Forschungsportal-Mailliste EU-Foerderinfo: Querschnitt europäische Forschungsförderung
Data analytics, Hydrogen production, Hydrogen Valleys, Electrolysers
erstellt am 08.04.2022, gültig bis 22.09.2022, Autor: Dipl.-Ing. Martina Hagen

Inhaltsverzeichnis

Inhalte

1. /BMBF/ Stärkung Deutschlands im Europäischen Forschungs- und Bildungsraum (EFR-Förderprogramm), Frist: 30. Juni 2022, 1. Stufe

Die Fördermaßnahme erfolgt im Rahmen der strategischen Ziele des Bundesministeriums für Bildung und Forschung (BMBF) zur Stärkung und Erweiterung des Europäischen Forschungsraums (EFR). Sie soll dazu dienen, die Kooperation zwischen Wissenschaft und Wirtschaft mit ausgewählten Donauanrainerstaaten - vor allem aus den EU13-Ländern sowie dem Westbalkan - zu stärken und diese an die großen europäischen Forschungs- und Innovationsprogramme heranzuführen.
Ziel dieser themenoffenen Förderrichtlinie ist die Intensivierung der multilateralen Technologiekooperation mit den Donauanrainerstaaten Kroatien und der Slowakei sowie Albanien und Montenegro (Zielländer), insbesondere über Stärkung der engen Zusammenarbeit von kleinen und mittleren Unternehmen sowie gegebenenfalls Forschungseinrichtungen beider Länder. Die zu erwartenden Projektergebnisse sollen im Einklang mit den EUREKA-Zielen zu marktwirksamen Innovationen (neue kommerzielle Produkte, Verfahren und/oder Dienstleistungen) mit ziviler Anwendung beitragen. Einem nachhaltigen Beitrag zu den Wertschöpfungsketten kommt weiterhin besondere Bedeutung zu. Es handelt sich um eine Maßnahme der strategischen Projektförderung.
Zuwendungszweck ist die Förderung gemeinsamer Forschungs- und Entwicklungsprojekte zur Entwicklung innovativer Produkte und Verfahren durch das BMBF gemeinsam mit den jeweils zuständigen Fördermittelgebern der teilnehmenden Länder. Diese Bekanntmachung wird gemäß den Verfahren von EUREKA durchgeführt: EUREKA-Büro. EUREKA ist eine europäische Initiative für grenzüberschreitende Zusammenarbeit auf dem Gebiet techno¬logischer Forschung und Entwicklung für zivile Zwecke. Ziel ist es, das in Europa vorhandene Potenzial an fachlichem Know-how und Ressourcen in Kooperationsprojekten zu bündeln und somit effektiver zu nutzen.
Gefördert werden im Rahmen dieser Fördermaßnahme Forschungs- und Entwicklungsprojekte als Verbundvorhaben, die entsprechend des oben beschriebenen Zuwendungszwecks in internationaler Zusammenarbeit mit Partnern aus den in Nummer 1.1 beschriebenen Zielländern der Bekanntmachung erfolgen - also mit Partnern aus Kroatien und der Slowakei sowie Albanien und Montenegro. Die Beteiligung weiterer Länder ist erwünscht.
Die Förderung erfolgt grundsätzlich themenoffen. Themen, für die das BMBF nicht zuständig ist oder die aus ethischen Erwägungen in Deutschland nicht gefördert werden sollen, sind allerdings von der Förderung ausgeschlossen.
Die Vorhaben sollen eine hohe Praxisrelevanz aufweisen sowie Erkenntnisse und in Deutschland verwertbare Forschungsergebnisse in den genannten Anwendungsfeldern erwarten lassen, die zu neuen Technologien, Produkten oder Dienstleistungen führen. Am Ende des Vorhabens soll der Technologiereifegrad TRL 4 bis 6 erreicht werden.
Das Projekt soll einen ersichtlichen Vorteil und Mehrwert aufgrund der Kooperation der Teilnehmer der beiden Länder erzielen (beispielsweise eine verbesserte Wissensgrundlage, Zugang zu Forschungs- und Entwicklungs-Infrastruk¬turen, neue Anwendungsbereiche etc.). Das Projekt soll die Beiträge aller Teilnehmer der beteiligten Länder darstellen.
Antragsberechtigt sind kleinere und mittlere Unternehmen sowie gegebenenfalls als Verbundprojektpartner Hochschulen, Universitätskliniken und Forschungseinrichtungen. Zum Zeitpunkt der Auszahlung einer gewährten Zuwendung wird das Vorhandensein einer Betriebsstätte oder Niederlassung (Unternehmen) beziehungsweise einer sonstigen Einrichtung, die der nichtwirtschaftlichen Tätigkeit des Zuwendungsempfängers dient (Hochschule, Forschungseinrichtung), in Deutschland verlangt.
Das Antragsverfahren ist zweistufig angelegt.
Weitere Informationen:

https://www.bmbf.de/bmbf/shareddocs/bekanntmachungen/de/2022/04/2022-04-01-Bekanntmachung-EUREKA-Danube-2022.html

2. /HORIZON EUROPE/ Support for training interpreting 2022-2023 organisation of Master or post-graduate courses, deadline: 11. May 2022 17:00 Brussels time

To ensure the availability of a sufficient number of qualified conference interpreters, Directorate-General for Logistics and Interpretation for Conferences supports and assists in strengthening training programmes by providing professional and financial assistance. The aim of these activities is to help produce new generations of qualified conference interpreters who may, subsequently, be recruited by the EU institutions, and in particular by the European Parliament, as officials or as accredited conference interpreting agents.
As a provider of interpretation services in the European Parliament, and increasingly to other EU institutions and bodies, the mission of the Directorate-General for Logistics and Interpretation for Conferences is to ensure that a sufficient number of qualified conference interpreters are available to enable the EU institutions and bodies to function properly in a context of linguistic diversity including at regular events, all over the world, where wide language cover is required.
Under the principle of subsidiarity, Member States have the obligation to provide the necessary training. The European Parliament identifies the language combinations and skills that best match its needs, and assists universities in training high quality conference interpreters within these priority combinations.
The programme contributes to this mission by supporting the following actions in the field of interpretation:
- The promotion of quality and linguistic diversity in the teaching of conference interpreting in the official languages of the EU, of the candidate countries, and of the countries which are the main political partners of the Union;
- The establishment of postgraduate centres of excellence;
- Cooperation among postgraduate courses from different European, candidate and third countries offering relevant language combinations;
- Regional cooperation among universities with complementary language regimes;
Scope:
- Higher Education Institutions, Universities, university institutes, consortia and associations of universities or institutes, which offer or coordinate postgraduate courses specialising in conference interpreting.
- Associations, consortia and bodies, whose main mission is to support cooperation and disseminate best practices in the field of worldwide conference interpreter training.
Eligible applicants:
- Higher-Education Institutions, Universities, university institutes, consortia and associations of universities or institutes, which offer or coordinate postgraduate courses specialising in conference interpreting.
- Associations, consortia and bodies, whose main mission is to support cooperation and disseminate best practices in the field of worldwide conference interpreter training.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/ep-linc-subv-2022-conf-int-01;callCode=EP-LINC-SUBV-2022-CONF-INT;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1;statusCodes=31094501,31094502,31094503;programmePeriod=null;programCcm2Id=null;programDivisionCode=null;focusAreaCode=null;destination=null;mission=null;geographicalZonesCode=null;sCode=null;programmeDivisionProspect=null;startDateLte=null;startDateGte=null;crossCuttingPriorityCode=null;cpyCode=null;cpvCode=null;performanceOfDelivery=null;sortQuery=sortStatus;orderBy=asc;onlyTenders=false;topicLalse;topicListKey=callTopicSearchTableState

3. /HORIZON EUROPE/ The European Social Innovation Challenge Prize 2022, deadline 17. May 2022 17:00 Brussels time

The European Social Innovation Competition- the Challenge Prize 2022 will focus on 'the future of living, innovation for affordable, and sustainable housing districts'.
The objective of the New European Bauhaus movement is to re-invent our current way of living to meet the goals of the European Green Deal. By creatively addressing the way we construct and renovate our city buildings, major determinants of greenhouse gas emissions, the EU Bauhaus Initiative aims to engage citizens and all relevant actors to ignite a cultural change leading to more sustainable living. The 'Renovation Wave for Europe strategy is pivotal to contributing to this aim and to achieving a successful EU post-COVID recovery and long-term green transition. Beyond addressing energy poverty of the current building stock in the EU, the Renovation Wave - and the Affordable Housing Initiative in particular - represents a chance to rethink and restore not only the economic activities linked to renovation of buildings and housing districts, but also the way we live in them.
Social innovation can be a driver to make housing districts not only spaces to live, but also more livable, sustainable, inclusive and closer to the residents' needs. Social innovation in this case can boost employment and improve energy efficiency, while ensuring cities' and regions' sustainability and citizens' well-being. When approached from an innovative perspective, renovation of buildings shifts from a cost into an opportunity for local creativity and business' market.
Against this background, the European Social Innovation Competition - the Challenge Prize 2022 will support proposals coming from social innovators and bringing forward innovations expected to generate economic and/or societal benefits (i.e. positive impacts on employment, societal, environmental, scientific, vulnerable groups etc.). Gender-sensitive solutions with regards to energy consumption, mobility patterns, waste management, and other sustainable living aspects should be taken into account, where relevant.
In addition to non-technological social innovations, the competition will look for projects with a particular focus on breakthrough, market-creating and deep-tech innovations embracing the policy objectives of this year's editions, which will boost innovation within housing districts and, consequently, will have an impact on local prosperity and sustainability.
In order to be eligible, the applicants must be:
- A natural person or a legal entity (such as universities, research organisations, SMEs, start-ups or NGOs, except public administrations) and located in one of the EU Member States (including overseas countries and territories, (OCTs)) or Associated Countries to Horizon Europe.
- Winners both from the Challenge and the Impact Prizes, of previous editions of the European Social Innovation Competition are NOT eligible.
- Applicants that have already received an EU or Euratom prize CANNOT receive a second prize for the same activities.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-eic-2022-socialinnovationchallengeprize;callCode=null;freeTextSearchKeyword=;matchWholeText=true;type
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4. /HORIZON EUROPE/ Data analytics technologies and data purchases, deadline: 24. May 2022 17:00 Brussels time

The purchase and maintenance of commercial specialised databases, data analysis platforms capable of running analysis in big data environments, risk and predictive analysis and data mining tools, as well as systems supported by artificial intelligence used in the fight against irregularities, fraudulent activities and corruption, detrimental to the Union's financial interests. These purchases include capacity building in Member States for developing, using and sharing databases and business intelligence tools. These purchases may also enable the acquisition of integrated packages, comprising, for example, hardware and software, access and training, including training for the 'Tobacco Tracking & Tracing' database.
Specialised training to enable staff to operate these tools is recommended to be included as part of the action.
In order to be eligible, the applicants (beneficiaries and affiliated entities) must:
- Be legal entities (public or private bodies) which are: for the Technical Assistance call: national or regional public authorities or international organisations whose task is to protect the EU financial interests.
- For the Trainings call: national or regional public authorities or international organisations that can help to achieve a EUAF objective, in particular to protect the EU financial interests or research and educational institutes and non-profit making entities that can help to achieve the objectives of the EUAF Programme, in particular to protect the EU financial interests, and have been established and operating for at least one year.
- Be from a EU Member State (including overseas countries and territories (OCTs)) or listed EEA country or country associated to the EUAF Programme or country which is in ongoing negotiations for an association agreement and where the agreement enters into force before grant signature.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/euaf-2022-ta-03;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statusCodes=31094es=31094502;programmePeriod=null;programCcm2Id=null;programDivisionCode=null;focusAreaCode=null;destinastination=null;mission=null;geographicalZonesCode=null;programmeDivisionProspect=null;startDateLte=null;startD=null;startDateGte=null;crossCuttingPriorityCode=null;cpvCode=null;performanceOfDelivery=null;sortQuery=startDQuery=startDate;orderBy=asc;onlyTenders=false;topicListKey=topicSearchTablePageState

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5. /HORIZON EUROPE/ Development of low temperature water electrolysers for highly pressurised hydrogen production, deadline: 31. May 2022 17:00 Brussels time

High-pressure electrolysers should be compatible with direct injection into chemical industry and gas networks both onshore and offshore as the avoidance of mechanical compressors are of crucial importance to reduce the LCOH and improve the availability of systems. The developed electrolysers may reach low LCOH for both centralised and decentralised applications due to the unique modular approach.
The scope of this project is to develop the next generation of water electrolysers (PEMEL or AEMEL) operating below 150 °C for pressurised hydrogen production at the pressure of minimum 50 bar for AEL and AEMEL and 80 bar for PEMEL further advancing innovations developed in projects like NEPTUNE and PRETZEL.
To this extent, breakthroughs in materials science of cell components should encompass advances in the cell design, cell architecture and BoP modules. This requires a completely new design enabling: low energy consumption and low degradation rates while contributing to reduce the hydrogen production costs.
Novel stack concepts should be designed, whilst innovations in BoP (e.g., integration of innovative compression solutions with electrolyser stacks), advanced materials with longer term durability and components (membranes/diaphragms, porous transport layers, bipolar plates, catalysts) developed and integrated into a short-stack prototype.
Targeted prototype scale and cell size should be appropriate for targeted application but a scale of minimum 50 kW for AEL and PEMEL and 25 kW for AEMEL, including larger cell areas than SoA, should be addressed.

Proposals should demonstrate how the concepts developed will be validated in a laboratory (TRL4) but should also include testing in relevant environment (TRL5) to pave the way for end-use applications (e.g. technology could be tested for injection in transmission natural gas grid). This includes the validation at the single cell and stack levels, testing the components at nominal, steady state and dynamic conditions and identifying a best candidate solution.
Operations at elevated pressures should be validated under various operating conditions (understood as directly scalable to multi-MW electrolysers) in order to develop new control strategies and to optimise operation at high-pressure and evaluate the effect of pressure in the case of hot starts and cold starts.
Proposals should investigate the high-pressure effects on the overall electrolysis process, both with respect to the effect of increased gas solubility, bubble-formation and the effect on electrode overpotentials and ohmic losses as well as the associated increase in gas cross-over at elevated pressures.
Optimal stack and cell design in terms of structure and geometry (e.g. spacing distances within the cell) should be within the scope of proposals.
Research on corrosion effects on the cells and/or lifetime prediction model and mitigation strategies should be conducted in order to maintain lifetime and degradation.
Proposals are expected to address sustainability and circularity aspects.
Activities developing test protocols and procedures for the performance and durability assessment of electrolysers and fuel cell components proposals should foresee a collaboration mechanism with JRC (see section 2.2.4.3 "Collaboration with JRC"), in order to support EU-wide harmonisation. Test activities should adopt the already published EU harmonised testing protocols to benchmark performance and quantify progress at programme level.
Activities are expected to start at TRL 2 and achieve TRL 5 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-01-03;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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6. /HORIZON EUROPE/ Efficiency boost of solar thermochemical water splitting, deadline: 31. May 2022 17:00 Brussels time

Thermochemical cycles can directly convert heat into chemical energy by a series of chemical reactions. The direct application of solar heat in water-splitting thermochemical cycles for renewable hydrogen production allows operating at relatively moderate to upper temperatures, reducing electricity consumption and also reducing production cost. Main technical challenges to be addressed are increasing the solar-to-hydrogen efficiency through process intensification, especially through highly efficient internal heat transfer and recovery as well as the scalability of the reactor concept to achieve high energy conversion efficiencies and high throughput. Two stages of development are foreseen for thermochemical cycles and for achievement of the indicated targets and KPIs.
The most promising and advanced solar thermal and hybrid water-splitting processes are those based on metal oxide cycles or on sulphur cycles (thermal and hybrid ones), where prototypes of core components and core production chain elements have been developed and tested at solar towers. Those cycles are attractive since they involve only few chemical steps with low complexity, leading to high reversibility and potentially high cycle efficiency.
One of the central measures to reach intermediate targets in terms of efficiency and cost is the improvement of heat management. It is necessary to recover and reuse a significant portion of the high temperature heat in order to increase the process efficiencies thus making the systems more attractive for commercial use. Several approaches for such heat recovery systems are currently under consideration

and development. Proposals should demonstrate how they intend to address this.
Proposals should also address the heat recuperation from solid and gas phase by enhancing heat and mass transfer especially in the reactor using suitably structured porous materials and also in other units of the process via the usage of suitable heat transfer media such as gases or particles.
Proposals should demonstrate on-sun operation of a prototype plant system (including key components) in a relevant environment (typically between 50 and 300 kW) for at least 6 months operation time (net operation time; only day time operation) reaching average hydrogen production rates higher than 0.75 kg/year per m2 land area used (equivalent of 2.16 kg/day/m2 (receiver area) for a solar concentration factor of about 1,000).
Proposals should develop smart operation and control strategies as well as pathways to scale the technology to the multi-MW scale using modelling and simulation of the plant and key components.
To tackle the above, proposals should consider the following:
- improvement of heat management via efficient heat recovery systems;
- improvement of coupling the process to a concentrating solar energy source ("solar interface");
- shaping the solar field towards the needs of a chemical process;
- wherever possible, the coupling to heat storage;
- integration of smart control procedures as a central measure to incorporate aspects on digitalisation of the energy system;
- explore suitable options for decreasing the production cost through hybrid renewable supply;
- develop suitable 3-dimensional structuring of key materials, like redox materials, to achieve high production rates and high reactor efficiencies through optimal heat and mass transfer in the reactor;
- ensure stability and performance of key components and related properties of their constituent functional materials;
- consider the circular economy aspects such as the recycling/regeneration of the materials and low content of Critical Raw Materials;
- optimised fluids handling, including the minimisation of inert gas consumption, the efficiency of gas separation operations, and auxiliary power needs;
- describe and validate upscaling strategies of the process and all major components.
Proposals are encouraged to seek collaboration with the existing or upcoming projects of the European Innovation Council (EIC) Pathfinder Challenge on novel routes to green hydrogen production. In particular, applicants should consider building on the breakthrough technologies and advance thermochemical processes developed in these projects.
Proposals are expected to address sustainability and circularity aspects.
Activities are expected to start at TRL 4 and achieve TRL 6 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-01-06;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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7. /HORIZON EUROPE/ Bringing green hydrogen MW scale off grid installations closer to technical and financial maturity, deadline: 31. May 2022 17:00 Brussels time

The main objective of this topic is to demonstrate the complete value chain of off-grid hydrogen production, storage and end-use installations at MW scale.
In regions of high renewable resource where the electricity grid is either heavily utilised or non-existent, off-grid hydrogen production provides the only opportunity for harnessing renewable energy at scale. Off-grid electrolysers should be designed to be coupled directly to variable solar/wind power sources and

survive periods of zero power generation and poor weather, without recourse to the electricity grid. In this way they can access renewable electricity at least cost, by avoiding the usual fees and tariffs that are imposed for grid connection by grid operators, electricity suppliers and regulators. The combination of high renewable resource and low-cost electricity suggests that hydrogen could be produced at low cost, provided that suitable off-grid electrolysers are developed.
The electrolyser function cannot rely on a stable energy source (AC grid); it has to perform across the whole range of operation with high flexibility and use advanced control systems to efficiently utilise the time-varying renewable electricity input. The electrolyser system needs to include some energy storage (eg. by incorporating batteries, hydrogen storage and fuel cells) to ensure that the electrolyser is always protected during dormant periods (especially freezing weather conditions) and is ready to operate as soon as the renewable generation begins. More development is needed to achieve better ratios of BoP/stack power at all ranges of operation, looking for improvement in the electricity consumption of components (intensity) during operation, in order to realise cost-effective and efficient off grid electrolyser solutions. Also, further development is needed to find optimised and cost-efficient system architectures for the coupling between RES and the system. Direct connection of the RES source to the stack (DC/DC) has been satisfactorily demonstrated for units at 50 kW scale in a strict off-grid environment (TRL 6), obtaining 97% of efficiency across the whole range of operation, which makes the scale up to MW scale feasible by adapting the design to cope with higher input voltages and currents. Modifications to be applied to renewables technologies in terms of DC/DC conversion are also conceivable, and suitable ways to include batteries and supercapacitors for safe stand-alone operation can be explored.
To optimise the efficiency, cost reduction, flexibility, and reliability (security of supply) of the whole value chain adding hydrogen storage (or hydrogen transport in comparison to electricity transport), it is essential to support the role of electrolysis in off-grid configuration. In this respect, optimisation of the control strategy and alignment with the storage system specifics (and other components of the value chain) to improve overall system efficiency and lifetime for the complete facility has to be taken into consideration. Projects should provide a preliminary analysis for relevant geographical regions, including country-specific challenges, a sustainability assessment for the environmental impact, social acceptance, as well as economic feasibility.
The participation of inter- and trans-disciplinary consortia combining expertise and capacity covering both renewables and hydrogen technologies from public authorities, industrial stakeholders, infrastructure providers, knowledge institutions, planners, entrepreneurs, societal actors and citizens is advised to address the challenges.
In addition, proposals should address the following aspects:
- As the aim of the topic is to cover the whole value chain and depending on the application the cost of certain components may be more relevant than others, the following ranges are to be considered. Size of electrolysis system: 3 to 5 MW. Minimum size of hydrogen storage: 4 tonnes;
- Proposals should be oriented to optimise the performance of the system, with particular attention paid to the effects on electrolyser's efficiency and degradation rate on hydrogen production, as well as to power conversion, system control and other critical parameters. The KPI values as indicated above should be achieved at the end of the project, with the exception of the capital cost KPI. It is recognised that the cost of a MW scale off-grid electrolyser system may be significantly different to that of a grid-connected electrolyser of the same size;
- Proposals should secure downstream use, and it should include integration with enough storage to match discontinuous generation with hydrogen end uses. The end use of the hydrogen should be included and clarified in the proposal including a viable business case. All decisions relating to pressurised or atmospheric electrolyser operation, the use of compressors, and the amount and type of hydrogen storage should be justified;
- Proposals should also build upon knowledge and experience from relevant previously funded FCH JU projects, like ELY4OFF and REMOTE;
- Proposals should consider periods for scheduled maintenances of the system and estimate the performance of the system on that period;
- Strict off-grid conditions are desirable, although connection to the grid for testing, control and safety reasons can be foreseen;

- The system (demonstrator) developed by the project should operate for at least one complete year. This includes the complete value chain covering off-grid hydrogen production, storage, and end use.
Costs of equipment besides the electrolyser can be considered eligible as long as proposals demonstrate that they are essential for implementation of the project, e.g. compression of hydrogen, storage and any essential end-use technology. Costs related to the development of renewable energy technologies specifically designed for off-grid hydrogen production, e.g. a hydrogen producing wind turbine, would also be considered eligible.
This topic is expected to contribute to EU competitiveness and industrial leadership by supporting a European value chain for hydrogen and fuel cell systems and components.
Proposals should provide a preliminary draft on 'hydrogen safety planning and management' at the project level, which will be further updated during project implementation.
It is expected that Guarantees of origin (GOs) will be used to prove the renewable character of the hydrogen that is produced. In this respect consortium may seek out the issuance and subsequent cancellation of GOs from the relevant Member State issuing body and if that is not yet available the consortium may proceed with the issuance and cancellation of non-governmental certificates (e.g CertifHy).
Activities developing test protocols and procedures for the performance and durability assessment of electrolysers and fuel cell components proposals should foresee a collaboration mechanism with JRC, in order to support EU-wide harmonisation. Test activities should adopt the already published EU harmonised testing protocols to benchmark performance and quantify progress at programme level.
Activities are expected achieve TRL 7 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-01-07;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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8. /HORIZON EUROPE/ Implementing new/optimised refuelling protocols and components for high flow HRS, deadline: 31. May 2022 17:00 Brussels time

The development of hydrogen powered heavy-duty vehicles (HDV) is key to be able to decarbonise transport of passengers and goods. To achieve this effectively, hydrogen refuelling station (HRS) technologies need to be upgraded to address the refuelling needs of heavy-duty vehicles. The actions described herein will contribute to bring appropriate HDV HRS and HDV HRS components on the market.
Project results are expected to contribute to all of the following expected outcomes:
- Fully developed and ready to commercialise HRS components (nozzle, hose, cooling unit, safety critical devices, pressure regulator or flow control valve, filters, advanced safety-related communication interface, flow meter etc) meeting the refuelling needs of HDV;
- Certification of the above-mentioned components according to relevant ISO, OIML or CEN standards. If related standard is still under development, contribution to standard writing in order to ensure components compatibility with future and enable certification in the short term;
- Demonstration of the fully integrated chain of specific HDV HRS components on at least 2 different HDV HRS for a total of 300 refuelling events each;
- Full demonstration of new standardised refuelling protocols for heavy-duty vehicle developed in ISO TC 197 WG24 or other standardisation body, as well as approval concept for the conformity of the station to the protocol.
To fulfil future HDV refuelling needs such as fuelling a 100 kg HD truck storage system in 10 minutes, an HDV refuelling point should reach a mean fuelling rate of approximatively 170 g/s with a peak fuelling rate

up to 300 g/s. To guarantee optimal refuelling performances, reliabilities and costs for a wide range of possible HDV storage capacities and configurations, new fuelling protocols based on advanced and safe communication between vehicle and station (e.g. the one developed in ISO TC 197 WG24 based notably on feedback from PRHYDE project) should be implemented. To meet these requirements, proposals should develop, test and certify appropriate components to bring them to commercialisation.
Proposals should address:
- Qualification of the components:
- Identify the gaps in terms of standards, market availability and testing;
- Perform a qualification roadmap individual for each component, with specific targets;
- At the end of the project, identify potential missing gaps, components, experience to be continued before full market implementation.
- Qualification of the protocol:
- Implement the components developed in the qualification program or potential alternatives
- Define a refueling protocol validation roadmap, accounting for available standards
- Check that each component performs as expected in a full assembly
- Validate the protocol on various testing
- Dissemination of the outcomes;
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-02-10;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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9. /HORIZON EUROPE/ Large scale demonstration of European H2 Heavy Duty Vehicle along the TEN-T corridors, deadline: 31. May 2022 17:00 Brussels time

Hydrogen has proven to be the alternative to conventional ICE operated on fossil fuels, especially for long range and flexible zero emission (ZE) Heavy-Duty (HD) mobility, where direct electrification with large batteries cannot meet the intensive usage and payload requirements. Large scale fleet deployments and operations are needed. Wheels on the roads, operated by different operators in different EU markets and geography, providing insight on relevant business cases for potential buyers, and then the respective refuelling infrastructure in order to guarantee the long-haul distance are needed.
Hydrogen mobility currently is not always perceived as a viable zero emission alternative against ICE and BEV. Allowing relevant fleet owners and operators to experience first-hand the technology would play an important role in changing this perception of the technology. Furthermore, their lighthouse function will set an example for many other potential end-users, who can benefit from the experience of the 'front-runners'. Next to this, the parallel introduction of multiple fleets throughout a variety of operations, in multiple EU Member States, will increase the credibility of hydrogen as a commercial alternative. For this to happen it is necessary to break through the current vicious circle (small quantities because of high prices and high prices because of small quantities).
This flagship topic aims to address all of the aspects above mentioned via the deployment of a large fleet of fuel cell HDV across several countries and use cases.
Current research shows that boosting economies of scale on the short term, will enable hydrogen to become economically feasible as from 2025. In this sense this project represents a critical step in that direction. It will initiate and substantially accelerate the initial cost reduction of fuel cells trucks by enabling the relevant supply chains to reach critical mass, which in turn will accelerate the attainment of the Total Costs of Ownership (TCO) competitiveness.

As enabler, heavy-duty, long-haul truck has proven to be the ideal market-segment for doing this. It is often forgotten that the market size, combined with the total energy consumption, and a high potential to generate (concentrated) vehicle fleets, provides the ideal situation to function as a flywheel for other markets. Current market research is expecting 100,000 vehicles in 2030 and growing to >100,000 hydrogen trucks per year (representing 25-30% of the yearly truck sales). The end goal is to make hydrogen for Heavy-Duty applications economical viable without funding's in the next 5-10 years.
In earlier programs the feasibility of hydrogen in distribution trucks was demonstrated (H2Share 27 tonne and Hydrogen Region 2.0 44 tonne truck). The FCH JU funded H2Haul project intends to upscale the tractor truck to long haul operation along defined corridors near the operator.
In total 16 trucks will be deployed in the H2Haul project. As seen in comparable markets, such as public transport, a logical transition step for operators is to start with a demonstrator, then move to a small series and towards a first fleet of 20 to 40 vehicles, before they have fully embraced the technology as a 'normal' alternative. These single fleets will drive the OEM and suppliers forward as they need to work in parallel to be able to provide the right product and service proposition. To this end, the FCH JU funded StasHH project aims to define a standardised fuel cell module in order to facilitate growth and economy of scale.
Therefore, the next step (before hydrogen trucks can be delivered at large scale in the Important Projects of Common European Interest (IPCEI projects) are the flagships projects: allowing the truck agglomerates (OEM) to have a hydrogen truck ready for sale in limited numbers and to integrate the hydrogen truck as platform in their product line and service organisation. Furthermore, the data collected in such a flagship project is key to allow truck manufacturers and transport companies to strengthen and validate the operational and financial viability of hydrogen trucks for daily operation.
A critical success factor is the network of HRS to ensure the hydrogen refill demand is available on the route showing the hydrogen trucks long haul capabilities along major transport corridors throughout Europe. In addition, a truck refuelling market could enable a faster deployment of HRS and a lower price of hydrogen delivered thanks to higher volume associated than when solely supplying light duty vehicles.
Project results are expected to contribute to all of the following expected outcomes:
- Economy of Scale for all hydrogen components, and as a result demonstrate a significant decrease in TCO per tonne per km by truck OEM, HRS operators and transport companies working together, making heavy-duty hydrogen trucks operationally and financially viable;
- Increase in sales of the total volume of trucks as similar TCO decreases can be expected in other markets and applications (e.g.: refrigerating trucks);
- Contribute to the expansion of the hydrogen truck service network and HRS network through Europe and along the TEN-T core and comprehensive network. This should require OEM agreement to mitigate the risk of creating stranded assets and to concentrate resources;
- The creation of a competitive offering of several models of hydrogen trucks (from different truck OEM) and creating added value for the European Industry;
- Promote hydrogen trucks and refuelling as an operationally and financially viable alternative for BEV trucks and biofuels, contributing to the resolution of a maximum scope of technological (e.g. lifetime and durability, HRS/truck compatibility), operational (e.g. driving range, payload capacity, refuelling time), regulatory (e.g. tax exemptions and incentives), and financial challenges (TCO), making hydrogen trucks operationally and financially viable for transport companies in Europe;
- Comparison of the different zero emission trucks on performance, range, environment, TCO, etc;
- Gathering of relevant technical and financial data in different conditions from truck operation: range, speed-, load profile, refuelling time and the supply of hydrogen: (public) pipeline network, tube trailer (different pressures), local electrolysis etc;
- Providing a growing market that becomes increasingly interesting for competition between hydrogen component suppliers and enabling the transition from job shop and batch manufacturing towards mass production of hydrogen trucks and HRS;
- Demonstrate the implementation/feasibility of harmonised legislation extended to HD trucks (UN R134) by the main truck OEM in Europe;
- Strong dissemination and awareness program, involving a maximum number of transport and logistic companies;

- Fostering innovative truck operator business models lowering the financial, operational and technological risk barrier for transport and logistics companies to adopt hydrogen trucks. Strengthening global competitiveness of European truck OEM in the heavy-duty truck segments;
- As international operation is foreseen, a broad spectrum of use cases is covered (climate, road conditions, daily operations);
- Limit the cost per truck below EUR 450,000. In addition, it is also expected to see the cost of trucks decrease throughout the duration of the action. OEM in the project should monitor and report on the cost evolution.

Hydrogen will be one of the dominant solutions enabling Horizon Europe to contribute to a more liveable and Carbon neutral Europe towards 2050. The 'Hydrogen Economy' (Users and Suppliers) will benefit from the approach of this proposal. This flagship project on hydrogen trucks will contribute to this by the fact that developments will shift from technology into applications (EU wide) and thus will accelerate the use of hydrogen as an alternative fuel. This will result in the critical reduction of costs in order for Hydrogen to settle as an operationally and financially viable alternative to ICE and BEV. The end goal is to make hydrogen for Heavy-Duty applications economical viable without funding's in the next 5-10 years.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-03-03;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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10. /HORIZON EUROPE/ Hydrogen Valleys (large-scale), deadline: 20. September 2022 17:00 Brussels time

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 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. 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 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.

Proposals should:
- Showcase the ability of hydrogen and its associated technologies to decarbonise different sectors in EU through this renewable hydrogen flagship project;
- Demonstrate how hydrogen enables sector coupling and allows large integration of renewable energy on the selected territory;
- Include clear plans for transport, storage and distribution of hydrogen;
- Cover the complete value chain of hydrogen from production to distribution, storage and end-use in order to decarbonise regions by harnessing renewables with significant fluctuations in seasonal energy demand, while at the same time allowing matching supply and demand on a daily basis. The proposed solution should thus provide energy flexibility and improve the Regions' system resilience through the use of renewable hydrogen. Applicants are expected to consider the environmental impact, including water utilisation;
- Foresee enough time for monitoring and assessment and at least 2 years of operations. The monitoring strategy should as a minimum allow to assess compliance with the KPIs of the Clean Hydrogen JU SRIA 2021-2027 for each of the technologies covered, as mentioned in the expected outcome section.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-06-01;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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11. /HORIZON EUROPE/ Hydrogen Valleys (small-scale), deadline: 20. September 2022 17:00 Brussels time

Building on the successful experience of previous years (Hydrogen Valleys in the FCH 2 JU call 2019 and Hydrogen Islands in the FCH 2 JU call 2020), this topic calls for the deployment of a flagship 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.
Proposals under this topic are expected to demonstrate how they contribute to the objectives of the European Hydrogen Strategy and the European Green Deal.
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.
Project results are expected to contribute to all of the following objectives of the Clean Hydrogen JU SRIA for H2 Valleys. In particular:
- System integration: integrating several elements together to improve overall synergies and facilitate sector coupling;
- System efficiency: improvement of overall energy and economic efficiency of the integrated system;
- Improved security and resilience of the energy system, e.g. via hydrogen production using locally available renewable energy sources,
- Market creation: demonstration of new market for hydrogen
- Complementarity of hydrogen with RES, integration with other technologies, existing infrastructure;
- Assessment of the availability and affordability of clean (pollution free) energy provision for industry and cities uses; whilst also considering environmental impacts like water utilisation;

- Mutualisation of production or distribution and storage, assuming decentralisation as key parameter;
- Help set or test regulation requirements at the relevant governance level;
- Increase the knowledge management with assessment of the socio-economic and environmental impacts, including the concept of digital twin assuring an effective monitor and optimisation strategy for the operation and further development of the valley;
- Development of public awareness of hydrogen technologies including contributions from Social Science and Humanities if this was relevant.
- Support development of Hydrogen Valleys in areas of Europe with no or limited presence of Hydrogen Valleys.

In addition, proposals should demonstrate how they intend to reach the KPIs of the Clean Hydrogen JU SRIA 2021-2027 for each of the technologies deployed in the H2 Valley.
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.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-06-02;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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12. /HORIZON EUROPE/ Demonstrating offshore production of green hydrogen, deadline: 20. September 2022 17:00 Brussels time

The European Commission's "Strategy to Harness the Potential of Offshore Renewable Energy for a Climate Neutral Future" expects renewable energy projects to become increasingly important in most sea basins in Europe, including innovative projects such as offshore hydrogen production. Hydrogen may be produced offshore by achieving an association between wind turbines and electrolysers by various approaches. These include retrofitting an electrolyser to an existing oil & gas platform, building a renewable hydrogen production hub on a man-made island, building a new platform close to a wind farm, or integrating the electrolyser and wind turbine into one offshore assembly. The electricity may be supplied via a private wire, a grid connection, or off-grid. Moreover, offshore produced hydrogen may be exported via existing repurposed or new pipelines (gas blended or pure hydrogen) or by dedicated ships; and a platform may be used for grid balancing and for refuelling ships offshore.
This topic calls for a flagship project demonstration at multi-MW scale, >5MW, of the feasibility of offshore renewable hydrogen production. This may be achieved by either re-using existing offshore electricity/oil/gas infrastructure or using new infrastructure, to export energy as hydrogen rather than electricity and so support the greater integration of renewable power sources into the energy system. It is expected that the electrolyser operation will closely follow the wind power generation profile. This will be one of the first worldwide demonstrations of an offshore multi-MW system integration for renewable hydrogen production and export/use.

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.
Proposals should aim to improve understanding of the technical, economic, regulatory and operational benefits and hurdles of producing and exporting offshore renewable hydrogen with direct connection to offshore windfarms
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-01-10;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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13. /HORIZON EUROPE/ Design for advanced and scalable manufacturing of electrolysers, deadline: 20. September 2022 17:00 Brussels time

The huge leap expected in the evolution of water electrolyser technology can be performed only by reaching significant technical and economic targets. The European Hydrogen strategy targets 6 GW installed electrolyser capacity by 2024 ramping up to 40 GW electrolyser capacity by 2030. To achieve such targets, both products and production processes should undergo a significant enhancement, by means of strong cost reduction program, as well as improved automation and technologies. Such upgrades can be applied to the several steps of manufacturing, starting from the single electrolyser cell to the stack assembly. Therefore, it is necessary that the whole manufacturing chain is involved in this cost reduction/performance improvement of the electrolyser stacks required to produce enough renewable hydrogen to fulfil the EU targets, similarly to the on-going manufacturing development of fuel cells (e.g. slot die coating for Catalyst Coated Membrane, plasma spray, roll-to-roll coaters).
The project should aim to find the best compromise between CAPEX and OPEX costs to minimise the cost of produced hydrogen, also considering the output pressure.
At the end of the project the achievement of the target figures described in detail above should be demonstrated. The outcome should be a novel component(s) or manufacturing process(es) integrated in a demonstrator stack. The scalability of the final demonstrator and the cost targets of hydrogen should be clearly proven with a business plan.
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.
Proposals should aim to significant and innovative improvements of the manufacturing processes to achieve the expected KPI targets. The changes can involve both the manufacturing of components of the single unit (e.g. innovative materials and processes) and the assembly of a whole stack (e.g. automation). Integrated quality control and monitoring systems are also included.
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.
Consortia should include at least one electrolyser OEM, one actor from the manufacturing sector and at least one SME.
Proposals are expected to address sustainability and circularity aspects. In particular, circularity and sustainability by design concepts should be holistically considered towards the whole technology chain.
Activities are expected to start at MRL 4 and achieve MRL 5 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-01-04;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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14. /HORIZON EUROPE/ Scaling up of cells and stacks for large electrolysers, deadline: 20. September 2022 17:00 Brussels time

This topic concerns the research and development of much larger cells and stacks for water electrolysers than the current State of the Art (SoA). By upscaling electrolyser cells and stacks, economies of scale can be realised in manufacturing and more compact installations can be achieved when integrating electrolysers into industrial chemical processes, thermal processes and hydrogen hubs. Achieving all of the 2024 KPI targets stated in the SRIA of the Clean Hydrogen JU for low-temperature electrolysers will ease the adoption of renewable hydrogen by existing industrial processes and facilitate the introduction of renewable hydrogen production at scale. Furthermore, the research findings and outcomes at cell, stack

and balance of plant level are expected to advance the subsequent deployment of large electrolysers to help satisfy the 2030 target of 40 GW renewable hydrogen electrolysers included in the European Hydrogen Strategy and contribute to speeding up the achievement of key 2030 KPIs specified in the Clean Hydrogen JU SRIA.
Project results are expected to contribute to all of the following expected outcomes:
- Innovations will be delivered with respect to the design and construction of electrolyser cells and stacks, which have considerably larger active areas and operate at higher current densities than the existing SoA;
- The performances of a number of prototype test stacks based on these cells will be assessed in order to establish the viability of building a single stack of nominally 10 MW capacity. This will fill a knowledge gap concerning the feasibility of large cells and stacks and prepare the way for subsequently demonstrating a 10MW electrolyser module (including appropriate balance of plant);
- A techno-economic evaluation should be undertaken of electrolyser systems, of approximately 50-1,000MW scale, comprising assemblies of this electrolyser module for use in identified industrial processes and other large-scale applications
The application of electrolysers to industrial clusters and hydrogen hubs in order to achieve substantial CO2 savings is inhibited by the present capacities of electrolyser stacks. Hydrogen production could be achieved more cost effectively if larger electrolyser cells and stacks were available. When compared with the current SoA, the development of an electrolyser module of about 10MW, if feasible, would be a considerable step-forward (where a module comprises the least number of stacks and preferably only one stack). However, there are several R&I challenges which first need to be overcome to realise this. Proposals are expected to address the following:
- Scale-up of cell active areas by a factor of at least two, operating at higher current densities and increasing the number of cells per stack, while ensuring durability and performance (mechanically, electrically and in terms of heat and mass transfer) for the envisaged balanced pressure or differential pressure stack;
- Ensure the catalyst and electrode production techniques achieve uniform performance for the required cell areas;
- Develop appropriate production methods and supply chains for larger cell plates and electrodes;
- Establish any technical limits that may restrict the achievable cell size, current density or stack size for a large electrolyser;
- Establish the extent of cost reductions, relative to a SoA stack, when innovating larger cells and stack;
- Ensure a good match between the design of the stack assembly and the power supply unit to minimise energy losses and the overall cost of the electrolyser module;
- Appropriately scale-up of the balance-of-plant while ensuring a compact design for the electrolyser module;
- Minimise weight and footprint to ensure ease of handling and shipping;
- Maximise the overall cost reduction potential by minimising parts count and value engineering;
- Build and test several short stacks, based on large cells, in order to establish the feasibility of subsequently building an electrolyser module of 10MW capacity comprising preferably a single stack;
- Identifying any optimal sizes for larger cells and stacks from scientific, engineering, logistics and economic perspectives.
Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-01-05;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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15. /HORIZON EUROPE/ Ammonia to Green Hydrogen: efficient system for ammonia cracking for application to long distance transportations, deadline: 20. September 2022 17:00 Brussels time

Liquid hydrogen carriers will play a significant role in diversifying Europe's energy supply corridor, transporting hydrogen at scale (>1,000 tonnes of hydrogen transported per day), especially across larger distances. Low carbon footprint, high energy density and easy storage and transportation are important key factors for their application. Amongst all liquid hydrogen carriers, ammonia has proven itself as a carbon free and sustainable candidate and, very importantly, it presents advantages of a one-way transport, in fact, ammonia does not need to be directly recovered and recycled after the dehydrogenation step (to release hydrogen). Moreover, even if safety and toxicity concerns have been raised, ammonia has been produced industrially for over 75 years, with a large existing infrastructure and offtake. However, further studies to assess the large-scale potential of ammonia as a hydrogen carrier are needed and energy efficiency and environmental impacts have to be carefully addressed.
Ammonia synthesis can be performed close to centralised hydrogen production sites, but their dehydrogenation needs to be easily obtained locally for different applications after transportation. Many technical and economic challenges related to dehydrogenation step and sustainability need to be overcome.
In order to bring ammonia cracking to the next stage of maturity 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.
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.
More in detail proposals should include:
- Development of catalyst (CRMs free catalysts or reduction of CRMs use should be considered) and reactor for the ammonia dehydrogenation at lower temperature compared to state of the art, capable to:
- ensuring the highest possible ammonia conversion (>98%) reducing the downstream cleaning/recycling steps;
- improving the overall thermal efficiency of the ammonia dehydrogenation step;
- providing high reliability, ease of operation, and cost-effectiveness to hydrogen production.
- A demonstration system, running for at least 500 hours and producing at least 10 kg H2/day at atmospheric pressure;

- Demonstration of hydrogen fuel quality (according to ISO 14687:2019) from dehydrogenation of the liquid hydrogen carrier in relevant conditions;
- Demonstration of Scalability of the developed system to large-scale production (equivalent to the 100 tH2/day) for long distance transportation;
- A Life Cycle Assessment of the developed system in the frame of the whole supply chain: ammonia 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.

In order for the proposal to reach the expected outcome, the deliverables should be disseminated at the end of the proposal to the hydrogen mobility and hydrogen refuelling infrastructure sectors and relevant working groups of the standardisation technical committee's such as ISO TC 197, CEN TC 268, including the hydrogen purity standard ISO14687 and EN17124, related to hydrogen fuel sampling.
Proposals are expected to address sustainability and circularity aspects.
Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-02-04;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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16. /HORIZON EUROPE/ Efficient system for dehydrogenation of liquid organic hydrogen carriers for application to long distance transportations, deadline: 20. September 2022 17:00 Brussels time

Liquid hydrogen carriers will play a significant role in diversifying Europe's energy supply corridor, transporting hydrogen at large scale (>1,000 t H2/day) especially across longer distances. In this frame, liquid organic hydrogen carriers (LOHC) have attracted attention of Europe's research and industry community. LOHC provide the possibility of transporting significant amount of hydrogen during hydrogenation/dehydrogenation cycles. Availability and degradation issues should be further studied to assess the large-scale potential of these liquid carriers. In addition, energy efficiency and environmental impacts have to be carefully addressed.
The hydrogenation of LOHCs can be performed close to centralised hydrogen production sites, but their dehydrogenation needs to be easily obtained locally for different applications. Many technical, environmental and economic challenges related to dehydrogenation step need to be overcome.
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.

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.
In order for the proposal to reach the expected outcome, the deliverables are expected to be disseminated at the end of the action to the hydrogen mobility and hydrogen refuelling infrastructure sectors and relevant working groups of the standardisation technical committee's such as ISO TC 197, CEN TC 268, including the hydrogen purity standard ISO14687 and EN17124, related to hydrogen fuel sampling.
Proposals are expected to address sustainability and circularity aspects.
Activities are expected to start at TRL 3 and achieve TRL 5 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-02-05;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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17. /HORIZON EUROPE/ Development and demonstration of mobile and stationary compressed hydrogen refuelling solutions for application in inland shipping and short-distance maritime operations, deadline: 20. September 2022 17:00 Brussels time

Hydrogen and hydrogen derivative fuels are expected to play a vital role in enabling the decarbonisation of shipping and maritime activities. Many projects are underway seeking to develop hydrogen fuel cell

systems to provide both auxiliary and propulsive power for vessels at a range of scales, with strong engagement from ship designers, ship builders, owners and operators, as well as fuel cell developers. However, these organisations may not be well placed to develop the understanding of technical and societal parts of bunkering infrastructure deployment required to facilitate market uptake of hydrogen-fuelled solutions. This action will address that gap.
This topic aims to contribute to setting standards for future inherently safer hydrogen bunkering for inland shipping, and for short-distance sea-going maritime applications, including in island contexts. Developing these solutions is of vital importance to facilitating further innovation activity in deploying hydrogen solutions in shipping, as well as in de-risking future investments.
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.
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.
Proposals should also:

- Demonstrate a smart and safe logistics solutions and develop a market standard to support front-running shipping projects;
- Evaluate the proposed solutions from technical and economic points of view, including robustly considering business models and the cost of hydrogen delivered;
- Address health, safety and environmental considerations, and should take account of standards in development internationally;
- Specifically, build upon existing blueprints deriving from liquified natural gas protocols and international standards developed for those. To this end project consortia should seek to involve key sector stakeholders, such as port authorities, classification societies, ship designers, ship owners and specifically international organisation such as the Society of International Gas Tanker and Terminal Operators (SIGTTO), the International Association of Ports and Harbours (IAPH) and the Society for Gas as a Marine Fuel (SGMF)

Activities are expected to start at TRL 3 and achieve TRL 6 by the end of the project.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-02-11;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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18. /HORIZON EUROPE/ Public understanding of hydrogen and fuel cell technologies, deadline: 20. September 2022 17:00 Brussels time

Public and consumer understanding and acceptance will play a critical role in the successful future adoption of hydrogen and fuel cell (FCH) applications, both in the residential and the transport sectors. As markets for FCH technologies develop, citizens may react in different ways to hydrogen policies and infrastructures in their countries, regions and cities, and consumers and end-users will decide whether fuel cell applications fit their circumstances. The transition to hydrogen therefore not only poses technological challenges; it also requires a better understanding and response to cross-cutting issues related to citizen and consumer understanding and acceptance as well as broader environmental, socio-cultural and political issues.
Project results are expected to contribute to some of the following outcomes:
- Understanding public perceptions and reactions to hydrogen and fuel cell technologies;
- Identification of the main individual-level determinants of public understanding and acceptance of FCH technologies;
- Enhancing involvement of citizens in the implementation of solutions contributing to the transition to hydrogen and fuel cells;
- Understanding the pathways to influence public opinion by analysis of the current depiction of FCH technologies in broadcasts, newspapers, and social media, and from this developing a public information strategy;
- Assessment of the specific role of the socio-economic and environmental impacts of FCH technologies in both the public acceptance of FCH technologies and informed decision-making.

The challenge for this topic is to further understand reactions and attitudes towards FCH technologies among citizens, consumers, and stakeholders in Europe for developing a comprehensive set of guidelines/good practices and engagement activities to increase public awareness and trust, supporting the mass uptake of FCH technologies in Europe. The successful proposal should generate empirical evidence regarding public attitudes towards FCH technologies in Europe. This knowledge will inform the future implementation of actions aimed at devising more effective ways of involving citizens and stakeholders in FCH related aspects and projects.

Activities should take into account the outcomes of the public tender launched in 2021 by the FCH 2 JU on the "public opinion survey and measures to be taken to overcome the challenges" as well as previous and ongoing FCH projects and initiatives engaging the public, on previous social research on public attitudes and reactions to hydrogen and fuel cell technologies and specific social research initiatives on FCH technologies and applications such as the activities of the HYACINTH project (FCH 2 JU, 2014-2017), facilitating the learnings from past and on-going experiences and successes for the development of the final guidelines/good practices and engagement activities.
Activities should focus on FCH technologies as a whole and should target the public and specific groups of stakeholders from sectors and territories for which the development and deployment of FCH technologies can play an important role.
Activities should include social research and public engagement activities, implemented in a significant number of Member States or associated countries, covering but not limited to EU-13 countries, such as world cafes, panel debates, focus groups, workshops, demonstrations, 'hands-on' events (e.g.: museum workshops), surveys, exhibitions, social media campaigns, etc. targeted at the public and relevant FCH stakeholders and coming from a collaborative, science-driven framework that involves social/sustainability scientists and FCH experts, scientists experts in popular science, scientific content editors, etc. as needed.
Projects should provide a quantitative assessment of the impacts foreseen, providing the metrics and/or indicators to assess the impacts of the engagement activities towards the identified target groups.
The use of bridging tools (for instance, Social Life Cycle Assessment) to facilitate the connection between the technical and social dimensions and enable informed decision-making is encouraged. In this regard, the joint work between social sciences experts and experts in the entire FCH value chain, among others, should result in sound guidelines and materials for future FCH public engagement programmes, projects, and outreach activities.
A balanced overall coverage of EU countries should be sought. All categories of the population, including minorities, youth and the elder generation, as well as urban, peri-urban and rural areas, should be considered.
Activities should envisage links and synergies with existing platforms and/or projects on FCH technologies as well as means of collaboration with similar activities ongoing internationally.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-05-01;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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19. /HORIZON EUROPE/ Safe hydrogen injection management at network-wide level: towards European gas sector transition, deadline: 20. September 2022 17:00 Brussels time

To date, the approach taken to inject hydrogen in the gas networks is left to be defined on a local basis in terms of concentration threshold, locations and purity. This fragmentation could cause significant interoperability issues, particularly when the quantities of hydrogen injected into the gas network will be more widespread geographically and probably variable in time. The impact on gas transportation and distribution (T&D) network components (e.g. valves, fittings, reduction stations, etc) and on all end-users connected to the gas infrastructure, with respect to the nominal 100% hydrogen and transients in the blend compositions is not fully understood.
To address these gaps, it is vital to map European gas T&D infrastructure and interact with operators in order to collect information about materials, components, technology and their readiness for hydrogen blending. It is also vital to develop knowledge for localisation of hydrogen injection, managing concentration fluctuations for blends and a detailed understanding of the implications of repurposing

pipes for hydrogen duty.
The need for protocols for inspection and monitoring emerges from the development of networks carrying new gases or gases for which they were not originally designed. Preventive measures (inspection) and solutions to mitigate the impact of hydrogen at component level are still at a low level of maturity or not yet fully adapted to the integration of hydrogen into networks.
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.
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 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 which provides the regulatory framework within which future gas networks will operate.
Proposals should address the management and control of transients of composition of natural gas and hydrogen mixtures for safe end use. In particular:
- Injection of hydrogen in existing gas grids can lead to a heterogeneous quality delivered to end-users. Quality variation should be predicted and controlled and injection strategies of hydrogen in the gas grid are needed.
Facing multiple production and injection points, complex grids, time-varying injection volumes and end-user demand volumes, the goal to predict and control gas quality in hydrogen blends could be addressed with a twofold approach. On one hand, by developing open modelling tools for gas network simulation, on the other hand, by identifying key technologies for quality tracking and the mitigation of quality variation in the natural gas network.
Solutions for the coordination of the hydrogen production and blending installations and their operations are required both from technical and regulatory points of view to guarantee quality control and to provide gas operators with the tools to manage a harmonised playing field for investors at EU level. Therefore, modelling should identify strategies for optimal injection points and gas network control, to evaluate pure or blended hydrogen injection strategies and to perform gas quality tracking and control. The project should analyse these issues in view of the intersectoral integration through power-to-hydrogen. Both gas distribution and transmission networks should be considered.
On the other hand, it is necessary to identify key technologies for quality tracking and the ones that are able to subsequently mitigate quality variation in the natural gas network, fully integrated with a dedicated ICT infrastructure for the digitalisation of the sector. Guidelines can also provide input for new technical norms that may spur innovation in selected network technologies for quality tracking and control.
Proposals should provide guidance to assist the injection of hydrogen in the gas infrastructure across Europe, consistently highlighting the new issues, the technical and administrative barriers and gaps by using a clear methodology that will give the basis to the definition of EU technical standards, which should include also the ICT protocols.
In addition, proposals are strongly encouraged to address the following activities:
- Analysis of delivered gas quality impacts on repurposed and new pipelines.

Proposals are expected to build on previous projects investigating the effects of hydrogen quality through repurposed pipelines (such as the Cadent Gas Hydrogen Grid to Vehicle project), with a specific focus on the effect of the hydrogen presence (and its variation) on all the items of the networks (e.g. valves, fittings, sealants, reduction stations, etc).
In addition, proposals are encouraged to perform gas quality testing of real samples. The analysis obtained will be undertaken along the delivery chain from the industrially produced hydrogen to storage and transmission and distribution through to final appliances. On the one hand, the work will support European industry to confidently produce, transport and store hydrogen with no impact to the end-user due to gas quality issues. On the other hand, it will help in generating a methodology to set specific hydrogen acceptability and hydrogen variation limits in sections of the gas infrastructure, depending on the status of the existing infrastructure and the functional requirement of the connected appliances.
Further Information:
https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-05-03;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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20. /HORIZON EUROPE/ Development and optimisation of reliable and versatile PEMFC stacks for high power range applications, deadline: 20. September 2022 17:00 Brussels time

Developing and deploying cost-competitive and mature Hydrogen Fuel Cell technology by 2030 is crucial for reaching EU's aim of reducing greenhouse gas emissions while maintaining economic growth. Innovative solutions addressed by the proposals submitted for this topic will contribute to the clean and sustainable transition of the transport sector towards climate neutrality, targeting here its exploitation primarily for road transport, while considering possible spill over benefits for maritime, rail and aviation. The major expected long-term impact is an actual support to cost-competitive deployment of reliable Fuel Cell based heavy-duty land transport, thanks to advances in the PEMFC stack which is the core and one of the main technology building blocks for fuel cell-based propulsion systems.
Cost, power density, efficiency and durability are the key parameters for successful fuel cell stack implementation in heavy-duty transport applications. The final outcomes will be enhanced performance and durability assessed at stack level, through optimised and sustained operation validated at high efficiency under high load. These results will also facilitate integration and the adaptation of the innovative solutions to various user profiles and applications, taking into account hybridisation and fair compromise between stack and system performance.
Project results are expected to contribute to all of the following outcomes:
- Deployment of the developed solutions by PEMFC stack manufacturers (2027);
- Uptake of the developed solutions by Fuel Cell system developers for their further implementation in trucks, ships, aircrafts or trains (2030);
- Contribution to Clean Hydrogen JU SRIA KPIs (2024 and 2030) on PEMFC stacks and systems for road transport applications;
- Identification of new possible routes or breakthrough for PEMFC based on new knowledge (>2030);
- Proposal of technical ideas adaptable for developments of FC systems for ships, trains or aircrafts (>2030);
- Contribution to Regulation Codes and Standards in the fields of PEMFC or hydrogen for transport (continuously).

Advances in the PEMFC stacks technology are needed to support deployment of Fuel Cell heavy-duty transports. Cost-competitive and reliable integration require stack solutions particularly tailored for sustained operation at high stack-power. Proposals should focus on applicability of their developments in the field of land transport, primarily road, while considering possible spill over benefits for maritime, rail and aviation
Proposals should address innovative concepts, designs, methods and/or operating-strategies. Related investigations may tackle cell and stack levels, including flow-fields, bipolar plates or assembling features (e.g. mechanical aspect), as well as the range, the distribution or the management of the operational conditions (e.g. thermal or reactant gases feeding aspects). The overall process should build on comprehension of the currently proven PEMFC technology and further development at stack level targeting optimised operation for high efficiency and extended durability at high stack power density. For the range of power envisioned, increasing efficiency would enhance the overall system with respect to volume savings for fuel storage.
Innovation on MEA is out of scope of this topic. Work should therefore be conducted on validated components, including commercialised or developed in other actions. Availability of baseline features on MEA should be a prerequisite: for commercial or promising R&D products, agreement of companies or developers to provide needed parameters and to allow deep analysis as relevant for reaching expected outcomes is needed. Maximum total loading should be 0.5 mg PGM/cm^2.
Optimisation should be supported by advanced experimental and simulation tools to analyse the impact of stacks features on their functional properties (e.g., performance level and limitations, voltage losses, electrochemical characteristics) regarding application requirements and system specifications. Local insights, especially meaningful for the large active area considered, should be assessed for different zones, between cells and across interfaces by in- and ex-situ characterisations and by simulations using cell- and stack-design based models. A better specific understanding of global and local mechanisms, occurring in cells and stacks operated at high power and affecting both performance and degradation, should be acquired thanks to spatially distributed analyses. Data will be used to clarify the influence of components, design, assembly or working features (e.g., load profiles, conditions and events). Developed experimental, monitoring or model-based approaches should be exploited to promote expected innovations and advances on comprehensive operating strategy of the PEMFC and on design of the cell unit or of the overall stack.
Compliance with the targeted KPIs, assessment of progress and final validation should be examined at stack scale (minimum 5 kW, or 10-cell-stack and scale-1 cell surface) under relevant conditions representative of actual use, taking into account system requirements for the targeted applications. Validated agreed protocols (including accelerated testing) should be applied to confirm and quantify improvements in areal power density, stack or system efficiency and lifetime. These protocols will be developed within the project if needed or selected in agreement with previous initiatives and in cooperation with relevant applicative roadmaps.
Focusing the development on advanced research work while monitoring progress and validating final optimisation at representative scale under protocols and conditions relevant for system level, is expected to achieve expected outcomes with efficient innovative solutions applicable for short-term integration.
Proposals should, where relevant, build on previous/on-going FHC JU projects addressing transport and similar activities, aligning particularly with: ID-FAST, IMMORTAL or MORELife regarding degradation understanding or ageing protocols; INSPIRE, DOLPHIN for developments on stacks; STaSHH for outcomes related to stack integration.
Proposals should demonstrate how the results would benefit to the whole industry, while protecting intellectual property for the involved partners. With this in mind, proposals should include public deliverables and describe how project data will be made available to the large public.
Consortia should include at least one partner in the consortium for the exploitation of the project results and willingness to exploit the results should be demonstrated. It is encouraged to include actors from research and industry, the latter being interested in PEMFC stacks or system deployment.
Further Information:

https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-jti-cleanh2-2022-03-01;callCode=null;freeTextSearchKeyword=;matchWholeText=true;typeCodes=1,2,8;statu
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21. /HORIZON EUROPE/ A new initiative for Young Observers in evaluations. Deadline: 14. December 2022

Young people have been strongly affected by the impacts of the COVID-19 pandemic in their lives, education and careers. The European Year of Youth 2022 is dedicated to them.
It will intensify efforts to include youth priorities in relevant EU policy areas and at every level of the EU's decision-making process. Special emphasis is placed on the need to support young people with fewer chances, to acquire relevant knowledge and experiences to be active and engaged citizens.
At all levels, EU, national, regional or local, the European Year of Youth aims to support young people to engage in opportunities that can boost their personal and professional development.
What's in it for you?
- You will observe the work of independent experts evaluating proposals. This is a unique opportunity to experience directly how the EU budget for Horizon Europe is used, by selecting the best proposals in a fair and impartial evaluation process within a fiercely competitive environment.
- You will gain knowledge and support to develop skills relevant for assessing proposals, getting an insider's view and awareness of the opportunities of the EU funding programmes, that you may use later in your career.
- If you are selected and participate successfully, you will receive a 'Young Observer' certificate, awarded by the European Commission.
- You will play a pivotal role in testing this new initiative, by giving feedback to the European Commission and taking part in follow up actions to inspire young people to engage with research
Students currently enrolled in a master's programme, in any discipline, at a university in an EU Member State can apply to this initiative. Students from disadvantaged and diverse backgrounds or belonging to vulnerable and marginalised groups are particularly encouraged to apply.
Further Information:
https://ec.europa.eu/info/research-and-innovation/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe/become-horizon-europe-young-observer_en

22. /JPI HDHL/ Nutrition-responsiveness of the immune system: interplay between infectious diseases and diet-related metabolic diseases and the potential for food-based solutions (NUTRIMMUNE), deadline: 21. April 2022 16:00 CEST

The aim of this call is to support transnational, collaborative research projects that gain a better understanding of the interactions between nutrition and immunity within the context of ist interplay between infectious diseases and diet-related metabolic diseases. Relevant research questions may include (but are not limited) the generation of scientific evidence for differences in individual susceptibility to and the severity of infectious diseases in people with diet-related metabolic diseases such as obesity or type 2 diabetes. Research should focus on the underlying mechanisms by which nutrition, food composition and/or dietary patterns affect immune function (e.g. both innate and adaptive immune function, and

microbiome). The roles of host genotype, body weight and composition, and life style factors such as physical fitness, and stress can also be considered.
Proposals should focus on one or both of the following topics:
- Establishing the cause-and-effect relationship between nutrition, immune function and infectious diseases in the context of diet-related metabolic disorders. Building on existing knowledge to further identify mechanisms of action (including common molecular pathways), projects will: Advance understanding of how nutrition, foods and dietary patterns modulate immune system homeostasis, response (e.g. inflammation), dysregulation and susceptibility to infectious disease across the life course in people with diet-related metabolic diseases. Explore how nutrition may contribute to infectious disease risk in people with diet-related metabolic diseases at various stages including prevention of, severity of, recovery from, and rehabilitation after the infectious disease.
- Development of innovative food solutions. Proof of principle studies are desired in order to support the development of effective diet-related health-improvement strategies health-improvement strategies and/or food products to promote a healthy immune system in people with diet-related metabolic diseases and their application at any stage of the infectious disease process.
In general, joint research proposals may be submitted by applicants working in universities (or other higher education institutions), non-university public research institutes, hospitals and other health care settings. Participation of private parties is encouraged as well as commercial companies, in particular small and medium-size enterprises. Only transnational consortia willl be funded.
Further Infomation:
https://www.healthydietforhealthylife.eu/index.php/call-activities/calls/98-calls-site-restyling/670-nutrimmune-2022?jjj=1648553877380

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23. /ESA/ TEMPUS experiments in Parabolic Flight (PF), deadline: 19: April 24:00 CET

The objective of this opportunity is the selection of an appropriate number of samples and experiment cycles for the 2022 TEMPUS experiment on the 39th DLR parabolic flight campaign. This campaign includes three flight days with 31 parabolas each and is currently scheduled in the weeks 35-36 (August 29 - September 8, 2022). The contingents of the German Space Agency and the European Space Agency that are the subject of this joint AO comprise of 31 parabolas (experiment cycles) each.
The TEMPUS (See the attachment TEMPUS AO InformationPackage 2022) facility enables containerless processing of metallic and other electrically conductive liquids excluding the effects of gravity and can be used for the study of solidification mechanisms (e.g., crystal nucleation and growth, multiphase growth, and glass formation) and the measurement of thermophysical properties (e.g., specific heat capacity, surface tension and viscosity) amongst others. Extending scientific knowledge in these areas is of pinnacle importance in further advancing the predictive capabilities of numerical modelling approaches for casting and solidification processes, which in turn are key to the manufacturing of almost all (metallic) industrial and consumer goods on Earth.
Except for scientific investigations, the TEMPUS facility also serves to qualify new materials and alloy compositions for the Electro-Magnetic Levitator onboard the International Space Station (EML-ISS), realised and operated by DLR and ESA as a joint undertaking. Sample selection for EML-ISS is done following dedicated Announcements of Opportunity (for batches of 18 samples). The enduring and enhanced microgravity conditions on the ISS allow for longer experiment durations, experiment repetitions for statistical purposes and parameter studies, as well as enable measurements at unprecedented accuracy. Work on TEMPUS provides the entry point to such investigations.
Specifics of this Announcement of Opportunity are as follows.
- The proposed samples and experiments are to build on and supplement the alloy systems, chemical compositions and investigations that have been and are being undertaken for the earlier selected samples for TEMPUS and EML-ISS and as being documented in scientific literature amongst others.

- Collaboration and sharing of samples between research teams and projects is encouraged so as to make optimal use of resources.
- In addition to established research teams and projects (e.g., DLR or ESA AO projects), scientists that have not worked with TEMPUS before are encouraged to apply. Further, first-time Principal Investigators are encouraged to apply so as to foster a new generation of scientists to conduct research with TEMPUS and in due time EML-ISS.
Further Information:
https://ideas.esa.int/servlet/hype/IMT?documentTableId=45087669060788261&userAction=Browse&templateName=&documentId=d712f986f212c6646715851b50d39995

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24. /ESA/ Moonlight Initiative: Lunar Communications and Navigation Services (LCNS), deadline: 30. April 2022

The objective of this Call for ideas is to inspire different types of potential lunar users to submit ideas for new use cases and applications that can be enabled and supported by the LCNS services under development.
The present Call for ideas is aimed at collecting new ideas, engage new users and open up new possibilities and opportunities for the new and diverse Lunar user community that is starting to emerge and that will be vital to build a sustainable future for Lunar exploration.
This Call allows the applicants to influence the definition and future roll out of LCNS and the overall Moonlight Initiative by proposing ideas of how to these services could be utilised and how they can support the future development of the Lunar Economy.
ESA will select the best ideas and use cases and invite the applicants to ESA establishments for dedicated 1-to-1 meetings and help them mature their ideas. On case-by-case basis, ESA will direct them to the most appropriate ESA programme or funding mechanism that could be suitable for them to advance their work.
Furthermore, selected applicants will be invited to the 2nd LCNS User Engagement Workshop, to be held in Q2/Q3 2022, and have the opportunity to present their ideas and use cases together with other future and potential users and with the two Industrial consortia working on the Phase A/B1 of LCNS.
The best ideas will have the chance to be invited to take part to the ESA Lunar Forum, a permanent group made of international Moonlight stakeholders who share the common interest in the future of Lunar exploration and explore together new missions and LCNS concepts.
Expected Ideas:
ESA is looking for innovative ideas for application cases, at concept stage as well as at higher level of maturity, that can be enabled by the LCNS communications and/or navigation services.
These applications shall make use of the LCNS services to serve users' needs within the lunar environment (lunar surface and/or lunar orbit) and/or to users located on Earth. Some of the presented application cases may be taken forward and integrated into mission concepts at the next ESA Council at Ministerial level.
Who should respond tot he call?
- Commercial users (i.e for profit entities within and outside the space sector)
- Academic/scientific users (e.g. universities, R&D dept.)
- Institutional users (e.g. space agencies, governments)
- Anybody who has an idea for an use case/application for LCNS communication and/or navigation services
Further Information:
https://ideas.esa.int/servlet/hype/IMT?documentTableId=45087669060788065&userAction=Browse&templateName=&documentId=335dbe1a8f262b8e3fbd02bcfb89de12

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25. /Volkswagen Stiftung/ Perspektiven auf Reichtum: Die (Re-) Produktion von Reichtum, Frist: 25. Mai 2022 12 Uhr MEZ

Extrem ungleiche Einkommens- und Vermögensverhältnisse sind eine wiederkehrende Ursache für Konflikte und ein anhaltendes Hindernis für menschliche Entwicklung. Die wissenschaftliche Erforschung des Phänomens Reichtum ist daher ein zentrales Element zum Verständnis gesellschaftlicher Transformationsprozesse. Mit der Förderinitiative ,,Perspectives on Wealth" möchte die VolkswagenStiftung einen Perspektivwechsel initiieren von der Armutsforschung auf Facetten des Phänomens Reichtum. Der Fokus dieser Ausschreibung richtet sich auf die Genese von Reichtum. Vor dem Hintergrund gesellschaftlicher Transformationsprozesse in Vergangenheit, Gegenwart und Zukunft und der jeweils bestehenden Macht- und Herrschaftsverhältnisse zielt die Ausschreibung darauf ab, konzeptionelle, methodische und empirische Erkenntnisse zum Thema "(Re-)Produktion von Reichtum" zu generieren und dabei auch der Frage nachzugehen, welche (neuen) konzeptionellen Sichtweisen und methodischen Herangehensweisen benötigt werden, um den Perspektivwechsel auf die Reichtumsforschung zu ermöglichen. Da die umfassende Analyse des Phänomens als wichtiger Baustein für das Verständnis gesellschaftlicher Transformationsprozesse erachtet wird, ist die Stiftung darüber hinaus an der Frage interessiert, wie sich Reichtum zu gesellschaftlichen Transformationsprozessen in Vergangenheit, Gegenwart und Zukunft verhält. Dabei geht es darum, bestehende normative Setzungen in verschiedenen Bereichen von Wissenschaft und Gesellschaft (z.B. Kapitalismus-, Nachhaltigkeits- und Transformationsforschung) kritisch zu hinterfragen, um auf dieser Basis neue Erkenntnis- und ggf. Handlungsmöglichkeiten zu eröffnen und diese auch entsprechend zu kommunizieren.
In der Förderlinie können Kooperationsprojekte beantragt werden, in denen Forschende von deutschen Universitäten oder Forschungseinrichtungen mit internationalen Partner:innen gleichberechtigt zusammenarbeiten, um empirische Erkenntnisse über die (Re-)Produktion und Genese von Reichtum in globaler Perspektive zu generieren und einen zielgruppenspezifischen Transfer zu initiieren. Es sind sowohl Untersuchungen auf der Mikro- als auch auf der Makroebene möglich. Hauptantragstellende müssen an einer Einrichtung in Deutschland beschäftigt sein. Die Einbindung von mindestens zwei internationalen Partner:innen ist verpflichtend, darüber hinaus ist die Integration gesellschaftlicher Akteure (NGOs etc.) sehr wünschenswert.
Projektdesign:
- Gefördert werden eng interagierende Forschungsteams mit 3- 5 Partner:innen. Neben einem/r Hauptantragsteller:in von einer deutschen Universität oder Forschungseinrichtung ist die Beteiligung von mindestens zwei Partner:innen erforderlich, die derzeit in LMIC (Low and Middle Income Countries, gemäß Weltbank Klassifizierung) ansässig sind.
- Hauptantragstellende müssen Wissenschaftler:innen aller Karrierestufen nach der Promotion aus den Geistes-, Kultur- und Sozialwissenschaften sein.
- Die Einbeziehungen von interdisziplinären Partner:innen ist möglich, aber nicht verpflichtend.
- Nichtakademische Akteure können als Projektpartner:in eingebunden werden, aber nicht als PI (Mitantragstellende) auftreten. In geringem Umfang können Kosten für Projektpartner:innen bspw. für Reisekosten und/oder Werkverträge in das Budget aufgenommen werden.
- Die Weiterqualifizierung des wissenschaftlichen Nachwuchses muss ein zentrales Element des jeweiligen Forschungsvorhabens sein.
Weitere Informationen:
https://www.volkswagenstiftung.de/unsere-foerderung/unser-foerderangebot-im-ueberblick/perspektiven-auf-reichtum-die-re-produktion-von-reichtum

26. /ESA/ Investigations into Biological and Physical Effects of Radiation at GSI, deadline: 10. June 2022 at 23:59 CET

The radiation risk is characterized by a high uncertainty and lack of countermeasures. Most of the uncertainties on space radiation risk are associated with the poor knowledge of the biological and physical effects of Galactic Cosmic Rays (GCRs). The knowledge to be advanced includes (but is not limited to):
- Transport codes
- Relative biological effectiveness (RBE) factors for energetic heavy ions for late effects
- Effects of exposure to mixed high and low LET space radiation
- The dose response curve at low radiation doses
- Individual differences in response to ionizing radiation

The Investigations into Biological and Physical Effects of Radiation are addressing following general objectives:
- To investigate the negative health effects of space radiation exposure, with the focus on Central nervous System (CNS), cardiovascular and other tissue degenerative effects and cancer, including individual susceptibility.
- To assess the health risks based on space radiation exposure, including providing quantitative estimates of the dose - and dose-rate dependence of the risk for radiation-induced acute and late morbidity (cancer and non-cancer effects).
- To mitigate health risks by identifying, developing, and validating biomedical and physical countermeasures, including shielding, as well as the potential impact of individual susceptibility.
- To improve existing models and tools describing space radiation environment, monitoring, and predicting space weather (solar activity), and how complex space radiation interacts with physical matter.

Proposals shall address these research questions through ground-based experimental studies making use of the GSI Accelerator Facility in Darmstadt, Germany. The data to be obtained shall improve the models, which are necessary for a correct radiation risk assessment. In addition to supporting the needs of Human Space Exploration missions, the information obtained is relevant to assessment of terrestrial risks due to low dose ionizing radiation exposure and improvement of charged particle therapy in oncology.
Priority will be given to proposals that fulfil following criteria (if applicable):
- Proposals address one of the stated above scientific objectives.
- Proposals are hypothesis-driven, with clearly defined scientific objectives and a highlighted contribution to health risk assessment.
- Proposals investigate individual (including biological sex) susceptibility to ionizing radiation and include equal numbers of female and male subjects (animals) and/or equal numbers of female and male-derived cells or cell cultures.

The scientific institution for which the coordinator of a proposal is working must be located in one of the ESA member or associated member states that contribute to the SciSpacE programme: Austria, Belgium, Canada, Czech Republic, Denmark, France, Germany, Greece, Hungary, Ireland, Italy, Luxemburg, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Spain, Sweden, Switzerland, United Kingdom. Scientists from other ESA Member States that do not contribute to the SciSpacE Programme and scientists from other European countries having a cooperation agreement with ESA are encouraged to enquire with their national space organisation about the conditions for their participation in proposals to ESA.
Further Information:
https://ideas.esa.int/servlet/hype/IMT?documentTableId=45087669060789813&userAction=Browse&templateName=&documentId=e0e5b0d983b5bf62392a05e134bade22

27. /Canon Foundation in Europe/ Research Fellowships, deadline: 15. September 2022

Annually, the Canon Foundation in Europe grants up to 15 Fellowships to highly qualified European and Japanese researchers. European Fellows are expected to pursue a period of research in Japan whereas Japanese Fellows are expected to do their research in Europe.
Canon Foundation Fellowships are for a minimum period of three months up to maximum of one year.
We support all fields of research. There are no limitations or restrictions. Applicants do not have to be currently enrolled or employed at the time of applying.
Canon Fellows from Europe are free to choose their host institutes and hosts in Japan. The same freedom is given to Japanese Canon Fellows coming to Europe. Canon Foundation Research Fellowships may be applied for when an agreement on co-operation and on a research plan has been reached between the guest researcher and the proposed host institution.
Applications can also be submitted by members of commercial, industrial, governmental or professional organisations.
All Europeans are eligible to apply (including UK, Israel, Turkey, Balkan and Baltic countries).
Applicants should have obtained at least a Master's or PhD degree within the last ten years of applying to the Canon Foundation. We will also consider candidates who obtained their qualification more than ten years ago as long as they provide further supporting information in their application.
Further Information:
https://www.canonfoundation.org/programmes/research-fellowships/

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28. /Herder-Institut/ Fellowships, Frist: 30. September 2022

Das Herder-Fellowship richtet sich an Promovierende oder Postdocs, insbesondere aus ostmitteleuropäischen Ländern und dem westeuropäischen Ausland. Beide Zielgruppen sollen sich in ihrer Forschung mit der Geschichte des östlichen Europas beschäftigen. Im Rahmen eines Fellowships haben Fellows die Möglichkeit, mit den herausragenden Sammlungen und der Forschungsbibliothek des Herder-Instituts ihre Qualifikationsschrift oder ihr Forschungsprojekt zu verfolgen. Darüber hinaus versteht sich das Herder-Institut als Forum einer international ausgerichteten wissenschaftlichen Diskussion, dass Ihnen als Plattform für Austausch und Networking dienen soll.
Das Fellowship ermöglicht einen einmonatigen Forschungsaufenthalt in den Sammlungen des Herder-Instituts.
Weitere Informationen:
https://www.herder-institut.de/herder-fellowships/

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29. /Sonstige/ 3rd ERA CoBioTech Hub Meeting, 19. May 2022

The 3rd and final ERA CoBioTech Hub Meeting, which will take place as a virtual conference on May 19th, 2022.
The discussion will focus on the transition process from Horizon 2020 to Horizon Europe and the new opportunities for cooperation for the different partners of ERA-Nets and other partnerships in the fields of biotechnology, bioeconomy, life sciences and other innovative technologies.
Further Information:
https://www.cobiotech.eu/news?news=Announcement_3rd_ERA_CoBioTech_Hub_Meeting

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30. /Sonstige/ ERA CoBioTech final meeting, 01. - 02. June 2022

The final meeting of ERA CoBioTech, which will take place as a hybrid two-day meeting on June 1-2, 2022 in Ljubljana, Slovenia.
The ERA CoBioTech ERA-Net Cofund, which began in 2016, is slowly coming to an end. Before the end of the project, we will organize a closing meeting, which will be open to the widest audience. Scientists, researchers, students, policy makers, funders, industry representatives, and anyone interested in biotechnology, are invited to join! After a long time, the 'in person' meeting will be an excellent opportunity to socialize and network. But also a lot of interesting information and presentations of keynote speakers will be available for everyone who will attend only online.
Besides pitch talk presentations of co-funded research projects of the 1st ERA CoBioTech Joint transnational call 2017, there are the following topics on the agenda: a brief presentations of ERA CoBioTech's main activities: Strategic Agenda for Biotechnology and RRI Framework, developed under ERA CoBioTech, Policy Briefs, panel discussion on Bridging the gap between science and industry with a focus on biotechnology, presentation of UNESCO's recommendation on Open Science, online discussions in break-out groups on lessons learnt under ERA CoBiotech and also some possibilities for continuation of ERA-Net instrument in co-funded partnerships and CSAs under Horizon Europe will be presented. In addition to all communication prizes for the ERA CoBioTech Video contest 2022 will be awarded.
If you are going to participate 'in person', please fill out the application form. Registration will be open until May, 27, 2022. Registration for 'in-person' participation will close once 100 participants are reached.
If you are going to attend the meeting online, no registration is needed. The active link for the online participation will be published on May 23, 2022.
Further Information:
https://www.cobiotech.eu/news?news=ERA_CoBioTech_final_meeting_announcement_and_invitation

31. /Sonstige/ Contact Research Funding Advice of the Otto von Guericke University Magdeburg

For questions about funding opportunities, specific calls for proposals, help with submitting applications and project support, please contact the department for Research Funding Advice/EU-University Network of Otto von Guericke University Magdeburg.
Information on current events, funding structures and contact online at:
https://www.ovgu.de/en/ContactResearchFundingAdvice
https://www.euhochschulnetz-sachsen-anhalt.de/en/