

WHITEPAPER

Three key challenges faced by the global hydrogen industry

LRQA



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Introduction

Low-carbon hydrogen is an excellent source of clean energy and represents a fantastic opportunity for countries to establish hydrogen-based economies and decarbonize their industries.

While progress has been ticking along at a relatively slow rate in years past, the recent COP26 summit has acted as an accelerator for the hydrogen industry to begin moving forward, and it is now doing so at a pace that we’ve never seen before. This is reflected by recent figures from the EIC, which is tracking no fewer than 300 hydrogen projects globally with an anticipated capital expenditure of US\$352 billion.

As we move forward post-COP26, hydrogen strategies and projects will continue to be developed at a faster rate across the planet, particularly in key markets such as Europe, the U.S., and Australia. With this growth, however, come several key challenges that the industry will need to overcome to achieve at-scale use and deployment.

Our experts

Leanne Halliday

Corporate Account Manager | LRQA

Noureen Faizee

Global Director, Strategy & Growth – Hydrogen | Worley

Katie Zimmerman

Business Development Manager | Wood PLC

“The EIC is currently tracking well over 300 hydrogen projects in the EIC data stream with about 378 billion of investment globally - there’s been over 111 hydrogen related contract awards since January 2021”

Amanda Duhon

Director - North and Central America | EIC

Strategies for reducing carbon

Industry has three main strategies for reducing carbon. The first and simplest of these is the optimization of operations and sustainable design. In other words, it's finding ways to cut operational carbon emissions through methods such as optimizing infrastructure and replacing old machinery with newer, cleaner and greener alternatives. This is something that's been taking place for many years, but it's not enough on its own to bring about the levels of carbon reduction needed to meet the lofty goals being set by governments.

This is where hydrogen comes in, and it plays a big role in the two other strategies - carbon offsetting and low-intensity business, the latter of which focuses on green hydrogen projects, such as pure solar and pure wind. Still, more needs to be done.

“ To meet 2030 targets, we need at least 2.4 Million tons increase in hydrogen production. What's more dramatic is the change in the use of hydrogen so you'll see there we start to see shipping, aviation, we start to see the use of hydrogen for electricity generation, blending into gas grids so hydrogen is going to be seen by everybody. ”

Leanne Halliday
Corporate Account Manager | LRQA



Key challenges

1. Technology and supply chain

LH: While the technology isn't new, the scale and cost point at which we're needing to buy is. As is the innovation needed to produce at a higher scale. For example, LRQA recently worked with an Australian company that had bought an electrolyzer from a Chinese company that had never exported one. They employed us to perform a gap analysis of the design to ensure that the electrolyzer met Australian standards, but we couldn't extract design documentation in English and were therefore unable to perform the gap analysis to Australian standards. This led to the project being pulled and the Australian client being forced to find a new electrolyzer provider. We're likely to see more of these supply chain constraints and new challenges such as a lack of trust due to an abundance of new market entrants.

KZ: In the Americas, we're seeing a growing need to scale but we don't have the supply chain capacity available to support this, and with all the ups and downs of oil and gas with everyone waiting for money to be spent on energy transition, we're having a difficult time ramping up. We've also made our businesses more international over time to take advantage of cost structures and different locations, but now there's an increasing need for localization, and a lot of the time this simply isn't possible because firms have pivoted their operations over time.

NF: If we look back in time by 30 or 40-or-so years, the mature offshore oil and gas facilities that we see today were very complex pilot projects back then. We probably experienced the same supply chain issues with those industries which are now very mature. So, with hydrogen being the nascent industry that it is right now, it's important to recognize that the global hydrogen economy will need time to develop, and with this development will come the resolution of many of the risks and challenges we're facing today. There also has to be a variety of solutions to produce hydrogen at the quantities that we need to meet net-zero goals. This of course boils down to the maturity of technology and the commercial viability of projects, but there are common goals that we should all be working towards to achieve hydrogen production on the massive scale that's required.

“It’s important to recognize that the global hydrogen economy will need time to develop, and with this development will come the resolution of many of the risks and challenges we’re facing today.”

Noureen Faizee
Global Director, Strategy & Growth – Hydrogen | Worley



Key challenges

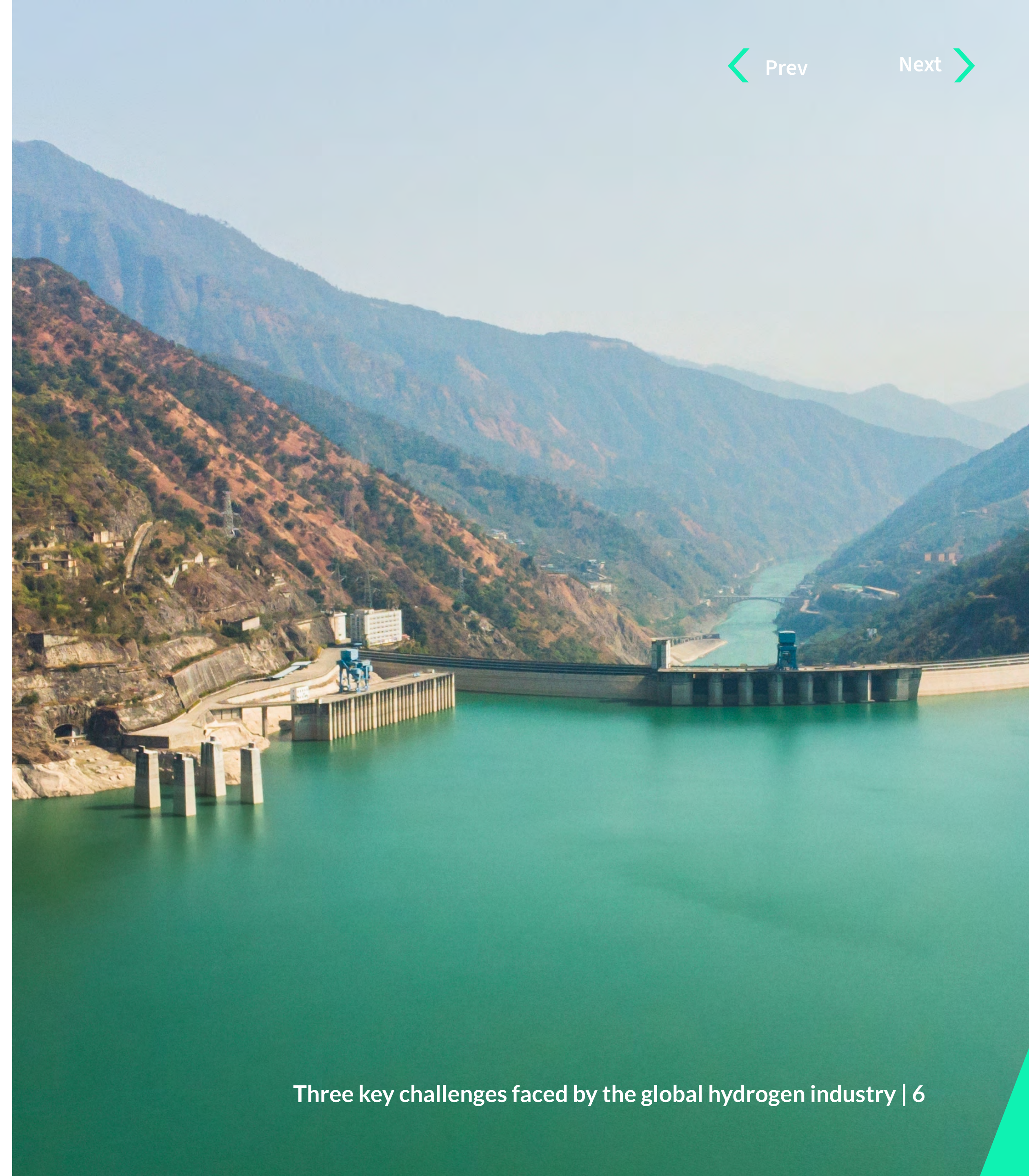
2. Regulations and standards

LH: Many regulations and standards exist globally but they're very much country-specific. What we don't have, and arguably what we need, are global regulations and standards. This can be tied back to the example I shared earlier - when you trade across borders, you need common regulations to enable it to run smoothly. While there are ISO and IEC standards, they do not, and indeed cannot, cover the whole hydrogen production value chain. Hydrogen also has a wide scope, much wider than oil and gas, in areas including energy, transportation, and conversion into ammonia - regulations need to account for this.

KZ: I could talk for a long time about standards. What I would emphasize however is that firms need to consider how they're defining key terms such as 'green emissions' - how do you define emissions? What makes them green? What makes them clean? This is one of the critical things that firms need to focus on, especially as regulators like the FCC begin to introduce guidance covering things like greenhouse gases.

3. Social license to operate


LH: The most important area where I see risk concerns the social license to operate. In other words, making sure that stakeholders have complete trust and faith in hydrogen's safety and quality, as well as your reputation as a business. To instill this trust in stakeholders, we need to ensure that risk is dealt with correctly, that we understand risk, that we treat the risks as they should be, and that quality and safety are built into the core of hydrogen projects. If we fail to do this, it will cause delays, lead to unnecessary higher costs, and cause risks to reputation and, fundamentally, compromise all the exciting hydrogen projects that are being developed right now - perhaps fatally.



Supporting your energy transition


LRQA's experts work with you to integrate changes that support your transition to cleaner energy, operations and asset life cycles. We cover many areas including renewable energy production and distribution, nuclear power and hydrogen, and have the knowledge and expertise to help you meet your sustainability ambitions. We'll help you meet tightening regulations, improve your carbon footprint, and improve efficiency.

Since 2003 LRQA has been active in a number of international hydrogen initiatives including the International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE) Regulations, Codes, Standards & Safety (RCSS), the Mission Innovation Challenge on Clean Hydrogen, and the International Energy Agency Safety Task.



Net Zero Manufacturing Assurance

Organizations who are looking to adopt hydrogen often find they require specialist insight and experience. Our Net-Zero Manufacturing Assurance service offers a full, modularized hydrogen assurance solution covering design and technology evaluation, independent assessments and many more.



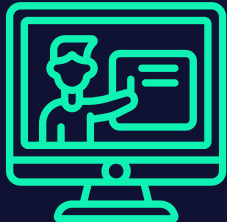
Approval in Principle

Approval in Principle (AIP) is the systematic approach to review and certify the conceptual design or a new product before placing it into the market. AIP is based on risk assessment and engineering evaluation. It is carried out to ascertain the fundamental design and standards are suitable for the intended service. LRQA assists manufacturers to demonstrate the feasibility of their product for the intended use. It also provides confidence to the end users that the product will be suitable for intended application.



Certificate of Origin

The certificate of origin is a digital certificate that provides proof of hydrogen production method and assessment of greenhouse gas (GHG) emissions based on the energy source. The certificate can be used to demonstrate compliance with customer or regulatory requirements (e.g. recast Renewable Energy Directive 2009/28/EC). The certificate of origin also helps to demonstrate progress against GHG targets.



Hydrogen Standards Training

The LRQA knowledge transfer sessions demonstrate the necessary overview of global standards and best practices of the entire supply chain process. Training provides your management teams and customers with confidence in various phases of the process life cycle, including the production, storage, transportation of hydrogen and fueling stations.

LRQA experts have experienced resources who have worked with many organizations to identify gaps in manufacturing processes and controls, subsequently reducing operational risk. Training can be tailored to your needs. Usually, a typical approach would be a mix of training and workshops. Resources include access to the detailed global map covering regulations and standards, and email updates.



YOUR FUTURE. OUR FOCUS.

About LRQA:

By bringing together unrivaled expertise in certification, brand assurance, cybersecurity, inspection and training, we've become a leading global assurance provider.

We're proud of our heritage, but it's who we are today that really matters, because that's what shapes how we partner with our clients tomorrow. By combining strong values, decades of experience in risk management and mitigation, and a keen focus on the future, we're here to support our clients as they build safer, more secure, more sustainable businesses.

From independent auditing, certification and training; to technical advisory services; to real-time assurance technology; to data-driven supply chain transformation, our innovative end-to-end solutions help our clients negotiate a rapidly changing risk landscape – making sure they're shaping their own future, rather than letting it shape them.

Get in touch

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