MISSION INNOVATION
accelerating the clean energy revolution

सत्यमेव जयते
Department of Science and Technology
Ministry of Science and Technology
Government of India

आज़ादी का अमृत महोत्सव

GUIDELINES FOR

HYDROGEN VALLEY INNOVATION CLUSTER

Revised document for "Call for proposals on Hydrogen Valley Platform in India"

Last Date for submission of EoIs – 17th May 2023

सत्यमेव जयते

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GUIDELINES FOR HYDROGEN VALLEY INNOVATION CLUSTER

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1. Introduction

1.1 Vision for India's Green Hydrogen Economy

India is undertaking a resolute march towards a sustainable energy future. In line with the announcement made by Hon'ble Prime Minister at COP26, India is committed to achieving 500GW of installed electricity capacity from non-fossil fuel sources by 2030.So far, a total of 172.72 GW capacity from non-fossil fuel-based energy resources has been installed in the country. This includes 119.09 GW of Renewable Energy, 46.85 GW of Large Hydro, and 6.78 GW of Nuclear Power capacity.

Increasing renewable energy use across all economic spheres is central to India's Energy Transition. Hydrogen offers the possibility to decarbonize applications, end uses, and sectors that have been traditionally difficult to tackle with other clean energy solutions. Hence, it is useful to view hydrogen's contribution to the clean energy transition on a case-by-case basis as complementary to other solutions for mitigating climate change. Among the different shades of hydrogen, Green Hydrogen is considered a promising alternative for enabling this transition that can be utilized for long-duration storage of renewable energy, replacement of fossil fuels in industry, clean transportation, and potentially also for decentralized power generation, aviation, and marine transport.

India is at a crucial juncture in terms of its energy landscape and green hydrogen has a critical role to play to make the nation self-reliant and energy-independent. This transition can be synergistic with the scale, ambition, and economic competitiveness of its renewable industry. This will enable the emergence of an energy carrier that is domestically produced, reducing the dependence on imports for key energy commodities like natural gas and petroleum. Hydrogen can be an energy molecule that is truly 'made in India' and that can contribute to the country's energy security and long-term economic competitiveness

Three highly interlinked programs aim for a transformation of the Indian energy sector as a pathway to decarbonization:

(a) Renewable energy target of achieving 50% cumulative electric power installed capacity from Renewable Energy, by 2030,
(b) Electric Mobility Mission with a specific target to deploy light electric vehicles and electric urban transport buses, and
(c) The National Green Hydrogen Mission was approved by the Union Cabinet on January 2023, with the intended objectives of:

- Making India a leading producer and supplier of Green Hydrogen in the world
- Creation of export opportunities for Green Hydrogen and its derivatives
- Reduction in dependence on imported fossil fuels and feedstock
- Development of indigenous manufacturing capabilities

- Attracting investment and business opportunities for the industry
- Creating opportunities for employment and economic development
- Supporting R&D projects

In view of the above, DST's vision is to support India's progress towards Green Hydrogen and to transform India into an energy-independent nation by 2047 where green hydrogen will play an active role as an alternate fuel to the petroleum/ fossil-based products. To realize this goal, DST will provide funding for Research, Development, and Demonstration (RD&D) activities essential for small-scale demonstration by enhancing the readiness of technologies in the green hydrogen value chain.

Brief & Salient Features of the National Green Hydrogen Mission

The **National Green Hydrogen Mission** has the following key objectives:

i. To make India the Global Hub for the production, usage, and export of Green Hydrogen and its derivatives. This will contribute to India's aim 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 decarbonization of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in Green Hydrogen.
ii. To build capabilities to produce at least 5 Million Metric tonnes (MMT) of Green Hydrogen per annum by 2030, with the potential to reach 10 MMT per annum with the growth of export markets.
iii. The Mission also aims to make India a leader in the technology and manufacturing of electrolyzers and other enabling technologies for Green Hydrogen.

Salient features of the National Green Hydrogen Mission with respect tothe role of government departments as per the integrated mission strategy are as follows:-

i. Scientific Departments and agencies, including MNRE, the Office of the Principal Scientific Advisor to the Government of India, the Department of Science and Technology, the Department of Scientific and Industrial Research, the Department of Space, Defence Research& Development Organisation, the Ministry of Environment Forests and Climate Change, and other public research and innovation institutions will pool resources to build a comprehensive goal-oriented Research and Innovation program in collaboration with the private sector.

ii. All concerned Ministries, Departments, agencies, and institutions of the Central and State Government will undertake focused and coordinated steps to ensure the successful achievement of the Mission objectives.

iii. State governments and state agencies will also play an integral role in the development of a green hydrogen ecosystem. States will have an opportunity to establish themselves as front runners in this sunrise sector through project development, manufacturing, setting up renewable energy capacity, and promoting the export of green hydrogen derivatives. For this, the States will be requested to put in place fair and rational policies for the provision of land and water, suitable tax and duty structures, and other measures to facilitate the establishment of Green Hydrogen projects.

Mission Innovation and Clean Hydrogen Mission

Mission Innovation (MI) was announced at COP21 on November 30, 2015, as world leaders came together in Paris to commit to ambitious efforts to combat climate change. Mission Innovation (MI) is a global initiative of **23 countries and the European Commission** (on behalf of the European Union).This global initiative is to catalyze action and investment in research, development, and demonstration to make clean energy affordable, attractive, and accessible to all this decade. This will accelerate progress toward the Paris Agreement goals and pathways to net zero.

Mission Innovation 2.0, launched on 2 June 2021, is catalyzing a decade of action and investment in research, development, and demonstration to make clean energy affordable, attractive, and accessible for all. MI 2.0 has seven missions namely:-

i. Green Powered Future Mission
ii. Zero-Emission Shipping Mission
iii. Clean Hydrogen Mission
iv. Carbon Dioxide Removal Mission
v. Urban Transitions Mission
vi. Net Zero Industries Mission
vii. Integrated Biorefineries Mission

The **Clean Hydrogen Mission** will accelerate the building of a global clean hydrogen economy by reducing end-to-end clean hydrogen costs to USD $2 per kg by 2030. This represents a tipping point in making clean hydrogen cost competitive with other energy vectors in different industries across production, transportation, storage, and end-use. Currently, there are **37 Hydrogen Valleys**(small-scale to large-scale) across **20 countries(https://h2v.eu/)**. India is a part of the mission as one of the founder countries& currently, the Department of Science & Technology is the nodal agency for mission innovation.

What is a Hydrogen Valley?

A Hydrogen Valley is a defined geographical area where hydrogen serves more than one end sector or application in mobility, industry, and energy. This typically covers all the necessary steps in the hydrogen value chain, from production (and often even dedicated renewable electricity production) to subsequent storage and its transport & distribution to various off-takers.

1.2.1 Objective:

The objective of hydrogen valley is to demonstrate how the technology development in the entire value chain of hydrogen (production, storage, and transportation) as an energy vector fit together in an integrated system approach through industrial deployment at a small scale. This concept as a national initiative to foster green hydrogen transition has been taken up by the Department of Science and Technology (MoS&T) for showcasing & deploying technological advancements at the industrial level across green hydrogen value-chain and creating interconnected hydrogen ecosystems across selected regions of India.

The specific objectives include:

1. Improve through research and innovation, including activities related to higher Technology Readiness Levels (TRL), the cost-effectiveness, efficiency, reliability, quantity, and quality of clean hydrogen solutions, including production, distribution, storage, and end uses;
2. Strengthen the knowledge and capacity of scientific and industrial actors along the hydrogen value chain, while supporting the uptake of industry-related skills;
3. Carry out demonstrations of clean hydrogen solutions with the view to local, regional, and nationwide deployment, aiming at assessing the resource availability, involving stakeholders, and addressing renewable production, distribution, storage, and use for transport andenergy-intensive industries as well as other applications.
4. Increase public and private awareness, acceptance, and uptake of clean hydrogen solutions.
5. Development and commercialization of a new product/process in the hydrogen value chain.
6. Significant improvements in the existing product/process/applications.
7. Substantial quality upgradation, reduced material consumption, reduced energy consumption, cost reduction, improved competitiveness.
8. Development and deployment of technology or design to satisfy existing occupational health and/or safety standards or improve upon them.

Suggested Focus areas covering the green hydrogen value chain

The suggested focus areas covering the entire green hydrogen value chain are listed below & depicted in ***Figure 1***.

A. Green Hydrogen Production: Further improvements are required especially in cost reduction and efficiency increase for a variety of green hydrogen production routes, the main workhorse being electrolysis, supported by other routes exploiting direct sunlight such as thermal dissociation of water using concentrated solar energy or through photocatalysis, biomass/biogas or other biological routes. Water electrolysis will be the main technology supported, covering both high TRL types - Alkaline Electrolysis (AEL), Proton Exchange Membrane Electrolysis (PEMEL), Solid Oxide Electrolysis (SOEL) - and less mature types - Anion Exchange Membrane Electrolysis (AEMEL) and Proton Conducting Ceramic Electrolysis (PCCEL) and other routes of renewable Hydrogen production.

B. Hydrogen Storage and Distribution: It is essential that hydrogen becomes an intrinsic part of an integrated energy system. For this to happen, hydrogen will have to be used for daily and/or seasonal storage providing buffering functions, thereby enhancing the security of supply in the medium term. The strategy also calls for an India-wide logistical infrastructure that needs to be developed to transport the hydrogen from areas with large renewable potential to demand centres across India. A pluralistic approach with respect to the technologies that will be investigated and supported is envisaged, to have a complete set of technologies that can serve as building blocks of the India-wide logistical infrastructure. The specific areas of support include Hydrogen Storage, Hydrogen in the natural gas grid, Liquid hydrogen carrier, Improving existing hydrogen transport means, compression, purification, and metering solutions, and Hydrogen refueling stations.

C. Hydrogen end uses: Some of the potential uses of green hydrogen include-

i. **Transport:** The technology developments so far are not sufficient to meet the ambitious emission reductions in transport. Several technology routes still need further improvements, especially in the context of reducing costs and increasing durability, to make them competitive with incumbent technologies. It should be also stressed that, especially in the case of hydrogen-based transportation, the competitiveness of hydrogen technologies is dependent on research and innovation breakthroughs, on production volumes of vehicles and components, and on the price and availability of hydrogen as a fuel. The areas of research include passenger vehicles, heavy-duty vehicles, waterways, rail applications, and aeronautical applications.

ii. **Clean heat and power:** Hydrogen offers a unique chance to decarbonize the power generation and heating sectors reliably and independently from weather or seasonal conditions. The overall goal of this pillar is to support Indian supply chain actors to develop a portfolio of solutions providing clean, renewable, and flexible heat and power generation for all end users' needs and across all system sizes; from domestic systems to large-scale power generation plants which include Stationary fuel cells, turbines, boilers, and burners.

iii. **Industry applications:** The areas of research include where Hydrogen is primarily used as a component or catalyst in ammonia production, oil refining, steel industry fertilizers, methanol production, city-gas distribution, etc.

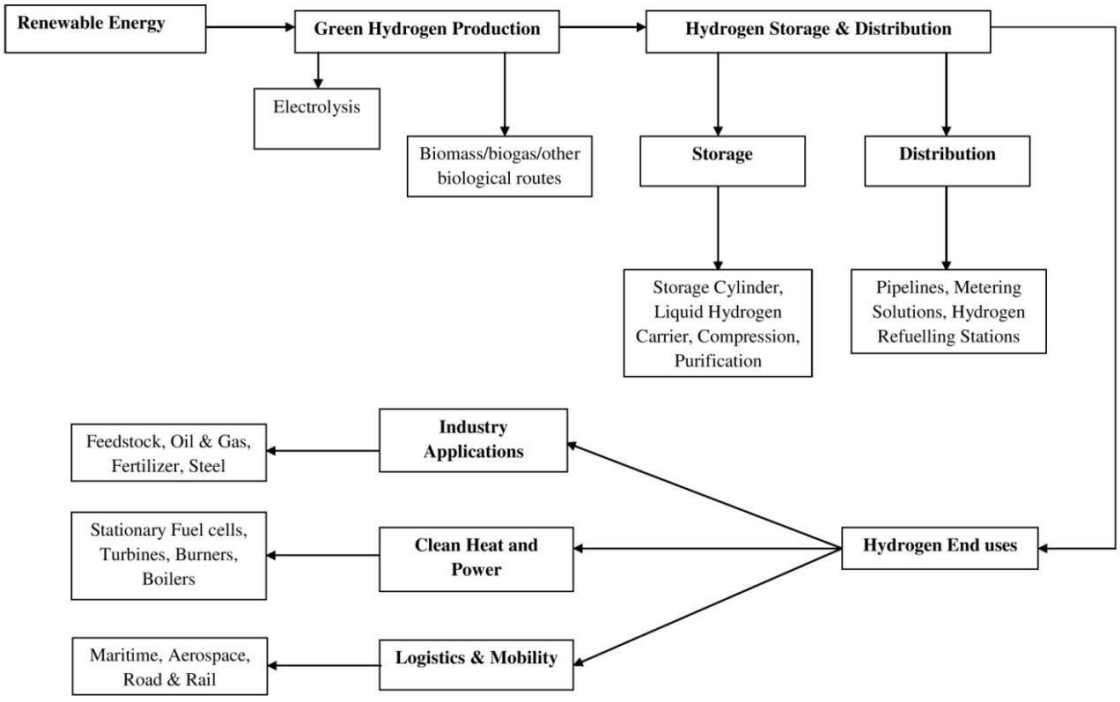


Figure 1. Schematics of HVIC

Timelines &Targets:

Time Period: (5 years: 2024-2028)

DPR should include the timelines by which the infrastructure & production will be operationalized (within 18 months would be preferred). Beyond 5 years, scaling up the HVIC will be the responsibility of the respective Section 8 Company to tie up and identify appropriate funding agencies (Govt. / Private, etc) as per targets referred below:

The small-scale Hydrogen Valley Innovation Cluster broadly aims to achieve:

- Each Hydrogen Valley Innovation Cluster (HVIC) should identify and validate technologies to demonstrate hydrogen at an industrial scale and accordingly work out and define year-wise production targets depending on locational/regional strengths, preparedness, and utilization capabilities to minimize storage and transportation.

- Supply to more than one end sector or application [mobility, industry (fertilizer, refinery, City-gas distribution, etc)] /meet green hydrogen demand for each of the 2 main applications.
- Demonstrate existing/new green hydrogen markets as off-takers for better adoption and clean energy transition thereby contributing impact, and likely prospects of replicability and scalability through the shared commitment of stakeholders.

- Financing structure and strategy, including envisaged sources of co-funding/ co-financing to be identified for both HVIC and as a future scope.

- Each HVIC will target annual production of green hydrogen up to 500 tonnes per year through various proven technology routes will be considered a small scale.

- After the initial phase of 5 years as envisaged and successful demonstration, each HVIC will plan to scale up a commercial level.

The main goal of the Hydrogen Valley Innovation Cluster is to enhance the readiness of technologies in the green hydrogen value chain for manufacturing and deployment asa small-scale demonstration. To realize this goal, the Innovation cluster will provide funding for Research, Development, and Demonstration (RD&D) activities essential for small-scale demonstration of such technologies through initial support from DST and other funding partners.

Suggested types of Small-scale Hydrogen Valley Innovation Clusters (HVIC):

The suggested types of small-scale Hydrogen Valley Innovation Clusters in a few identified locations/ regions that would be considered are given below in ***Figure 2***:

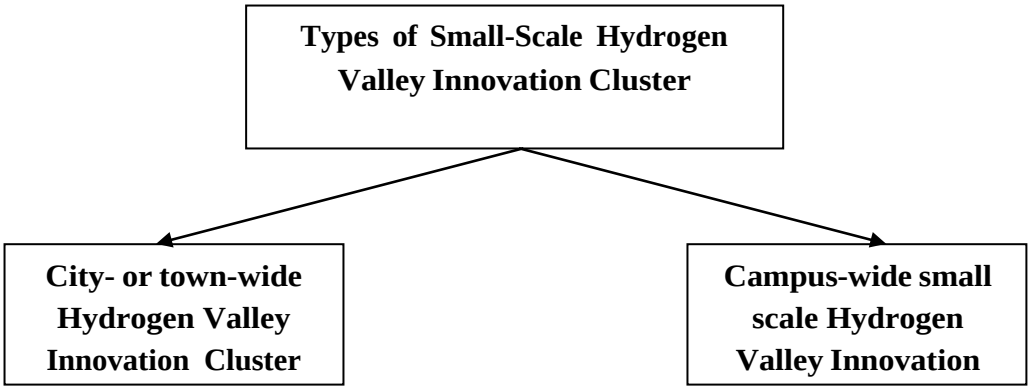


Figure 2. Suggested types of small-scale Hydrogen Valley Innovation Clusters

City- or town-wide Hydrogen Valley Innovation Cluster:

A setup with a geographical area of approximately 100 km radius (City-or town-wide Hydrogen Valley) consisting of various parts of the hydrogen value chain would be suitable for funding under the Hydrogen Valley Innovation cluster. If some parts of the value chain already exist or are under development in this area, and technology development and demonstration in specific value chain segments require the Innovation cluster funding then a consortium might plan to utilize the funding to support pilots-scale green hydrogen production, storage, and/or transportation in the proximity of renewable power generation and/or hydrogen consumers.

Campus-wide small scale Hydrogen ValleyInnovation Cluster:

A Campus-wide small scale Hydrogen Valley, in which the hydrogen value chain spans the area of an R&D institution or an industrial establishment would be suitable for funding under the Hydrogen Valley Innovation cluster if all or most parts of the hydrogen value chain need to be deployed on a pilot-scale during the Innovation cluster period. In such cases, a consortium might plan to demonstrate green hydrogen production, storage, transportation, and consumption within the premises of a company or an R&D institution. It is likely that the Innovation cluster funding might not be sufficient to fund the development, deployment, and demonstration of all these technologies. Therefore, such a consortium would need to identify which activities are best suited for the Innovation cluster funding and plan to get the rest of the funding from other sources. In case of scaling up, the small-scale HVIC would have to plan to re-establishoff-campus in another location during the subsequent phase of scalability.

2. Hydrogen Valley Innovation Cluster in India:

2.1 Composition of Consortium Partners (Hydrogen Valley Innovation Cluster)

Each Hydrogen Valley would necessitate a consortium of multiple entities in the Innovation cluster Phase where the industry will be the ultimate off-taker of the technologies successfully demonstrated in the valley and would later invest in large-scale manufacturing and deployment of these technologies. Therefore, a consortium that includes one or more commercial enterprises as a member will be a pre-requisite. Therefore consortium **(*Figure 3*)** represents the participation of hydrogen value chain/ hydrogen ecosystem partners are defined as:

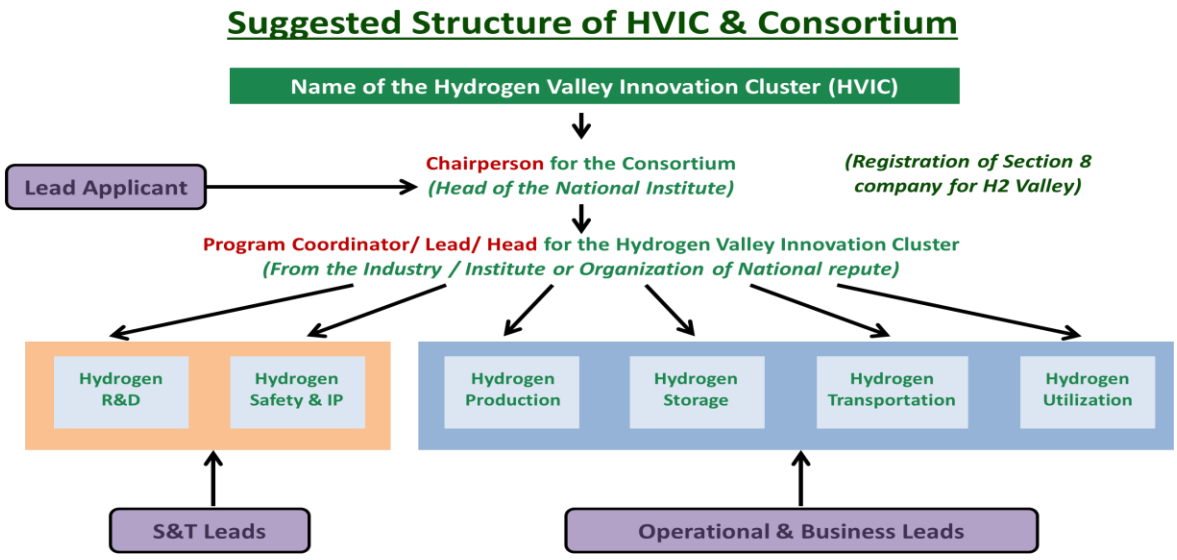


Figure 3: Suggested Structure of HVIC & its Consortium

A consortium must include the following (Mandatory):

1. **HVIC proposal has to be submitted by the lead applicant who will drive the consortium.**

2. **Lead applicant should be a national institute of high repute/ national R&D lab/organization having demonstrated capabilities in terms of expertise and activities in the hydrogen domain.**

3. **The lead applicant will identify and put in place consortium partners to be part of HVIC who could add value to the HVIC activities and outcomes.**

4. **On selection of DPR, the lead applicant has to register separately a Section 8 company within 3 – 6 months to manage HVIC after the receipt of the initial grant.**

5. **Industry participation is mandatory. However, Industry partners willing to contribute towards the funding in the entire hydrogen value chain especially for production would be preferred.**

6. **After setting up of Section 8 company, a tripartite agreement between DST, the Lead applicant, and HVIC needs to be signed.**

In addition to the above partners, the consortium may also include the following:

Indian entities (with expertise in the Hydrogen sector) eligible to participate may include:

- Knowledge Clusters who are already engaged in stakeholder consultation in the green hydrogen ecosystem.

- Industries working on the Hydrogen Value supply chain.

- Central Government / State Government supported or recognized (Public or Private) academia and urban or other local bodies;

- National / State funded R&D Labs

- Government of India / State Government recognized not-for-profit (Societies/ Trusts or Research Foundations), having research and innovation as one of the imperative mandates; R&D centers recognized as Scientific Industrial Research Organization (SIRO) by DSIR with Industry partners;

- GoI-funded incubators / Startups incubated in any of the recognized Tech Business Incubators in the hydrogen domain.

- Any other entity which can add value to HVIC can be a partner.

A consortium (Hydrogen Valley Innovation Cluster) is expected to bring different parts of the green hydrogen value chain in geographical proximity to:

1) Facilitate deeper coordination and collaboration among actors in various value chain segments,

2) Mainly balance the demand & supply of Green Hydrogen.

3) Help reduce various transaction costs among the actors, including storage and transportation costs of hydrogen.

Foreign Assistance - Kindly indicate in the EoI, if any expertise or assistance is required from the International Experts in fostering the Hydrogen value chain or scaling up Hydrogen technologies. Fraunhofer (Germany) will act as a Technology Partner to DST, Govt of India for the Hydrogen Valley Innovation Cluster and will provide information and access to technologies of TRL 5 – 8, scientific and technical experts, collaboration in preparing technology roadmaps and guidelines for innovation cluster.

Management Structure of HVIC and Roles& Responsibilities of consortium partners:

Legal entity

The lead applicant will put in place a Section 8 (legal entity) specifically for the Hydrogen Valley Innovation Cluster hosted at institute premises. The consortium and its activities are to be managed by a newly registered section 8 company with the name of HVIC.

Board of Directors (BOD)

The Hydrogen Valley Innovation Cluster (HVIC) Board of Directors (BOD)will be steered by a competent organization(i.e., by a national institute of high repute/ R&D lab) in a consortium mode, having the key stakeholders of the Hydrogen value chain on board and can lead the consortium.

The Board of Directors (BOD) of the Section 8 Company would be chaired by the Head of the Lead applicant. It is suggested that BOD may include relevant government representatives, funding organizations such as DST, Industry/Associations etc. It should also involve the representation of key members from both industry and the Private or Public sector. BOD may guide, monitor and review the overall functioning of HVIC including the projects being supported.

- The Section 8 Companyof the consortium will be responsible for coordinating, implementing, and managing the project with DST. The S&T leads along with the legal entity will advise the Operational & Business Leads on aspects related to technology, system integration, and any quick R&D testing, etc.

- The R&D and other IP-related work will be done by the S&T Leads along with the legal entity.Members from both the groups (S&T Leads and Operational & Business Leads) will participate as one single unit with the main applicant (Legal Entity).
- The Operational & Business Leads will use all the current incentives available under the Hydrogen Mission in terms of PLI (Production Linked Incentive), GHCO (Green Hydrogen Consumption Obligation), Depreciation, Lower GST, etc. to make the business viable.

Industry partners:

The industry partners can be any of the following:-

- Should be an Indian Company registered under the Companies Act.
- Start-up companies registered in India by Indian Residents having valid registration and submission of the certificate of incorporation issued under the Companies Act;
- Recognition certificate issued by DSIR to the in-house R&D centreof the company and registration at the Government of India's Public Finance Management System (PFMS) shall be obligatory.

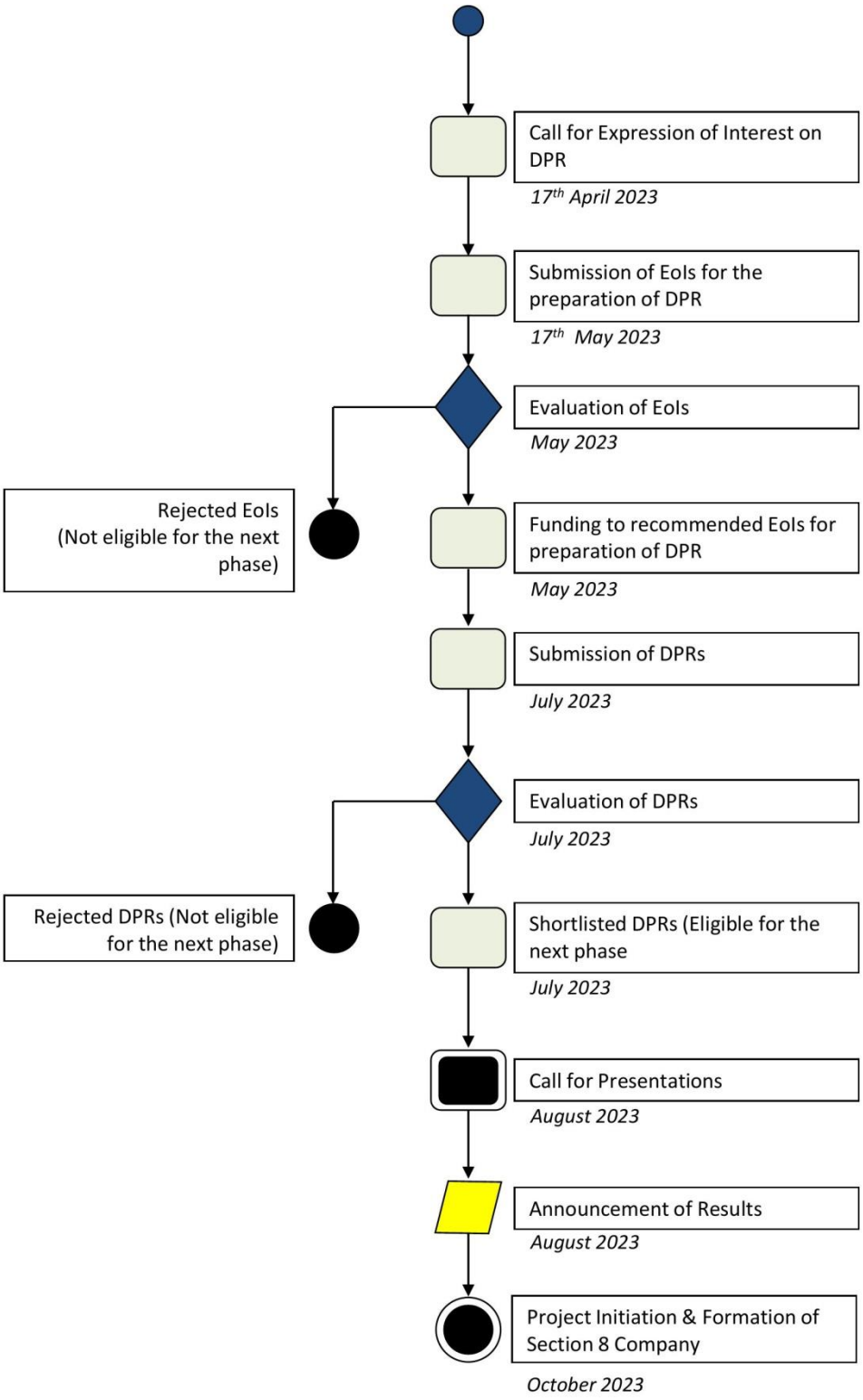
Academic/Research Partners:

- Public and/or private universities and research organizations must have a well-established research support system for research. Submission of proof of establishment under Indian statute; recognition documents and registration at the Government of India's Public Finance Management System (PFMS) is mandatory.
- If the proposal includes the commercialization of technology developed by a domestic R&D institution, the commercial enterprise should apply along with an agreement signed with the R&D institutions willing to transfer the technology.

Not-for-profit Organizations (Societies/ Trusts or Research Foundations):

- The Indian Private R&D performing institutions and Not-for-profit - Societies/ Trusts or Research Foundations should have experience of at least 3 years in scientific research, teaching, skill development, training, and extension activities;
- Proof of Certificate of registration under Society Registration Act; registration at ‘NGO DARPAN’ of NITI Aayog; R&D centre recognition as Scientific Industrial Research Organization (SIRO) by DSIR and registration at Government of India's Public Finance Management System (PFMS) shall be mandatory.

2.3 Complete Process Flow for Evaluation of EoI& DPR



A. Submission of Expression of Interest (EoI) (~ 2 weeks)

The purpose of inviting a call for Expression for the preparation of a Detailed Project Report (DPR) is to establish an overview of interested parties with relevant and sufficiently mature projects that can be included as stakeholder contributions to a joint consortium project for the development of the Hydrogen Valley Innovation Cluster. ***The format for the Call for Expression of Interest to be submitted by the Legal Entity is attached as Annexure I.*** All submitted EoIs will be evaluated and ranked by the Evaluation Committee of DST. Selected EoIs will be invited to submit DPRs for the Hydrogen Valley Innovation cluster.

B. **Preparation of DPR for Implementation of Hydrogen Valley Innovation Cluster [HVIC](45 days)**

The allocated budget or assistance provided for the Preparation of DPR for implementation of a hydrogen valley innovation cluster **is up to Rs. 25 lakhs** and **needs to be completed within 45 days. Any additional cost is to be described and justified properly and the committee will take a call on a case-case basis.** All submitted DPRs will be evaluated and ranked by the DST-constituted expert committee. The purpose of the preparation of DPR is to identify deserving projects that can potentially be funded by DST. Highest-ranked DPR after the evaluation process will be funded. ***The format for the Preparation of DPR is attached as Annexure II.***

Guidelines for the preparation of DPR:

The details of the submission of DPR for the Implementation of a Hydrogen Valley Innovation Cluster are as below:

- Based on the geographical location, regional strengths, and capabilities, DPR must contain all value chains of hydrogen including production, storage, and transport & off-takers for various application sectors.
- Creation of a Centre of Excellence for testing, validation, and standardization of hydrogen technologies.
- Demonstration of the end-to-end value chain by ensuring off-take availability and access to requisite hydrogen technologies.
- Showcase different applications of hydrogen.
- Demonstrate early success (high TRL) and longer-term success (lower TRL)
- Showcase scalability and sustainability over a duration that is longer than the project lifetime.

2.4 Evaluation Criteria

The lead organization hosting the Hydrogen Valley Innovation Cluster should have the ability to connect with various stakeholders to translate the research outputs for practical applications. Proposals are evaluated and scored against selection and award criteria - excellence, impact, and quality and efficiency of implementation. Integrated proposals which can address one or more research challenges right from R&D to development and demonstration at laboratory/ field level/ Technology bed, wherever feasible as well as standalone proposals focusing on pressing challenges/issues with a clear path to bring about affordability, robustness, and accessibility are welcome.

It is mandatory that the research consortium is engaged in cutting-edge R&D and has proven research and technical competence to execute the project. DPR will be evaluated and scored against selection and award criteria of excellence, impact, and quality and efficiency of implementation.

DST's Project Monitoring & Review Committees (PMRC):

DST will set up three different boards which help to advise and evaluate the consortia of Hydrogen Valley as shown below in Figure 4:

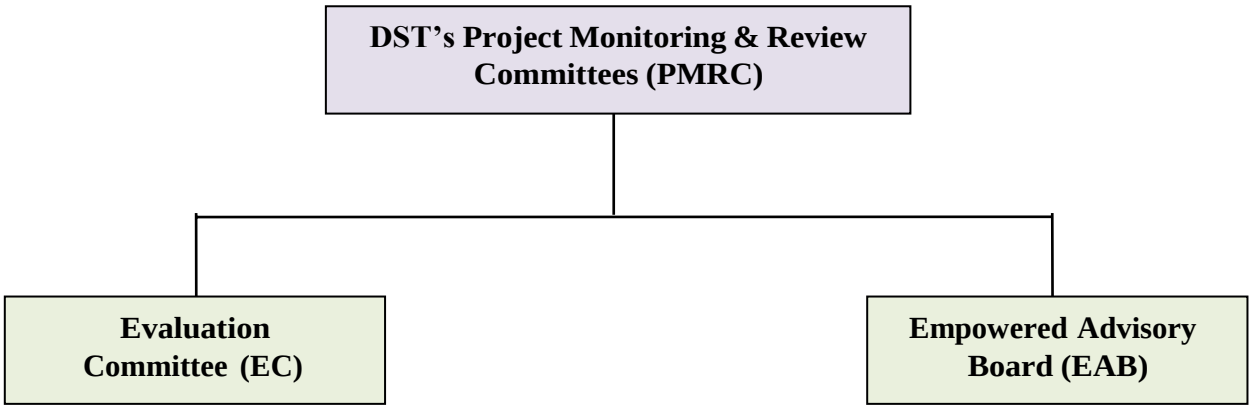


Figure 4: DST's Project Monitoring & Review Committees

Evaluation Committee (EC) - *For EoI and DPR*:

An Evaluation Committee (EC) will be constituted with experts from the government, academic research enterprise, and industry along with DST officials. Expressions of Interest in the call for DPR will be considered by the Evaluation Committee. Applicants will not only be assessed on their professional background and expertise but also on the skills that are needed in this interactive process of joint research development and competencies in terms of co-creation and interdisciplinary research. From these initial submissions, Evaluation Committee (EC) will shortlist the eligible applicants through the peer review process for the preparation of DPR.

Empowered Advisory Board (EAB)- *For guidance in HVIC*:

An Empowered Advisory Board (EAB) will be constituted by DST to include experts from the government, academic research enterprise, and industry along with experts from Mission Innovation countries. Along with DST, EAB will also have representatives from other relevant government departments. The EAB's responsibilities will include:

- Guiding the governance and operational aspects of the Hydrogen Valley Innovation Cluster.
- Guiding coordination of the Hydrogen Valley Innovation Cluster with other concerned departments of the government if necessary.

Reviewing and providing guidance to revise, if necessary, the structure of the Hydrogen Valley Innovation Cluster based on requirements to ensure the success of the Innovation Cluster.

2.5 Suggested Schedule / Timelines - Year-wise activities planned

S.No.	Activities	Timelines
1	**Call for Expression of Interest on DPR**	**17th April 2023**
2	**Last date of submission of EoI**	**17th May 2023**
3	**Evaluation & Selection of EoI**	**May 2023**
4	**Start Date of Preparation of DPR**	**May 2023**
5	**Last date of submission of DPR**	**July2023**
6	**Evaluation of DPR**	**July 2023**
7	**Shortlisting of DPR**	**July 2023**
8	**Call for Presentation**	**August 2023**
9	**Announcement of results**	**August 2023**
10	**Project Initiation&Formation of Section 8 Company for HVIC**	**October 2023**

3 Components of Funding

PPP (Public-Private Partnership) - Industry partners willing to contribute towards the funding with respect to their specific area in the Hydrogen Value Chain would be preferred. Each HVIC will be a PPP-driven project.

DST will allocate up toRs. 30 Crores / 50% of the HVIC total cost, whichever is lower based on justified needs.A particular HVIC may source additional funds from the government or private sector firms supporting green energy businesses.**The total cost of running HVIC will be for 5 years.**

Note: The budgetwill be considered based on the justified needs and specific requirements.The funding will be provided to the lead applicant as an initial grant and subsequently to the legal entity that will manage the consortium.

4 General Instructions

4.1 Submission of Project Proposals:

TheEoI could be submitted in the enclosed format (Annexure I) through **ONLINE MODE ONLY** (www.onlinedst.gov.in). **NO HARD COPY** of the EoIshould be submitted.

Applications received without the Annexures and with incomplete information will not be entertained. A soft copy (of the EoI) in PDF format is also to be emailed to **ranjith.krishnapai@gov.in** on or before **17thMay 2023.**

Contact: Any inquiries related to this call should be directed to:

Dr. Ranjith Krishna Pai
Director/Scientist 'E'
Climate Change & Clean Energy (C^3E) Division, Department of Science and Technology (DST)
Ministry of Science and Technology, Govt. of India
Technology Bhavan, New Mehrauli Road
New Delhi-110016. **E-mail: ranjith.krishnapai@gov.in**

Guidelines for Management of intellectual property rights, licensing, confidentiality, and Non-compete:

The operation of the consortium will be governed by a consortium agreement, signed by all consortium members, and duly submitted to the concerned DST office.

- How ownership of intellectual property (e.g., patents or copyrights) generated as a result of the funded project activities will be assigned and shared.
- How other intellectual property generated as a result of the funded project activities and that is not to be registered but to be protected (e.g., trade secrets) will be protected by all consortium members.
- Terms for the use or modification of the above intellectual properties by other consortium members during and after the end of the project.
- Terms for the use or modification of intellectual property that was owned by one or more consortium members and that was not generated as part of the funded project but will be utilized in the project.
- Terms of confidentiality that all consortium members agree upon.
- 'Non-compete' clauses, if any, that all consortium members agree upon.

- Terms in the matters mentioned above that would apply to entities other than the consortium members who might be involved in the project activities.

5 Formats/ Annexures

5.1 Expression of Interest for Preparation of DPR *AnnexureI*

Expression of Interest on Hydrogen Valley Innovation Cluster (HVIC)

1. Details of Lead Applicant:

- Name of the lead applicant **(*Please refer to pt. 2 in pg. 11*):**
- Specify the legal entity of the lead applicant (Section 8 Company/ Trust/ Society)
- Name of the Head of the lead applicant with contact details:
- Contact Details of Lead applicant (Nodal person, if other than Head):
- Location & Region being targeted:

2. Briefly outline the overall preparedness to develop small scale Hydrogen Valley Innovation Cluster:

3. Background and Expertise:

a. Brief summary of the lead applicant's background with specific strength in the hydrogen domain. (200 words max):
b. Brief Scope of Work of Hydrogen Valley Innovation Cluster (***Please refer to the HVIC guidelines)***:
c. Consortia partner of Hydrogen Valley Innovation Cluster defining roles and responsibilities of all the partners:
d. Brief Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis with respect to the Hydrogen value chain of the location and consortia identified:
e. Overall operational framework of the Section 8 Company put in place for the management of the Hydrogen Valley Innovation Cluster:
f. Identified Technology to be used in Production, Storage & Distribution with TRLs and likely production capacity for small-scale HVIC:
g. Timelines for preparation of DPR:
h. Broad Targets & Deliverables of the Hydrogen Valley Innovation cluster for 5 years for the entire Hydrogen value chain (activities& projects to be identified):
i. Broad Estimate costing of green hydrogen per kg and assumptions, if any:
j. Proposed Budget for DPR:
k. Broad Success parameters of Hydrogen Valley Innovation Cluster envisaged for 5 years:
l. Suggestions, if any:

Signature:
Name:
Place:
Date:

5.2 Format for Preparation of DPR *Annexure II*

Structure for DPR Preparation

The DPR should contain, among others, details such as;

1. Details of Lead Applicant:

- Name of the lead applicant
- Specify the legal entity of the lead applicant
- Name of the Head of the lead applicant with contact details:
- Contact Details of Lead applicant (Nodal person, if other than Head):
- Location & Region being targeted:

2. Lead Applicant's strength & preparedness to host Hydrogen Valley Innovation Cluster:

3. Introduction and Background of the Proposed Hydrogen Valley Innovation Cluster:

4. Project Objectives:

5. Members of a consortium of Hydrogen Valley Innovation Cluster as a whole:

- Describe the consortium (Project Management & Governance). How does it match the project's objectives, and bring together the necessary disciplinary and inter-disciplinary knowledge?
- Hydrogen Production, Storage & Utilization, Offtakers, R&D, Hydrogen Safety & Maintenance.
- Show how the partners will have access to the critical infrastructure needed to carry out the project activities.
- Describe how the members complement one another (and cover the value chain, where appropriate).
- In what way does each of them contribute to the project? Show that each has a valid role, and adequate resources in the project to fulfill that role.
- If applicable, describe the industrial/commercial involvement in the project and explain why this is consistent with and will help to achieve the specific goals which are proposed in the project.

6. Framework and Methodology of key activities for HVIC to be undertaken:

- Selection of proposals and adding new partners & collaborations:
- Describe and explain the overall methodology, including the concepts, models, and assumptions that underpin your work. Explain how this will enable you to deliver your

project's objectives. Refer to any important challenges you may have identified in the chosen methodology and how you intend to overcome them.

- Describe any national or international research and innovation activities whose results will feed into the project, and how that link will be established.
- Explain how expertise and methods from different disciplines for the consortium will be brought together and integrated withthe pursuit of your objectives.

7. Legal Structure & Governance to Manage Hydrogen Valley Innovation Cluster:

8. Review & Monitoring of the HVIC:

9. Work plan and resources:

(Please give enough detail in each work package to justify the proposed resources to be allocated and also quantify information so that progress can be monitored. Resources assigned to work packages should be in line with the objectives and deliverables)

- Brief presentation of the overall structure of the work plan/ GANTT Chart;
- Timing of the different work packages and their components;
- Detailed work description, i.e., List of work packages; Description of each work package, Quantified list of deliverables (year-wise), and milestones to be achieved (year-wise) for five years.

10. Expected Target & Outcome for five years:

(Green hydrogen production capacity, cost of hydrogen production, tangible and intangible benefits, likely reduction in carbon emissions, indigenous manufacturing capabilities, creation of employment opportunities across the value chain, development of cutting-edge technologies, innovation ecosystem in the country and off-takers)

11. Impact:

- The credibility of the pathways to achieve the expected outcomes and impacts specified in the work program, and the likely scale and significance of the contributions due to the project.
- Suitability and quality of the measures to maximize expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.

12. Risk management strategy:

- Strategic risks related to supply chain challenges for critical inputs
- Technological risks related to uncertainties due to technologies at the R&D stage or unforeseen technological developments
- Operational or project-level risks, such as availability of water, land, or energy resources or essential data, and safety.

- Financial and market risks, including additional infrastructure costs and capital expenditure or availability of funding/financing needed in addition to the DST funding.

13. Project costing of HVIC for five years (*Refer pt. 3 in pg 17*)

Project Cost for 5 years *(separately for Hydrogen production, storage, transportation, etc) (Please also indicate industry contribution in each head), year-wise details for five years)*

- Capital Expenditure
- Equipment & Machinery *(if applicable)*
- Operational Expenditure *(if applicable)*
- Land Requirements *(It is assumed that requisite land for production & storage is already available. It may also be added that the consortium partners involved in H2 production & storage **must** use the existing land).*
- Likely arrangements with off-takers& possible tie-ups

Total Project cost for five years:

Means of Financing for the overall project under HVIC (DST funding and otherfunding including private/industry):

Post-implementation maintenance and Sustainability & Scalability mechanism after 5years:

14. Summary of the project:

- What are the specific needs that triggered this project?
- What do you expect to generate by the end of the project?
- Who will use or further up-take the results of the project? Who will benefit from the results of the project?
- What change do you expect to see after the successful dissemination and exploitation of project results to the target group(s)?
- What are the expected wider scientific, economic, and societal effects of the project contributing to the expected impacts outlined in the respective destination in the work program?

15. Annexures:

- Maps/sketches, showing the location of works:
- Other details / supporting documents, references, maps, designs, and specifications as required.