

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

**Organisation:** Australian Alliance for Energy Productivity

**Date Received:** 8 March 2021

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*Doing more. Using less.*

## **Submission to** **Legislative Council of New South Wales** **Standing Committee on State Development** **Inquiry into the development of a hydrogen industry**

### **Executive Summary**

Green hydrogen is currently enjoying unprecedented political, economic and community interest. As a result, the number of hydrogen initiatives currently underway across the globe, and in Australia, is increasing rapidly.

Hydrogen is not a new fuel source, having been used in industrial processes for more than 200 years. It is light, storable, energy-dense, and produces no direct emissions of pollutants or greenhouse gases. But for hydrogen to make a significant contribution to a clean, green energy transition, it needs to be adopted in sectors where it is almost completely absent, such as transport, buildings and power generation.

It also needs to be available at a far more commercially competitive price, including the cost not only for production, but also transportation and distribution.

New South Wales can contribute to the international and domestic race for large-scale production of green hydrogen at a competitive global price. As Australia's financial centre, with a strong research capability, extensive energy and export infrastructure (eg pipelines and deep-water ports), large end-user segments within close proximity to potential production sites (advanced manufacturing, transport, electricity), as well as significant large-scale solar, wind, pumped hydro and other sources of clean energy, and access to significant waste water supplies (in preference to utilising scarce potable water supplies).

However, it may be sometime before green hydrogen can be produced at a price that is competitive with other fuel sources, such as natural gas.

Until then investments into the research, production, storage, transport and use of green hydrogen must continue, in parallel with a focus on reducing overall energy consumption while increasing energy productivity.

The Australian Alliance for Energy Productivity (A2EP) appreciates this opportunity to contribute to the work of the Inquiry. A2EP looks forward to working with the NSW Government to achieve Net Zero by 2050 across as many industrialised sectors as possible. We acknowledge the leadership that New South Wales has demonstrated by establishing a Net Zero Plan and supporting the Plan with a range of policies and programs that establish realisable pathways to net zero.

In the short to medium term A2EP recommends that the NSW Government supports research, development and demonstration of end-use applications of hydrogen as a fuel. The kinds of processes that could be piloted include heat for glass, bricks, cement, ceramics, metals. All have long histories and promising futures in NSW.

### The Future of Hydrogen in New South Wales

The Future of Hydrogen report commissioned by the International Energy Agency (IEA) notes the “demand for hydrogen, has grown more than threefold since 1975, and continues to rise – almost entirely supplied from fossil fuels, with 6% of global natural gas and 2% of global coal going to hydrogen production.

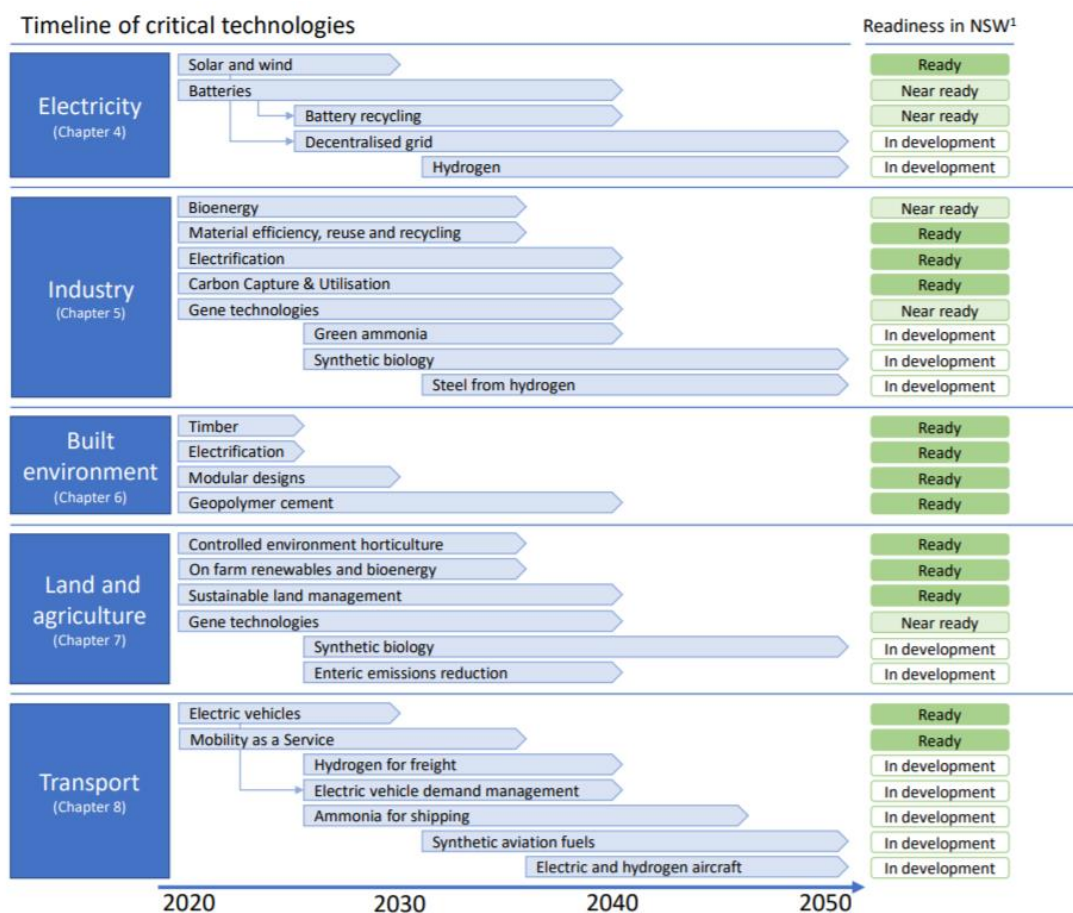
As a consequence, production of hydrogen is responsible for CO<sub>2</sub> emissions of around 830 million tonnes of carbon dioxide per year, equivalent to the CO<sub>2</sub> emissions of the United Kingdom and Indonesia combined.”

The promise of clean hydrogen is therefore a significant potential contributor to the promise of meeting global Paris Agreement commitments. As a result, the number of countries, sectors and businesses engaging in hydrogen research is growing rapidly.

In particular, and of relevance to NSW, is the increasing interest in hydrogen production via water electrolysis. With access to large-scale solar, wind and pumped hydrogen, as well as significant volumes of wastewater (in preference to potable water), NSW is well placed to contribute to global advances in green hydrogen.

In addition, as Australia’s largest economy, it becomes possible for NSW to build electrolyzers close to both renewable energy sources, end-user segments (industrial, transport, buildings, power generation, feedstock) and deep-water export ports.

The potential for hydrogen’s contribution to NSW’s economy and its decarbonisation objectives is captured well in the chart below from the Decarbonisation Innovation Report by the NSW Chief Scientist.



**Timeline of critical technologies underpinning the economic opportunities identified in the report**

**Note 1:** ‘Readiness in NSW’ refers to NSW’s capability and preparedness to deploy the technologies.

Over recent years, the NSW Government has acted authoritatively to influence energy systems (particularly electricity and gas) and emissions reduction. Recent and current work includes:

- Net Zero Plan - Stage 1: 2020-2030
- Decarbonisation Innovation Study
- Electricity Strategy
- Energy Security Target and Safeguard
- Emerging Energy Program
- Hydrogen Program
- Renewable Energy Zones
- Transmission Infrastructure Strategy
- Electricity Infrastructure Investment Safeguard
- Emissions Intensity Reduction Program
- Western Sydney Green Gas Project
- NSW CO2 Storage Assessment Project
- Special Activation Precincts

In addition, the National Hydrogen Strategy reports that “NSW is the home of significant research and innovation capability, including in hydrogen. Over 60 hydrogen-related research and innovation projects are in train in seven on the state’s universities, the CSIRO and in private industry”.

Individually and in combination, these initiatives are affecting energy systems and markets. And they run concurrently with international and national developments of significance. They create a platform against which businesses can and do invest in NSW.

With a diverse membership including large-scale industrial users of energy, A2EP maintains a strong interest in and openness to collaborating with the NSW Government on the efficient, timely and effective decarbonisation of these sectors. A2EP has a strong track record in delivering applied research, industrial pilot projects and evidence-based insights for use in policy creation, technology commercialisation and/or operational reorganisation to secure cost, emission and productivity outcomes.

A2EP does not yet have a hydrogen pilot project underway, but A2EP would be pleased to investigate opportunities to undertake complementary efforts in research, development and demonstration of end-use applications of hydrogen as a fuel, with burners and boilers in manufacturing, as an example.

After three years of desktop research and real-world studies on alternatives to fossil fuels for industrial process heating, we have concluded that low temperature applications (below 180C) will be best served by heat pumps powered with renewably generated electricity (grid-supplied and distributed, mostly solar and wind). For mid-range temperatures (to 800C) there is potential for bioenergy and solar thermal to power existing and emerging equipment. We have also concluded that hydrogen undoubtedly has a role to play in high temperature industrial process heating. There is a clear need for demonstration of the potential for hydrogen in these settings. There are currently no hydrogen-fuelled high temperature applications in NSW. The kinds of processes that could be piloted include heat for glass, bricks, cement, ceramics, metals. All have long histories and promising futures in NSW.

### **A2EP & NSW - Demonstrating innovation**

Over the last three years A2EP has led a series of projects to test the feasibility (technical and commercial) of innovative approaches to energy consumption and, in some cases, production. Our interest is in making changes that improve productivity, optimise energy use and reduce emissions. We’ve undertaken projects with a focus on industrial process heat in partnership with the Australian Renewable Energy Agency and the NSW Department of Planning, Industry and Environment. We’re also working with DPIE on the modernisation of compressed air systems. For the NSW Department of Primary Industries, we managed ten feasibility studies of on-farm energy productivity projects that assessed processes and equipment along with energy consumption and the potential for improvement. Five of those projects are proceeding to pilot implementations that will evaluate energy, emissions and business impacts. A2EP is well placed to work with governments, businesses, researchers, equipment providers and advisors to develop and conduct demonstration projects.



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## **About A2EP**

A2EP, established in 2009, is an independent, non-partisan, not-for-profit coalition of business, government and research leaders promoting a more energy productive economy. Energy productivity is a measure of value: how much is produced (yield or profit) relative to how much energy is input. Alongside emissions reduction, energy productivity improvement should be the leading filter for decision-making about investments in energy systems, for both supply and demand.

We're leading a drive to double energy productivity in Australia. Our reach is across the national economy with a focus on the manufacturing, agriculture and transport sectors. Our innovation programs accelerate the uptake of technology for transformative change by making research and reports become reality. We're doing this right now, for example, through several projects supported by the NSW Government that demonstrate the potential for innovation in process heating, compressed air services and on-farm energy productivity.

## **A2EP Members**

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Australian Meat Processor Corporation	Institute
BlueScope Steel	Ndevr Environmental
Bright Engineering	Northmore Gordon
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