

# National Codes of Best Practice Hydrogen Production and Refuelling Facilities

## Consultation questions for participants

### Purpose of this document

This document provides the questions for participants in relation to the information and proposed safe operation and job roles in the **Facility Technical Map – Plant and Equipment** and the *identified emissions, wastes and pollutants in Facility Technical Map – Potential emissions, pollutants and wastes*.

*Please note, For the purposes of developing the ‘technical mapping’ consultation, the existing national hydrogen regulatory review project team has been assisted by the procurement of a technical advisor. The technical advisor has brought hydrogen engineering competencies to the development of the first instance technical map to provide a baseline input document for a range of SMEs across the activities identified as in scope for the first iteration of technical mapping.*

*In scope for the purposes of the first iteration of technical mapping includes:*

- *Simplified plant and equipment for the purposes of hydrogen production and refuelling facilities:*
  - *It only includes hydrogen specific plant, and balance of plant, production by electrolysis and current activities ‘behind the fenceline’ (ie not as yet, fire protection equipment, not pipelines or fuel cell vehicles that might use a refuelling facility, not full lifecycle, or end of life ‘best practice’ for plant.*
  - *It does not include broader facility safety or design issues, for example safety cases, or emergency plans (including fire fighting responses).*

## Document context

This document is part of the consultation documentation package which includes:

1. National Hydrogen Codes – Information for participants
- 1A. National Hydrogen Codes - Additional information for participants - slide deck
2. National Hydrogen Codes - Questions for participants [\[this document\]](#)
3. Facility Technical Map - Plant and Equipment - Production and Refuelling
- 3A. Facility Technical Map - Job Roles and Competencies - Production and Refuelling
4. Facility Technical Map - Potential emissions, pollutants, and wastes - Production and Refuelling
5. Facility Technical Map - Schematic representation - Production and Refuelling
6. National Codes of Best Practice – draft Regulator Matrix - Facility Safety
7. National Codes of Best Practice – draft Regulator Matrix - Environment and Planning

These documents can be found on the Commonwealth Department of Climate Change, Energy, the Environment and Water Consult Hub: [Review of Hydrogen Regulation: Hydrogen Industry Consultation - Climate](#)

## Parts of this document

This document has 5 parts to it:

- Part 1: Plant, Equipment and Job Roles – Hydrogen Production
- Part 2: Plant, Equipment and Job Roles – Hydrogen Refuelling
- Part 3: Potential emissions, pollutants and wastes – Hydrogen Production
- Part 4: Potential emissions, pollutants and wastes - Hydrogen Refuelling
- Part 5: Draft Regulator Matrix – Hydrogen Production and Refuelling

Please note that much of the plant and equipment and potential emissions, pollutants and wastes are replicated at least partially between hydrogen and refuelling. However, we provide separate sections for question inputs on each for ease of input and recognising that participants may have expertise in one or another or both.

## Consultation Questions-

### Part 1: Plant, Equipment, and Job Roles - Hydrogen Production

Questions in this section refer to the following documents:

3. Facility Technical Map - Plant and Equipment - Production and Refuelling
- 3A. Facility Technical Map - Job Roles and Competencies - Production and Refuelling
5. Facility Technical Map - Schematic representation - Production and Refuelling

#### 1.1. Production methods

The Facility Technical Map assesses the commercially viable plant and equipment most likely to be used in production of hydrogen through electrolysis. Production of hydrogen using steam methane reforming has not been included as this is already occurring in Australia at scale and is not considered to be in need of additional regulatory guidance.

Are there any other production methods or permutations of production methods (e.g. alternative electrolyser technologies) that should be included?

*Please include response here*

#### 1.2. Identification of plant and equipment

Do you have any comments on the plant and equipment identified for a hydrogen production facility?

1. Is the list of plant/equipment accurate and complete?
2. Is there any significant plant/equipment missing?

*Note: Refer to the **Name of item** in **Tables A1 and A2** in document **3. Facility Technical Map – Plant and Equipment**.*

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document **3. Facility Technical Map – Plant and Equipment – Production and Refuelling***

### 1.3. Description of plant and equipment

Do you have any comments on the **descriptions** of the plant and equipment identified for a hydrogen production facility?

1. Do you agree with its broad description and use in a production facility?
2. Do you agree with the characteristics identified that would inform an assessment of whether the equipment is electrical or gas equipment, electrical or gas installation or pressure vessel?

*Note: Refer to the **Description of plant or equipment/process it undertakes** in **Tables A1 and A2** in document **3. Facility Technical Map – Plant and Equipment**.*

- *please include response here; or*
- *use the 'track-change and comment' function in Word and provide input directly into document 3. Facility Technical Map – Plant and Equipment*

### 1.4. Safe operation of plant and equipment

Do you have any comments on the summary of the safe operation of the plant and equipment identified for a hydrogen production facility?

1. Do you agree with the hazards identified?
2. Do you agree with the standards identified to demonstrate best practice?
3. Do you have any practical experience with applying existing mandatory (ie called up in a statutory provision) standards to hydrogen specific plant and equipment? Are these standards appropriate and adapted for the purpose? For example, in the context of the electrolyser stack AS3000 (the wiring rules) or AS4343:2014 (pressure equipment hazard levels). If not appropriate or adapted, please explain why and include the extent of the issue. For example, it is relatively inefficient and could be improved upon, or, it is completely problematic.
4. Are there any other standards or practices you have used, recommend or are aware of?

*Note: Refer to the **Safe Operation** in **Tables A1 and A2** in document **2. Facility Technical Map – Plant and Equipment**.*

- *please include response here; or*
- *use the 'track-change and comment' function in Word and provide input directly into document 3A. Facility Technical Map - Job Roles - role description and competencies*

### 1.5. Job roles – identification

Do you have any comments, in the context of relevant regulatory frameworks, on the job roles identified in relation to a hydrogen production facility?

1. Do you agree with the assessment of the current job role?
2. Is the job role identified the most appropriately qualified person to safely undertake the relevant activities for the corresponding plant/equipment as a matter of best practice?
3. Are there job roles missing (whether or not these can be allocated to a specific piece of equipment). Roles could include:
  - a. a licensed worker or worker of a type named in regulations
  - b. a person with a specific set of skills, training or experience that makes them a ‘competent person’ under work health and safety laws

*Note: Refer to*

- **Job Role in Tables A1 and A2 in document 2. Facility Technical Map – Plant and Equipment**
- **Document 3A. Facility Technical Map - Job Roles and Competencies**

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document 3A. Facility Technical Map - Job Roles - role description and competencies*

### 1.6. Job competencies, skills and accreditations

Legislative instruments in all jurisdictions include requirements concerning worker skills, accreditations or competencies (for example, WHS/OHS, gas safety or electrical safety regulatory instruments). In the context of such regulatory frameworks, do you have any comments on the competencies, skills or accreditations identified for the respective job role in relation to a hydrogen production facility? For example:

1. Are existing basic level qualifications for electricians or gasfitters, plumbers, refrigeration mechanics (etc) sufficient to ensure safe installation, commissioning and operation of hydrogen plant/equipment?
2. Are existing additional accreditations (eg. electrician with explosive atmosphere accreditation) available that would be appropriate to be mandated as best practice for safe installation, commissioning and operation on hydrogen plant/equipment?
3. Are those additional accreditations available on a nationally consistent and recognised basis?
4. Are there gaps in the existing accreditations available for each identified job role?

*Note: Refer to document 3A. Facility Technical Map - Job Roles and Competencies - Production and Refuelling*

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document 3A. Facility Technical Map - Job Roles - role description and competencies*

### 1.7. Information sharing – list of job roles, role descriptions and training

If you are currently operating a production facility, are you able to share a list of job roles, role descriptions and training within your facility?

*Note: this information will be taken as commercial in confidence and used to inform development of the Codes and not otherwise shared outside of government.*

*Please set out response here or attach as a separate document.*

*Alternatively, please contact the National Hydrogen Regulatory Review project team at [nationalhydrogenregulatoryreview@dcceew.gov.au](mailto:nationalhydrogenregulatoryreview@dcceew.gov.au) to discuss other ways of sharing this information.*

## Part 2: Plant, Equipment, and Job Roles - Hydrogen Refuelling Facility

Questions in this section refer to the following documents:

3. Facility Technical Map - Plant and Equipment - Production and Refuelling
- 3A. Facility Technical Map - Job Roles and Competencies - Production and Refuelling
5. Facility Technical Map - Schematic representation - Production and Refuelling

### 2.1 Refuelling Facility

The Facility Technical Map assesses the plant and equipment present at a refuelling facility assuming tube trailer supply, or onsite production.

Are there any other refuelling station types or permutations that should be included?

*Please include response here*

## 2.2 Identification of plant and equipment

Do you have any comments on the plant and equipment identified for a hydrogen refuelling facility?

1. Is the list of plant/equipment accurate and complete?
2. Is there any significant plant/equipment missing?

*Note: Refer to the **Name of item** in Tables A3 and A4 in document 3. Facility Technical Map – Plant and Equipment.*

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document 3. Facility Technical Map – Plant and Equipment – Production and Refuelling*

## 2.3 Description of plant and equipment

Do you have any comments on the **descriptions** of the plant and equipment identified for a hydrogen refuelling facility?

1. Do you agree with its broad description and use in a production facility?
2. Do you agree with the characteristics identified that would inform an assessment of whether the equipment is electrical or gas equipment, electrical or gas installation or pressure vessel?

*Note: Refer to the **Description of plant or equipment/process it undertakes** in Tables A3 and A4 in document 3. Facility Technical Map – Plant and Equipment.*

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document 3. Facility Technical Map – Plant and Equipment*

## 2.4 Safe operation of plant and equipment

Do you have any comments on the summary of the safe operation of the plant and equipment identified for a hydrogen refuelling facility?

1. Do you agree with the hazards identified?
2. Do you agree with the standards identified to demonstrate best practice?
3. Do you have any practical experience with applying existing mandatory (ie called up in a statutory provision) standards to hydrogen specific plant and equipment? Are these standards appropriate and adapted for the purpose? For example, in the context of the electrolyser stack AS3000 (the wiring rules) or AS4343:2014 (pressure equipment hazard levels). If not appropriate or adapted, please explain why and include the extent of the issue. For example, it is relatively inefficient and could be improved upon, or, it is completely problematic.
4. Are there any other standards or practices you have used, recommend or are aware of?

*Note: Refer to the **Safe Operation** in **Tables A3 and A4** in document **2. Facility Technical Map – Plant and Equipment**.*

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document 3. Facility Technical Map – Plant and Equipment*



## 2.5 Job roles – identification

Do you have any comments, in the context of relevant regulatory frameworks, on the job roles identified in relation to a hydrogen refuelling facility?

1. Do you agree with the assessment of the current job role?
2. Is the job role identified the most appropriately qualified person to safely undertake the relevant activities for the corresponding plant/equipment as a matter of best practice?
3. Are there job roles missing (whether or not these can be allocated to a specific piece of equipment). Roles could include:
  - a. a licensed worker or worker of a type named in regulations
  - b. a person with a specific set of skills, training or experience that makes them a 'competent person' under work health and safety laws

*Note: Refer to*

- **Job Role** in **Tables A3 and A4** in document **2. Facility Technical Map – Plant and Equipment**
- **Document 3A. Facility Technical Map - Job Roles and Competencies**

- *please include response here; or*
- *use the 'track-change and comment' function in Word and provide input directly into document 3. Facility Technical Map – Plant and Equipment*

## 2.6 Job competencies, skills and accreditations

Legislative instruments in all jurisdictions include requirements concerning worker skills, accreditations or competencies (for example, WHS/OHS, gas safety or electrical safety regulatory instruments). In the context of such regulatory frameworks, do you have any comments on the competencies, skills or accreditations identified for the respective job role in relation to a hydrogen refuelling facility? For example:

1. are existing basic level qualifications for electricians or gasfitters, plumbers, refrigeration mechanics (etc) sufficient to ensure safe installation, commissioning and operation of hydrogen plant/equipment?
2. Are existing additional accreditations (eg. electrician with explosive atmosphere accreditation) available that would be appropriate to be mandated as best practice for safe installation, commissioning and operation on hydrogen plant/equipment?
3. Are those additional accreditations available on a nationally consistent and recognised basis?
4. Are there gaps in the existing accreditations available for each identified job role?

*Note: Refer to **document 3A. Facility Technical Map - Job Roles and Competencies - Production and Refuelling***

- *please include response here; or*
- *use the 'track-change and comment' function in Word and provide input directly into document 3A. Facility Technical Map - Job Roles - role description and competencies*

## 2.7 Information sharing – list of job roles, role descriptions and training

If you are currently operating a refuelling facility, are you able to share a list of job roles, role descriptions and training within your facility?

*Note: this information will be taken as commercial in confidence and used to inform development of the Codes and not otherwise shared outside of government.*

*Please set out response here or attach as a separate document.*

*Alternatively, please contact the National Hydrogen Regulatory Review project team at [nationalhydrogenregulatoryreview@dcceew.gov.au](mailto:nationalhydrogenregulatoryreview@dcceew.gov.au) to discuss other ways of sharing this information.*

## Part 3: Potential emissions, pollutants and wastes - Hydrogen Production

Questions in this section refer to the following documents:

4. Facility Technical Map – Potential emissions, pollutants and wastes - Production and Refuelling
5. Facility Technical Map - Schematic representation - Production and Refuelling

### 3.1 Identification of production facility process streams/substances/chemicals

Do you have any comments on the process streams/substances/chemicals or associated origin or destination plant identified for a hydrogen production facility?

1. Is the list of process streams/substances/chemicals, origin plant and destination plant accurate and complete for the purpose of identifying relevant emissions, pollutants, contaminants or wastes?
2. Is the listed approximate quantity for each material/substance accurate?
3. Is there any significant process streams/substances/chemicals missing that are relevant to identifying relevant emissions, pollutants, contaminants or wastes?
4. Trace elements have been considered but determined to be too minor for inclusion. Do you agree?

*Note: Refer to the **Table B1** in document 4. **Facility Technical Map – Potential emissions, pollutants and wastes.***

- *please include response here; or*
- *use the ‘track-change and comment’ function in Word and provide input directly into document 4. **Facility Technical Map – Potential emissions, pollutants and wastes***

### 3.2 Safe storage, handling and disposal

Do you have any comments on the summary of the safe handling, storage and risk mitigation of the process streams/substances/chemicals identified for a hydrogen production facility?

1. Do you agree with the environmental hazards/impacts identified?
2. Do you agree with the mitigations identified to demonstrate best practice? Are any missing?
3. Are there any other standards, specifications or practices you have used, recommend or are aware of?

*Note: Refer to the **Table B1** in document **4. Facility Technical Map – Potential emissions, pollutants and wastes**.*

- *please include response here; or*
- *use the 'track-change and comment' function in Word and provide input directly into document **4. Facility Technical Map – Potential emissions, pollutants and wastes***

### 3.3 Hydrogen emissions

What is your understanding of the environmental impacts of hydrogen emissions in relation to hydrogen production facilities?

1. What is the potential for environmental impact from hydrogen emissions generally?
2. What is the impact/significance of leaked hydrogen?
3. Is there a need for ongoing monitoring of hydrogen emissions for environmental/greenhouse gas emissions reasons which may need more refined monitoring than for safety reasons?

*Note: Refer to the **Table B1** in document **4. Facility Technical Map – Potential emissions, pollutants and wastes**.*

*Please include response here.*

### 3.4 Water discharges

What is your understanding of the environmental impacts of water discharges in relation to hydrogen production facilities?

1. What is the potential for environmental impact from water discharges at a hydrogen production facility generally?
2. What are the impacts of **waste from the water treatment plant**?
3. What are the impacts (and extent of impacts) from **other water discharges** (e.g cooling or chilled water loops)?

*Note: Refer to document 4. Facility Technical Map – Potential emissions, pollutants and wastes.*

*Please include response here.*

### 3.5 Environmental impacts of streams/substances/chemicals

For each substance or process stream/substance/chemical:

1. What is your assessment of the potential environmental impact relating to the key waste streams
2. Please provide your assessment of whether it is likely to be classified as serious environmental harm, material environmental harm, environmental harm or environmental nuisance (or equivalent as used by your jurisdiction's environmental protection legislation)?

*Note: Refer to the Table B1 in document 4. Facility Technical Map – Potential emissions, pollutants and wastes.*

Substance	Environmental impact
Water treatment plant wastes (refer stream E2)	<p><i>What is the likely environmental impact?</i></p> <p><i>Would you classify this as serious environmental harm, material environmental harm, environmental harm or environmental nuisance (or equivalent as used by your jurisdiction's environmental protection legislation).</i></p>
Other water discharges	
Lye - Potassium hydroxide (refer stream E7)	
Hydrogen (leaked/vented/H <sub>2</sub> blowdown) (refer stream E9)	<i>Please include any other comments not discussed in question 3. 3 above.</i>
Oxygen (leaked/vented/O <sub>2</sub> blowdown) (refer stream E10, H10)	

## Part 4: Potential emissions, pollutants and wastes – Hydrogen Refuelling

Questions in this section refer to the following documents:

4. Facility Technical Map – Potential emissions, pollutants and wastes - Production and Refuelling
5. Facility Technical Map - Schematic representation - Production and Refuelling

### 4.1 Identification of production facility process streams

Do you have any comments on the process streams/substances/chemicals or associated origin or destination plant identified for a hydrogen refuelling facility?

1. Is the list of process streams/substances/chemicals, origin plant and destination plant accurate and complete for the purpose of identifying relevant emissions, pollutants, contaminants or wastes?
2. Is there any significant process streams/substances/chemicals missing that are relevant to identifying relevant emissions, pollutants, contaminants or wastes?

*Note: Refer to the **Table B2** in document 4. Facility Technical Map – Potential emissions, pollutants and wastes.*

- *please include response here; or*
- *use the 'track-change and comment' function in Word and provide input directly into document 4. Facility Technical Map – Potential emissions, pollutants and wastes*

### 4.2 Hydrogen emissions

What is your understanding of the environmental impacts of hydrogen emissions in relation to hydrogen refuelling facilities?

4. What is the potential for environmental impact from hydrogen emissions generally?
5. What is the impact/significance of leaked hydrogen?
6. Is there a need for ongoing monitoring of hydrogen emissions for environmental/green house gas emissions reasons which may need more refined monitoring than for safety reasons?

*Note: Refer to the **Tables B1 and B2** in document 4. Facility Technical Map – Potential emissions, pollutants and wastes.*

*Please include response here.*

#### 4.3 Environmental impacts of substances and materials

For each substance or stream in a hydrogen refuelling facility:

1. Please provide your assessment of the potential environmental impact relating to the key waste streams
2. Please provide your assessment of whether it is likely to be classified as serious environmental harm, material environmental harm, environmental harm or environmental nuisance (or equivalent as used by your jurisdiction's environmental protection legislation)?

*Note: Refer to the **Table B2** in document **4. Facility Technical Map – Potential emissions, pollutants and wastes**.*

## Part 5: Draft Regulator Matrix – Hydrogen Production and Refuelling

This Part 5 seeks feedback on the draft Regulator Matrix.

Once finalised, the Regulator Matrix will have two main objectives:

- Provide a high-level snapshot of the Australian regulatory architecture as it applies to hydrogen production and refuelling facilities, and
- Identify relevant regulators responsible for each statutory instrument.

Note: The focus of the summaries in the draft Regulator Matrix is identifying whether or not a statutory instrument applies. Details on specific obligations and compliance will be addressed in the proposed Section 3 Regulatory Obligations of the codes which will include detailed regulatory guidance and compliance information.

Questions in this section refer to the following documents:

6. National Codes of Best Practice – Regulator Matrix - Facility Safety
7. National Codes of Best Practice - Regulator Matrix - Environment and Planning

### 5.1 Interpretation/application of legislation

Do you have any comments on the content of the summary for any of the entries in the draft Regulator Matrix? <i>Please use the table below, adding any extra rows as required.</i>		
Jurisdiction	Act	Comment
<i>E.g. ACT</i>	<i>Planning Act</i>	[insert comment]

### 5.2 Nature of information in summaries

Do you have any comments on the type of information provide in the summary? For example, is there any additional information that you would find useful?

**5.3 General**

Do you have any other feedback on the draft Regulator Matrix?