

Ministry of New & Renewable Energy (MNRE)

Government of India

Scheme Guidelines for implementation of Pilot projects for use of Hydrogen in the Steel Sector

1. Introduction

- 1.1. The National Green Hydrogen Mission, hereafter mentioned as the 'Mission', was launched on 4th January 2023 with an outlay of Rs. 19,744 Crore with an aim to make India a Global Hub for production, usage and export of Green Hydrogen and its derivatives. It will contribute to India's goal to become Aatmanirbhar (self-reliant) through clean energy and serve as an inspiration for the global Clean Energy Transition. The Mission will lead to significant decarbonisation of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen. Under the Mission, along with other initiatives, the Ministry of New & Renewable Energy (MNRE) proposes to implement pilot projects for replacing fossil fuels and fossil fuel-based feedstock with GH₂ and its derivatives.
- 1.2. Steel production is one of the potential sectors where Green Hydrogen can replace fossil fuels. With the falling costs of renewable energy and electrolyzers, it is expected that Green-Hydrogen based steel can become cost-competitive over the next few years. Provision of carbon credits and imposition of market barriers on carbon intensive steel, in some countries, is likely to further enhance the viability of Green Hydrogen based steel. To assess the potential for use of Green Hydrogen in the steel industry, the Mission supports setting up of pilot projects in the steel sector. These pilot projects will be implemented through the Ministry of Steel (MoS) and the Scheme Implementing Agencies (SIAs) as elaborated under this scheme.

2. Pilot Projects in Steel Sector

- 2.1. Para 7.7.1(c) of the Mission Document states that the efforts to enhance low - carbon Steel production capacity will be supported. Considering the higher costs of Green

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Hydrogen at present, Steel plants can begin by blending a small percentage of Green Hydrogen in their processes. The blending proportion can be progressively increased as cost-economics improves and technology advances. Further, upcoming steel plants should be capable of operating with Green Hydrogen. This would ensure that these plants are able to participate in future global low-carbon Steel markets. Green field projects aiming at 100% green steel will also be considered.

2.2. Thrust areas under this Scheme for providing support for development/ selection/ validation of commercially viable technologies, for the utilization of hydrogen in steel sector, are as follows:

- i. Use of 100 % Hydrogen in DRI process using vertical shaft/kiln
- ii. Use of Hydrogen in Blast Furnace, as per limits prescribed.
- iii. Substitution of fossil fuels with Hydrogen in a gradual manner in DRI process.
- iv. Any other innovative use of Hydrogen for reducing Carbon emissions in Iron & Steel production.

3. Objectives of the Scheme

- i. To advance technologies and expertise for the utilization of Green Hydrogen in the steelmaking process, addressing any existing gaps.
- ii. To support the deployment of Green Hydrogen and its derivatives in the steel, on a pilot basis.
- iii. To validate the technical feasibility and performance of Green Hydrogen and its derivatives in the Iron & Steel manufacturing in real-world operational conditions.
- iv. To evaluate the economic viability of the use of Green Hydrogen and its derivatives in the iron & steel sector.
- v. To evaluate the performance of Green Hydrogen and its derivatives based low-carbon iron & steel and identify the areas for improvement.
- vi. To demonstrate safe and secure operations of Green Hydrogen and its derivatives based production of low-carbon iron & steel.

4. Budgetary Outlay: Rs. 455 Crore till FY 2029-30

5. Rationale and the Salient Features

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- 5.1. These pilot projects will help identify operational issues and gaps in terms of current technology readiness, regulations, implementation methodologies, infrastructure and supply chains. These will serve as valuable inputs for future scaling and commercial deployment of Green Hydrogen in the iron & steel sector.
- 5.2. The use of Green Hydrogen and its derivatives in the steel sector, through the proposed pilot projects, will lead to development of necessary infrastructure including as refueling stations, storage and distribution networks, resulting in establishment of a Green Hydrogen ecosystem in the steel sector. With the expected reduction in the cost of Green Hydrogen production over the years, the utilization in the steel industry is expected to increase.
- 5.3. Salient features of the Scheme are given below:
- i. Projects with an intention to develop Pilot Scale/ Demonstration Plants for replication of technology will be supported.
 - ii. Ministry of Steel shall finalize the SIA(s) for implementation of the Scheme.
 - iii. Ministry of Steel to develop a transparent and competitive framework for selection of pilot projects.
 - iv. The SIAs shall issue the call for proposals for projects under the scheme in line with the selection framework developed by Ministry of Steel.
 - v. MNRE will issue administrative sanctions for the projects under the Scheme based on the recommendations of Project Appraisal Committee (PAC).
 - vi. The SIA will share knowledge and the outcome of the pilot projects through project completion report, monitoring reports, workshops, and publications to disseminate findings, best practices, and lessons learned from the pilot.
 - vii. The Scheme aims to leverage existing resources and infrastructure available for transport, storage and use of Green Hydrogen and its derivatives in the iron & steel sector.
 - viii. The Scheme would primarily fund capital equipment required for use of Hydrogen in the iron & steel manufacturing process. Expenses on account of production of Hydrogen, land, etc. will not be funded. The cost of preparing the Detailed Project Report (DPR) may be covered under the scheme for approved projects subject to the ceiling specified in sub-para x.
 - ix. Financial support for projects will be evaluated and granted taking into consideration the specific needs, merits, and feasibility of each project.

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- x. Funding of the approved projects shall not exceed 50% of the total cost of the project. For consortium of Independent Steel Producers (ISP) and DRI industry or associations or DRI industry, the funding may be increased to 70% of the project cost, with the approval of the Project Appraisal Committee.

6. Implementation Methodology

- 6.1. **Selection of application areas:** Ministry of Steel will explore the possibilities of taking up the projects in consortium mode. The SIA will identify the areas for implementation of pilot projects based upon the thrust areas mentioned in para 2.2 in consultation with the Ministry of Steel.
- 6.2. **Call for proposals:** The SIA(s) will issue Call for Proposals for the projects. The proposal shall be submitted to the SIAs. In case of a consortium/partnership-based proposal, a lead agency should be mentioned, which shall function as Executing Agency (EA) for that project.
 - i. The eligible EAs would include CPSUs, State-PSUs, Private sector, State Corporations, Indian R&D institutions/Research labs/academic institutions, JVs/Partnerships/Consortiums of such entities.
 - ii. The necessary capabilities need to exist with the EAs for taking forward the completed pilot projects towards commercialization.
- 6.3. **Evaluation and Award:** The proposals will be evaluated by a Project Appraisal Committee in accordance with the criteria specified in the Call for Proposals. The letter of Award shall be issued to the EA by the SIA upon receipt of administrative sanction from MNRE.
- 6.4. **Execution and Commissioning:** Work shall be executed as per the approved scope of work.
- 6.5. **Technical and Regulatory approvals:** The EA shall be solely responsible for obtaining the safety, environmental and regulatory approvals, as required.
- 6.6. **Testing and Certification:** The EA shall get necessary testing and certification compliance from concerned agencies.

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7. Funding and Disbursement

7.1 Ministry of Steel may decide the allocation of the budget between different types of pilot projects envisaged to be taken up under the scheme.

7.2 Stages of disbursement of CFA for both the components is given below:

S.No.	Stages of Disbursement	Percentage of CFA to be released
1	Issue of Letter of Award (LoA)	20%
2	Milestone based disbursements*	70%
3	On completion	10%
	Total	100%

* The milestones for disbursement of funds shall be specified in the Call for proposals to be issued by the SIA.

7.3 Funds will be released to the SIAs by MNRE on the recommendation of the Project Appraisal committee, received through Ministry of Steel.

7.4 Ministry of Steel may also specify further terms and conditions for grant of financial assistance for general financial prudence.

8. Timelines and Penalty Provisions

8.1. The grants released shall be exclusively earmarked for the project and should not be diverted for any other purpose.

8.2. If the EA fails to utilize the grant for the purpose for which it has been sanctioned or fails to complete the project as per DPR, it shall refund the entire amount of the grant, with interest as per GFR to MNRE.

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- 8.3. The Call for proposals should indicate a suitable timeline for completion of the project. Extension of up to one year may be granted for completion of the project on the basis of adequate justification, with the approval of the Steering Committee, without any penalty. Any extension beyond one year shall only be granted with the approval of the Minister of New and Renewable Energy, with suitable penalties which shall be specified by the SIAs in the Call for Proposals issued.
- 8.4. MNRE reserves the right to retract sanction or cancel or short-close projects in consultation with the Steering Committee in cases where the EA(s) or the project(s) face unreasonable delays or fail to comply with the objectives/ provisions of this Scheme or the Mission.

9. Monitoring Framework

9.1 Steering Committee

- 9.1.1 Overall monitoring of the scheme and projects undertaken will be carried out by a Steering Committee (SC) under the co-chairpersonship of Secretary, Ministry of Steel and Secretary, MNRE. The Steering Committee shall be responsible for overall monitoring and implementation of this scheme and suggest modifications and course corrections for its successful implementation.

- 9.1.2 In case of any ambiguity in the interpretation of any of the provisions of this scheme, the decision of MNRE shall be final. The SC will also facilitate/ recommend measures to resolve difficulties, if any.

- 9.2 Project Appraisal Committee:** A Project Appraisal Committee (PAC) under the chairpersonship of Secretary/Additional Secretary, Ministry of Steel, with Mission Director, National Green Hydrogen Mission (NGHM) as a member and other members nominated by Ministry of Steel shall monitor/review/evaluate the project proposals and recommend projects for sanction of Central Financial Assistance (CFA). The PAC shall monitor sanctioned projects on a quarterly basis for the allocation of funds based upon the progress of the project. The PAC shall send recommendations to MNRE for the release of CFA through Ministry of Steel.

- 9.3** The SIAs shall also devise a monitoring mechanism to track the progress under the pilot projects. The same may be shared with Ministry of Steel and MNRE.

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9.4 Quarterly monitoring reports shall be submitted by the SIAs to Ministry of Steel and MNRE.

9.5 Expenditure of funds will be monitored by MNRE. Utilization Certificates shall be provided by the SIA as per the provisions of GFR.

10. Project Completion

10.1. The SIAs shall submit the Project Completion Report (PCR) to the PAC within one month from the completion of project. PCR shall include the following:

- i. Technical aspects of the project, including the hardware, software, and other technologies used.
- ii. Technical challenges encountered during the project, and how they were overcome.
- iii. Outcome of the project comprising of technical know-how generated along with the data collected during the execution of the project.
- iv. Recommendations for future projects, based on the lessons learned from project.

11. Guidelines for safeguard of Intellectual property: Ministry of Steel shall issue the necessary guidelines for the safeguard of any Intellectual Property Rights such as Publications, Patents, Registered Designs or Trademarks etc. which are generated through projects funded under this scheme. The guidelines may also be a part of the Call for Proposals to be issued by the SIAs.

12. Power to amend Scheme Guidelines: MNRE may make the necessary amendments in the Scheme Guidelines, as and when required, with the approval of the Minister of New & Renewable Energy.

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