National Hydrogen Codes of Best Practice
Information for participants to co-design workshops

Contents

1. Purpose

The Commonwealth government on behalf of all States and Territories are developing National Hydrogen Codes of Best Practice through a co-design process with industry and regulators, to address regulatory gaps and barriers impacting the safety and development of the hydrogen industry. The purpose of this paper is to provide information to support stakeholders to participate in the upcoming co-design workshops.

Following the first phase of the National Hydrogen Regulatory Review the Commonwealth, States and Territories identified three priority projects to address key regulatory barriers. These are:

1. **Developing 5 National Hydrogen Codes of Best Practice for endorsement by Energy Ministers**
2. **Prioritising transport regulatory reform**
   Maintain collaboration and engagement across the energy and transport portfolios to address the regulatory gaps and barriers identified by the National Hydrogen Regulatory Review to facilitate transport regulatory reforms and interim streamlined regulatory exemption processes to regularise the importation, modification, sale, operation and maintenance of vehicles and vessels using hydrogen or ammonia as a fuel source and/or cargo.
3. **Standardisation of best practice (standards acceleration)**

The identification and adoption of a broader array of international standards and technical specifications for use in the 5 National Hydrogen Codes of Best Practice and the prioritisation of transport regulatory reforms for hydrogen and ammonia powered vessels, vehicles, and hydrogen and ammonia as a transport cargo.

The upcoming co-design workshops relate to the first of these commitments to regulatory reform measures – the 5 National Hydrogen Codes of Best Practice.

2. Developing National Hydrogen Codes of Best Practice

To support development of Australia's hydrogen industry and provide greater clarity of regulatory pathways, the Commonwealth, states and territories have committed to develop hydrogen industry specific regulatory guidance through 5 National Hydrogen Codes of Best Practice (the Codes):

1. National Code of Best Practice for Hydrogen Production
2. National Code of Best Practice for Ammonia Production
3. National Code of Best Practice for Hydrogen Refuelling Stations
4. National Code of Best Practice for Hydrogen Appliances, Plant and Equipment Compliance
5. National Code of Best Practice for Ammonia Appliances, Plant and Equipment Compliance.

It is proposed that the Codes will:

- List key hydrogen specific regulatory obligations, including providing guidance on both broad, principles-based obligations (e.g. general obligations to ensure worker safety under work health and safety laws) and more detailed, prescriptive obligations (e.g. requirements to hold a specific licence or undertake an activity in a specific way).
- Identify regulators responsible for compliance and approvals of regulatory obligations.
- Articulate best practice activities that hydrogen and ammonia projects may implement to comply with key regulatory obligations (e.g. referring to or incorporating relevant standards, accepted practice, technical specifications, case studies etc.)

The Codes will be modelled on existing codes of best practice and developed in coordination with state, territory and Commonwealth governments to:

- Facilitate national consistency.
- Create a single repository of information covering different areas of law and emerging interactions between laws.
- Separate laws and regulations by operational project type for ease of application by industry and regulators.
- Maintain agility and flexibility to adapt with changing technology and evolving industry needs.
- Adopt or incorporate best practice standards set out in a range of different domestic and international sources.

To minimise the time required to implement the Codes and maximise opportunities for national consistency, a non-legislative approach will be taken, and the Codes will be implemented by jurisdictions as regulatory guidance. This will ensure the fastest possible implementation and maximise agility and flexibility to enable the Codes to adapt with industry needs and technology developments.

3. Need for Codes of Best Practice

As a nascent and rapidly emerging industry, novel technology applications and innovative ways of designing and using infrastructure and resources have outpaced the development of a supportive regulatory framework. The speed of development of the hydrogen and ammonia industries mean that a traditional legislative reform solution applied to incremental changes in mature industries is unlikely to be flexible or fast enough to support hydrogen projects and may create additional barriers and impede industry development.

Hydrogen, like other fuels and industrial chemicals can be dangerous if not handled appropriately. Safety is a top priority in regulatory regimes relating to hydrogen. Environmental and social considerations are also significant. Regulatory issues also have direct economic impact on hydrogen projects and if not addressed could constrain financial decisions and hinder the project development needed for scaling-up an Australia hydrogen industry.

The initial stage of the regulatory review project identified a wide range of regulatory obligations across all Australian jurisdictions applying to hydrogen projects. While many regulatory obligations are of a general nature (e.g. planning, environment, health and safety), there is no or very limited understanding or experience of applying these obligations in a hydrogen-specific context.

These findings were reflected in the initial regulatory review and stakeholder consultation, with stakeholders raising concerns including:

- Lack of clarity regarding regulatory approval pathways in a range of hydrogen industry applications.
- Disparate legislation and regulatory regimes around energy, infrastructure and climate.
- Inconsistency in regulatory approvals across Australian jurisdictions.

Further, it was also identified that there was no or very limited regulatory guidance to:

- Assist industry understand how activities would demonstrate compliance with regulatory obligations (and provide confidence in the timing and cost of compliance).
- Assist regulators determine what would be acceptable for granting approvals or enforcing compliance with regulations.

The Co-design workshops are now seeking further input from industry and regulators to develop the Codes, and ensure they are appropriate and adapted to industry needs and can ensure the highest standards of safety regulation are upheld.

4. QUESTIONS AND INPUT FOR CODES OF BEST PRACTICE CO DESIGN WORKSHOPS

4 (a) SCOPE OF EACH OF THE CODES

The scope of the Codes will be considered in two parts:

1. **Code scope**: What components or processes should be included in the scope for each code? For example, should the hydrogen production code include the transport of hydrogen from its place of production to the end user?
2. **Specific regulatory obligation scope**:
    a. What regulatory obligations should be described in each of the codes?
    b. What are the specific regulatory issues in each of the areas of scope under discussion?

We consider the Code scope question relatively self-explanatory. However, assessing the scope of regulatory obligations may be assisted by some explanation to help inform workshop discussion and input.

Regulatory obligations within scope

It is proposed that only those regulatory obligations that are *materially relevant* to each hydrogen project type should be included in the Codes.

Materially relevant hydrogen project regulatory obligations fall into three broad categories:

1. Regulatory obligations that are either ***general or specific*** to hydrogen and require a ***hydrogen specific standard*** to demonstrate compliance. For example, major hazard facility approvals, or waste emissions, air and water from an electrolyser.
2. Regulatory obligations of *a* ***general nature*** that are ***more significant in their application*** to the hydrogen industry than most other sectors. For example, wastewater from a water purification plant.
3. Regulatory obligations of a ***general nature*** that apply specifically to hydrogen industry and other projects but there may be ***limited understanding*** of how the obligations apply to the hydrogen industry because no or a limited number of projects have been progressed (i.e. because it is new/nascent). For example, transport of hydrogen by road.

By incorporating these three levels of regulatory obligations, the Codes will address the issues of regulatory transparency and efficiency - what obligations apply to a hydrogen project, and who is the relevant regulatory authority.

4 (b) CONTENT FOR BEST PRACTICE

Once we have identified the relevant regulatory obligations to include in the Codes, we need to determine ***how to comply*** with those obligations. Where the solution for hydrogen projects is not yet clear or not universally accepted, what is the currently understood best practice standard that will demonstrate compliance with the relevant regulatory obligations?

This is where the proposed Codes regulatory guidance goes beyond transparency and efficiency in regulatory approvals and requires the identification of hydrogen specific 'best practice' regulatory guidance. Identifying a single set of preferred best practice standards for Australia will provide national consistency and greater confidence in the cost and timing for regulatory compliance.

What is Best Practice?

Dictionary definitions of best practice include:

> (from Miriam Webster) *a procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption*
>
> (from Cambridge Dictionary) *a working method or set of working methods that is officially accepted as being the best to use in a particular business or industry, usually described formally and in detail.*

The challenge for the hydrogen industry is that in many instances there is insufficient experience in any given scenario to determine definitively that a proposed standard is suitable for widespread adoption.

However, what we do have is research and collaboration with project proponents to start forming a baseline of 'best practice' that is appropriate in the context of the development stage of the hydrogen industry.

In some respects, the Codes are about officially recognising what is acceptable as being the best to use, and that now is an appropriate time in the lifecycle development of the industry to be able to do so with some acuity.

So, what we want to do is identify all research and experience within the hydrogen industry which we think can produce optimal results (optimal meaning the safety and development of the hydrogen industry) and should be included in the national codes for endorsement in each jurisdiction in Australia.

Examples of sources of information that may describe a 'Best Practice'

We are proposing that sources of 'best practice' may include the following:

- Laws and regulations from other jurisdictions.
- Technical work undertaken by publicly funded technical and research institutions to underpin hydrogen safety regulation (not yet law, regulation or standard)
- A broader range of industry standards bodies to consider whether suitable standards are available, and where multiple standards are available, which is the 'best'.
- Case studies and examples of industry proponent developed 'safety cases' or 'precedential novel regulatory approvals'.

Why is best practice not as simple as referencing an Australian Standard or an ISO?

Standards made by the usual international standards organisations, such as ISO and IEC, are not yet available for hydrogen. Multi-lateral standards organisations are experiencing significant delays in the production of the necessary standards. This also means, given that most Australian Standards are the adoption of ISO, that AS don't exist either.

Standards, such as an ISO standard, are also not necessarily fit for purpose for every regulatory compliance scenario.

For example, a demonstrated hydrogen project safety case, which is a requirement for a range of hydrogen specific regulatory obligations, may not include any standards. Such a compliance obligation may be demonstrated through a range of different 'standard' setting mechanisms (for example, particular training or accreditation for participants may be required).

Background

Process

The National Hydrogen Codes of Best Practice (Codes) will be developed using a co-design approach with industry and regulators as described below. The co-design workshop agenda for the Codes indicates an input process as against the hydrogen production and hydrogen refuelling codes of practice as the two most common announced project types. However, stakeholders are encouraged to provide input on all aspects of the hydrogen supply chain relevant to their operations. We do anticipate drafting the hydrogen production and hydrogen refuelling codes as a matter of priority. However, the purpose of the co-design workshops in the first instance is to seek information across the supply chain where there is significant interaction between each of the proposed stand-alone codes. We note it is also an open question for the consultation workshops about what is in and out of each of those proposed codes.

Figure 1: Overview of National Hydrogen Codes development

Limitations of the National Hydrogen Codes of Best Practice and exclusions from scope

Developing regulatory and technical guidance is a complex and time-consuming process. The Codes have an ambitious timeline to mitigate the lag between technology development and regulatory reform as quickly as possible.

It is important to note that speed to implementation is a core objective for the Codes. The Codes are not seeking to replicate work already being undertaken by organisations such as the International Organization for Standardization (ISO) or Standards Australia in developing approved technical standards. The Codes seek to consolidate and agree sets of best practice standards based on existing knowledge and information.

The first iteration of the Codes are designed to capture the highest priority issues that will enable industry and regulators to facilitate the timely implementation of Australian hydrogen and ammonia projects. This means a targeted focus on the core content required to facilitate industry growth allowing future iterations, or other regulatory mechanisms to be developed as appropriate and consistent with the development of the hydrogen industry.

To ensure quality of the Codes in the expedited timeframes it is necessary to focus on the issues most pressing for hydrogen industry development. The regulatory guidance provided by the first iterations of the Codes are expected to be broadly applicable and relevant in a wide range of scenarios. However, the Codes cannot**:**

- Identify all ways in which a project may be progressed.
- Identify all regulatory approvals or obligations that may be required to undertake a project.
- Identify all regulatory pathways which are available to project proponents to meet a regulatory obligation.

FAQs on the National Codes of Best Practice

Most National Codes of Best Practice deal with discrete obligations under a single discrete set of Acts / provisions – Why don't the National Hydrogen Codes of Best Practice adopt similar approach?

- Most codes are created for established industries regulated through an underlying act.
- The hydrogen industry, as a nascent industry, does not have an equivalent underlying act regulating the industry.
- The nascent nature of the hydrogen industry also means there is less regulatory guidance material available – as regulators and project proponents have not had time to consider what 'regulatory compliance' looks like in the hydrogen space.
- Given this, it is appropriate for the National Hydrogen Codes of Best Practice to capture a wide range of activities - i.e WHS; environmental; planning; handling dangerous goods etc.

Most Codes of Best Practice are limited to a single jurisdiction – How and why are the Hydrogen Codes of Best Practice national in scope (i.e dealing with obligations across 9 separate jurisdictions)?

- Many codes of practice are in fact 'model laws'. See for example the WHS codes of best practice. Each jurisdiction must individually enact each of the codes of best practice, however they are mirrored across a number of Australian jurisdictions.
- The hydrogen industry is in its nascent stage of development which is anticipated to expand dramatically between now and 2030 and beyond.
- This nascent development means that project proponents have not established a standard 'way of doing things' – and similarly regulators have not established a standard process for, or against which they assess things.
- A number of these regulatory obligations are reflected across all (or most) Australian jurisdictions and enshrined in legislation - just slightly different legislation in some instances in different jurisdictions.
- The National Hydrogen Codes of Best Practice aim to take advantage of this unique situation and establish a uniform approach in terms of how both project proponents and regulators do things.

Most Codes of Best Practice are produced by regulators – Why aren't the National Hydrogen Codes of Best Practice produced by a regulator?

- Most codes of best practice are established by regulators to support regulatory compliance and safety with the regulation which the regulator administers.
- There are no regulators, in any jurisdiction, whose purview explicitly includes the entire hydrogen industry, its regulatory compliance, public and internal safety, sustainability or reputation.
- The National Hydrogen Codes of Best Practice are being developed by a national working group – the Legal Frameworks Review Working Group. This includes representatives from the Commonwealth, state and territory – regulators have access to, and may provide input to the National Hydrogen Codes of Best Practice through these members. Additionally, in developing the National Hydrogen Codes of Best Practice we will be consulting directly with relevant Commonwealth, state and territory regulators.

What is being proposed seems like a significant and complex process. How do you intend to meet the proposed timeframe of delivery of national codes by June 2024?

- Any nationally consistent regulatory reform process is complex. This one no less so given the intention to span the hydrogen supply chain.
- We are aiming to minimise delay to production of useful product by prioritising the National Hydrogen Codes of Best Practice for production and refuelling facilities.
- We are also designing the National Hydrogen Codes of Best Practice in a way that they can be incrementally adapted and improved over time to ensure that minimum viable product can be available to the industry as soon as possible.

.

Acknowledgement of Country

We acknowledge the Traditional Custodians of Australia and their continuing connection to land and sea, waters, environment and community. We pay our respects to the Traditional Custodians of the lands we live and work on, their culture, and their Elders past and present.