pace.

About LAVO

LAVO is an Australian technology and lifestyle company powered by hydrogen.

LAVO has the first and only commercial-ready hydrogen energy storage system in the world designed for everyday use by residential homes and businesses. Developed by leading researchers at the University of New South Wales (UNSW), our technology provides a more complete, versatile and sustainable solution than other energy storage solutions currently on the market.

We aim to power a cleaner, more sustainable future through the cutting-edge hydrogen storage technology built into the LAVO System.

LAVO is a privately held Australian company, funded by a small group of investors who believe in the power and potential of hydrogen as the energy source of the future. The company has recently undergone a Series A capital raising activity and the current investor deck has been supplied as a reference.

LAVO is part of the Providence Asset Group (PAG); an organisation focused on creating impactful investments through commercialising technology for generating and storing electricity.

Through the commercialisation process, PAG will focus on developing infrastructure assets and consumer products that eliminate the need for electricity generated from fossil fuels. This focus on clean energy will promote reduction in greenhouse gas emissions.

The technology

LAVO's technology has a storage capacity three times greater and a lifetime more than two times longer compared to market alternatives, offering a unique value proposition and strong competitive advantage.

LAVO's patented metal hydride absorbs hydrogen in a metal alloy to enable safe, long term storage within a secure vessel. Designed to be portable and versatile, LAVO's technology can be used for a diverse range of everyday applications.

Beyond its first product to market, the LAVO System, LAVO is developing a range of lifestyle technology products, including a hydrogen-powered barbecue and bicycle.

The LAVO System

The LAVO System is the first commercial application of LAVO's patented metal hydride storage technology.

Developed in partnership with UNSW and Design + Industry, the LAVO System is a hydrogen hybrid battery that stores more than 40KWh of electricity – enough to power the average Australian home for two days without additional solar input.

Integrating with standard rooftop solar, the system generates green hydrogen for renewable power.

The LAVO patented hydride absorbs hydrogen in metal alloy to enable safe, long term storage within a secure vessel, providing sustainable energy for domestic and business applications. We are particularly excited about the potential it offers to regional and rural properties with secure and reliable microgrid, edge of grid and off-grid energy solutions.

Each LAVO System contains:

- **Fuel cell:** The fuel cell is used to convert energy stored in the hydrogen back into electrical energy. This electrical energy is released by combining hydrogen from the hydride storage vessels and oxygen from the air to form water.
- **DC-DC converter:** A power conversion system is used to regulate the electrical output from the fuel cell. The electrical output from the fuel cell is variable. The DC-DC converter regulates this by boosting the voltage from the fuel cell output up to match the voltage expected at the input of the hybrid inverter.
- **Battery:** The LAVO™ system also includes a small traditional Lithium-ion battery for fast response time. A hybrid energy storage system provides benefits of both storage technologies
- **Hybrid inverter:** The hybrid inverter manages the flow of electrical energy between the solar cell array, the LAVO™ and the household.
- **Electrolyser:** The electrolyser converts excess electrical energy from the solar system through electrolysis, where the water is split into hydrogen and oxygen. The energy is stored as hydrogen and the oxygen is released into the atmosphere.
- **Water purifier:** The electrolyser requires demineralised water for the electrolysis process. The integrated water purifier treats the incoming tap water, enabling the electrolyser to run using a standard mains water supply.
- **LAVO hydride:** Patented metal alloy that stores and regulates hydrogen at a pressure of 30 bar, the hydride will deliver 20,000 cycles of storage and charge.

The LAVO system is available for pre-order now. We have been encouraged by the response from our pre-orders, with 190 Systems currently on order to the value of AUD $5,930,000. Domestic orders account for 56% and the majority of the 44% international are distributed between EU (Germany) and the USA. In addition to these firm orders we have firmed Memorandums of Understanding either finalised or in progress with an additional 20 channel partners for 3 year forward orders of 3855 or approximately $115M AUD.

Our initial numbers demonstrate the appetite and proactiveness of a community eager for technology that reflects a shift towards a lower carbon future. With delivery and installations to commence in the second half of 2021 we are excited about the future of the LAVO System.

The opportunity

Market segments

Our business is initially targeting four Australian key markets: residential, commercial, off-grid/back up diesel, and telecommunication towers. Across these segments LAVO estimates the addressable market for its technology as $2 billion in Australia, expanding on a global scale to $40 billion.

Australia is a world leader in rooftop solar penetration with more than 15 per cent or 2.4 million houses with installations, creating significant opportunity for LAVO to make a notable and immediate impact.

In addition to metropolitan homes and businesses, our hydrogen storage technology will provide regional and rural properties with much needed secure and reliable energy source for microgrid, edge of grid and off-grid solutions.

A State industry capitalising on global growth

A New South Wales based hydrogen industry supported by the right regulatory settings and investment incentives will ensure that the State is well-positioned to capitalise on global green energy demands and the shift toward renewable energy.

With global investment in hydrogen forecast to increase from US$150 billion to more than US$2.5 trillion p.a. by 2050, there are multiple opportunities for New South Wales to capitalise on that investment growth.

In Australia, the hydrogen industry benefits from an increasingly favourable regulatory environment at both state and federal levels, including through the National Hydrogen Strategy.

Coupled with a renewed push to support Australian manufacturing, the time is right for the Government to best consider how to accelerate the development of a local hydrogen industry.

Local manufacturing

While the core technology in the LAVO System has been developed in Sydney, we have partnered with a range of world leading technology companies to develop and source components for the System. For example, our fuel cells are developed by Nedstack in the Netherlands, while our electrolysers are manufactured by German company Enapter.

We are currently working with Nedstack to establish a fuel cell manufacturing facility in Australia, and in time hope to be able to source most of our components from local suppliers.

For LAVO alone, we estimate that our investments will create 1,400 Australian jobs by 2025, including R&D, manufacturing, installation and maintenance.

At an industry level, the order of magnitude will be much higher.

Recommendations

As the Committee examines ways to establish a local hydrogen industry, we make the following recommendations for the Committee's consideration:

1. **Develop a New South Wales Hydrogen Economy Plan.** Building on the work of the NSW Renewable Energy Plan, a hydrogen specific roadmap will clearly outline the policy and regulatory environment for investment in this State, providing certainty to investors, entrepreneurs and interested stakeholders along the energy supply chain.

2. **Establish a Hydrogen Economy Taskforce** to guide the implementation of the Hydrogen Economy Plan and establish protocols to expedite the assessment and approval for hydrogen related infrastructure and projects. The Taskforce membership should be drawn from Government, business and research bodies, bringing together the experience and the knowledge to fast track the development of the NSW hydrogen industry.
3. **Consider targeted and specific financial incentives for hydrogen and related technology companies** to establish operations in New South Wales, including payroll and other business tax incentives, along with Government support in the form of scientific research, regional and economic development assistance.
4. **Commission the NSW Chief Scientist & Engineer** to deliver an evidence-based scientific assessment of the potential for hydrogen technologies to contribute to emissions reductions in NSW.

Conclusion

New South Wales is well placed to develop a local hydrogen industry – one that will deliver thousands of jobs across the supply chain, that will attract a wide range of investment into the State, and that has the potential to transform the way that we use and store energy well into the future.

To capitalise on the opportunities arising from the global growth in the hydrogen sector, we believe that the Government needs to act now to ensure that policy and regulatory settings clearly signal to investors that the State is open for business.

We would be pleased to speak further with the Committee as the Inquiry continues, and to demonstrate to you how our technology works by inviting the committee to our joint laboratory within the Hydrogen Energy Research Centre at UNSW.

If you would like further information, please contact Mr Matthew Muller on or via email to

Yours Sincerely

Alan Yu
Chief Executive Officer
LAVO Hydrogen Technology Limited
www.lavo.com.au