

Prospective FEnEx CRC R&D Projects for Program 4: Market & Sector Development

<p>The Pilbara as a Hydrogen Processing and Export Hub⁹</p>	<p>Hydrogen Sector Development</p>	<p>The Pilbara is rich in renewable energy sources with gas and fertilizer processing plants, domestic gas pipelines, and energy export facilities established in the region. Incumbent owners of these facilities own mature supply chains linking production to key global end users of energy. Synergies between the LNG and hydrogen supply chains can be leveraged, particularly given gas and electricity generation and transmission systems are also present in the Pilbara. The optimum development pathways to leverage these synergies and maximize the value delivered to both the local community and the nation will be investigated through this project.</p>
<p>Australia's Hydrogen Economy: Development drivers, barriers to adoption and community impact</p>	<p>Hydrogen Sector Development</p>	<p>It is not inevitable that new scientific knowledge and technologies like hydrogen will take over the market or benefit communities. This project will map value chains associated with Australia's hydrogen industry (export and domestic) to unpack how market and competitive dynamics will impact on the new industry's growth and influence the uptake of new technologies. Customised governance processes will also be developed to engage communities and stakeholders in shaping the outcomes of technology adoption and the growth of Australia's hydrogen industry.</p>
<p>Understanding the Impact of Exports on Domestic Hydrogen Supplies.</p>	<p>Hydrogen Sector Development</p>	<p>Tension between domestic use of natural gas and its export is currently abundantly evident in Australia. There are real lessons to be learnt in regards to how this was, and is currently, handled both at the state and federal level that would be very useful for the fledgling hydrogen export industry, and how it navigates these two conflicting pulls on its production inventory in the future. This project will identify the parallels and differences between the cases of natural gas and hydrogen and develop policy recommendations to maximise the public good derived from Australia's hydrogen export industry.</p>

⁹ Similar projects & case-studies could be posed for other specific regions around Australia that have natural advantages in terms of a confluence of wind and solar power potentials, and/or existing infrastructure and facilities that could be leveraged to support a hydrogen processing and export hub.

<p>Fuelling Cleaner International Shipping with Liquefied Natural Gas</p>	<p>LNG Market Development</p>	<p>Ship propulsion accounts for about 3 % of the world’s energy consumption, which is equivalent to that of Australia and South Korea combined. Heavy fuel oil (HFO), which accounts for 85 % of the fuel used by the global shipping industry, emits the most SO_x, NO_x, particulate matter and CO₂ of any viable transport fuel; the current allowable sulfur content in HFO is 10,000 ppm in emission controlled areas and 35,000 ppm elsewhere (in contrast with gasoline limits of 10 and 150 ppm in Korea and Australia, respectively). To reduce shipping’s impact on the global environment, the International Maritime Organization has established aggressive new regulations on SO_x, NO_x and CO₂ emissions from ships to be phased in from 2020. These regulations are driving the development of technologies required to enable ships fuelled by liquefied natural gas (LNG) to operate at all scales of international shipping. The safety of using or transporting LNG in small or large quantities is well-established; in 50 years there have been only a handful of shipping accidents comprised of 2 fires (both started by lightning) and 4 spills with no fatalities. However, uptake of LNG fuelled shipping has been slower than expected despite its clear advantages on emissions. This project will identify the primary barriers that have stymied the adoption of LNG as a maritime fuel and design new pathways to accelerate the adoption of a technically proven and cost-effective solution to cleaner international shipping.</p>
<p>Leveraging International Trade and Environmental Agreements.</p>	<p>Hydrogen Market Development</p>	<p>Working through the Institute for International Trade’s partnership research agreement with the World Trade Organisation (WTO) this suite of projects will seek to ensure that the development of trade in hydrogen and its derivatives are not hindered by WTO policies</p>
<p>Incorporating Hydrogen into Bilateral and Regional Free Trade Agreements.</p>	<p>Hydrogen Market Development</p>	<p>In recent years, Australia has been focusing on and seeking ways to expand the number of bi-lateral and international free trade agreements to which it is party. Coal and LNG are part of many of these agreements but, as yet, none explicitly consider the possibility that Australia could soon have significant quantities of green hydrogen, green ammonia, etc. to export. This suite of projects will begin by examining the case for amending and or renegotiating these agreements with a view to expediting the development of this industry.</p>

<p>Enhancing the role of international environmental agreements in the development of the green hydrogen export industry</p>	<p>Hydrogen Sector Development</p>	<p>In an attempt to protect the environment and reduce the adverse impacts of greenhouse gas emissions, Australia is party to a significant number of environment agreements. This project will review the nature of these agreements and, in particular, to explore opportunities to either a) develop a new agreement and or enhance existing agreements. Careful consideration will be given to the nature of international agreements that limit greenhouse gas emissions and the possibility that access to affordable sources of green hydrogen might increase country willingness to commit to faster transition pathways. In addition to consideration of key principles, concepts and opportunities, this research will include consideration of certification, monitoring and other similar arrangements.</p>
<p>Assessing the costs and benefits of developing the hydrogen export industry</p>	<p>Hydrogen Sector Development</p>	<p>Building on the future energy scenario project models being developed for the Future Fuels CRC, this suite of projects will model the regional and national consequences of changes in international demand for green hydrogen and the consequences of pursuing the opportunities identified by the above projects.</p>