Draft – not to be quoted

Kerala Green Hydrogen Policy 2025 (Draft)

1. Preamble

1.1. All over the world, energy transition plans to achieve net-zero goals are being formulated. This is necessary to mitigate the effects of climate change. Hydrogen is expected to play a critical role as an energy carrier in the global energy system on a 1.5°C or 2°C pathway to 2050. India is committed to achieving the Net Zero target by 2070 and aspires to become the world's third largest economy with a GDP of USD 7 trillion by 2030. Achieving the above said goals, energy self-reliance is crucial, and the green hydrogen could play a pivotal role.

1.2. Green hydrogen (GH2) produced by renewable energy through electrolysis of water and green hydrogen generation from biomass and biowaste will be crucial for achieving decarbonisation of harder-to-abate sectors such as, fertilisers, refining, methanol, maritime shipping, iron & steel and transport. It will be a game changer for the hard-to-abate sectors, which cannot readily be electrified. Currently it may be considered as the only way we have to decarbonise these sectors.

1.3. GH2 is versatile as it can be used as a combustion fuel, energy carriers or as feedstock for industrial processes. It can also be converted back into electricity in a fuel cell. Compared to grid renewable electricity, green hydrogen can be stored and transported over long distances, though it requires advanced storage solutions such as pressurized tanks or conversion into derivatives like ammonia for efficient transport.

1.4. Derivatives of GH2, such as green ammonia and green methanol, are long-term energy carriers. They store surplus renewable electricity produced during periods of low demand. Just like GH2, its derivatives can be used as industrial energy source, be used as green feedstock, or used as green transportation fuel.

1.5. GH2 and its derivatives play a crucial role in the transition to clean energy and is vital for achieving decarbonization goals, thereby helping to create a more sustainable and cleaner future.

1.6. Green ammonia, synthetically manufactured by combining nitrogen with hydrogen using renewable energy sources, can be applied in sustainable fertiliser production, thereby contributing to decarbonising the food value chain, while supporting agricultural productivity and food security. It is also substantially easier to transport compared to green hydrogen, with adequate safety measures.

1.7. Much work needs to be done in making the energy transition a reality. No mature GH2 markets exist yet. But the number of countries with national hydrogen roadmaps has tripled over the last year, indicating that many countries are readying themselves to start using GH2 and planning how best to benefit from the economic opportunities it will provide.

1.8. The Union Government has announced a National Green Hydrogen Mission to increase the production and use of Green Hydrogen.

1.9. It is in this context that this policy is being formulated to achieve maximum green hydrogen production and consumption within the state and realise the opportunities for sustainable industrialisation and export through public and private investment in the Green Hydrogen value chain.

1.10. ***Uniqueness of Kerala in the Green Hydrogen Ecosystem***

a. Kerala enjoys availability of high annual rainfall, high solar, tidal, wind (onshore and offshore) and biomass potential and availability of large reservoirs/waterbodies for setting up of floating solar projects and electrolysers.

b. A vibrant power sector with well-defined policies and regulations enable for private investment under captive and 3rd party routes for power generation and supply for end uses.

c. Kerala is uniquely positioned with a strong ecosystem of demand centres for hydrogen consumption such as refineries, fertiliser plants, chemical plants, and new mobility solutions such as water metro along inland waterways. Some of the demand centres are FACT, Cochin Refineries, MRPL Mangalore, KSRTC, Vizhinjam Seaport, KSWTD, KSINC, KMRL, etc.

d. There is also a strong system of green infrastructure. This includes natural and LPG pipelines (where hydrogen can be blended for distribution); the 616 km long inland waterways (with Government already having identified economic development opportunities in tourism, trade, industry, agriculture and renewable energy along the waterways)

e. Access to international container terminal and Kochi and the greenfield seaport at Thiruvananthapuram.

f. South Kerala is becoming an Aerospace & Defence Hub. Recently ISRO inaugurated a launch pad which is situated near the southern tip of mainland India, close to the Earth's magnetic equator.

2. Title and enforcement

This policy shall be known as the Kerala Green Hydrogen Policy 2024 and shall come into effect from the date of approval by Government and will remain in force until superseded or modified by another Policy.

3. Definition

3.1. Electrolyser: Electrolyser is a system or device that uses electricity to split water molecules into hydrogen and oxygen, thereby producing hydrogen gas as a sustainable source of clean energy.

3.2. Eligible developers: developers who wish to produce Green Hydrogen/Green Ammonia by way of electrolysis of water using Renewable Energy in the State and the Green Hydrogen/Green Ammonia produced from biomass.

3.3. Fuel cell: A fuel cell is an electrochemical cell that converts the chemical energy of a fuel and an oxidizing agent (often oxygen) into electricity through a pair of redox reactions.

3.4. Green Hydrogen: Hydrogen produced using renewable energy sources, including but not limited to electrolysis, biomass conversion, and other low-carbon-intensity production pathways, including Renewable Energy which has been stored in an energy storage system or banked with the grid in accordance with applicable regulations.

3.5. Green Ammonia: Ammonia produced through the Haber-Bosch process using nitrogen from air and green hydrogen, where both the hydrogen production and the Haber-Bosch process are powered entirely by renewable energy sources.

3.6. Green Methanol: Methanol produced through the catalytic hydrogenation of carbon dioxide (CO_2) using green hydrogen, where both the CO_2 capture/utilization and the synthesis process are powered entirely by renewable energy sources.

4. Policy Overview

The vision of the policy is to make Kerala a leading green hydrogen/ammonia economy in India. It aims to provide a conducive and sustainable green hydrogen ecosystem for new and existing investments, promote inclusive growth, aggregation of demand, support innovation including in the areas of generation/supply side including distribution, refuelling stations, and transportation of green hydrogen, and implement

solutions for the holistic and sustainable development of the state. The state envisions to promote green hydrogen/ammonia as the foundational pillar for the green energy transition in Kerala and make the state ready for a net-zero economy in the future.

5. Objectives

5.1. Kerala shall strive to facilitate ease of doing business for setting up and promoting investments in green hydrogen/ammonia production facilities and green hydrogen-based manufacturing units.

5.2. Kerala envisions to transform the West Coast Canal (WCC) into an Economic and Trade Corridor of Kerala. Land for setting up of Economic Development Opportunities (EDOs) emerging from Renewable Energy and Green Hydrogen sectors shall be made available to investors for integrated development of economy under PPP framework through transparent process.

5.3. Kerala would encourage adoption of innovation in green hydrogen/ammonia production and consumption technologies to reduce the cost of green hydrogen/ammonia to competitive levels.

5.4. Kerala shall support infrastructure development including renewable energy capacity development, particularly floating solar power projects, biomass projects and small hydro projects, green hydrogen pipeline, storage, liquefaction, and export facilities across the hydrogen value chain to promote hydrogen valley and hub developments.

5.5. Kerala shall encourage green hydrogen/ammonia market creation by providing fiscal and non-fiscal incentives.

5.6. Kerala shall develop adequate skilled workforce in green hydrogen/ammonia domain.

5.7. Kerala shall attract globally competitive investors for transforming it into a green hydrogen generation and export hub.

5.8. Kerala shall build a robust entrepreneurial ecosystem in the State and make Kerala a thriving start-up destination in India for green hydrogen/ ammonia.

5.9. Kerala shall promote innovation and R&D in the development of contingency technologies and applications for green hydrogen and ammonia.

6. Broad Targets

6.1. Kerala aspires to be a leading producer and exporter of green hydrogen and ammonia. By 2040, Kerala aims to be a 100 percent green hydrogen/ammonia consuming state, translating to a domestic demand of approximately 0.155 million tons per annum of green hydrogen.

6.2. Kerala aspires to achieve 10% (by volume) green hydrogen blending with natural gas in city gas distribution networks of the state by 2030

6.3. Kerala aims to provide fiscal and non-fiscal incentives to reduce the cost of green hydrogen generation and make efforts to bring it down from current market levels in India by approximately 50% by 2030, and achieve a total reduction of about 75% in the long-term..

6.4. Kerala also aspires to demonstrate a hydrogen valley, spread out from Vizhinjam (Thiruvananthapuram) to Kochi on the lines of the Green Hydrogen Valleys in Europe.

6.5. Kerala aspires to set up a Hydrogen Hub focused on domestic consumption and export at Kochi for which a roadmap has already been prepared after a detailed study.

6.6. Kerala shall promote setting up of Centres of Excellence to lead research, development, and techno-economic innovation activities through Public Private Partnerships.

6.7. Promote skill development through various agencies to establish Kerala as a leader in green hydrogen workforce capabilities through targeted training programs, industry collaborations, and academic partnerships.

6.8. Develop at least 2 strategic global partnerships focused on export of green hydrogen.

6.9. Develop Kerala as the top state in India for the export of green hydrogen.

6.10. GH2 Obligations: Kerala aims to promote 25% of the hydrogen use (especially in the refinery, fertiliser industries) to be from green hydrogen/ ammonia by 2030. These industries shall be promoted to produce or procure green hydrogen/ ammonia to achieve this target.

6.11. Kerala shall promote the bunkering of green hydrogen derivatives including liquid hydrogen and encourage its use for mobility, in the marine sector, for long-haul trucks, and in the aviation sector.

7. Incentives

Kerala shall undertake the following interventions to facilitate existing and new green hydrogen/ammonia investments. In case of any overlap with the incentives provided in other policies, the incentives provided in this policy shall prevail. Following benefits/incentives shall be granted to the producer of Green Hydrogen and Green Ammonia for the projects commissioned within twenty-four months of the notification of this policy.

7.1. Aggregation of Green Hydrogen demand:

7.1.1. In order to achieve competitive prices, the nodal agency shall aggregate demand from different sectors and have consolidated bids conducted for procurement of Green Hydrogen/Green Ammonia through any of the designated implementing agencies.

7.2. Open Access:

7.2.1. Green Hydrogen/Green Ammonia plants will be granted Open Access for sourcing of Renewable Energy within 15 days of receipt of application complete in all respects.

7.2.2. Renewable Energy can be sourced from a co-located Renewable Energy plant, or sourced from a remotely located Renewable Energy plants, whether set up by the same developer, or a third party through Open Access or procured renewable energy from the Power Exchange.

7.3. Electricity duty, Transmission, wheeling charges, and Cross Subsidy Surcharges:

7.3.1. The incentives mentioned below shall apply to renewable electricity generation provided for producing green hydrogen/ammonia.

i. 50 percent exemption from wheeling charges for 10 years

ii. 50 percent exemption from intra-state transmission charges for 10 years

iii. 100 percent exemption from cross-subsidy surcharge for 10 years

iv. 100 percent exemption from electricity duty for 10 years

7.3.2. The exemptions provided under Kerala Solar Policy and Kerala Small Hydro Policy shall apply to green hydrogen/ammonia projects as well.

7.4. Banking:

7.4.1. Banking shall be permitted for a period of 30 days for Renewable Energy used for making Green Hydrogen/Green Ammonia. Renewable energy banking for 30 days shall be permitted for the first 100 MW electrolyser deployment in the state and shall be extended to subsequent projects (capacities) in later versions of this policy or notifications.

7.4.2. The eligibility, applicability, charges, quantum and settlement for RE banking shall be as per the applicable regulations of State Electricity Regulatory Commission.

7.5. Connectivity:

7.5.1. Connectivity, at the generation end and the Green Hydrogen/Green Ammonia manufacturing end, to the Transmission and Distribution network shall be granted on priority.

7.6. RPO compliance:

7.6.1. Renewable Energy consumed for the production of Green Hydrogen/ Green Ammonia shall count towards RPO compliance of the consuming entity.

7.7. Floating solar Power Projects: those setting up green hydrogen production facilities along with floating solar shall be given preference.

7.8. Pumped hydro storage Power Projects: those setting up green hydrogen production facilities along with pumped hydro storage shall be given preference.

7.9. Hydrogen mobility projects for the deployment of green hydrogen-powered buses, trucks, and fishing crafts shall be encouraged with incentives. All the benefits of the Kerala State EV policy 2020 are extended to on-road vehicles that are fully powered by green hydrogen.

7.10. Manufacturing of electrolysers, fuel cells, and other ancillary components by technology companies, manufacturers, and startups to reduce the cost of green hydrogen in the state shall be promoted through state incentives in addition to central government incentives.

7.11. Creation of Land Bank:

7.11.1. INR 300 Crs is earmarked in the State Budget 2023-24 for procuring land along the West Coast Canal waterways for developing economic development activities in green energy and hydrogen domain for making available to the investors on the basis of State's PPP policy.

7.11.2. Manufacturers of Green Hydrogen/Green Ammonia shall be allowed to set up bunkers near Ports for storage of Green Ammonia for export/use by shipping. State shall facilitate providing land for the storage purpose coordinating with the respective Port Authorities at applicable charges. INR 1000 Crs is earmarked in the State Budget for 2023-24 for the Land acquisition activities of developing industrial and infrastructure investment corridor around Vizhinjam International Seaport Ltd.

7.12. Viability Gap Fund/Grant/Equity support:

7.12.1. INR 200 Crs is announced in the State Budget 2023 for V.G.F/Grant/Equity support to set up Green Hydrogen hubs in Kochi and Thiruvananthapuram over the next 2 years. This fund shall be utilised for the following purposes.

i. INR 50 Crs shall be earmarked as State's or any of its partnering agencies' share in the first Kerala Green Hydrogen Hub for subsidizing the Green Hydrogen generation cost.

ii. For the first 100 MW electrolyser deployment in the state, Capital Expenditure (CAPEX) subsidy of 25% shall be eligible for electrolysers, subject to a maximum of INR 1.5 Cr. per MW. The minimum capacity to avail this subsidy shall be more than 50 MW. The subsidy shall be paid to the developer, linked to the production of green hydrogen, over a period of five years post commissioning of the plant. Integrated green hydrogen, green ammonia and green methanol facilities will be given preference when selecting the first 100 MW electrolyser deployment in the state.

iii. According to clause 5.9 – biomass based green hydrogen production pathways shall be encouraged and CAPEX subsidy for the same shall be decided on case-to-case basis.

7.13. Incentives proposed in the Kerala Industrial and Commercial Policy and the Export Promotion Policy

7.13.1. Kerala is the first Indian State to adopt 'Responsible Investment, Responsible Industry' programme as part of industrial growth. The State's renewed focus on ESG-driven Responsible Investments is paving way for growth of new emerging sectors in the State. This policy places a special emphasis to achieve the State's vision to build an Industry 4.0-ready industrial ecosystem by 2028 for generating responsible investments and fostering innovation across sectors. Renewable energy and Green Hydrogen development is one of the priority sectors identified in this policy. Incentives proposed in the 'Kerala Industrial and Commercial Policy 2023-28', such as Investment Subsidy on Fixed Capital, SGST Reimbursement, Apprenticeship Incentive (Manufacturing sector), Waiver of Stamp Duty & Registration charges, reduction in Land Conversion charges etc., shall apply to new green hydrogen/ammonia investments subject to projects falling under MSME (Investment in Plant & Machinery not exceeding INR 50 Crs and turnover not exceeding INR 250 Crs.), Large (Investment in Plant & Machinery above INR 50 Cr. and not exceeding INR 300 Crs) and Mega (Investment in Plant & Machinery above INR 300 Crs) categories.

7.13.2. Benefits under the proposed Kerala Export Promotion Policy shall also apply

7.14. Water for electrolysers

7.14.1. Water for electrolysis shall be provided by the Kerala Water Authority at rates applicable for industrial consumers. Preference should be given to projects where hydrogen production systems are co-located near water resources. Infrastructure for the project shall be created by Kerala Water Authority for the developer.

7.14.2. Use of desalinated or purified wastewater for green hydrogen production shall be promoted.

8. Mandatory provisions / obligations

8.1. The Government does not plan to impose any mandatory provisions on the use of green hydrogen initially. But gradually, the Government aims at making the use of green hydrogen obligatory, especially in industries where there are limited options or no other option to decrease carbon emission, and where already hydrogen/ ammonia is already used in their industrial processes.

9. Compliance to standards

9.1. Storage, transport, and other stages life cycle of green hydrogen shall adhere to specified standards of BIS and, in its absence, applicable international standards as mandated by the Union or State Governments / authorised agencies including, but not limited to, Bureau of Indian Standards, Oil Industry Safety Directorate, Petroleum and Explosives Safety Organisation, Ministry of Road Transport and Highways and Petroleum and Natural Gas Regulatory Board.

9.2. Project developers and operators must ensure that all regulatory measures and safety protocols are integrated throughout all stages of green hydrogen projects – from initiation and execution to operation and decommissioning – to ensure safe handling, storage, and use of green hydrogen for all stakeholders and the public.

9.3. All electrolyser and fuel cell equipment to be installed in projects commissioned in the state shall have a comprehensive end-of-life management plan, including proper recycling and disposal mechanisms, to prevent environmental impacts. Project developers must submit Life Cycle Assessments and demonstrate adherence to state waste management regulations.

10. Skill development initiatives

Manpower development will be an important aspect for development of green hydrogen projects. Currently we have limited skilled and knowledgeable manpower in this area.

10.1. Courses and certificate programmes will be formulated and implemented based on the needs of the industry, in association with organisations including National Skill Development Corporation and Kerala Academy for Skills Excellence.

10.2. Short courses/ electives would be formulated for engineering graduates as part of their courses. Later on, this would be extended to diploma and ITI courses.

10.3. Training and certification programmes for skill building in this area would be devised and implemented with the help of reputed organisations. There is possibility of including these under the national skill council for green jobs initiatives.

11. Implementation

11.1. High Level Committee for implementation

11.1.1. The High Level Committee (HLC) which is set up for carrying out all the activities and monitoring and evaluation of floating solar projects scheme with the Chief Secretary as the Chairman, ACS (Power Department) as Convenor and Secretaries of the participant departments (Agriculture, Environment, Finance, Fisheries, Forests, Irrigation/Water Resources, Local Self Government, Revenue) and CEO (ANERT) as members would carry out all the activities and monitoring and evaluation of the policy.

11.2. Nodal agency

11.2.1. ANERT has already been nominated as the nodal agency for development of green hydrogen in the state (G.O. (Rt) No. 97/2023/Power dated 31.5.2023)

11.2.2. Charges to nodal agency: An amount of ₹15,000 per megawatt of proposed electrolyser capacity or ₹1,00,000 per KTPA of production capacity whichever is higher, or as decided by the High-Level Committee from time to time, shall be paid to the nodal agency for the registration and development of green hydrogen projects.

11.2.3. The nodal agency shall strive to aggregate the demand for green hydrogen in the state.

11.3. Single window

11.3.1. A single window system for accepting, evaluating, processing and approving investments in the area of green hydrogen shall be implemented by the nodal agency.

With this context, the Government of Kerala recognises the opportunity and necessity to take immediate actions in the collective effort towards net zero goal while ensuring economic development and energy transition.