

# EARLY COMMUNITY ENGAGEMENT WITH HYDROGEN IN AUSTRALIA

Johnson, S.M.<sup>1</sup>

<sup>1</sup> Hydrogen Business Unit, Woodside Energy Ltd, 11 Mount St, Perth, 6000, Australia,  
sussan.johnson@woodside.com.au

## ABSTRACT

Community support and acceptance is part of the licence to operate for any industry. The hydrogen industry is no different and we will need to have strong support from the broad community to establish a viable hydrogen economy in Australia.

As Woodside progresses our plans for bulk hydrogen export and associated domestic opportunities, stakeholder engagement throughout will be critical to success. This talk will share Woodside's approach to community engagement and local opportunities, and how we plan to draw on more than 30 years' experience operating liquefied natural gas plants in Western Australia's Pilbara region.

At this early stage of our hydrogen work, we are beginning with the end in mind: engaging the customer. We've worked with local Australian businesses to help raise public awareness and interest in hydrogen by producing prototype consumer products. We will share experiences from this work that underscore the value of early engagement with all stakeholders: government, regulators, industrial and community neighbours and end consumers to enable the hydrogen economy vision for Australia.

This paper will present information on community engagement and acceptance of hydrogen in Australia. This information has come from Woodside Energy Ltd by engaging with small businesses, government regulators and the community at large. As we establish community acceptance for hydrogen as an energy carrier in Australia Woodside has been working in parallel to have standards and regulations established for hydrogen in Australia. Through our work with Hydrogen Mobility Australia we are advocating the adoption of ISO standards unless there is a specific geographic or health, safety and environment reason not to.

## 1.0 INTRODUCTION

Woodside is the pioneer of the LNG industry in Australia and the largest Australian natural gas producer. We have a global portfolio and are recognised for our world-class capabilities as an integrated upstream supplier of energy.

One of the ways Woodside is diversifying our energy offering is our work to introduce hydrogen to our portfolio of energy options. We view hydrogen as a natural evolution of our business model, post 2030. We are in an advantageous position in the Pilbara region of Western Australia, where we have access to solar power which means we can create hydrogen from a renewable source. It then needs to be chilled and transported in large quantities via ship, which is what we already do with LNG.

Hydrogen can also help build domestic energy security. In the shorter term we see a lot of domestic market development in the mobility and power sectors. We expect a lot of diversity in how this plays out across markets, because each market is at a different maturity and has different ambitions.

Hydrogen can be part of the solution to cheap, clean and reliable energy. This has led to interest worldwide in adoption of hydrogen as a fuel. In August 2018 Australia published three significant hydrogen strategy and analysis papers from CSIRO [1], ARENA [2] and the report of the Chief Scientist to the Council of Australian Governments Energy Council [3]. Western Australia also held the first

renewable hydrogen conference hosted by the Department of Primary Industries and Regional Development on Friday, 31st August 2018 at the Perth Convention and Exhibition Centre [4].

## **2.0 WOODSIDE IN THE COMMUNITY**

Woodside builds long-lasting relationships with the communities in which we are active. We act with integrity as we generate positive social and economic outcomes and demonstrate respect for the culture and values of our host communities. Managing our activities in a sustainable way is fundamental to the wellbeing of our workforce, our communities and our environment.

In the early days of hydrogen in Australia Woodside is focused on establishing collaborative partnerships to share and improve knowledge, and facilitate problem-solving across the hydrogen value chain.

Woodside's approach to this engagement is:

Facilitating respectful relationships;

Identifying and managing community risks and opportunities;

Engaging stakeholders who affect or are affected by our activities;

Communicating stakeholder views to inform decision making;

Implementing processes to manage social impacts; and

Contributing to the long-term capacity and capability development of communities.

At the first Western Australian renewable hydrogen conference Woodside wanted to showcase the use of hydrogen as a fuel. Some practical applications could show how hydrogen can be used safely and provide public education. This is part of the Woodside community engagement framework – engaging stakeholders who affect or are affected by our activities. We are scaling our community engagement appropriately in line with the maturity of our projects. As hydrogen in Australia is in the very early stages, we are starting with basic awareness and education about the product, rather than our operations.

Understanding that we are part of the community we live in Woodside devised several ideas to showcase hydrogen use to the public at this first green hydrogen event in WA. Options for the conference were virtually limitless - anything that needs power could use hydrogen. To help de-mystify hydrogen and show that it could be operated safely and cleanly we wanted to provide exposure to the use of hydrogen in some normal settings.

As part of our mandate to contribute to the long-term capacity and capability development of communities Woodside commissioned some local Australian manufacturers with the task of creating a hydrogen barbecue and a hydrogen fuel cell powered inverter (generator). Woodside actively sought out local industry partners for the development of these products. Having local industry partners is part of our vision in supporting the development of a hydrogen economy.

### 3.0 TESTING AND CERTIFICATION

The standards for gas as a fuel are limited in Australia to LPG and LNG. Hydrogen is treated as a specialist gas without any public handling standards. This makes emerging hydrogen technologies subject to the un-intended consequences of regulations that were written at a time when hydrogen as a fuel was not being anticipated.

The lack of Australian standards for hydrogen was something that Woodside anticipated was going to create challenges for the certification of the hydrogen fuelled devices. Being a producer and a supplier of natural gas, we called upon our internal knowledge for the safe handling of gas products and gas safety procedures so that we could overcome and address appropriately any concerns as they arose. This procedural approach to safety helped to navigate the barriers that were erected as we progressed through the product development life cycle. This meant that we provided certification where possible, and conducted both formal risk assessments and task based risk assessments.

Woodside's charter includes identifying and managing community risks and opportunities. The hydrogen appliances we created for the renewable hydrogen conference offered the opportunity to explore both. In order to manage the risks, we worked with the relevant authorizing bodies to review the appliances that were created so that they could be assessed as far as possible under existing guidelines and regulations.

### 4.0 BARBECUE

Heatlie, <https://www.heatlie.com.au/>, is the only remaining Australian barbecue manufacturer. They are a small family business based in Adelaide. Heatlie used expertise from the University of South Australia for assistance in certification. Then the Australian Gas Association reviewed the barbecue's performance against the gas standards. One notable difference was that combustion testing was not carried out – this is because hydrogen does not produce CO or CO2 release.



Figure 1. Flame at maximum setting



Figure 2. Hydrogen prototype barbecue after testing

The hydrogen barbecue was used in a convention setting. The barbecue was used out of doors to minimise any concerns over hydrogen leakage and flame. We engaged with the convention centre staff and we had a professional chef (supplied by Perth Convention and Exhibition Centre) as the primary user of the barbecue. Instructions for use were shared. The manufacturer attended the conference to engage with the public. The convention centre staff cooked the barbecue items and had positive feedback on the quality of the barbecue and the ease of use.

## 5.0 INVERTERS

AVID, a local Western Australian engineering company created the inverter using a fuel cell from intelligent energy <https://www.intelligent-energy.com/>. AVID provide electrical engineering, testing and servicing of electrical assets <https://www.avidgroup.net/>. Using their electrical engineering background AVID was able to create a solution where the fuel cell was safely enclosed in housing that could then be used in a conference setting.

Once again there was a challenge to provide certification. The inverters needed an electrical safety certificate. The limitation here was that an energy safety inspection was done but no sign off could be given as there was no legislation that could be used for compliance. The principal from Energy Safety performed a visual inspection. Compliance to the standard could not be issued as the standard did not include hydrogen under the legislation.



Figure 3. Inverter and fuel cell

The inverters were used to power three items – a mobile phone recharging station, a freezer, and a mobile DJ. In all cases the fuel cells performed as expected with the three different users of the inverter having no issues in set up, use or performance.

## 6.0 CONCLUSION

By implementing processes to manage the impacts of the hydrogen appliances Woodside was able to successfully negotiate with the various stakeholders and use the hydrogen devices at the Renewable Hydrogen Conference.

Collaboration and education is key to the acceptance of hydrogen by the broader community. Having appropriate level standards and regulations will help with that adoption. The regulations provide consumers with confidence that equipment they use has been through appropriate testing. Having a broad range of hydrogen appliances to use will only further help develop the adoption of hydrogen in Australia.

There is still a lot of work to be done to overcome people's reticence to embrace something new. Public education on the benefits and safe handling of hydrogen is necessary to gain broad acceptance. Regulations and standards for Australia need to be implemented, borrowing from international standards as far as possible to speed up implementation and additionally provide the ability for international commonality.



Figure 4. Hydrogen Barbecue in use at Western Australian Renewable Hydrogen Conference 2018

## 7.0 ACKNOWLEDGEMENTS

The author would like to acknowledge the assistance of Woodside Energy Ltd for the support of this work. The contributions of the various state agencies for hydrogen safety assessment are graciously acknowledged.

## 8.0 REFERENCES

1. CSIRO Australia (2018) *National Hydrogen Roadmap*. Retrieved from <https://www.csiro.au/en/Do-business/Futures/Reports/Hydrogen-Roadmap> on 20 January 2019
2. ACIL Allen Consulting for ARENA (2018), *Opportunities for Australia from hydrogen exports*. Retrieved from <https://arena.gov.au/assets/2018/08/opportunities-for-australia-from-hydrogen-exports.pdf> on 21 January 2019
3. COAG Energy Council (2018) *National Hydrogen Strategy and Workplan*. Retrieved from <http://www.coagenergycouncil.gov.au/publications/establishment-hydrogen-working-group-coag-energy-council> on 16 February 2019
4. Retrieved from <http://www.drd.wa.gov.au/projects/EnergyFutures/Pages/Renewable-Hydrogen-Conference.aspx> on 14 January 2019