LOW-CARBON AMMONIA CERTIFICATION SCHEME

CONSULTATION PHASE LAUNCH – 26 August 2021

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AMMONIA ENERGY ASSOCIATION

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The mission of the Ammonia Energy Association (AEA) is to promote the responsible use of ammonia in a sustainable energy economy.

Established in 2004, the AEA has unrivaled knowledge, networks, and credibility to establish the vision for ammonia as a globally-traded sustainable energy commodity

AEA members include over 120 corporations, international and cross-sectoral, including a significant proportion of current and future ammonia producers, as well as many first-movers in consumer industries for ammonia energy, across maritime, power, fertilizers, chemicals, and other sectors.

Platinum, Gold, and Silver Members of the AEA, August 2021

SCHEME OBJECTIVES

Support adoption of a **globally harmonised framework** for the accounting, reporting, and verification of emission reductions associated with low-carbon ammonia initiatives.

1.

Low-Carbon Ammonia Projects – Registration and Reporting:

registration of *Low Carbon Ammonia Projects* under the Certification Scheme, against approved project design, accounting, monitoring, reporting and verification methodologies.

2.

Low-Carbon Ammonia Products – Certification:

issuance of *Low-Carbon Ammonia Certificates* for verified emission reductions arising from the implementation of Low Carbon Ammonia Projects registered under the scheme

DESIGN PRINCIPLES

1. TRANSPARENT

Explicit accounting of *Major GHG Species* [1]

Explicit reporting of *Scope Boundaries*

2. ADAPTABLE

Always aligned with *up-to-date* GWP-100 factors from UNFCCC

Reporting against *Project-specific* or *Market-based* Baselines

3. INCLUSIVE

Multiple Ammonia Production Pathways (incl. co-products)

Ammonia Delivery and End-Use Pathways

4. PORTABLE

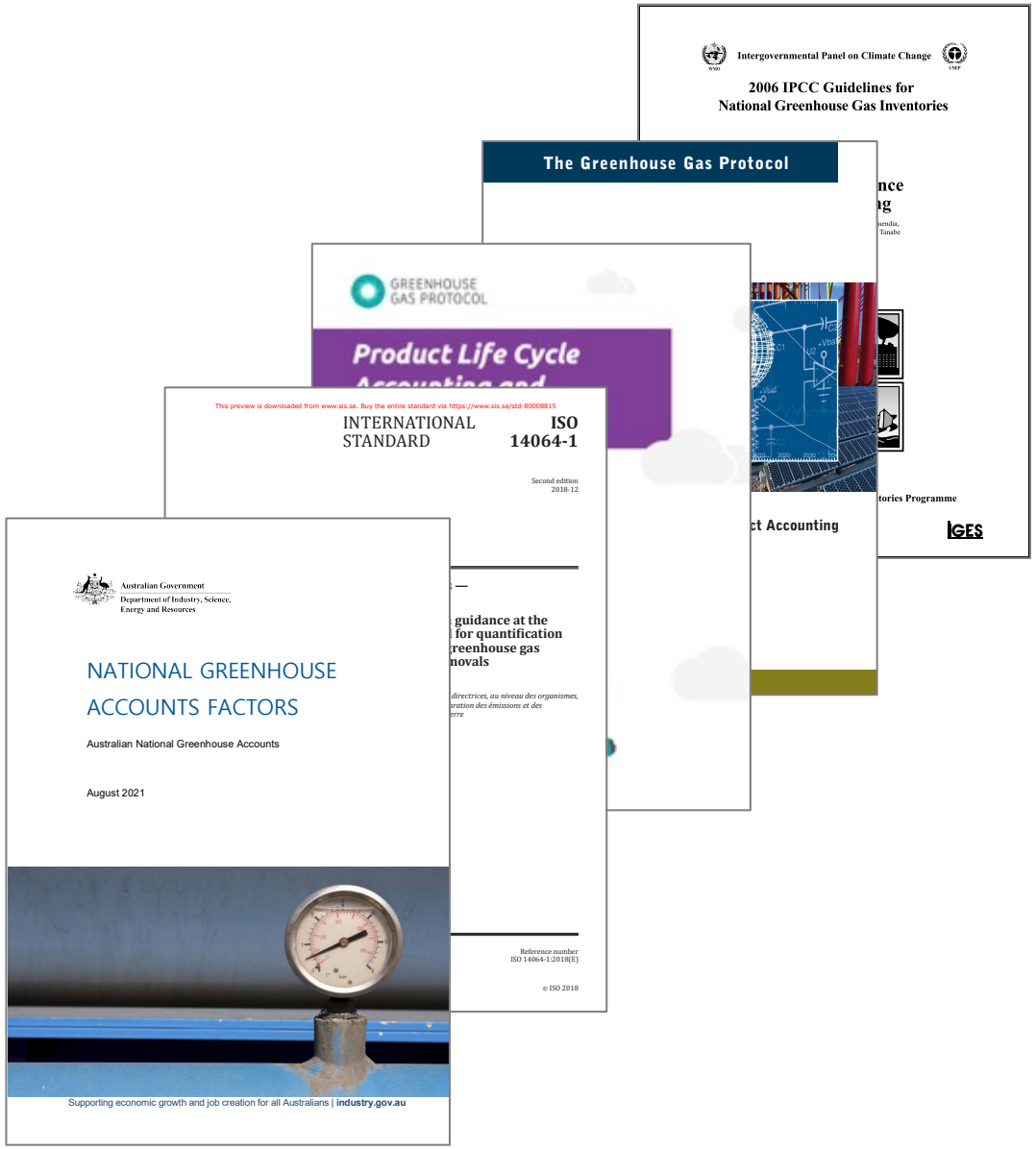
Enable integration across *value-chain activities*

Enable *cross-jurisdiction* accounting

[1] CO_2, CH_4, N_2O, HFC_x, PFC_x, SF_6, NF_3

METHODOLOGY REFERENCES

Key References	UNFCCC guidelines and key publications
Standards	ISO 1406X standards GHG Protocol
National-level	Accounting and Reporting Guidelines Reference Methods and Factors



PRINCIPLES, METHODS and GOVERNANCE

Attilio PIGNERI

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Working Group 1

Key Objectives and Contribution

1. GOVERNANCE FRAMEWORK

Certification of Verification Bodies and Verifiers/Assessors

Project Registration and Reporting Procedures

2. METHODOLOGY GUIDELINES

Project Design and Baseline Selection Activities

Monitoring, Verification and Reporting Activities

3. QUALITY ASSURANCE FRAMEWORK

Methodology Review and Assessment Procedures

Certification and Auditing Procedures

KEY FEATURES

1. APPLICABILITY

Project Registration and Reporting

Product Certification

2. MODELLING APPROACH

Life-cycle (Value-chain) modelling

Emission reduction focus

3. FUNCTIONAL UNITS

Primary: one metric tonne of Ammonia (t_{NH3})

Other: one metric tonne of co-products (hydrogen, carbon black,…)

4. REPORTING UNITS

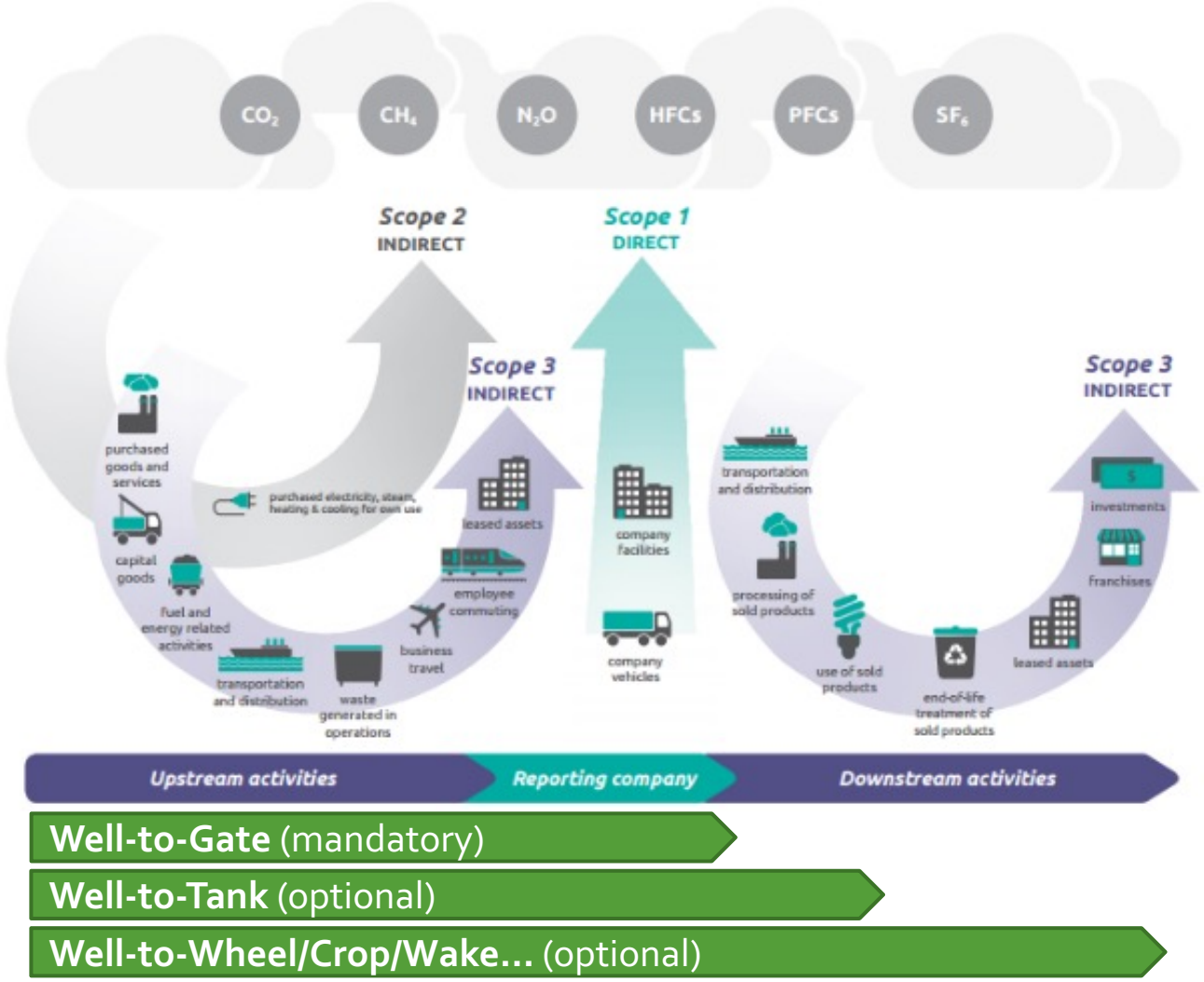
Primary: tonnes of CO2-e per tonne of ammonia ($t_{CO2\text{-}e} / t_{NH3}$)

Other: tonnes of CO2-e per tonne of co-product ($t_{CO2\text{-}e} / t_{co\text{-}product}$)

SCOPE BOUNDARIES

Well-to-Gate (mandatory)	Scope 1 Emissions Scope 2 Emissions Scope 3 Emissions (upstream)
Well-to-Tank (optional)	Well-to-Gate, *plus:* Scope 3 Emissions (downstream)
Well-to-"Wheel" (optional)	Well-to-Tank, *plus:* Scope 3 Emissions (end-use)

SOURCE: WRI/WBCSD



LOW-CARBON AMMONIA PATHWAYS

Blake ADAIR

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Working Group 2

Key Objectives and Contribution

1. PATHWAY ASSESSMENT

Multiple Ammonia Production Pathways (incl. co-products)

Ammonia Delivery and End-Use Pathways

2. PILOT PROJECTS

Representative Portfolio of Production and End-Use Cases

Project Proponents engaged as *early adopters* of the Scheme

3. PROJECT METHODOLOGIES

Support Methodology Development

Support Project Registration

PATHWAY ANALYSIS

Support selection of priority pathways for pilot implementation, ideally from **implementation-ready projects** under development by AEA Members.

Support development of initial portfolio of **project-level methodologies** to be approved within the Scheme.

1. PRODUCTION PATHWAYS

Conventional

Natural-gas reforming, Coal gasification, …

Conventional + Abatement

Carbon Capture and Utilization, Carbon Capture and Sequestration, …

Electrolysis-based

Electrolysis from grid electricity (with and without power purchase agreements/renewable energy certificates)

Electrolysis from dedicated sources (wind/solar/nuclear)

Novel and Hybrid Pathways

Biogenic gas reforming, Pyrolysis/Gasification, Pyrolysis/Gasification + Carbon Sequestration, Direct-synthesis Pathways, Hybrid Electrolysis/CCUS Pathways

2. UTILIZATION PATHWAYS

Feedstock

Manufacturing of Basic Chemicals, Use/Manufacturing of Fertilizers,

Manufacturing of Explosives

Industrial Use

Mineral Processing

Refrigeration

Industrial Refrigeration

Fuel

Power Generation, Shipping,…

EMISSIONS BASELINES

Adoption of **Emissions Baselines** for Projects registered under the Scheme is key to enable *apple-for-apple* comparisons between different pathways based on verified emission reductions reported for each Project.

1. PROJECT-SPECIFIC
(brownfield projects/initiatives)

Examples:

- Existing production sites
- Existing end-use operations/activities

2. MARKET-BASED
(greenfield projects/initiatives)

Examples:

- New production sites
- New end-use operations/activities

MARKETS, POLICIES and REGULATIONS

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Working Group 3

Key Objectives and Contribution

1. GLOBAL SURVEY OF CERTIFICATION SCHEMES

Landscape analysis of relevant initiatives for the certification of products and processes – including regulations and voluntary standards, existing or under development.

Develop matrix that tracks the initiatives' approach to key factors and attributes, and their relevance to certification of ammonia.

2. ASSESS INTERPLAY BETWEEN AEA SCHEME AND OTHER CERTIFICATION INITIATIVES

Examine how potential AEA ammonia fuel certification approaches might complement, conflict with, or otherwise relate to other standards surveyed under Objective 1.

3. PROMOTE CROSS-PLATFORM COHESION

Advise AEA on opportunities to promote cohesion and collaboration between an ammonia certification scheme and other regulations, standards, or certification initiatives.

SURVEY OF RELEVANT INITIATIVES

Review process will initially focus on a handful of large and/or early-mover geographies and jurisdictions—e.g., Australia, EU/UK, China, Japan, USA; and include international organizations including IMO, IPHE, and others. Subsequent reviews may examine relevant regulatory measures and certification schemes in other geographies and jurisdictions.

Assessment will identify elements of existing and under-development measures and schemes that are most salient to the development of an ammonia fuel certification process.

Partial *draft* matrix (right) illustrates how key attributes of a regulatory scheme (e.g., California Low Carbon Fuel Standard) and a voluntary accounting scheme (e,g,. CertifHy) might be organized and presented.

	California LCFS	CertifHy
Type	Sets declining CI target for transport fuel, mandates compliance by fuel providers; hydrogen can be used for compliance either directly or as an input to other fuels	Voluntary standard for hydrogen
Categories	None	"Green" or "Low-carbon" hydrogen
System boundary	Upstream to point of use	Upstream to point of production
End uses	Transportation	NA
Reference flow	Market driven	3MPa, 99.9% purity
Carbon capture and storage	Generally allowed	Allowed
Carbon capture and utilization	Generally disallowed	TBD
Units	$gCO2e/MJ_{LHV}$	$gCO2e/MJ_{LHV}$
Threshold	None	≥60% lower than conventional SMR
Chain of custody	Book & claim	Book & claim
Guarantees of origin for input energy	*[Further review needed]*	*[Further review needed]*
Additionality requirement (for RE)	*[Further review needed]*	*[Further review needed]*
Reporting requirements	Quarterly and annual	None

CERTIFICATION and CHARACTERIZATION

CERTIFICATION
(KEY REQUIREMENTS)

Guarantee of Origin

Reporting of Scope Boundaries

Reporting of Life-cycle emissions

Emission Intensity per tonne of product

CHARACTERIZATION
(POTENTIAL APPROACHES)

Technology/Pathway Approach
(Green, Blue, Turquoise, Grey…)

or

Quality/Performance Approach
(Low-, Very-Low, or Zero-Carbon)

or

No Characterization
(Certification Of Emissions Intensity/Reduction Only)

GETTING INVOLVED

DISCUSSION PAPER and CONSULTATION ACTIVITIES

Discussion Paper, Public Consultation, Expressions of Interest

Available from **September 1, 2021** on:

https://ammoniaenergy.org/certification