Joint-Declaration on the Responsible Deployment of Renewables-Based Hydrogen

Dubai; December 5th, 2023; Today, representatives from across the world have come together to sign a *Joint-Declaration on the Responsible Deployment of Renewables-Based Hydrogen*.[1] This declaration aims to ensure that the implementation of renewables-based hydrogen technologies is conducted in a manner which sufficiently prioritises the intentional and judicious scaling of deployment, outlines required standards for the production, application, and trade of hydrogen; and gives guidance on potential impacts (both negative and positive) to local communities, the natural environment and the climate, as well as the inclusive and equitable energy transition in the context of a global 1.5C pathway.[2][3][4]

We, the undersigned parties, representing regional hydrogen alliances from across the world, hydrogen organisations & corporations, national labs, industry stakeholders, academia, government institutions, public agencies, environmental organisations, and civil society, hereby join forces to address the urgent issue of climate change and the world's mutual recognition of renewables-based hydrogen as a potential solution in a truly net zero future. We unequivocally agree to the understanding that the only scalable, truly near-zero emissions hydrogen is produced from water using renewable energy (including solar, wind, geothermal and hydro power - i.e., renewables-based). In recent years, renewables-based hydrogen has emerged as a means of decarbonising select hard-to-abate /

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[1] The term 'renewables-based hydrogen' refers to hydrogen which is produced from water using renewable energy (this includes solar, wind, geothermal, & hydro power). The term does not refer to or include what is known as "white" hydrogen removed from subsurface deposits. The term does not include or exclude what is known as "dark green" hydrogen but reserves the right to make a distinction on the value of this technology and its role in responsible deployment.

[2] The term 'intentional scaling' refers to the establishment of a hydrogen market which - while greater than the current hydrogen market size - is developed with the intent to serve only those end use applications which are considered unavoidable, that it is primarily produced locally to avoid transportation-related emissions and costs, and it is part of a broader system of solutions which will maximise value to communities, the natural environment, and the climate.

[3] The term 'responsible' will hereinafter refer to the language referenced here - wherein responsible deployment indicates the implementation of of renewables-based hydrogen technologies is conducted in a manner which sufficiently prioritises the intentional and judicious scaling of deployment, outlines required standards for the production, application, and trade of hydrogen; and gives guidance on potential impacts (both negative and positive) to local communities, the natural environment and the climate, as well as the inclusive and equitable energy transition in the context of a global 1.5C pathway.

[4] The undersigned parties recognize that, while not completely exhaustive, it is necessary to address specific environmental, ecological, and social concerns, including but not limited to: avoiding harm to sensitive habitats, delivering a net-positive impact on biodiversity, prioritising sustainable water management, implementing regenerative practices, ensuring climate change resilience, fostering community benefits, engaging communities transparently, promoting local job creation, prioritising social inclusivity, adhering to responsible sourcing, and upholding labour rights and safety throughout the project lifecycle.

hard-to-electrify sectors around the world. These include what The Breakthrough Agenda Report 2023 has defined as "Priority Sectors", including some specific products/processes in chemicals and steel (fertiliser, methanol, chemical feedstock, direct reduced iron), maritime shipping (as a renewables-based hydrogen power-to-x derivative), aviation (as a renewables-based hydrogen power-to-x derivative), seasonal electricity storage when renewable supply to the grid is >100%, and some very limited segments of heavy-duty trucking / off-road mobility.[5][6] However, notably, renewables-based hydrogen presents a range of opportunities and challenges which must be proactively and holistically accounted for in order to avoid any pitfalls on the journey to a net zero economy. Renewables-based hydrogen - when compared to other solutions - can often be both inefficient and more costly in comparison. Additionally, it has the potential to add a range of complexities to the energy transition – delaying our progress towards delivering on a 1.5C pathway.

Recognizing the urgency of the climate crisis, specifically the ever-increasing potential risks and real-world impacts on vital ecosystems and weather patterns around the world, we are committed to taking immediate action to ensure a pathway of 1.5 degrees Celsius warming is achieved in a truly responsible manner as it relates to the hydrogen sector and its impactful but limited role in a net zero future. As such, we, the undersigned parties, acknowledge the need for mutual recognition of a broad range of standards guiding the deployment of renewables-based hydrogen around the world. These standards, outlined below, will support global actors in ensuring the growth of the hydrogen economy is both climate positive and puts people + the planet at the forefront of hydrogen-related development.

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By signing this joint-declaration, representatives from across the world demonstrate their collective willingness to promote standards related to responsible production, transportation and end use of renewables-based hydrogen technologies and to collectively address the challenges and opportunities associated with the growth of hydrogen ecosystems on a global scale.

These standards are built upon existing international conventions, treaties and frameworks - including but not limited to: The Ten Principles of the United Nations Global Compact, the United Nations Sustainable Development Goals, the

[5] IEA/IRENA/UN High-Level Champion, The Breakthrough Agenda Report 2023, https://mc-cd8320d4-36a1-40ac-83cc-3389-cdn-endpoint.azureedge.net/-/media/Files/IRENA/Agency/Publication/2023/Sep/IRENA_IEA_UNCCHLC_Breakthrough_agenda_report_2023.pdf?rev=ad8e40e358e6407fa0a6dc17198016c1

[6] We, the undersigned parties, recognize this list is both non-exhaustive and the reality that these end use applications are variable to change as “responsible” deployment of climate-aligned renewables-based hydrogen is concerned.

Universal Declaration of Human Rights, the International Labour Organization's Declaration on Fundamental Principles and Rights at Work & Convention 169, the Rio Declaration on Environment and Development, the United Nations Framework Convention on Climate Change and the United Nations Convention Against Corruption.

The implementation and monitoring processes of these standards, as well as specific timelines, will be outlined in a support document, known as the *Guiding Document for the Implementation of the Joint-Declaration*.

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STANDARDS:

Continuously defining and integrating a holistic, dynamic approach to technology readiness levels - as well as stringent methodologies and thresholds for emissions intensities - into investment & project decision-making criteria

1. We, the undersigned parties, agree to the phasing out of all fossil fuel-based hydrogen in alignment with a global 1.5C pathway.
2. The undersigned parties hereby agree to work collaboratively to support solutions that ensure the responsible production, deployment, and use of renewables-based hydrogen (and its relevant derivatives), with a focus on minimising environmental impact. Our collective efforts aim to advance technologies and practices that contribute to the reduction of greenhouse gas emissions, promote sustainability across the entire hydrogen value chain, and prioritise the conservation of ecosystems. By doing so, we aspire to achieve outcomes that are truly beneficial for the climate and the natural environment.[7]
3. The undersigned parties agree to integrate holistic, dynamic Technology Readiness Levels (TRLs)[8] into feasibility and viability criteria throughout the project lifecycle; which include analysing environmental and social impacts in accordance with international standards.[9] The undersigned parties

[7] The term 'relevant derivatives' refers to a broad spectrum of products and applications stemming from renewables-based hydrogen. This includes, among others, direct applications like ammonia and methanol, as well as integration into processes such as chemical feedstock and direct reduced iron production. The term acknowledges the diverse range of downstream products and end use applications within the hydrogen value chain, representing the varied contributions of renewables-based hydrogen in a net zero economy.
[8] Technology Readiness Levels (TRLs) are a type of measurement system used to assess the maturity level of a particular technology. Each technology project is evaluated against the parameters for each technology level and is then assigned a TRL rating based on the project's progress. There are nine technology readiness levels. TRL 1 (lowest) to TRL 9 (highest).
[9] While non-exhaustive - we recognize the following international standards in this declaration: The Ten Principles of the United Nations Global Compact, the United Nations Sustainable Development Goals, the Universal Declaration of Human Rights, the International Labour Organization's Declaration on Fundamental Principles and Rights at Work & Convention 169, the Rio Declaration on

acknowledge that certain international standards may not be established or there may exist some variability of international standards for a specific topic area. Therefore, the undersigned parties commit to addressing this issue by establishing clear and consistent criteria for technology readiness.

4. The undersigned parties commit to full life cycle accounting for all relevant climate warming-related emissions for renewable-based hydrogen and its relevant derivatives, including all relevant timescales and scope 1, 2, and 3 emissions across all stages of the project lifecycle. This includes the independent monitoring and certification that the hydrogen in question is in fact produced from renewable energy sources via a certification of origin (CO) scheme or comparable tool for ensuring transparency and reliability in developing countries where a CO scheme may not be feasible; while aiming for near-zero emissions from leakage and venting from well-to-X supply chain processes (well-to-wake, well-to-wheel, etc.). The undersigned parties recognise the difficulty and climate imperative of safely and effectively managing production and transmission / distribution systems to appropriately safeguard against hydrogen leakage which can undermine hydrogen's climate benefits.[10] Additionally, the undersigned parties are encouraged to consider embodied or embedded emissions when accurately reporting the net impact on emissions of hydrogen deployment. The undersigned parties agree to work collaboratively to establish regional and international harmonisation of certification schemes in alignment with the above emissions accounting methodology.
5. The undersigned parties recognize the need to achieve verifiable emission intensities that trend towards near-zero by 2030.

Tailoring the application and end use of renewables-based hydrogen technologies to specific regional/sectoral sensitivities

6. The undersigned parties agree to assess key geotemporal regional and sectoral supply and demand sensitivities which will - when considered in concert with environmental, social, and economic risks - maximise the achievement of the Sustainable Development Goals (specifically SDGs 6, 13, 14, and 15 which are considered fundamental to mitigating the impacts of climate change as well as SDGs 7, 9 & 12 which renewables-based hydrogen will have a direct impact on).[11]

Environment and Development, the United Nations Framework Convention on Climate Change and the United Nations Convention Against Corruption.

[10] According to the latest science (Sand, M., Skeie, R.B., Sandstad, M. et al. A multi-model assessment of the Global Warming Potential of Hydrogen, https://doi.org/10.1038/s43247-023-00857-8 & Warwick, N. J., Archibald, A. T., Griffiths, P. T., Keeble, J., O'Connor, F. M., Pyle, J. A., and Shine, K. P.: Atmospheric Composition and Climate Impacts of a Future Hydrogen Economy, https://doi.org/10.5194/acp-23-13451-2023, 2023.), hydrogen has ~12 times the climate warming power of CO_2 by mass over 100 years after release (GWP 100); additionally, it is even more powerful in the first 20 years (37x that of CO_2 (GWP 20).

[11] The term 'geotemporal' refers to a combining of the variables space and time. In other words, the question is not only what are the right use cases for hydrogen but when should we deploy hydrogen-related infrastructure based on the region/market in question.

7. The undersigned parties agree to prioritise the displacement of fossil-fuel based hydrogen – followed by hard-to-abate sectors which are necessary applications of renewables-based hydrogen to achieve near-zero emissions intensities; such as specific products/processes in chemicals and steel (fertiliser, methanol, chemical feedstock, direct reduced iron), maritime shipping (as a renewables-based hydrogen power-to-x derivative), aviation (as a renewables-based hydrogen power-to-x derivative), seasonal electricity storage when renewable supply to the grid is > 100%, and some very limited segments of heavy-duty trucking / off road mobility.[12]
8. The undersigned parties agree to prioritise deployment of renewables-based hydrogen technology and infrastructure which does not cannibalise the use of more efficient, fitting solutions, perpetuate unnecessary dependencies on fossil fuels and related fossil fuel subsidies, or prevent the permanent displacement of fossil fuels (including but not limited to most use cases related to residential & commercial heating and power generation).

Providing guidelines for global trade & commoditization

9. The undersigned parties agree to only support the development of a renewables-based hydrogen trade ecosystem which properly delivers on the standards outlined in the *Joint-Declaration*; specifically standards 1, 2, 3, 4, 5, and 18 – and takes into account national development priorities of emerging economies.
10. The undersigned parties acknowledge the importance of leveraging and deploying regulation, policies, and market-based mechanisms which embody the spirit of the joint-declaration (specifically as it relates to the reversing of the historical dominance donor economic priorities have had over the sustainable development of emerging economies in North-South partnerships). This includes an agreement to work towards harmonised certification schemes for product quality, origin, and emissions intensity.
11. The undersigned parties will assess the economic, environmental and social viability of a project, and regional and sectoral supply and demand sensitivities (as previously outlined) to support regional decarbonisation specifically in those emerging economies which are projected to be net importers of renewables-based hydrogen and/or its relevant derivatives.

Addressing crucial aspects of capital deployment, financing, & policy schemes

12. The undersigned parties agree to conduct cost analysis - evaluating economic feasibility and competitiveness of renewables-based hydrogen projects - which goes beyond traditional frameworks to include specific methodologies for assessing both the potential negative and positive

[12] This implies reassessing hydrogen applications and projects as technology matures and - as such - this list may change as the responsible end use applications of hydrogen are reassessed over time.

outcomes to local communities; including but not limited to: the potential negative impacts of climate change, biodiversity loss, and increased presence of criteria air pollutants as well as the potential benefits such as job creation, enhanced air quality, increased energy resilience, and the overall advancement of sustainable and resilient local economies.

13. The undersigned parties agree to establish transparent financial mechanisms that ensure the responsible deployment of financial resources for renewables-based hydrogen projects. Additionally, the undersigned parties commit to promoting transparency in all financial transactions between hosting states, operating companies, and supporting states. This includes subsidies provided by supporting states to operating companies.
14. The undersigned parties agree to ensure equitable access to funding for renewables-based hydrogen projects, including end uses, particularly for underserved regions and sectors (any public funding for the project should be used in a way that increases transparency and ownership for the general public).
15. The undersigned parties recognize the necessity for significant increases in RD&D budgets – which are essential in delivering the required work to achieve acceptable TRLs for a broad range of production, transportation, and application technologies.
16. The undersigned parties recognise the critical role of policy instruments in fostering responsible hydrogen deployment, and hereby agree to coordinate on cross-border carbon trade agreements, subsidies, and related policy schemes for hydrogen production and end uses.

Preventing and/or mitigating any adverse effects on local communities

17. The undersigned parties recognise the importance of developing robust community benefits agreements and grassroots ownership models to create shared value in host communities (e.g., community training for jobs above the prevailing wage).
18. The undersigned parties agree to avoid, to the best of their ability, impacts to disadvantaged or at-risk communities in alignment with best practices regarding environmental justice outcomes; where not possible, environmental restoration and cultural preservation plans will be put in place. In addition, investments in community development, such as improved housing and healthcare facilities, will be put in place.
19. The undersigned parties hereby agree to work collaboratively to support solutions that ensure the responsible deployment and use of renewables-based hydrogen (and its relevant derivatives) is truly inclusive and equitable.
20. The undersigned parties agree to prioritise local usages of renewable-based hydrogen to provide social and economic benefits to local communities.

21. The undersigned parties agree, in areas with limited electricity or clean water access, to allocate a portion of renewable energy and/or water production for local consumption. Additionally, the undersigned parties agree to the general consensus that clean energy access and national just energy transition plans should be prioritised ahead of export models which do not provide direct benefits to the most disadvantaged communities in question.
22. The undersigned parties agree to promote and follow responsible sourcing practices for input materials into renewables-based hydrogen production (e.g. responsible mining of input materials for PEM catalysts).
23. The undersigned parties will actively involve the local community in an accessible manner, in the local language and with full disclosure of information – ensuring free prior and informed consent from indigenous people and local communities from the initial pre-feasibility phase of the project design process through operations; as well as establishing a comprehensive process for engaging civil society throughout the project lifecycle (International Labour Organization Convention 169 must be respected for all affected populations).
24. The undersigned parties commit to respect local labour laws, human rights and implement health and safety measures for all workers, contractors and suppliers throughout construction and operations phases.
25. The undersigned parties seek to give priority to local job creation through upskilling/reskilling and workforce contracting, as well as considering local suppliers of materials and services. In any region with high renewable energy potential, this will include training and employing local residents in the operation and maintenance of all related infrastructure.

Protecting the natural environment & delivering a net-positive impact on ecological systems

26. The undersigned parties commit to prevent the compromising of sensitive habitats during renewables-based hydrogen project development and operation.
27. The undersigned parties commit to delivering a net-positive impact on biodiversity and local ecology specifically as it relates to new installations or retrofits for existing infrastructure – acknowledging the interconnectedness of biodiversity loss and mitigation efforts.
28. The undersigned parties agree to prioritise non-freshwater sources for all required volumes of ultrapure, cooling, and raw water usage - if and only if desalination ensures proper dissemination of the resulting brine to avoid damage to salt-water environments and fish populations. In water stressed areas, sustainable water management practices will be enacted in cooperation with the local community.

29. The undersigned parties will prioritise regenerative practices as it relates to soil and land usage with a mitigation plan for restoring any impacted terrains at close of operations.
30. The undersigned parties agree to take into consideration the required measures to make all hydrogen-related infrastructure resilient to the impacts of climate change, ensuring safe and efficient delivery of power or fuel to the end user.

Dubai; December 5th, 2023

We, the undersigned parties, representatives from diverse sectors and regions, come together with shared dedication to the responsible deployment of renewables-based hydrogen. By developing and signing this Joint-Declaration, we affirm our commitment to the standards outlined herein. Together, we strive to uphold the mutual recognition of ethical, environmental, and social standards, ensuring the widespread adoption of renewables-based hydrogen in a manner that is just, inclusive, and sustainable.

Flagship Partners:

- UN High-Level Champion
- H2LAC
- The Green Hydrogen Organization
- Green Hydrogen Catapult

Endorsing Organisations:

- Climate Champions - Internal Records

Peer Reviewers: [13]

- Climate Champions - Internal Records

[13] The Flagship Partners are very grateful to all external and internal experts who reviewed the joint-declaration at length. The reviewers do not carry any responsibility for the final publication, which is the sole responsibility of the Flagship Partners and Endorsing Organisations.