Monitoraggio bandi tema idrogeno

Sommario

1. *Name*	**Smart and efficient ways to construct, maintain and decommission with zero emissions from transport infrastructure** **TOPIC ID: HORIZON-CL5-2022-D6-02-06**		
Opening date	28 April 2022		
Deadline date	**06 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	10.00 million	Expected EU contribution per project: 5.00 million	N. of projects expected to be funded: 2
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	Safe, Resilient Transport and Smart Mobility services for passengers and goods (HORIZON-CL5-2022-D6-02)		
Type of action	HORIZON-IA HORIZON Innovation Actions	Activities are expected to achieve at least TRL 7 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to the following expected outcomes: • A holistic approach to lowering transport infrastructure environmental impact, which takes into account the whole life cycle of transport infrastructure; carbon-neutral construction, maintenance, operation and decommissioning of the infrastructure • Implementation of circular economy principles (for example, by fostering new solutions and systems that are easy to maintain, repair, update, adapt and replace and by maximising the re-use/recycle of infrastructure components) to reduce emissions and the environmental impact; 100% reutilisation of construction materials within or across transport modes. • Performance-based design models and manufacturing techniques (e.g. additive and subtractive manufacturing) with the objective to substantially reduce materials consumption in construction and maintenance activities. • Enhanced modular construction, maintenance and decommissioning interventions able to reduce life cycle cost (LCC) by at least 30%. • Optimisation of energy use and increased share of renewable energy for infrastructure management operations as a way leading to achieving energy neutrality • Novel governance, public procurement and data utilization models to decrease the emissions and carbon footprint of the whole life cycle of transport infrastructure by 20%		
Key Strategic Orientations (KSO)	This Destination contributes to the following Strategic Plan's Key Strategic Orientations (KSO):		

	C: Making Europe the first digitally enabled circular, climate-neutral and sustainable economy through the transformation of its mobility, energy, construction and production systems; **A**: Promoting an open strategic autonomy[['Open strategic autonomy' refers to the term 'strategic autonomy while preserving an open economy', as reflected in the conclusions of the European Council 1 – 2 October 2020.]] by leading the development of key digital, enabling and emerging technologies, sectors and value chains to accelerate and steer the digital and green transitions through human-centred technologies and innovations.
Impact areas	It covers the following **impact areas:** • Industrial leadership in key and emerging technologies that work for people; • Smart and sustainable transport.
Link	Funding & tenders (europa.eu)

2. *Name*	**Design for advanced and scalable manufacturing of electrolysers** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-01-04**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	4.00 million	Expected EU contribution per project: 2.00 million	N. of projects expected to be funded: 2
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-RIA HORIZON JU Research and Innovation Actions	Activities are expected to start at MRL 4 and achieve MRL 5 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all the following expected outcomes: • Improving efficiency by 2-4% LHV compared to the use of the present state of the art solutions; • Increase system reliability and significantly reduce manufacturing costs resulting in an overall lower CAPEX and reaching a projected levelised cost of hydrogen (LCOH) below 3 €/kg assuming 40 €/MWh and 4,000 full load hours operation@, after the scaling up of the foreseen manufacturing techniques; • Demonstrate the value of advanced manufacturing techniques to reduce manufacturing times enhancing printing or assembly tolerances versus the state of the art.		
Scope	The following items are in scope of this topic and should lead to cost reduction and cell/stack reliability improvement. Scalability should be considered for each of the research paths to be followed in the project. The project should consider the re-use and recycling of the electrolysers and their components at their end of life. Proposals should address at least 3 of the topics below:		

	• Alternatives and/or novel processes should be identified, allowing improved conduction coatings with impact on Platinum group metals (PGM) content. Catalysts should be reduced in water electrolysers, since they are both very expensive and CRMs; • Exploration of new surface coating technologies and advanced manufacturing processes (e.g., 3D printing) for more efficient mass production, which can allow higher current density and process efficiency; • Improvement of manufacturing throughput, feature control, and scale for electrolyser bipolar plates to be coupled with a reduction of the processing cost through cost-effective and mass production-friendly processing techniques, including forming, punching, cleaning, coating and other processes; • Reduction of the manufacturing steps and transportation costs required to fabricate porous transport layers/gas diffusion layers; • Improvement of the level of automation of the cell stacks assembly thanks to the development of robotics tooling and automated inspection; • Test and development of scalable predictive maintenance devices which can greatly reduce the O&M costs of the electrolyser stack; • Include process design to leverage the recyclability of the materials at the end of life and the utilisation of recycled materials in novel manufacturing on a circularity approach.
Link	Funding & tenders (europa.eu)

3. *Name*	**Integration of multi-MW electrolysers in industrial applications TOPIC ID: HORIZON-JTI-CLEANH2-2022-01-08**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	18.00 million	Expected EU contribution per project: 18.00 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-IA HORIZON JU Innovation Actions	Activities are expected to start at TRL 6 and achieve TRL 8 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute but are not limited to the following expected outcomes: • Emphasise innovation aspects that demonstrate how electrolyser technology goes beyond the current state of the art, while ensuring replicability and wide commercial impact following the implementation of the project;		

	• Demonstrate reliable operation of large-scale electrolysis and the use of the produced hydrogen in an application valorising the renewable character of the produced hydrogen according to final user's requirements; • Gain operational experience, including safety and regulatory framework, of the contractual and hardware arrangements required to distribute and supply hydrogen to the specific industrial environment; • Perform techno-economic analysis of the performance of these systems showcasing the business case of the proposed solution; • Technically assess the operation of the electrolyser in the industrial environment regarding contractual and hardware arrangements and suggest best practices; • Evaluate the life cycle environmental performance of the system (including water usage) in alignment with the applicable regulation, defining renewable hydrogen with attention to the CO2 intensity of the hydrogen produced, which should include an understanding of the CO2 footprint impact in the addressed hydrogen end-user markets; • Identify the value and size of the markets addressed and the possibility of indirectly affecting additional relevant markets; • Assess the legislative and RCS implications of these systems and any issues identified in obtaining consents to operate the system; • Make recommendations for policy makers and regulators on measures helping to maximise the value of renewable energy and stimulate the market for renewables-electrolyser systems.
Scope	The scope of the project is to demonstrate the integration of a large-scale electrolyser of minimum 25 MW. Technical requirements in terms of purity and pressure shall be designed to fulfil the industrial requirements. At least 2 years of operation are expected. Hydrogen production should be >1,500 tonne/yr and the facility should be working more than 3,200 equivalent hours/yr at full load. Proposal should address innovation aspects that ensure the project goes beyond the state of the art. Examples of innovations could include, but are not limited to: • Possibly supply hydrogen to two separate users, each with their own operational requirements and managing electrolyser output both in terms of generation and storage in order to maximise the efficiency of the setup; • Use oxygen and/or waste heat from the electrolyser for other processes at the industrial site, or from the industrial process to the electrolyser in case of SOEL; • Concepts related to the circular economy (e.g.: water utilisation, re-use of CO2 at the site); • Provision of grid services that help the economics of the installation; • Footprint reduction, for example integrating hardware vertically instead of horizontally, or minimising the footprint of the electrolyser with a single balance of plant including all required utilities such as water purification, power rectification with appropriate grid interfaces and hydrogen purification, process cooling, etc;
Link	Funding & tenders (europa.eu)

4. *Name*	**Efficient system for dehydrogenation of liquid organic hydrogen carriers for application to long distance transportations** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-02-05**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	3.00 million	Expected EU contribution per project: 3.00 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-RIA HORIZON JU Research and Innovation Actions	Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following expected outcomes: • Contribute to Europe technology leadership, developing innovative reactors and catalyst for the dehydrogenation of LOHC, including integrated solutions for heat management and hydrogen purification; • Reducing the use of critical raw materials in LOHC dehydrogenation reaction; • Develop affordable business models related to the use of hydrogen carried on by LOHC for various applications, such as centralised and distributed power generation, shipping, heavy mobility, etc; • Contributing to the understanding of Europe need in terms of infrastructure and regulation for the management of liquid hydrogen carriers; • Foster the demonstration of the solutions developed in the project throughout Europe; • Contribute to the social acceptance of hydrogen technologies, demonstrating safe solutions for hydrogen transportation by LOHC.		
Scope	The project should develop and demonstrate reactors and catalyst dedicated to the dehydrogenation of LOHC. In particular, the project should contain a set of principles applied in catalyst and reactor design, which can bring significant benefits in terms of process intensification and chain efficiency, lower capital and operating expenses, higher quality of products, less wastes and improved process safety. Therefore, it is of interest to develop and demonstrate, at prototype scale, low-cost catalysts and integrated reactors that can deliver hydrogen at a high rate per volume from LOHC dehydrogenation at relatively low temperatures and high conversion, so that zero-carbon pure hydrogen can be transported at long distances. The proposal should contain: • Development of catalyst (CRMs free catalyst or reducing of CRM use should be considered) for the LOHC dehydrogenation at lower temperature compared to the state of the art:		

	• ensuring the highest possible dehydrogenation reaction conversion (>95%); • improving the overall thermal efficiency of the LOHC dehydrogenation step; • providing high reliability, ease of operation, and cost-effectiveness to hydrogen production; • an integrated system with high reliability, ease of operation, low materials degradation and cost-effectiveness to hydrogen production from LOHC. • A fully CO2-free dehydrogenation process; • A demonstration system, running for at least 500 hours and producing at least 10 kg H2/day at atmospheric pressure; • Demonstration of the absence of contaminants, by-products and degradation products from the dehydrogenation of LOHC in real conditions (hydrogen quality according to ISO 14687:2019); • Demonstration of scalability of the developed system to large-scale production (equivalent to the 100 t H2/day) for long distance transportation; • A Life Cycle Assessment of the developed system in the frame of the whole supply chain: LOHC inventory and make-up, (de)hydrogenation steps, temporary storage, shipping, CRM net consumption, etc; • Techno-economic analysis for the scalability of the developed system to large-scale production for long distance transportation, i.e. 1000 t H2/day, including centralised hydrogenation plant, storage, shipping and distributed dehydrogenation plants.
Link	Funding & tenders (europa.eu)

5. *Name*	**Hydrogen Valleys (large-scale)** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-06-01**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	25.00 million	Expected EU contribution per project: 25.00 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-IA HORIZON JU Innovation Actions	The TRL of the applications in the project should be at least 6 at the beginning of the project while the overall concept should target a TRL 8 at the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following expected outcomes: • Activate a long-lasting hydrogen economy in the targeted region/s and that goes beyond the boundaries of the Hydrogen Valley/s developed as a result of the proposal;		

	• Replicable model for mutualisation of hydrogen production or distribution and storage, in view of optimisation of investments as key parameter for financial viability; • At least 5 additional Hydrogen Valleys of at least a similar size and scope as the one required in this topic are initiated in other locations in Europe; • Improved public perception of hydrogen ecosystems, contributing towards an EU hydrogen infrastructure backbone in any possible way, e.g. HRS network, hydrogen pipeline, NG pipeline retrofitted to hydrogen, etc.
Scope	A Hydrogen Valley is a defined geographical area where hydrogen serves more than one end sector or application in mobility, industry and energy. They typically comprise a multi-million euro investment and cover all 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. Whilst most of the projects are located in Europe, over the past years, Hydrogen Valleys have gone global, with new projects emerging worldwide. Hydrogen Valleys are starting to form first regional "hydrogen economies". Already under the FCH JU provided support to a number of Hydrogen Valleys[2] across different locations in Europe and of different sizes. It is however still necessary to accelerate the deployment of additional Hydrogen Valleys already now in view of the objectives of the European hydrogen strategy[3]. To do this it is necessary to have testbed projects to act as first real-life cases for piloting global hydrogen markets. These projects needs to be expanded in scale to demonstrate the full range of benefits from the use of hydrogen as an energy carrier. This topic addresses this need by calling for a Hydrogen Valley of a large scale with high levels of hydrogen production. It also intends to stimulate the activation of hydrogen markets that go beyond the boundaries the Hydrogen Valley location. The scope of this topic is to develop, deploy and demonstrate a large-scale hydrogen valley with interlinkages to other places of hydrogen production and/or consumptions outside its boundaries. The size and other characteristics are given further below. To increase the impact, it is encouraged to accommodate these requirements across two separate interconnected valleys located in different intra-EU regions[4] whether within the same Member State/Associated country or not; in such cases, exchange of hydrogen is expected to exceed 20% of the overall annual production in order to have a meaningful impact, and individual regions would not be required to achieve the minimum project size of 5,000 tonnes/yr (outlined below) but would still be required to demonstrate minimum thresholds for percentages dedicated to end uses in various sectors as outlined below.
Partner	At least one partner in the consortium must be a member of either Hydrogen Europe or Hydrogen Europe Research.
Link	Funding & tenders (europa.eu)

6. *Name*	**Hydrogen Valleys (small-scale)** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-06-02**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	8.00 million	Expected EU contribution per project: 8.00 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-IA HORIZON JU Innovation Actions	The TRL of the applications in the project should be at least 6 at the beginning of the project while the overall concept should target a TRL 8 at the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following expected outcomes: • At least [5] additional H2 Valleys projects are initiated before 2027; • Replicable model for production or distribution and storage and end-use applications, in view of optimisation of investments as key parameter for financial viability; • Improved public perception of H2 ecosystems, with the aim to contributing towards an EU hydrogen infrastructure backbone, e.g. HRS network, H2 pipeline, NG pipeline retrofitted to H2, etc.		
Scope	A Hydrogen Valley is covering a defined geographical area in which hydrogen serves in general more than one end user or application in mobility, industry and energy. They typically comprise a substantial financial investment and cover as much as possible 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. Hydrogen Valleys are starting to form regional "hydrogen economies". Such projects are necessary for piloting global hydrogen markets and should be expanded in number or scale to demonstrate the full range of benefits from the use of hydrogen as an energy carrier The scope of this topic is to develop, deploy and demonstrate a hydrogen valley having the aim to increase in size and characteristics overtime. Particular attention is given to actions supporting the design and development of a Hydrogen Valley in areas of Europe with no or limited presence of Hydrogen Valleys such as, but not necessarily limited to, Central and Eastern European Countries.		
Partner	At least one partner in the consortium must be a member of either Hydrogen Europe or Hydrogen Europe Research.		
Link	Funding & tenders (europa.eu)		

7. *Name*	**Compatibility of Distribution non-steel metallic gas grid materials with hydrogen** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-02-01**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	2.5 million	Expected EU contribution per project: 2.5 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-RIA HORIZON JU Research and Innovation Actions	Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following expected outcomes: • De-risking of business case for repurposing of existing European gas grids for hydrogen and enabling expansion of new dedicated infrastructures for pure hydrogen; • Increased operator, regulator, authorities, and end user confidence in safety of repurposed gas grids by consolidated and exhaustive scientific data; • Making available harmonised guidelines to assess the hydrogen effect on metallic materials present in the gas grids to get a complete view of network compatibility. These guidelines would provide inputs to pre-normative actions conducted through European organisations and enable a seamless interconnection between gas grids.		
Scope	Former public bibliographic results and testing programs (e.g. NaturalHY[2], HYready[3], MultiHy[4] or Higgs[5] projects) have identified an embrittlement effect on steel grid materials used for pipes or network equipment, directly linked to the partial pressure of hydrogen (commonly expressed in terms of percentage of hydrogen in the total volume of gas at a specific pressure). However, this embrittlement effect on the various metallic materials used on the gas distribution networks (steel, but also cast iron, copper, lead…) has not been documented to date, as most existing testing programs have investigated non-metallic materials only. Therefore, there is a strong need to document the effect of hydrogen on metallic materials at low pressure, taking into account the great diversity of existing networks across the European Union, in terms of material grades used, building protocols (e.g. welds) or day-to-day current and future operational parameters (e.g. pressure level). All types of metallic materials (steel, cast iron, copper, brass, lead, aluminium) or operational parameters representative of the functioning of the distribution networks have not been fully studied. All gas grids characteristics and load case scenarios should be covered to better assess the lifespan of existing infrastructure.		

	Currently different standards can be used for the design of metallic components (ISO 11114-4, ASME B31.12) or to assess their mechanical properties in the presence of hydrogen (ANSI/CSA CHMC 1, ASTM G142). This wide range of standards and the lack of commonly agreed mechanical guidelines are slowing down the definition of harmonised criteria to assess hydrogen-readiness of European gas networks.
Link	Funding & tenders (europa.eu)

8. *Name*	**Ammonia to Green Hydrogen: efficient system for ammonia cracking for application to long distance transportations** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-02-04**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	3.0 million	Expected EU contribution per project: 3.0 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-RIA HORIZON JU Research and Innovation Actions	Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following outcomes: • Contribute to Europe technology leadership developing innovative reactors and catalysts for the dehydrogenation of ammonia as well as new integrated solution for heat management and hydrogen separation and purification; • Reducing the use of critical raw materials in ammonia dehydrogenation reaction; • Improving the economics of the ammonia dehydrogenation process; • Develop new business models related to the use of hydrogen from ammonia for various applications, such as centralised and distributed power generation, shipping, heavy mobility, etc; • Contributing to the understanding of Europe need in terms of infrastructure and regulation for the management of liquid hydrogen carriers; • Foster the demonstration of the solutions developed in the project throughout Europe.		
Scope	State of the art systems for H2 recovery from ammonia require reaction units and catalysts operating at high temperatures (550-800°C) for complete ammonia conversion and are principally based on fired and heat transfer limited cracker design. The application of heat sources to deliver the required thermal energy is a restricting challenge for ammonia as a reliable Hydrogen carrier. Moreover, components thermal losses, power consumed by pumps, and loss of hydrogen due to imperfect recovery in		

	conventional separation and purification section represent other important issues to address for the next generation ammonia dehydrogenation plants. In this regard, proposals should contain a set of principles applied in catalyst and reactor design, which can bring significant benefits in terms of process intensification and chain efficiency, lower capital and operating expenses, higher quality of products, less waste and improved process safety. Therefore, it is of interest to develop and demonstrate, at prototype scale, low-cost catalysts and integrated reactors that can deliver hydrogen at a high rate per volume from ammonia dehydrogenation at relatively low temperatures and high conversion so that zero-carbon pure hydrogen can be transported at long distances.
Link	Funding & tenders (europa.eu)

9. *Name*	**Safe hydrogen injection management at network-wide level: towards European gas sector transition** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-05-03**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	3.0 million	Expected EU contribution per project: 3.0 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-RIA HORIZON JU Research and Innovation Actions	Activities are expected to start at TRL 3 and achieve TRL 6 by the end of the project. TRLs at the start and at the end of the project are not referred to the specific actions proposed in the scope, but to the whole set of actions proposed, that due to the wide scope and the interaction with the harmonisation and regulatory activities will vary from TRL 3 to TRL 6.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to the following expected outcomes: • Definition of methods, tools and technologies for multi-gas network management and quality tracking, including simulation, prediction and safe management of transients, in view of widespread hydrogen injection in a context of European-wide interoperability and gas market reform; • Best practice guidelines for handling the safety of hydrogen in the natural gas infrastructure, managing the risks (with prevention and mitigation protocols) for guaranteeing the safe interoperability of gas transport at European level; • Mapping and assessing T&D infrastructure components at European level to identify best available technologies, the hydrogen readiness of components, network technologies and monitoring protocols in order to steer stakeholders towards effective regulation and technical standards, network repurposing and modernisation investments.		

Scope	This topic aims to define comprehensive technical information, standard protocols for the managing of a multi-gas network and give scientific-based evidence in order to help stakeholders towards the development of effective regulation and technical standards, network repurposing and modernisation investments. The GERG CEN H2 PNR project[1] has helped to define a comprehensive list of impacted standards and a gap analysis for managing these standards through targeted PNR, and the project should aim to interact with these identified priorities at CEN TC level where possible. Proposals should also support the aims of the Hydrogen and Decarbonised Gas Market Package[2] which provides the regulatory framework within which future gas networks will operate.
Link	Funding & tenders (europa.eu)

10. *Name*	**Development and demonstration of mobile and stationary compressed hydrogen refuelling solutions for application in inland shipping and short-distance maritime operations** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-02-11**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen, Maritime operations**		
Budget	7.00 million	Expected EU contribution per project: 7.00 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-IA HORIZON JU Innovation Actions	Activities are expected to start at TRL 3 and achieve TRL 6 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to, but not limited to, the following expected outcomes: • Improved understanding of the health and safety requirements for hydrogen bunkering in a range of operational shipping contexts, which will make bunkering more efficient and inherently safer to reduce hazards and consequences of potential incidents, and thus de-risk future developments; • Closed knowledge gaps on characteristic hazards and associated risks; • Lessons learned which can inform heavy-duty refuelling development for other sectors, to facilitate further deployment of hydrogen in a wide range of transport and freight sectors; • Identification of regulatory challenges and barriers, and areas of focus for pre-normative research and regulatory reform, in order to unlock future fuelling of heavy-duty applications;		

	• Guidelines and/or draft standards for hydrogen bunkering components and systems to increase the coherence of innovation activities and improve uptake throughout Europe and beyond; • Leveraging the opportunities associated with shipping as an off-take sector in the development of business cases for hydrogen storage and distribution networks. • Improved understanding of requirements for type approval for both ship-to-shore and ship-to-ship interfaces and control systems to facilitate widespread commercialisation of the solutions; • Deployment of hydrogen bunkering infrastructure of at least 800 kg H2/day capacity in project locations; • A boost in the uptake of hydrogen-fuelled vessels, and associated commercialisation benefits for the broader hydrogen economy; • Training for vessel crew and bunker terminal personnel, which can be replicated.
Expectation	It is expected that scalable bunkering solutions will best be developed through the demonstration of innovative systems which can deliver hydrogen to vessels safely, quickly and at low cost. The technical development for these solutions should be accompanied by work to understand the underlying physical phenomena, develop health and safety practices, satisfy existing and suggest new regulatory requirements as needed, deliver appropriate classification of the solutions developed, and facilitate wide roll out of the solution. Previous desk-based studies have proposed the development of a corridor of hydrogen bunkering hubs at key connecting ports across Europe, and it is expected that this initiative will be tied to a location with developed offtake for compressed hydrogen gas. To realise these ambitions, standardisation of the developed engineering solutions, including components such as refueller, connections, nozzles, as well as of fuelling protocols, is also a key priority. There are a number of different approaches to developing appropriate bunkering solutions, which will be more or less relevant according to local requirements. Maximum impact for the action will be secured by tying the solution developed to a local need, to enhance the commercial case for the adoption of the solutions developed. To ensure that the solutions developed address the full range of challenges foreseen, the action should focus on one of two distinct focus areas: A pipe-to-ship stationary refuelling solution which is multi-modal, in that it can address refuelling requirements for a range of vehicles including trains and trucks, as well as account for refuelling for shore-to-ship power. The infrastructure and fuelling protocols should be designed for simultaneous bunkering operations and should be able to scale in future; A floating ship-to-ship or platform-to-ship bunkering system and protocol, to facilitate efficient hydrogen delivery without the need for vessels to visit a port or stationary refuelling station, as well as to provide resilience and redundancy. If this focus area is selected, then the successful project should cooperate with the successful project of HORIZON-JTI-CLEANH2-2022-03-05, working on the barge-to-barge bunkering.

Partner	At least one partner in the consortium must be a member of either Hydrogen Europe or Hydrogen Europe Research.
Link	Funding & tenders (europa.eu)

11. *Name*	**Development of large scale LH2 containment for shipping** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-02-06**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Hydrogen**		
Budget	6.5 million	Expected EU contribution per project: 6.5 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-RIA HORIZON JU Research and Innovation Actions	Activities are expected to start at TRL 2-3 and achieve TRL 5 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following expected outcomes: • Enable safe, cost- and energy efficient transport of bulk LH2. Large scale LH2 ship storage concepts need to be developed for shipping of LH2 at energy system scale, in the order of GW hydrogen energy flux. An important aspect is to utilise the techno-economic advantage of scale; • Allow for the development of LH2 containment for shipping exceeding the currently demonstrated size of about 1,250 m3, corresponding to 90 tonnes of hydrogen. At present, large-scale solutions for the storage and bulk transportation of liquid hydrogen are in their infancy. It is expected that the development will foster the basis for large scale trade of LH2 by 2030 being a supplement and later an alternative to the current world-wide LNG trade; • Design a scalable liquid hydrogen storage to large dimensions, in the range of those implemented for LNG shipping today, e.g. 200,000 m3 per ship, distributed between a relevant numbers of storage tanks. Such a capacity will correspond to 14,000 tonnes of hydrogen transported per ship; • Demonstration and first application of the developed liquid hydrogen storage technology may be at reduced scale		
Scope	The scope of this topic is to develop and validate containment concepts intended for the bulk shipping of liquid hydrogen. The concepts developed should also be suitable for a later scale-up. Multiple European technology providers have started to design and develop LH2 containment solutions, e.g. based on the IMO Type B, Type C and membrane tank designs currently available for LNG shipping, as well as for other novel concepts. Due to the considerably lower temperature of LH2 than LNG, as well as the lower heat of vaporisation and different material compatibility characteristics, totally novel		

	insulation concepts need to be developed if LH2 should be contained with equally or lower boil-off rate as current LNG concepts. The scope for the proposed project should include: • Concept selection for large scale LH2 containment to be used in shipping; • Approval in Principle (AIP) for the LH2 containment concept by one of the major IACS classification societies; • Materials and component selection and integrity testing for LH2 exposure, e.g. strength, ductility, toughness, thermal expansion, sloshing and compatibility; • Sub-system testing for thermo-mechanical validation; • Detailed design, construction, and testing of a scaled-down prototype of at least 10 t LH2 capacity; • General Approval for the LH2 containment system by one of the major IACS classification societies; • Development of a preliminary integrated ship design with a corresponding cost estimation;
Link	Funding & tenders (europa.eu)

12. *Name*	**Demonstrating offshore production of green hydrogen** **TOPIC ID: HORIZON-JTI-CLEANH2-2022-01-10**		
Opening date	31 March 2022		
Deadline date	**20 September 2022 17:00:00 Brussels time**		
Keywords	**Offshore**		
Budget	20 million	Expected EU contribution per project: 20 million	N. of projects expected to be funded: 1
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	HORIZON-JTI-CLEANH2-2022 (HORIZON-JTI-CLEANH2-2022-2)		
Type of action	HORIZON-JU-IA HORIZON JU Innovation Actions	Activities are expected to start at TRL 5 and achieve TRL 7 by the end of the project.	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	Project results are expected to contribute to all of the following outcomes: • Achievement of a step change regarding experience with the additional safety aspects of hydrogen production offshore and export/use, de-risking future projects and investments; • Determination of the long-term performance of an offshore electrolyser in terms of integration capabilities, efficiencies, systems balancing, performance degradation, corrosion management and operational costs; • Evaluation and demonstration of operational, inspection and maintenance requirements of offshore electrolysis process; • Building upon existing experience and research into suitable offshore renewable hydrogen infrastructures and expanding this knowledge;		

	• Enabling further roll-out of offshore renewable hydrogen production and export/use; • Acting as a stepping stone for dedicated offshore electrolysis coupled with windfarms, transporting renewable energy as renewable hydrogen, or the offshore use of renewable hydrogen; • Provide relevant experience to retrofitting existing electricity/oil/gas offshore infrastructure demonstrating their feasibility and cost competitiveness in the long run.
Key points	Proposals should address the following: • Deployment of a system that is designed to be remotely controlled, monitored and autonomously operated to minimise operational costs, while also allowing ready access for essential maintenance purposes; • Evaluation of the operational, inspection and maintenance requirements of offshore electrolysis systems; • Operation of the offshore electrolyser and hydrogen export/storage/use for two complete seasonal cycles (24 months). Projects should record all relevant operating data (e.g.: electricity input, hydrogen production and export, system degradation, system fault/trips and root cause analysis) to allow the feasibility of offshore renewable electrolysis to be fully assessed; • Determination of the performance of the offshore electrolyser in terms of efficiency, performance degradation, operational and maintenance costs; • If relevant to the electrolyser site, an assessment of economic impact of re-using existing offshore infrastructure compared with developing new offshore infrastructure. KPIs regarding accommodation ratios (MW/m²), cost of installed production (€/MW), etc, shall be defined as appropriate in the proposals to build the assessment; • A techno-economic comparison of the chosen approach to offshore hydrogen production and transport by pipeline with an otherwise similar approach on land that is based on onshore wind power; • Assessment of the efficient use of the available renewable energy and of the best control strategies to optimise the plant performances based on the measured process operation data. For this purpose, proposals shall define KPIs regarding availability, efficiency, LCOH, etc; • Assessment of the environmental impact in terms of avoided CO2 emissions resulting from the utilisation of the renewable hydrogen produced offshore. A preliminary estimation of the CO2 avoided emission is expected already in the proposal; • Describe how learnings will be communicated and dissemination will occur beyond the consortium, including regions in Europe with significant potential for offshore renewable hydrogen production.
Partners	At least one partner in the consortium must be a member of either Hydrogen Europe or Hydrogen Europe Research.
Link	Funding & tenders (europa.eu)

13. *Name*	**Integrated wind farm control** **TOPIC ID: HORIZON-CL5-2022-D3-03-04**		
Opening date	06 September 2022		
Deadline date	**10 January 2023 17:00:00 Brussels time**		
Keywords	**Offshore**		
Budget	18 million	Expected EU contribution per project: 6 million	N. of projects expected to be funded: 3
Programme	Horizon Europe Framework Programme (HORIZON)		
Call	Sustainable, secure and competitive energy supply (HORIZON-CL5-2022-D3-03)		
Type of action	HORIZON-RIA HORIZON Research and Innovation Actions	Activities are expected to achieve TRL 5	
Type of MGA	HORIZON Action Grant Budget-Based [HORIZON-AG]		
Dealdline model	single-stage		
Expected outcomes	In this context, project results are expected to contribute to all of the following expected outcomes: • Development of open source data-driven tools to decrease energy costs on operation, while increasing total wind farm output, and a parallel evaluation of operational risks arising from the chosen solution, including e.g. limitations from machine learning (AI) and resilience against third-party fraud, i.e. operational security. • Development of digital and physical tools, as well as interoperable frameworks and controls, for enhanced data collection, analysis, and operation aimed at an improved performance at farm level. • Allow operators to make better informed decisions on farm-wide system optimisation, lifetime extension, decommissioning and/or recycling of components. • Contribute to LCOE reduction in line with the SET Plan targets (actions should clearly justify the estimated LCOE at project start and end).		
Key Strategic Orientations (KSO)	This Destination contributes to the following Strategic Plan's Key Strategic Orientations (KSO): **C**: Making Europe the first digitally enabled circular, climate-neutral and sustainable economy through the transformation of its mobility, energy, construction and production systems; **A**: Promoting an open strategic autonomy[['Open strategic autonomy' refers to the term 'strategic autonomy while preserving an open economy', as reflected in the conclusions of the European Council 1 – 2 October 2020.]] by leading the development of key digital, enabling and emerging technologies, sectors and value chains to accelerate and steer the digital and green transitions through human-centred technologies and innovations;		
Impact areas	It covers the following **impact areas**: • Industrial leadership in key and emerging technologies that work for people; • Affordable and clean energy.		
Link	Funding & tenders (europa.eu)		

14. *Name*	**Progetti R&D Idrogeno PNRR 2022-2025: Bando A**
Tipologia	**PNRR**
Investimento	Investimento 3.5 “Ricerca e sviluppo sull’idrogeno”
Missione	Missione 2 “Rivoluzione verde e transizione ecologica”
Componente	Componente 2 “Energia rinnovabile, idrogeno, rete e mobilità sostenibile”
Opening date	24 marzo 2022 alle ore 10.00
Deadline date	**9 maggio 2022 ore 10.00**
Keywords	**Hydrogen**
Budget	20 million
TRL	2-4
Destinatati	Rivolto a **organismi di ricerca pubblici** (soggetti proponenti). I soggetti proponenti possono presentare progetti anche congiuntamente tra loro o con **imprese** che esercitano attività dirette alla produzione di beni e/o di servizi, fino ad un numero massimo di 5 soggetti. Le imprese possono partecipare alla realizzazione dei progetti e beneficiare delle agevolazioni del bando unicamente in qualità di co-proponenti, con una percentuale di partecipazione non inferiore al 5% e non superiore al 15% del costo complessivo del progetto.
Focus area geografica	Il 40% della dotazione è rivolto a progetti da realizzarsi nelle Regioni Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardegna e Sicilia.
Progetti ammissibili	I progetti ammissibili devono prevedere **attività di ricerca fondamentale** relative a una delle seguenti tematiche: • produzione di idrogeno clean e green • tecnologie innovative per lo stoccaggio e il trasporto dell'idrogeno e la sua trasformazione in derivati ed e-fuels, • celle a combustibile per applicazioni stazionarie e di mobilità
Spese e costi ammissibili	Per essere ammissibili alle agevolazioni, i progetti devono: • Essere realizzati sul territorio nazionale • Prevedere spese e costi ammissibili non inferiori a 2 milioni di euro e non superiori a 4 milioni di euro • Essere avviati successivamente alla presentazione della domanda di agevolazioni • Avere una durata non inferiore a 12 mesi, fermo restando che il progetto deve risultare concluso entro il 31 dicembre 2025 • Sono ammissibili ai progetti le spese relative a personale, strumenti e attrezzature, servizi di consulenza, materiali utilizzati nello svolgimento del progetto e spese generali. • Forma e ammontare delle agevolazioni (art. 7) • Le agevolazioni sono concesse nella forma del contributo alla spesa per una percentuale del 100% dei costi e delle spese ammissibili per la ricerca fondamentale.

Presentazione domande	Le domande di agevolazione e la documentazione indicata al comma 2 dell'articolo 9 dell'Avviso devono essere presentate, ai sensi del comma 3 dello stesso articolo, pena l'invalidità e l'irricevibilità, dall'indirizzo di posta elettronica certificata (PEC) del soggetto proponente all'indirizzo PEC rsh2A@pec.mite.gov.it
Per informazioni	stefano.raimondi@mise.gov.it
Link	https://www.mite.gov.it/bandi/avvisi-pubblici-la-selezione-di-progetti-di-ricerca-nel-settore-dell-idrogeno-pnrr-m2-c2

15. *Name*	**Progetti R&D Idrogeno PNRR 2022-2025: Bando B**
Tipologia	**PNRR**
Investimento	Investimento 3.5 "Ricerca e sviluppo sull'idrogeno"
Missione	Missione 2 "Rivoluzione verde e transizione ecologica"
Componente	Componente 2 "Energia rinnovabile, idrogeno, rete e mobilità sostenibile"
Opening date	24 marzo 2022 alle ore 10.00
Deadline date	**9 maggio 2022 ore 10.00**
Keywords	**Hydrogen**
Budget	30 million
TRL	5-7
Destinatati	Rivolto alle **imprese**, per la selezione di progetti di R&S nel settore dell'idrogeno. I soggetti proponenti possono presentare progetti anche congiuntamente tra loro o con **organismi di ricerca**, fino ad un numero massimo di 5 soggetti. I progetti congiunti dovranno essere realizzati mediante l'utilizzo di contratti di rete o ad altre forme contrattuali di collaborazione, quali, ad esempio, il consorzio e l'accordo di partenariato.rivolto alle imprese, per la selezione di progetti di R&S nel settore dell'idrogeno. I soggetti proponenti possono presentare progetti anche congiuntamente tra loro o con organismi di ricerca, fino ad un numero massimo di 5 soggetti. I progetti congiunti dovranno essere realizzati mediante l'utilizzo di contratti di rete o ad altre forme contrattuali di collaborazione, quali, ad esempio, il consorzio e l'accordo di partenariato.
Focus area geografica	Il 40% della dotazione è rivolto a progetti da realizzarsi nelle Regioni Abruzzo, Basilicata, Calabria, Campania, Molise, Puglia, Sardegna e Sicilia
Progetti ammissibili	I progetti ammissibili alle agevolazioni devono prevedere **attività di ricerca industriale e sviluppo sperimentale**, strettamente connesse tra di loro in relazione all'obiettivo previsto dal progetto, finalizzate alla realizzazione o al notevole miglioramento di nuovi prodotti, processi o servizi relativi a una delle seguenti tematiche: • produzione di idrogeno clean e green • tecnologie innovative per lo stoccaggio e il trasporto dell'idrogeno e la sua trasformazione in derivati ed e-fuels • celle a combustibile per applicazioni stazionarie e di mobilità • sistemi intelligenti di gestione integrata per migliorare la resilienza e l'affidabilità delle infrastrutture intelligenti basate sull'idrogeno
Spese e costi ammissibili	Per essere ammissibili alle agevolazioni, i progetti devono: • essere realizzati sul territorio nazionale

	• prevedere spese e costi ammissibili non inferiori a 2 milioni di euro e non superiori a 4 milioni di euro • essere avviati successivamente alla presentazione della domanda di agevolazioni • avere una durata non inferiore a 12 mesi, fermo restando che il progetto deve risultare concluso entro il 31 dicembre 2025 • Sono ammissibili ai progetti le spese relative a personale, strumenti e attrezzature, servizi di consulenza, materiali utilizzati nello svolgimento del progetto e spese generali.
Presentazione domande	Le domande di agevolazione e la documentazione indicata al comma 2 dell'articolo 9 dell'Avviso devono essere presentate, ai sensi del comma 3 dello stesso articolo, pena l'invalidità e l'irricevibilità, dall'indirizzo di posta elettronica certificata (PEC) del soggetto proponente all'indirizzo PEC rsh2B@pec.mite.gov.it
Per informazioni	stefano.raimondi@mise.gov.it
Link	https://www.mite.gov.it/bandi/avvisi-pubblici-la-selezione-di-progetti-di-ricerca-nel-settore-dell-idrogeno-pnrr-m2-c2

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