

2024

NEWS ARCHIVE

of the Center for Sustainable Energy

18 JANUARY 2024

Gloria Gottardi nominated member of the PSE 2024 Advisory Board



19th International Conference
on Plasma Surface Engineering
September 2 – 5, 2024 | Trade Fair Erfurt, Germany
www.pse-conferences.net

This year again PSE will take place the first week of September, in Erfurt (Germany). The 19th International Conference on Plasma Surface Engineering is the established Conference for plasma and ion surface engineering.

PSE Conferences are established since 1988 and organized by the European Joint Committee on Plasma and Ion Surface Engineering.

The event provides opportunities to present recent progress in research, development and industrial applications. Its topics span a wide range from fundamentals such as e. g., process modelling and simulations of plasmas or thin film physics, through experimental studies which establish the relationships between process parameters and the structural and functional properties of modified surfaces and/or thin films, towards applications in industrial production.

Conference Topics of PSE2024

1. Plasma and ion sources
2. Process technologies
3. Properties and applications
4. Characterization and simulation

In parallel, an exhibition is also organised. It is an important part of the conference and provides opportunities to stay informed about new developments as well as innovative products and services, discuss new ideas and cooperations with the experts and gives time to take care of customers. Exhibitors use the chance to present their products and services to the community with growing interest. In this exhibition you find providers of coating systems, components, equipment, materials, vacuum and plasma technologies, analytical measurement instruments, simulation tools, products for process automation and coating services. The exhibition will take place from September 3 – 4, 2024.

More information on the conference: <https://pse-conferences.net/>

22 JANUARY 2024

USES4HEAT site visit at the cogeneration plant of Alto Garda Power and Cartiere Riva del Garda

On January 16, 2024, Diego Viesi, Masoud Manafi, Silvia Ricciuti and Francesco Ghionda - researchers of the Sustainable Energy Center of FBK - participated in the first site visit of USES4HEAT Project.

The visit took place in Riva del Garda, at the cogeneration plant of Alto Garda Power which is connected to Cartiere del Garda and the district heating of Riva del Garda.

The objective of this visit was to show the current state of art of the demo site of the project to the partners that will be involved in the local activities: [Fondazione Bruno Kessler](#), [Alto Garda Power S.r.l.](#), [Cartiere del Garda S.p.A.](#), [Alto Garda Servizi S.p.A.](#), [HYDRA S.r.l.](#), [HiRef S.p.A.](#), [Endef Engineering](#), [Energenius S.r.l.](#), [Università degli Studi di Genova](#).

The first analysis to the engineering and geological challenges have been launched in order to find the optimal integration in the innovative solutions that will be created for the Italian demo site:

1. New seasonal, large-scale, ATES via advanced drilling technologies – provided by the partner HYDRA;
2. New groundwater heat pump at high temperature, low GWP and ATES/DH-connected by HIREF;
3. Hybrid solar panels provided by ENDEF;
4. Intelligent energy management via AI, big-data and cloud-based tools by Energenius.

More information on the project: <https://magazine.fbk.eu/en/news/uses4heat-project-launched-to-enable-the-decarbonisation-of-european-heating-and-cooling-through-innovative-seasonal-thermal-energy-storage/>

23 JANUARY 2024

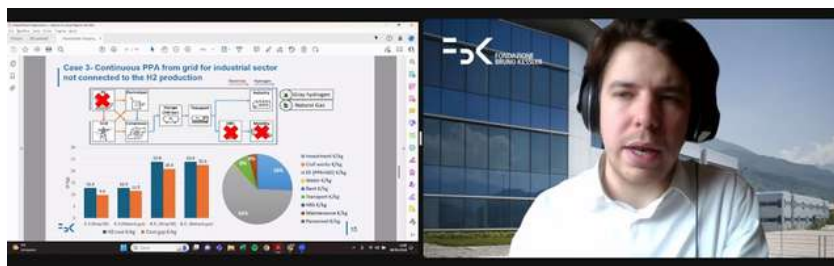
Gionata Luca invited as key note speaker at the Sri Lankan-Italian Forum on Green Hydrogen

Charting the Future of Green Fuels Bunkering at Trincomalee Port is the title of the Sri Lanka Hydrogen and Green Fuels Forum 2024, which took place last Thursday 18 January 2024 and was organised by the [Ceylon Italy Blue Economy Association \(CIBEA\)](#) and supported by the Sri Lankan Ministries and by the Italian Embassy in Sri Lanka.

As outlined by Vittorio Coco, President of CIBEA, "l'evento mira a generare attenzione ed interesse per una audience italiana ed internazionale qualificata di investitori, fornitori, autorità governative, operatori nel settore dei servizi ed imprese anche piccole e medie sull'opportunità di partecipare direttamente alla catena del valore dell'idrogeno e derivati verdi nell'Oceano Indiano [The conference aims to generate interest in the opportunity of actively participating in the Indian Ocean value chain of hydrogen and green fuels. The event addresses an Italian and international audience of investors, suppliers, policy-makers, service providers and companies].

Gionata Luca, researcher of the FBK Center for Sustainable Energy, presented the Key Note speech on the topics of costs behind the Italian green hydrogen supply chain. In particular, the researcher focused on the production costs of the green hydrogen, the cost gap with the reference fuel to be substituted (grey hydrogen for industries, natural gas for heating and diesel for mobility), and the strategies to reduce these costs.

In his speech, Gionata presented some results of a research work done within the HyRES Unit to evaluate possible incentives that can fill the cost gap with the reference fuel and launch the green hydrogen market.



What are the strategies presented to reduce the green hydrogen production costs?

- The impact of the plant complexity (modular and standardised solutions can reduce the investment capital cost);
- The increase of the electrolyser load factor that can lead to the absorption of the capital cost;
- The impact of the scale effect;
- The support of the investment costs through the active participation in calls and tenders to promote the hydrogen supply chain and the development of a scale manufacturing industry.

Read more here: <https://cibea.net/2024/01/03/sri-lanka-h2-forum-future-of-green-fuels-bunkering-at-trincomalee-port/>

23 JANUARY 2024

New report on "Green Hydrogen in the Alps. Identification of needs and targets for the deployment of green H2 solutions with a focus on touristic uses"

Within the [Interreg Alpine Space AMETHyST project](#), Eleonora Cordioli and Jacopo de Maigret - researchers of the Center Sustainable Energy - developed a report entitled "Green Hydrogen in the Alps. Identification of needs and targets for the deployment of green H2 solutions with a focus on touristic uses".

The document dives into the heart of sustainable energy innovation through the exploration of hydrogen solutions, with a special focus on transforming the Alps into a hub of green excellence.

The report reviews the state-of-the-art of hydrogen solutions, with a focus on touristic uses in the Alpine regions, gathering insights from local stakeholders, identifying the barriers to and the solutions for the development of local Alpine hydrogen ecosystems, and uncovering the immense potential of hydrogen. What is the purpose of the document?

The objective is twofold. Firstly, the study aims to map the level of interest and commitment of local communities and authorities in pursuing higher sustainable development objectives. Secondly, it seeks to identify their specific needs for the implementation of hydrogen-based pilot initiatives. The analysis is intended to outline the role of hydrogen in the Alpine territories, informing and sharing knowledge among local stakeholders, thus paving the way to the creation of Alpine hydrogen ecosystems.

Have a look at the report, [at this link](#).

More information on the project [here](#).

[AMETHyST](#) supports the deployment of Alpine green H2 ecosystems for a post-carbon future in the Alps. It reinforces the role of public authorities by increasing their capacity, designing support services to roll out green H2 solutions. This is done through 6 pilot territories in 5 countries which work together to implement the most appropriate solutions and test the ecosystem models.

25 JANUARY 2024

Luigi Crema invited as speaker at EIGA Winter Summit 2024

In these days, Antwerp hosted the event EIGA Winter Summit 2024 - Enabling Hydrogen together!

The [European Industrial Gases Association \(EIGA\)](#) is a "safety and technically oriented organisation representing the vast majority of European and also non-European companies producing and distributing industrial, medical and food gases".

The event was divided in 5 "steps" in order to allow participants to embark on a journey to

discover, aware, understand, believe and act on the present and future of hydrogen, with the leading voice in safety, health and environmental care in the handling of industrial gases in Europe."

Luigi Crema, Director of the Center SE and President of HER, participated in the Understand session, with the speech entitled The perspective of hydrogen in the field of energy storage.

More information on: https://www.eiga.eu/ws/2024_ws_programme/



6 FEBRUARY 2024

MANTOVA HYDROGEN VALLEY: CONFINDUSTRIA MANTOVA ROADSHOW ON GREEN HYDROGEN KICKS OFF IN THE FOUR DISTRICTS OF THE TERRITORY

In these days, the green hydrogen roadshow is taking place in four districts of the Mantova territories. The event is organised by Confindustria Mantova and wishes to present the "Mantua model" in order to raise the awareness on the potential of the green hydrogen for the industrial districts and the entire territory.

The project HYMANTOVALLEY represents an ambitious collaborative effort aimed at creating a Hydrogen Valley in the province of Mantua, Italy" outlines Matteo Testi - Head of the Hydrogen Technologies and Resilient Energy System Unit.

With a total investment of around 9 million euros, co-financed by the European Union through various programmes including the Interregional Innovation Investments Instrument (I3), the project aims to demonstrate the possibility of local decarbonisation in a of the most polluted regions in Europe, the Po Valley.

"FBK is happy to participate in this new growth opportunity in the H2 sector, located in a context with a high multimodality potential that will be able to optimize the management and economic aspects of hydrogen" continues Matteo Testi.

This integrated ecosystem is based on the river port of Valdaro, a logistics platform and a three-modal transport system (inland water, rail, road) to make the most of the strategic position of the site. The project aims to produce more than 1,500 tonnes of green hydrogen per year from renewable sources, reducing CO2 emissions by more than 14,000 tonnes per year.

The project involves 16 partners from 4 European countries: Italy, Austria, The Netherlands and Belgium. Among the partners there are public institutions such as the Province of Mantua, companies specialized in energy management such as AGIRE and SAPIO Srl, prestigious universities such as the Polytechnic of Milan and the Bruno Kessler Foundation, and other key organizations in the sector.

Fondazione Bruno Kessler - through the Center for Sustainable Energy - will participate in HYMANTOVALLEY with several activities such as the techno-economic assessment of the H2 transport solutions to be adopted in the context of the hydrogen valley. The Center will also coordinate the activities connected to the business case definition and will participate in the definition of a R&D hub that will be created within the valley.

Read more about the roadshow [here](#) (article in Italian - press release of Confindustria Mantova)

Read more about the kick-off meeting [here](#) (article in Italian - Gazzetta di Mantova)

12 FEBRUARY 2024

FBK at the Clean Hydrogen Partnership Info Days

Last 8th of February 2024, Luigi Crema and Luca Pratico were in Rome at the Info Day of the Clean Hydrogen Partnership that took place at the Congress Center of Rome, Italy.

The Clean Hydrogen Partnership is the public-private financing program established with the aim of contributing to fostering the transition towards a clean hydrogen economy.

As it is possible to read on the [event poster](#), the tender was opened on January 17, and a total of €113.5 million will be made available through Horizon Europe for projects covering research



and innovation activities along the entire hydrogen value chain. An additional amount of 60 millions of euros (from the RePowerEU plan budget) will be used to support various activities including the creation and management of a "Hydrogen Valleys Facility" to increase the number of valleys of hydrogen in Europe. ENEA and H2IT organized this national event to present the 2024 Call, addressed to all public and private entities interested in participating in the tender: Universities, public and private research centres, small businesses and large industry.

In his role of President of [Hydrogen Europe Research](#), Luigi Crema gave an overview of the European associations members of the Clean Hydrogen Partnership.

The researcher Luca Praticò presented [AMON Project](#) which was among the success stories invited to the event to provide suggestions for submitting competitive proposals.

More information at this link: <https://www.h2it.it/info-day-nazionale-clean-hydrogen-partnership/>

14 FEBRUARY 2024

INNOVATIVE SOLID OXIDE ELECTROLYZERS TO PRODUCE HYDROGEN WILL BE DEVELOPED IN THE HY-SPIRE PROJECT



The kick-off meeting of the Horizon Europe project Hy-SPIRE “Hydrogen production by innovative solid oxide cell for flexible operation at intermediate temperature” was held in Warsaw on 8-9 February 2024, hosted by coordinator – the Institute of Power Engineering – National Research Institute (IPE-NRI).

According to long-term goals of EU, green hydrogen produced using renewable energy sources will become an energy vector for decarbonisation of the EU economy, in particular the hard-to-abate industry and transport sectors.

What is the aim of the Hy-SPIRE project?

The overarching objective of Hy-SPIRE project is to further boost the potential of SOEL by lowering the operating temperature below 700°C and increasing its flexibility in order to match the profiles of electricity generation in renewable energy sources (RES).

Through the development and application of new materials, advanced manufacturing techniques and optimized cell as well as compact stack designs, the project focuses on the creation of novel oxygen ion- and proton-conducting cells (O-SOE and P-SOE, respectively) on both, ceramic and metallic supports. Among the key goals of the Hy-SPIRE a low degradation equal to or lower than 0.75% per 1,000 h, operation at high current densities ca. 1.2 A/cm² and ability to operate dynamically and fast ramping, can be listed.

Fondazione Bruno Kessler, through the Center for Sustainable Energy, will lead the Work Package 4, therefore managing the activities of communication, dissemination and exploitation, and providing a techno-economic analyses supported by life cycle assessment (LCA) addressing the recycling and end-of-life scenarios for the developed technology. FBK will also be in charge of the testing of the stack and the development of dedicated protocols and procedures for the testing activity on novel SOE stack based on metal and electrode supported cells.

“The HyRES unit of the Center for Sustainable Energy is honoured to participate in the Hy-SPIRE project” states Matteo Testi – Head of Hydrogen technologies and Resilient Energy Systems Unit. “HyRES will provide expertise and perform activities for Work Package 3 concerning the test of the short-stack solution developed in the project, and in Work Package 4, managing communication, dissemination, and exploitation efforts, including the techno-economic analysis of the iconic and proton cell solutions, providing valuable insights into the market potential and sustainability of these technologies.”

“FBK, through the Center for Sustainable Energy, is proud to participate and support Hy-SPIRE project. FBK-SE is preparing to support the hydrogen sector and be a key stakeholder for industrial players in the next future” states Luigi Crema – Director of the Center Sustainable Energy of FBK. “Hydrogen is part of the political agenda, a market framework is under development but, in any case, and even more it is necessary to support research and innovation on actual and next generation hydrogen technologies, to keep Europe in the forefront of the global hydrogen competition”.

Read the full press release in English: <https://magazine.fbk.eu/en/news/innovative-solid-oxide-electrolyzers-to-produce-hydrogen-will-be-developed-in-the-hy-spire-project/>

Read the press release in Italian: <https://magazine.fbk.eu/it/news/al-via-il-progetto-hy-spire-che-sviluppera-innovativi-elettrolizzatori-a-ossidi-solidi-per-la-produzione-di-idrogeno/>

27 FEBRUARY 2024

EU PROJECT SMHYLES DEVELOPS NOVEL SALT- AND WATER-BASED HYBRID ENERGY STORAGE SYSTEMS (HESS) ON AN INDUSTRIAL SCALE

The SMHYLES project, coordinated by FBK is funded by the EU under Horizon Europe with around €6 million for a period of four years from January 2024 on.

One of the greatest challenges of the 21st century is the transition to climate-neutral energy sources. Here, reliable energy storage plays a key role, as production and load peaks in the electricity grid require flexible storage systems that can be used for a wide range of applications. The recently launched EU project SMHYLES aims to develop innovative, sustainable, and safe salt- and/or water-based hybrid energy storage systems. These combine two storage technologies and their respective advantages: long duration capacity and high power density. The new low-CRM (critical raw materials) systems will also contribute to Europe's energy independence. The SMHYLES project, coordinated by the "Fondazione Bruno Kessler" (Italy), is funded by the EU under Horizon Europe with around €6 million for a period of four years from January 2024 on. The consortium includes 16 partners from seven countries.

Each storage technology has technical and economic characteristics that are ideally suited for a specific application. These characteristics include, for example, energy and power density, reaction time, environmental sustainability, and safety. Redox flow and salt batteries have a large storage capacity but can only be charged and discharged slowly. A supercapacitor, on the other hand, has fast charging times but cannot store large energy quantities over a long period of time. Only the efficient combination of both functionalities provides the necessary performance and flexibility in use.

"Modern energy storage systems need to guarantee security of supply, performance and safety, have flexible management software and be manufactured and operated in the most sustainable and environmentally friendly way possible," explains **SMHYLES coordinator Edoardo G. Macchi, Head of Battery and Electrification Technologies Unit** at the Fondazione Bruno Kessler in Trento, Italy.

The central goal of the SMHYLES project is to develop and demonstrate such innovative, safe, and sustainable hybrid energy storage systems on an industrial scale. [...] In SMHYLES, a water-based supercapacitor and, either a redox flow battery or a salt battery, are to be combined to create innovative hybrid energy storage systems. During the second half of the project, various use cases will be trialled for 12 months in the three pilot plants in Portugal and Germany [...].

Fondazione Bruno Kessler, through the Center for Sustainable Energy, will be the Project Coordinator and also a work package leader, where it will be responsible for the development of new digital tools. These will be used to support techno-economic analyses on the sizing of the aqueous-based and salt-based hybrid energy storage systems (HESSs) and the optimization of control strategies and operations. In this work package, FBK will also supervise the identification of the most promising use and business cases for the proposed hybrid systems along with the Life Cycle Assessment (LCA).

"We are really proud to coordinate SMHYLES project. It is for us an important initiative to scale up and implement in several EU territories hybrid energy storage solutions. This is developing further the concept of a specific technology and looking for the best integration approach for end use applications, following their specific requirements.

This is indeed a general approach we are favouring and supporting, trying to develop more integrated solutions and going beyond the technology silos approach" states **Luigi Crema, Director of FBK's Center of Sustainable Energy**.

Read the full press release in [English](#)

Read the press release in [Italian](#)



15 MARCH 2024

FBK at EHEC 2024

After the great success of the EHEC 2022 with over 1100 attendees and 200 + speakers from across the entire hydrogen value chain, the event took place again last week.

From the 6th to 8th of March 2024, Bilbao (Spain) hosted EHEC, the European Hydrogen Energy Conference 2024 and the Center for Sustainable Energy could not miss the opportunity to participate! Luca Praticò, researcher at the Center for Sustainable Energy at Fondazione Bruno Kessler, presented the work entitled "From direct use of ammonia in solid oxide fuel cells to the next generation of ammonia fuel cell systems", in the context of AMON Project.

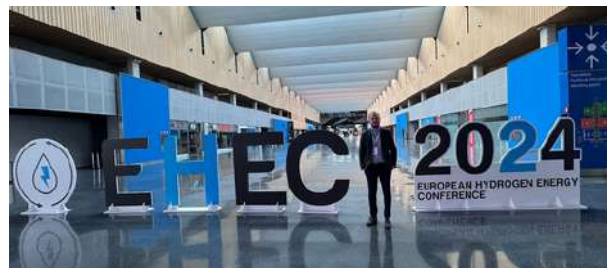
In its presentation, Luca the objectives and results of AMON and updated the audience about the activities implemented and the progress achieved so far, as well as the next steps and expected impact. Hossein Namdar, PhD student at the Center SE, also participated in the event presenting the work "Investigating PEMWE commercial membrane performance using argon-oxygen plasma and ALD-TiO₂ technology".

As reported in the website: "The European Hydrogen Energy Conference (EHEC) is Europe's conference of reference in the hydrogen sector. Hosted every two years, EHEC is organized by the Spanish Hydrogen Association (AeH2) and brings together experts, researchers, and industry leaders in the field of hydrogen, providing a platform for sharing the latest advances, innovations, and developments in hydrogen-based technologies.

With a focus on promoting sustainable and clean energy solutions, EHEC seeks to play a crucial role in advancing the adoption of hydrogen as a clean energy source across Europe and the world."

More information on the agenda at this link:

<https://ehec.info/>



18 MARCH 2024

CINZIA MORISCO IN BRUSSELS FOR THE ENERGY COMMUNITIES MEETING

Last week, on the 13th and 14th of March 2024, CINEA - European Climate, Infrastructure and Environment Executive Agency organised the LIFE-CET Energy Communities Contractor's Meeting.

Cinzia Morisco, researcher at the Center SE of FBK and Coordinator of the ECOEMPOWER project was in Brussels to participate in the event to foster collaboration and synergies between European project working on Energy Communities.

A lot of interesting discussions sparkled between projects and with CINEA on the energy systems of the future and how to support this transition in the best way through our projects.

The meeting was an opportunity for our on-going projects dealing with energy communities to get to know each other and identify cooperation opportunities. Several discussions happened on subjects related energy communities such as financing, One Stop Shops, capacity building and energy poverty. CINEA members, project referents and EU policy officers animated the discussions to understand how to provide the best support to the growing and active number of energy communities in Europe.

In addition, the participation of relevant policy officers from different DGs provided the opportunity to carry out exchanges on policy recommendations and reflect on future needs.

More information on the project: <https://ecoempower.eu/>

25 MARCH 2024

Eleonora Cordioli speaks about Hydrogen mobility at the 2024 National Ski Championships of Engineers and Architects

Last week the 2024 National Ski Championships of Engineers and Architects were held in Corvara in Badia. The event was organized by the Order of Engineers of the Autonomous Province of Bolzano, the Order of Engineers of the Province of Trento, the Order of Architects PPC Bolzano and the Trento Order of Architects with the support of the [National Council of Engineers](#) and the [National Council of Landscape Architects, Designers, Landscape Architects and Conservators](#).

Numerous engineers and architects from all over Italy participated in the event. Fundamental part of the iniziativa has been the conference "*Mobility and sustainable construction in mountain areas*".

Our researcher Eleonora Cordioli was invited as speaker during the conference and presented the opportunities and challenges of hydrogen in the sector, with the speech "*Hydrogen mobility in the Alpine context: technologies, opportunities and barriers*". With her presentation, the researcher illustrated the state of the art of hydrogen applications and the initiatives in the Alpine mobility sector, and therefore the possibilities of integrating hydrogen in mountain areas and the priorities to be managed.

Among the initiatives mentioned, also the [AMETHyST project](#), which aims to define the role of hydrogen in the Alpine context, share best practices and support the development of policies and strategies for the creation of hydrogen-based ecosystems at Alpine level.

More information on the event, [at this link](#).

Programme: <https://www.ingbz.it/it/modulistica-docman/lingua-italiana/news/80-campionato-nazionale-sci-ingegneri-architetti-2024/file>

La scorsa settimana a Corvara in Badia si sono tenuti i Campionati Nazionali di Sci degli Ingegneri e degli Architetti 2024, organizzati dall'Ordine degli Ingegneri della Provincia Autonoma di Bolzano, l'Ordine degli Ingegneri della Provincia di Trento, l'Ordine Architetti PPC Bolzano e l'Ordine Architetti Trento con il patrocinio di [Consiglio Nazionale degli Ingegneri](#) e [Consiglio Nazionale Architetti Pianificatori Paesaggisti e Conservatori](#).

Numerosi ingegneri e architetti da tutta Italia hanno partecipato all'evento. In questo contesto ha preso luogo il convegno "*Mobilità e costruzioni sostenibili nelle zone montane*".

Tra i relatori era presente anche **Eleonora Cordioli**, ricercatrice del Centro Sustainable Energy della Fondazione Bruno Kessler, che ha presentato le opportunità e le sfide dell'idrogeno nel settore, con l'intervento "*Mobilità a idrogeno nel contesto alpino: tecnologie, opportunità e barriere*". Con la sua presentazione la ricercatrice ha illustrato lo stato dell'arte delle applicazioni a idrogeno e le iniziative nel settore della mobilità alpina, e quindi le possibilità di integrazione dell'idrogeno in territori montani e le priorità da gestire.

Tra le iniziative menzionate, anche il progetto [AMETHyST](#), che mira a definire il ruolo dell'idrogeno nel contesto alpino, condividere best practice e supportare lo sviluppo di policy e strategie per la creazione di ecosistemi basati sull'idrogeno a livello alpino.

Maggiori informazioni, [at this link](#).



26 MARCH 2024

The Center SE at the first European PhD Conference!

The first edition of the European PhD Hydrogen Conference (EPHyC) recently concluded!

The conference is aimed solely at EU-based PhD researchers working on a hydrogen-related research topic, and provides a nurturing environment for early-stage researchers to grow, learn and establish their academic presence.

The event was organized by BE-HyFE and Hydrogen Europe Research and took place from 20 till 22 March 2024 in Ghent (Belgium).

EPHyC gathered together over 160 Ph.D. students to unveil the future of hydrogen technology. Among them, there was also Giulia di Gregorio.



"My PhD project focuses on the development of novel platinum-group metal-free electrocatalyst materials for anion exchange membrane water electrolysis (AEMWE)" explains **Giulia di Gregorio**, PhD student at the Center for Sustainable Energy of FBK.

Giulia gave the presentation "Radio Frequency Sputtering deposition of MoS₂ electrocatalyst thin films for Anion Exchange Membrane Water Electrolysis" where she outlined a one-step method for fabricating ionomer-free MoS₂ electrocatalysts onto graphite laminate substrates using radio frequency sputtering. A preliminary ex-situ screening of the functional properties was conducted to evaluate the influence of sputtering operating parameters, using X-ray photoelectron spectroscopy (XPS), X-ray Diffraction (XRD), and Scanning Electron Microscopy (SEM). The as-sputtered samples were integrated into a 25 cm² AEMWE cell setup as cathode electrodes, alongside commercial anodes and anion exchange membranes. Under optimal sputtering conditions, the obtained current density values were comparable to those achieved with benchmark materials. This highlights the potential of radio frequency sputtering for tailoring the physicochemical and electrochemical properties of electrocatalysts, thus contributing to the advancement of AEMWE technology.

Luigi Crema as President of HER made the keynote welcoming speech, in collaboration with Marijke Mahieu, Project coordinator BE-HyFE.

27 MARCH 2024

The meeting of the Zero Carbon Community in FBK

The PNRR has allocated over 3 billion euros to promote the production, distribution and use of hydrogen, considered a fundamental component for the energy transition process. Many of these funds were allocated during 2023, raising the awareness of the need for a national strategy capable of combining decarbonisation objectives with a clear vision of industrial development around this vector.

Yesterday, 27 March 2024, the Partners of the Zero Carbon Community of The European House - Ambrosetti met in Trento with the various public and private stakeholders, to stimulate a concrete debate about the critical success factors for the birth of a national hydrogen supply chain.

During the meeting, the state of the art of hydrogen in Italy and results achieved during the first year of activity of the Zero Carbon Community were presented and themes and stages of the 2024 path was launched.

The meeting has also been the opportunity to discuss the strategies through which to promote industrial initiatives around the development of hydrogen valleys with a focus on the opportunities offered to companies by the ecosystem of the Autonomous Province of Trento.

Among the speakers, there was Luigi Crema - Director of the Center and Vice-President of H2IT, and Matteo Testi - Head of HyRES Unit.

Luigi spoke about the "Political and regulatory conditions for the development of a market for hydrogen applications in Italy" while Matteo Testi presented the activities and the future steps of the Center SE.

28 MARCH 2024

Riva del Garda plans the district heating of the future: a workshop to present the new European project USES4HEAT

How to create the district heating of the future between efficiency, sustainability and flexibility?

This is the question that the 12 speakers and around 100 participants asked themselves at the workshop organized by Alto Garda Servizi, Cartiere del Garda and Alto Garda Power within the new European project USES4HEAT at Riva del Garda.

The workshop addressed various topics of interest, including technological innovations in the district heating sector, strategies to increase energy efficiency, sustainable approaches for the production and distribution of thermal energy as well as the role of renewable energies in the future of district heating. Industry experts, institutional representatives and local stakeholders participated in the event, sharing their experiences and perspectives to outline an increasingly sustainable and cutting-edge future in the field of district heating.



The workshop illustrated the general characteristics of the USES4HEAT project, started in December 2023 for a duration of 4 years. The project will develop two units for the seasonal storage of thermal energy in an underground environment (Borehole Thermal Energy Storage - BTES and Aquifer Thermal Energy Storage - ATES) at two demonstrator sites (Oslo in Norway and Riva del Garda in Italy). The two units will be connected to large-scale district heating networks capable of accumulating various sustainable heat sources.

8 project partners will be active in the area of Riva del Garda (4.1 M€ budget of which 3 M€ of EU funding): Fondazione Bruno Kessler, Cartiere del Garda, Alto Garda Power, Alto Garda Servizi, Hydra, Hiref, Endef, Energenius. The goal is to integrate four different innovative technologies:

1. New seasonal, large-scale ATES through advanced drilling technologies - provided by partner Hydra;
2. New groundwater heat pump with high temperature, low Global Warming Potential (GWP) and connected to both ATES and district heating - provided by partner Hiref;
3. Hybrid solar panels (PVT) - provided by partner Endef;
4. Intelligent energy management using artificial intelligence, big data and cloud-based IT tools - provided by partner Energenius.

Read the entire press release in Italian: [at this link](#).

12 APRIL 2024

FBK SE at Alkeemia Battery Forum 2024

These days, Venice is hosting the **Alkeemia Battery Forum** which is "an open event organized by Alkeemia and reserved for companies and professionals working within the battery and storage ecosystem, with the aim of supporting the European market growth by creating effective connections along the value chain and sharing updates on relevant projects underway."

The Center SE could not miss the opportunity to be there! Our Head of Battery and Electrification Technologies **Edoardo Macchi** participated in the event and had the opportunity exchange views with people of the sector of the latest innovations and receive top-level technical perspectives.

<https://finanza.lastampa.it/News/2024/03/13/alkeemia-battery-forum-il-futuro-delle-batterie-in-europa-passa-per-la-supply-chain-/ODVfMjAyNC0wMy0xM19UTEI>

More information on the event: <https://www.alkeemia.com/alkeemiabatteryforum/>

17 APRIL 2024

School visit to the battery labs

Last Friday the Center SE hosted two classes of the Liceo Rosmini of Rovereto and gave them a guided tour of the laboratories related to batteries.

The programme of the visit was the following:

09.00 - 10.15 | Introduction on FBK, on the Center SE and focus on the activities of the Battery and Electrification Technologies Unit. The presentation was given by the researcher Mattia Duranti.

10.30 - 11.50 | Laboratory tour by Gloria Gottardi, Emanuele Groiss and Mattia Duranti.

Gloria presented the Cluster, Emanuele the chemical lab and Mattia the battery lab.

The students were divided in 4 groups to visit the three laboratories in turns and receive all the clarifications needed.



29 APRIL 2024

FBK SE partners in a new project: NHyRA "Pre-Normative Research on Hydrogen Releases Assessment"

By 2050, hydrogen is expected to fulfill over 20% of Europe's and the global energy demand, becoming a crucial element of the energy transition. Yet, there are concerns about fugitive and vented H₂ emissions potentially increasing anthropogenic hydrogen levels, indirectly impacting the greenhouse effect. The uncertainty remains about the extent of H₂ emissions expected across future hydrogen value chains and their environmental impact. Existing literature offers various scenarios, differing not only in projected H₂ demand but also in how this demand is distributed across sectors.

The NHyRA Project (Pre-Normative Research on Hydrogen Releases Assessment) aims to comprehensively assess potential H₂ releases throughout the entire hydrogen value chain. Given the main information on the amount of anthropogenic H₂ in the atmosphere available in the literature, improving the capability to quantify both small and large releases is critically important. NHYRA will deliver validated methodologies and techniques for measuring or estimating these emissions.

The project is structured around four main macro-activities:

1. Establishing a hydrogen release inventory to catalog anthropogenic H₂ emissions across the hydrogen value chains.
2. Developing and validating methodologies for detecting and quantifying H₂ releases.
3. Quantifying H₂ releases and defining scenarios with various time horizons, such as 2030 and 2050.
4. Providing recommendations to International Standard Bodies and developing mitigation strategies to reduce identified H₂ releases.

FBK through the Center Sustainable Energy is actively involved in the creation of the hydrogen release inventory, leading the definition of the entire hydrogen supply chain. FBK's role extends to quantifying potential H₂ releases across the H₂ value chain and evaluating the impact of mitigation strategies at the process level. Additionally, FBK will quantify H₂ releases in future hydrogen economy scenarios, highlighting its pivotal role in advancing hydrogen safety and sustainability measures.

More information on the project: <https://nhyra.eu/>

Have a look at the press release: <https://nhyra.eu/news-and-publications/news/press-release-launch-of-the-eu-funded-project-nhyra-pre-normative-research-on-hydrogen-releases-assessment/>

7 MAY 2024

Fondazione NEST launches the Entrepreneurship School

Fondazione NEST - Network 4 Energy Sustainable Transition and the incubator of the Politecnico di Bari, BINP - Boosting Innovation in Poliba organize a learning path dedicated to **doctoral students** of any disciplinary sector through which to develop, in learning by doing mode, skills aimed at promoting the ability to translate their research into entrepreneurial opportunities.

The school will be held at the headquarters of the BINP incubator from **10 to 14 June** and is organized over 5 days, from 9:30 to 13:30 and from 14:30 to 18:30 for a total of 40 hours.

Those who complete the entire course will be awarded 4 CFU.

Fondazione NEST is the reference for the extended Partnership for the topic "*Energy Scenarios of the Future Line 2a: Green Energy of the Future*". The incubator BINP is specialized in the development of high-tech entrepreneurial initiatives and tools for the economic growth and employment of the territory.

PROGRAMME: <https://ow.ly/BaXB50RuYj6>

APPLICATION DEADLINE: 31 May 2024 - <https://ow.ly/cNc250RuYj2>

Fondazione NEST - Network 4 Energy Sustainable Transition, soggetto attuatore e referente unico per il Partenariato esteso per la tematica "Scenari Energetici del Futuro Linea 2a: Energie Verdi Del Futuro" e l'incubatore del Politecnico di Bari, BINP - Boosting Innovation in Poliba, specializzato nello sviluppo di iniziative imprenditoriali high-tech e in strumenti per la crescita economica e occupazione del territorio, organizzano un percorso di apprendimento dedicato ai dottorandi di qualsiasi settore disciplinare attraverso il quale sviluppare, in modalità *learning by doing*, competenze finalizzate a favorire la capacità di tradurre le proprie ricerche in opportunità imprenditoriali.

La scuola si terrà presso la sede dell'incubatore BINP **dal 10 al 14 giugno** ed è organizzata in 5 giornate, dalle 9:30 alle 13:30 e dalla 14:30 alle 18:30 per un totale di 40 ore.

A coloro che completeranno l'intero percorso saranno riconosciuti 4 CFU.

PROGRAMMA: <https://ow.ly/BaXB50RuYj6>

ISCRIZIONI: entro il 31 maggio 2024 - <https://ow.ly/cNc250RuYj2>

13 MAY 2024

AMETHyST 3rd Newsletter

In the newsletter you will find a lot of news, events, findings, key points and achieved results in it.

The Newsletter #3 contains information on

- the project meeting in Ljubljana and the exchange programme hydrogen landscape in Slovenia (political framework & pilots).

During the first week of April, Eleonora Cordioli, Ilaria Alberti and Sara Stemberger from the Center for Sustainable Energy of FBK participated in the project meeting hosted in Ljubljana by the Slovenian partner ENERGAP.

- on the publication: Current status of hydrogen application in the Alpine Region.

Our researcher Eleonora Cordioli and Jacopo de Maigret gave an insight into the first results of the Alpine Space Project AMETHyST. The first report shows the current status of hydrogen in the Alpine region. The second report illustrates the spatial distribution of applications using a mapbased representation.

- the Midterm-Conference Trentino that will take place on the 16th October 2024 in Trento!

Interview to Cordioli and de Maigret: <https://www.youtube.com/watch?v=FW1ZNLxKPKo&t=61s?>

14 MAY 2024

The social impact of Renewable Energy Communities

On May 8, the FBK Project Manager Cinzia Morisco was in Milan to take part in the workshop organized by the company Ricerca sul Sistema Energetico - RSE Spa on the social impact of Renewable Energy Communities within the ECOEMPOWER Project.

Cinzia, the Project Coordinator, presented ECOEMPOWER focusing on the efforts that are being made on building the indicators for social impact.

These indicators will be soon measured in the 15 pilot cases spread around Europe.

Several experts from the Italian landscape as well as Vincenzo D'Andrea and Letizia Zampino from the project partner University of Trento participated in the event fostering the discussion on how to build a methodology for measuring the social effects of the RECs.

Programme, [at this link](#).

20 MAY 2024

A novel flexible solution validated using a reversible Solid Oxide system: Smart Ways for In-Situ Totally integrated and Continuous Multisource Generation of Hydrogen (SWITCH project)

On the 31st of March 2024, the consortium partners brought the curtain down on SWITCH, an innovative project focused on the development and validation of an in-situ fully integrated and continuous multisource hydrogen production system. This European project was funded by the Clean Hydrogen Partnership and implemented by seven interdisciplinary organisations from across Europe led by Fondazione Bruno Kessler since it began in 2019.

One of the key principles of the EU Green Deal is to ensure a secure and affordable EU energy supply. Hydrogen generation is aiming to support the growth of clean and low carbon energy systems and their diffusion in order to have a fully decarbonized society.

At present, unfortunately, the large majority of hydrogen is produced from natural gas and oil, resulting in the co-production of CO₂, a significant greenhouse gas. The remaining hydrogen is generated through electrolysis, although the majority of this production relies on non-renewable sources.

The European research project SWITCH attempted to tackle these challenges. During four years of intense research and collaboration, the consortium succeeded in different directions by creating a system that accommodates the intermittency of renewable energy by being able to rapidly switch between electrolysis and fuel cell operation modes. Furthermore, the flexibility of the system is a big added value as it allows to use distinct energy carriers, the connections to the grid as it ranges from the production to the consumption of energy with a focus on mobility due to its reversibility.

The project provided a robust baseline from which to start further system development through the creation of demo sites.

“The SWITCH project has successfully concluded, leaving behind a lasting legacy in the field of sustainable energy production that will be felt for the years to come. The project's groundbreaking achievement lies in the development of a novel hydrogen production system that leverages solid oxide cell technology” reports the Project Coordinator Matteo Testi – Head of HyRES Unit at the Center for Sustainable Energy of FBK. “This system surpasses traditional hydrogen production methods in terms of efficiency, cost-effectiveness and environmental friendliness, heralding a potential revolution in the way we produce and utilize hydrogen. SWITCH represents a major leap forward in the journey towards a clean hydrogen economy, promising reduced emissions, enhanced energy security and a more sustainable future. The project's significant contribution to the development of a low-carbon future has been duly recognized on the international stage. SWITCH was recently bestowed with the prestigious Energy Globe Award 2023 for Italy, a testament to its remarkable impact in the fight against climate change and its potential to create a real difference in the world. The SWITCH project's success serves as an inspiration, showcasing the potential of innovation and collaboration to drive positive change and propel us towards a cleaner, brighter future”.

On May 15th, SWITCH held the final event “Hydrogen production and the society decarbonisation: SWITCH contribution to continuous energy supply and creation of flexible and interconnected energy systems grids”.

Read the entire press release (English), download the presentations and photos at this link: <https://switch-fch.eu/a-novel-flexible-solution-validated-using-a-reversible-solid-oxide-system-smart-ways-for-in-situ-totally-integrated-and-continuous-multisource-generation-of-hydrogen-switch-project/>

Download the press release in Italian: <https://magazine.fbk.eu/it/news/si-e-chiuso-il-sipario-sul-progetto-switch/>

27 MAY 2024

Hydrogen-powered snow groomers: FBK visited Prinoth in Vipiteno

On the 21st of May 2024, our researcher Eleonora Cordioli was in Vipiteno to visit the manufacturing site of Prinoth, together with [APE FVG - the Energy Agency for Friuli Venezia Giulia](#), [PromoTurismoFVG](#) and [Funivie Madonna di Campiglio](#).

[Prinoth Group](#) is specialized in producing heavy equipment for challenging conditions and their machines are designed for specific purposes, whether moving earth, grooming snow or managing vegetation.

The company guided the guests through a visit and showed the prototypes of hydrogen-powered snow groomers, that the company is developing.

FBK and APE FVG - partners in the AMETHySt project - together with Funivie Madonna di Campiglio and PromoTurismoFVG - which are involved in the project's pilot studies, are interested in understanding the potential and feasibility of implementing hydrogen-powered snow groomers in ski areas.

[Interreg Alpine Space AMETHyST project](#) supports the deployment of local alpine green hydrogen ecosystems, with a focus on tourist areas. Designing and testing support services to roll out green H2 solutions in areas with high potential, the project aims at reinforcing the role of public authorities by raising their awareness on hydrogen and its importance in the decarbonisation of these territories.



28 MAY 2024

Luigi Crema speaks about European research on hydrogen

During the fourth week of May, [IMDEA Energy](#) has organised together with the [Universidad Rey Juan Carlos](#) the Spring School of the [SH2EProject](#) and [eGHOSTProject](#).

The event aimed to showcase and train in new tools and technical developments around the hydrogen economy as a basis for achieving a decarbonised society in 2050, including environmental, economic and social aspects to ensure sustainability in its broadest concept.

Along with its technical development, it is important to ensure its sustainability in its broadest concept, including environmental, economic and social aspects.

During the School, the guidelines proposed in SH2E for harmonized life cycle assessment, life cycle costing, social life cycle assessment and its combination in life cycle sustainability assessment were presented as well as the criticality indicator proposed in the project and the SH2E software tool to support these guidelines will be explained.

The School also focused on the eco-design of hydrogen systems following the guidelines developed in the eGHOST project, the first European project on the sustainable-by-design of hydrogen technologies. The methodology and guidelines developed in the project are the basis for the corresponding lectures. As a complement, some of Europe's most important researchers will present the current and future state of hydrogen research and technologies.

To this end, some of Europe's leading researchers presented the current and future state of hydrogen research and technologies.

4 JUNE 2024

Luigi Crema at JUST-GREEN AFRH2ICA Stakeholders' Event

JUST GREEN AFRH2ICA is a Clean Hydrogen Partnership project that aims to develop a Green Hydrogen Just Transition Roadmap that would make African-European transition pathways to H2 synergic, sustainable and avoiding any "Africa hydrogen colonization", but promoting a mutual benefit collaboration of the two continents towards the development of independent and collaborative hydrogen economies, R&D ecosystem and value chains.

Africa has a unique potential to exploit low cost renewable energy to produce green hydrogen for domestic and external markets. Green Hydrogen could become indeed the booster of a sustainable development of the continent, enabling African countries to reduce their environmental impact as well as to make them less dependent to fossil fuels which can create geopolitical issues too. African green hydrogen development could be helpful for European hydrogen transition, that's why it's important that both EU and AU hydrogen policies and development roadmaps are conceived in a cross-fertilizing way.

On May 28, the project organised in Genoa (Italy) a Stakeholder event where local and national authorities discussed with stakeholders from the private sector on the importance of a strategy for the collaboration between Italy, Europe and Africa when creating a hydrogen market.

The first session entitled "Italy as protagonist in Green Hydrogen Transition in EU/AU and the role of green hydrogen in Italian Piano Mattei" delved into the impact of the Italian Piano Mattei and the abundant opportunities for hydrogen ventures bridging Italy and Africa. In this occasion, Luigi Crema spoke about the green hydrogen production projects in Italy and the national roadmap.

The second session will be dedicated to real experiences of hydrogen experts from industries already engaged both in Europe and Africa.

More on the project: <https://just-green-afrh2ica.eu/about/>



Nienke Homan (CEO of Impact Hydrogen) and Luigi Crema (Director of FBK-SE Center) at the event.

10 JUNE 2024

Fiera di Primiero hosted international experts on Energy Communities

Experts from the eighteen partners of the European Horizon Europe COMMUNITAS project met in Fiera di Primiero for three days of meetings on the topic of energy communities, from June 5th to 7th. The first two days were held behind closed doors to analyze the progress of the project activities as well as the next steps in implementation at the demonstrator sites, including the Primiero Valley.

On Friday morning, a community event was held in collaboration with the European project LIFE ECOEMPOWER, coordinated by the Center for Sustainable Energy of FBK, on the topic of social participation in energy communities. Speakers at the event included Debora Cilio from RSE, Massimo Plazzer from APRIE (Province of Trento), Isacco Corradi from the Trentino energy community Green Land, Simone Canteri from the Azienda Consorziale Servizi Municipalizzati (ACSM S.p.A), and Roberto Pradel, president of the Primiero Community.

Additionally, workshops involving active public participation were organized during the morning. The first workshop focused on the ideation of solutions and activities aimed at social engagement of citizens in the development of energy communities, while the second workshop addressed regulatory contexts and governance, involving participants in defining cooperation strategies for optimizing economies of scale.

The Primiero Valley in Trentino is one of the eight European pilot sites involved through ACSM S.p.A., which has always been committed to the production, distribution, and sale of electricity and heat from renewable energy sources, specifically through hydroelectric plants and wood biomass district heating plants.

Read the press release in Italian, [at this link](#).

14 JUNE 2024

LUIGI CREMA HAS BEEN RE-ELECTED PRESIDENT OF HYDROGEN EUROPE RESEARCH

Luigi Crema, director of the Center for Sustainable Energy at Fondazione Bruno Kessler, has been reappointed as president of Hydrogen Europe Research (HER), Europe's leading hydrogen research organization. The appointment of the president and new board took place in Budapest today Thursday, June 13, at HER's General Assembly.

Hydrogen Europe Research, composed of more than 150 international universities and research centers, is a member of the Clean Hydrogen Partnership-along with the European Commission and Hydrogen Europe for the industrial sector: the main objective is to contribute to the Green Deal and the European hydrogen strategy by supporting research and innovation activities.

Luigi Crema, who has held the role of HER president since January 2023, commented on the appointment that officially took place this morning with these words: "I'll continue with great enthusiasm and motivation my activity as President of Hydrogen Europe Research, a role that allows to affect policies supporting European hydrogen research. This is also a significant achievement for the national context, as well as for FBK's visibility at the European and global level.

This role enables participation on the Governing Boards of the Clean Hydrogen Partnership, now halfway through its program, as the sole research delegate, along with Hydrogen Europe's three representatives from the European Commission and five from industry. New working groups are gathering important information to identify priorities for the future partnership for the 10th Framework Program, one of HER's upcoming relevant goals. In our proposal, research and innovation will have a well-defined role in a European strategy that will take into account three different areas, which it is important to consider in a united vision: improving competitiveness, supporting industrialization, and a framework for market building."

Also on the new board is Viviana Cigolotti – Head of Division of Technologies and Vectors for Decarbonization at ENEA – who with CNR and Fondazione Bruno Kessler has a collaboration agreement for hydrogen research – and who, at HER, will play the role of technical committee leader of TC4 – hydrogen end uses for stationary and industrial applications.



Read the press release in Italian: <https://magazine.fbk.eu/it/news/luigi-crema-e-stato-rieletto-presidente-di-hydrogen-europe-research/>

19 JUNE 2024

INTRODUCING FBK'S 25 FUTURE SCIENCE AMBASSADORS

Our researchers **Elena Crespi**, **Mattia Duranti** and **Sara Stemberger** are among the future FBK Science Ambassador!

The project aims to enhance the people and the current topics of our Research in line with FBK's Talent Program Hundreds of young researchers, innovators and PhD students are involved in research and higher education projects at Fondazione Bruno Kessler each year.

Human capital enhancement has always been one of FBK's main goals, and to better meet this need, several initiatives have been launched, including the upcoming Talent Program. This program aims to uncover the potential and maximize the skills of each talent by offering individual experiential learning pathways linked to their respective professional vocations.

Read the press release in Italian: <https://magazine.fbk.eu/it/news/presentati-i-25-futuri-science-ambassador-di-fbk/>

24 JUNE 2024

FBK SE at the Second Italian Workshop on Ammonia Energy

The event hosted by the Politecnico di Bari took place on the 5th and 6th of June 2024, and was organised by the Italian Section of The Combustion Institute and the Consiglio Nazionale delle Ricerche - Istituto di Scienze e Tecnologie per l'Energia e la Mobilità Sostenibili (CNR-STEMS).

As reported in the brochure of the workshop, Ammonia Energy is emerging as a key topic towards the decarbonization of power, heat and transportation sectors. However, "ammonia economy" still presents many open issues, spanning from ammonia synthesis to utilization, before its deployment at different scales. In this context this event provides a unique opportunity where academics, SMEs and Industrial companies can profitably discuss the future of ammonia energy. The forum represents a tangible opportunity to share actors' needs and expertise, towards the definition of common strategies to develop the role of Ammonia as a key player in the future of green fuels.

Workshop participants had the opportunity to proactively analyze ammonia energy peculiarities and define possible concrete roadmaps through their participation in round-table discussions and with their own contributions for oral presentations.

Our Head of HyRES Unit Matteo Testi outlined how direct ammonia fuel cells (DAFCs) are a promising technology for clean energy generation due to ammonia's advantages as a hydrogen carrier, summarizing the state of DAFC research, highlighting progress in experimental activities in the framework of European and national projects. The presentation was done in the context of the AMON Project.

26 JUNE 2024

Emanuele Maria Groiss at the 37th Topical Meeting of the International Society of Electrochemistry

On the second week of June 2024, the 37th Topical Meeting of the International Society of Electrochemistry took place in Stresa (Italy) where experts meet "to discuss the latest developments in materials and related electrochemical results and applications in strategic sectors such as local energy distribution, automotive, smart grids and electrical network load management, trying to push the state of the art of novel electrochemical processes to a new advanced level".

Emanuele Maria Groiss participated in the event with an oral presentation entitled "Iron hydrolysis suppression by glycine addition in concentrated iron electrolyte for aqueous Redox Flow Batteries" in the session Beyond Lithium, new chemistries and approaches.

Emanuele is 1 year PhD student in "Materials, mechatronics and systems engineering" at the Industrial Engineering dept. of the University of Trento with focus on materials for energy and sustainable development. Emanuele works on iron-based Redox Flow Batteries at the Centre for Sustainable Energy in Fondazione Bruno Kessler (FBK). His thesis aims to investigate the employability of low-cost, low-impact, abundant materials to produce valuable inorganic aqueous electrolytes for RFBs. We approach the challenge of energy storage diversification focusing on the materials' sustainable design for possible long-term, high-volume, stationary energy storage RFBs.



Have a look at the programme: https://topical37.ise-online.org/img_conf/TM-37-PROGRAM-A5.pdf
 Link to the abstract: https://abstracts.ise-online.org/infiles/doc_production/top240534.pdf

28 JUNE 2024

Luigi Crema in Storo to speak about energy in the future

One week ago, our Director Luigi Crema was invited as speaker in the event "L'ENERGIA NEL FUTURO: CONOSCERE PER PRODURRE, USARE E TRASFORMARE [Energy in the future: knowledge to produce, use and transform]", which took place in Storo hosted by [Agri'90](#).

More than 100 entrepreneurs and professionals participated in the event focused on the sustainability of the energy market.

Luigi Crema firstly made a presentation about the context, vision and macro-trend of the energy market, then outlined to the participants the new technologies that will have an impact in the production, distribution and energy storage policies.



This event is part of a series of meetings and initiatives called "InAgenda" organised by La Cassa Rurale Adamello Giudicarie Valsabbia Paganella for local companies to raise their awareness on the sustainable developments goals and the ESG criteria, and to provide them with tools to start or continue a sustainable path.

La Cassa Rurale is a bank of the Gruppo Bancario Cooperativo Cassa Centrale Banca and, among other activities, organises initiatives to favour exchanges of experiences, ideas and best practices on the territory.

1 JULY 2024

Matteo Testi invited as panelist in AMETHyST Exchange program



Photo taken from [this link](#)

On the 13th June 2024, Matteo Testi participated in a roundtable on policies and best practices for the deployment of hydrogen applications organized in the context of the third Exchange Program of the [AMETHyST project](#).

The panel moderated by Maren Mayer (Klima Haus) saw the participation of:

- Gottfried Rier, CTO, GKN Hydrogen
- Matteo Testi, Head of HyRES Unit, FBK-SE
- Ulrich Santa, Director, Energy Agency South Tyrol - CasaClima
- Matteo Mazzolini, Director, Energy Agency Friuli Venezia-Giulia (APE FVG)
- Tomaž Robič, Energy Agency ENERGAP, Maribor

The experts discussed the main barriers to implementation and perspectives on the stationary use of hydrogen in the building sector.

The panel was part of a bigger event for companies, public authorities, and experts which was held in South Tyrol, Italy, at the headquarters and assembly lines of the innovative company GKN Hydrogen.

The 26 participants from Italy, Austria, Germany, and Slovenia visited GKN Hydrogen to learn about the company's state-of-the-art hydrogen storage technology. They also toured the nearby farm and tourist accommodation "Arieshof," where one such storage solution is in operation, aiming to provide maximum energy autonomy.

More information: <https://www.alpine-space.eu/project-news/amethyst-exchange-programme-a-visit-to-gkn-hydrogen-and-pilot-site-arieshof/>

2 JULY 2024

Edoardo Macchi invited at the Batteries Europe workshop

[Batteries Europe](#) and [BEPA](#) have recently released five Position Papers in 2024 that shed light on critical aspects of the battery industry. These papers represent a collaborative effort to address critical challenges and opportunities in the battery sector. The topics covered include Education and Skills, Sustainability, Safety, Social sciences and Humanities, Digitalisation and Hybridisation.

Our Head of Batteries and Electrification Unit Edoardo G. Macchi is among the leading authors of the position paper of the Safety Task Force. The paper was published in April 2024.

Last June 18, Batteries Europe organised an online workshop to disseminate the papers. Edoardo Macchi was invited to speak about safety issues in Redox Flow Batteries and participate in the panel session "New approaches to develop enhances safety materials, cells and battery systems".

Batteries Europe is a European Technology and Innovation platform connecting and supporting research and innovation stakeholders across the entire European Battery Value chain.

More information on the position papers: <https://batterieseurope.eu/results/position-papers-on-cross-cutting-topics-2024/position-papers-on-cross-cutting-topics-2/>

Direct link to Safety Position Paper: https://batterieseurope.eu/wp-content/uploads/2024/05/Task-Force-Safety_.pdf

3 JULY 2024

Edoardo Macchi and Mattia Duranti at IFBF2024

Edoardo G. Macchi and Mattia Duranti participated in the International Flow Battery Forum (IFBF2024) in Glasgow, Scotland.

IFBF is the leading worldwide event for the flow battery community where, every year, experts present the most recent and cutting-edge developments on the flow battery technology. Scientific and business-oriented topics are showcased in a blend of competences heading toward the confirmation of this technology as a major player among electrical energy storage systems.

From 25 to 27 June 2024, our researchers had the opportunity to discuss the latest innovations, policy updates and market challenges for the flow battery sector, as well as the possibility to participate in the extraordinary site visit to [Invinity Energy Systems](#) manufacturing site.

Our researcher Mattia Duranti had the opportunity to present a poster entitled "Debate on Safe, Sustainable and Abundant Inorganic Electrolytes for Redox Flow Batteries", where he reviewed promising alternatives to the Vanadium electrolytes commonly employed in the mainstream systems, with a special attention to safety, affordability and sustainability.

More information: <https://flowbatteryforum.com/>



8 JULY 2024

Emanuele de Bona presents Hy-SPIRE at HYCELTEC 2024



Our Emanuele de Bona attended the IX Symposium on Hydrogen, Fuel Cells and Advanced Batteries ([HYCELTEC 2024](#)) during the first week of July 2024, in Milazzo (Sicily, Italy).

This conference was a great opportunity to meet many key actors in the field of H₂ production and renewable energies. The contributions were divided into 3 sessions, where the speakers shared the latest progress in their respective fields. General discussion and exchange among the different fields were fostered by the plenaries and the mixed poster session.

Emanuele was selected as oral contributor in the fuel cell session, where he gave the presentation entitled "*Symmetric electrolyte-supported solid oxide electrolyser cell for green H₂ production*", which reported the development of the test bench for single SOECs testing in the FBK laboratories.

The presentation was done in the context of [Hy-SPIRE project](#) where the Center SE leads the Work Package 4, therefore managing the activities of communication, dissemination and exploitation, and providing a techno-economic analyses supported by life cycle assessment (LCA) addressing the recycling and end-of-life scenarios for the developed technology. During the project, FBK will also be in charge of the testing of the stack and the development of dedicated protocols and procedures for the testing activity on novel SOE stack based on metal and electrode supported cells.

9 JULY 2024

Elena Crespi and William G. Morais at the MST Days

Every year the Doctoral Program in Materials Science and Technology of the University of Padova organises the MST Days. The event aims to promote research activities, networking and career development of the PhD students.

This year the MST Day took place on the 3rd of July 2024 and the Center for Sustainable Energy of Fondazione Bruno Kessler was invited to participate.

Elena Crespi and **William Gomes de Morais** were invited to participate and to represent the Center SE. Following a general presentation of Fondazione Bruno Kessler and the activities done within the Center SE, the researchers focused on the two Research Unit:

- Elena Crespi presented the activities of the HyRES Unit (Hydrogen Technologies and Resilient Energy Systems)
- William Gomes de Morais presented the activities of the BET Unit (Battery and Electrification Technologies).

During the presentation, some concrete examples of ongoing research projects were also introduced. This gave the opportunity to the PhD students to understand how the skills they are developing in their studies can be applied in industrial-oriented research projects.

10 JULY 2024

Fabio Torazzi at HYCELTEC 2024 with a poster on H2@TN

Fabio Torazzi presented the poster entitled "*Ba Zr_{0.8} Y_{0.2} O₃*" Proton Conductive ceramic: an electrolyte for H₂ production at intermediate temperature" about the results obtained regarding one of the topic he is currently working on: synthesis and sintering of Ytria-doped BaZrO₃ as promising electrolyte for Proton Conductive Electrolytic Cell (PCEC) for green hydrogen production.

Fabio is a PhD student at the University of Trento and FBK, financed by the project "Producing Hydrogen in Trentino (H₂@TN)" is a project of the University of Trento and Fondazione Bruno Kessler, financed by the Autonomous Province of Trento.

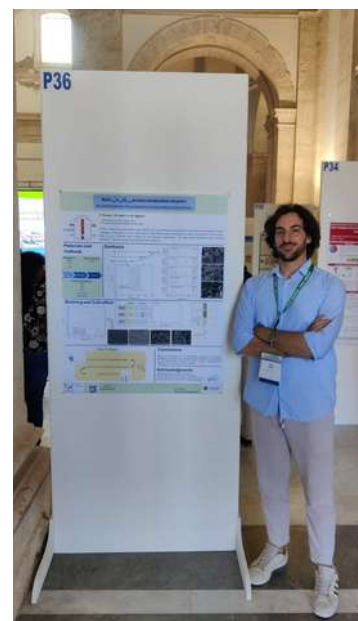
H₂@TN aims to develop innovative technologies for hydrogen production, providing valuable solutions to boost decarbonization and improve the flexibility of energy systems. The project is a concrete step toward realizing the Trentino Green Deal.

In H₂@TN project, the team is working on different topic in collaboration with Università degli Studi di Trento. In particular:

- Solid Oxide Cells and Proton Conductive Cells for green hydrogen production at intermediate and high temperature
- Plasma-assisted hydrogen production
- Solar energy-based fotoeletrochemical Cells for green hydrogen production

The project was born from the necessity to increase the green hydrogen production experience in Trentino region, joining experience of both University of Trento, FBK and companies of the sector.

Fabio reported that "The conference was a first experience for me, and I tried to bring home as much as possible: productive discussion about the topic, interesting networking, important new knowledge". Well done!



16 JULY 2024

FBK welcomes Austrian delegation

Experts from the Energy Institute at the Johannes Kepler Universität Linz visited FBK on Wednesday 10 July 2024 to open a partnership between Upper Austria and Trentino in the field of hydrogen technology and battery technology as part of the decarbonization pathway.

FBK is currently a partner of Upper Austria, Carinthia and Styria in HI2. HI2 is a Large Hydrogen Valley project that is currently under evaluation by the European Clean Hydrogen Partnership.

Large Hydrogen Valleys are ecosystems with a local or regional focus. They develop projects for the entire hydrogen chain, from production to storage and from distribution to final consumption.

"It is a pleasure and an honour for FBK to receive this delegation from Upper Austria, which includes leading personalities from institutions, research and industry. I hope that with this first exchange, we can quickly build a bridge of cooperation between our institutes on the key issues of climatic and energy challenges, in particular to the joint development of new hydrogen and battery technologies, also using our laboratories and infrastructures," comments Luigi Crema, Director of the Center for Sustainable Energy and President of Hydrogen Europe Research.

Italian version:

eri FBK ha accolto esperti dell'Energieinstitut an der JKU Linz per avviare una collaborazione tra Upper Austria e Trentino su temi legati alle tecnologie dell'idrogeno e delle batterie all'interno del percorso di decarbonizzazione.

Attualmente FBK è partner con Upper Austria, Carinzia e Stiria di **HI2**, il progetto di Large Hydrogen Valley in fase di valutazione da parte della Clean Hydrogen Partnership europea.

Le Large Hydrogen Valley sono ecosistemi con focus locale o regionale che sviluppano progetti applicati all'intera catena dell'idrogeno: dalla produzione allo stoccaggio, dalla distribuzione all'utilizzo finale.

"È un piacere e un onore per FBK ricevere e ospitare questa ampia delegazione dall'Upper Austria, che coinvolge figure istituzionali, dirigenti del settore ricerca e dell'industria. Con questo primo scambio mi auguro si possa rapidamente costruire un ponte di collaborazione tra i nostri istituti sui temi chiave della sfida climatica e energetica, in particolare sullo sviluppo congiunto di nuove tecnologie per l'idrogeno e le batterie, coinvolgendo anche l'uso dei nostri laboratori e infrastrutture", commenta Luigi Crema direttore del FBK-SE | The Centre for Sustainable Energy | Bruno Kessler Foundation e presidente di Hydrogen Europe Research.

German version:

Experten des Energieinstituts an der JKU Linz haben gestern FBK besucht, um eine Partnerschaft zwischen Oberösterreich und dem Trentino im Bereich der Wasserstofftechnologie und der Batterietechnik im Rahmen des Dekarbonisierungspfads zu eröffnen.

FBK ist derzeit Partner von Oberösterreich, Kärnten und der Steiermark in HI2. HI2 ist ein Large Hydrogen Valley Projekt, das sich zur Zeit von seitens der European Clean Hydrogen Partnership unter Bewertung befindet.

Large Hydrogen Valleys sind Ökosysteme mit lokalem oder regionalem Fokus. Sie entwickeln Projekte für die gesamte Wasserstoffkette, angefangen bei der Produktion bis zur Speicherung und vom Vertrieb bis zum Endverbrauch.

"Es ist eine Freude und eine Ehre für FBK, diese Delegation aus Oberösterreich, an der führende Persönlichkeiten aus Institutionen, Forschung und Industrie beteiligt sind, zu empfangen,. Ich hoffe, dass wir mit diesem ersten Austausch schnell eine Brücke der Zusammenarbeit zwischen unseren Instituten zu den Schlüsselthemen klimatischer und energetischer Herausforderungen schlagen können, insbesondere zur gemeinsamen Entwicklung neuer Wasserstoff- und Batterietechnologien, auch unter Nutzung unserer Labors und Infrastrukturen", kommentiert Luigi Crema, Direktor des FBK-SE | The Centre for Sustainable Energy | Bruno Kessler Foundation und Präsident von Hydrogen Europe Research.



29 JULY 2024

Marco Tomasi at SETE Festival

Do you know that in June Rovereto hosted the second edition of the [SETE Festival](https://www.setefestival.it/)?

The two-day event wishes to address climate change through a change of perspective, fostering the dialogue from different topics and sectors and with the presence of scientists, activists and companies as well as shows and installations.

The Senior Business Development Manager **Marco Tomasi** participated in the panel entitled "Energy transition is first of all a technological challenge" where the role of innovative ideas and new technologies was discussed in the perspective of sustainability.

SETE Festival is organized by oSuonoMio in collaboration with the Municipality of Rovereto, Impact Hub as part of the "Lungo Le vie dell'Acqua" project co-financed by the Italian Agency for Development Cooperation. More information at: <https://www.setefestival.it/>

30 JULY 2024

Giulia di Gregorio presents at the 21st International Conference of Advanced Nanomaterials.

The University of Aveiro (Portugal) hosted the [21st International Conference on Advanced Nanomaterials](#) from 24 to 26 July 2024.

Our PhD student Giulia di Gregorio participated in the conference with an oral presentation entitled "Radio Frequency Sputtering deposition of MoS₂ electrocatalyst thin films for Anion Exchange Membrane Water Electrolysis (AEMWE)".

Giulia outlined how AEMWE's distinct advantages lie in its reliance on alkaline feeds, making it compatible with cost-effective platinum-group-metal-free (PGM-free) electrocatalysts. Therefore, the fabrication of highly efficient PGM-free electrocatalysts is imperative for fostering the commercial growth of AEMWE. Herein, Giulia described a versatile method for fabricating self-supported molybdenum disulfide (MoS₂) electrocatalysts onto nickel fiber papers using Radio-Frequency (RF) magnetron sputtering (MS) at room temperature. This technique is emerging as an environmentally friendly, industrially scalable, and highly reproducible one-step fabrication technique for catalyst deposition. Indeed, it enables precise control over the deposited catalyst properties, allowing for tailoring the composition of the material, optimizing its microstructure, and controlling the loading and thickness on the substrate. A comprehensive ex-situ characterization of the physico-chemical properties was performed to evaluate the influence of sputtering power, using X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), and scanning electron microscopy with energy dispersive X-Ray spectroscopy (SEM-EDX) and atomic force microscopy (AFM). The hydrogen evolution reaction (HER) electrocatalytic performance of the as-sputtered thin films was assessed using a FlexCell® three electrode half cell setup, with a Pt wire serving as the counter electrode and a HydroFlex® electrode as the reference electrode. A solution of 1 M KOH served as the electrolyte. For benchmarking, a commercially available PGM-free electrocatalyst deposited on the same nickel fiber paper substrate, manufactured by Dioxide Materials, was used. XRD spectra showed no peaks corresponding to the crystalline phases of MoS₂, indicating the amorphous structure of the samples. In contrast, XPS analysis demonstrated that slight variations in sputtering power influence the chemical bonding and oxidation states of the thin films. SEM-EDX revealed a rough surface morphology that closely followed the laminated nature of the substrate. The AFM results suggest that the surface roughness increases with increasing sputtering power.

Giulia reported that electrochemical studies unveiled that the sputtering power also influences the HER performance of the MoS₂ electrocatalysts. Intriguingly, the MoS₂ sample deposited at the lowest sputtering power exhibited higher electrocatalytic activity for HER than the benchmark material.



10 SEPTEMBER 2024

The Center SE at PSE2024!

Ruben Bartali, ChandraKanth Reddy Chandraiahgari and Giulia di Gregorio participated in the 19th International Conference on Plasma Surface Engineering, which took place in Erfurt (Germany) from September 2 to 5, 2024.

The researchers presented their results on **hydrogen production using innovative plasma technologies** developed at the Center for Sustainable Energy of Fondazione Bruno Kessler. The focus was set on three main topics:

- plasma cracking for hydrogen production,
- fabrication of advanced electrocatalysts for hydrogen production using RF sputtering, and
- development of nanomaterial in liquids using RF Plasma Sputtering techniques.



The three researchers have proactively participated in the conference with two posters, two oral presentations and co-chairing a session!

Ruben Bartali co-chaired session 21 "Batteries and Green Hydrogen" and presented the work entitled Method for hydrogen production by methane cracking using vacuum plasma. The senior researcher explained the importance of plasma cracking and the developments in the sector. The cracking of methane-based compounds produces hydrogen gas and carbon-based materials without directly generating CO₂. However, many methane cracking processes operate at high temperatures (>600°C), requiring reactors made from refractory materials and the use of precious catalysts. Plasma cracking overcomes this issue, allowing methane cracking and hydrogen production to occur at ambient temperature.

The presentation was done in the context of the project MECCA "H₂ verde da cracking del bioMEtano tramite una tecnologia innovativa basata su plasma non-termico e Catalisi con nanoCarboni". The Project is funded under the National Recovery and Resilience Plan (NRRP), Project code: RSH2A_000002.

The PhD student **Giulia Di Gregorio** made the presentation entitled Radio Frequency Magnetron Sputtering of MoS₂ electrocatalyst for Anion Exchange Membrane Water Electrolysis. Giulia explained how sputtering technique is gaining prominence as a catalyst fabrication method for hydrogen production, offering a more sustainable alternative to traditional approaches. In her recent work, Radio Frequency Magnetron Sputtering was used to deposit MoS₂ electrocatalysts for Anion Exchange Membrane Water Electrolysis. This method enables precise control over the composition, microstructure, roughness, and thickness of the catalyst layers, which is crucial for optimizing electrochemical performance. By fine-tuning these parameters, sputtering can significantly enhance hydrogen production, making it a key technology for advancing electrocatalysts.

The researcher **ChandraKanth Reddy Chandraiahgari** presented two posters:

1. RF Sputtering onto Liquid Substrates for a Dry Single-Step Preparation of Nanofluids
2. Role of Oxygen Plasma Treatments in Cu/CNT Nanohybrids Synthesis by RF Sputtering

The two research works are highly innovative and sustainable approaches to the development of electrocatalysts by green plasma methods and have attracted a greater curiosity from the PSE community in activities done at the Center.

The posters are done in the context of the project NEST. The Project is funded under the National Recovery and Resilience Plan (NRRP), Project code: PE0000021 "Network4 Energy Sustainable Transition – NEST"

[website](#) and [program](#) of the Conference

13 SEPTEMBER 2024

Mattia Duranti represents BET Unit at the LOLOBAT Final Event

Last Monday, our researcher Mattia Duranti participated in the LOLOBAT Final Event that took place in Milan hosted by RINA Consulting.

LOLABAT is the acronym of "Long Lasting Batteries", a European Project dedicated to the improvement of various components for increasing the recyclability and decreasing the costs of NiZn batteries.

The project has been at the forefront of developing cutting-edge, rechargeable nickel-zinc batteries. This inherently safe technology has the potential to offer high energy and power densities at affordable costs, boosting Europe's energy security autonomy.

During the event, Mattia - researcher of the Battery and Electrification Technologies Unit (BET) - participated with a presentation and as a panelist.

Firstly, he presented the SMHYLES project explaining the objectives and the roadmap of the newly started project and exploring the affinity between the two projects. SMHYLES "Safe, sustainable and Modular HYbrid systems for Long-duration Energy storage and grid Services" is coordinated by FBK through the Center for Sustainable Energy.

SMHYLES project proposes novel sustainable Hybrid Energy Storage Systems (HESSs) based on the combination of two storage technologies with a low content of Critical Raw Materials (CRM), one with long duration capacity and one with very high-power density providing ultra-fast ancillary services for the electrical grid. The project comprehends the design, construction, deployment and demonstration of an Aqueous-based Hybrid Energy Storage System (AHES) and a Salt-based Hybrid Energy Storage System (SHES) as well as a storage duration expansion of a Vanadium Flow Battery.

Furthermore, Mattia participated in the Round Table "Empowering Tomorrow: Advancements in Battery Technology and Sustainable Material Solutions for Production, Recycling, and Supply Chain Management in the EU", discussing aspects related to safety, sustainability and recyclability of the materials used in building today's batteries. The topics spanned from market availability for materials coming from Li-ion battery recycling to novel batteries using abundant and non-flammable materials, built on a safe and sustainable by design approach.

16 SEPTEMBER 2024

Eleonora Cordioli at SDEWES2024

Our researcher Eleonora Cordioli recently participated in the 19th Conference on Sustainable Development of Energy, Water and Environment Systems in Rome from 8-12 September 2024.

SDEWES2024 gathered experts to explore cutting-edge methods, policies, and technologies that promote sustainable development by decoupling economic growth from natural resource use and driving the shift toward a knowledge-based economy—all while balancing the economic, environmental, and social pillars of sustainability.

At the conference, Eleonora presented her work titled "Green Hydrogen in the Alps: Mapping Local Stakeholders' Perspectives and Identifying Opportunities for Decarbonization" in the session Sustainable education, policies and governance 1. This study, part of the Interreg Alpine Space AMETHyST project, delves into the potential of green hydrogen applications in the Alpine region.

The researcher reported that the event "was an excellent platform for exchanging ideas and connecting with fellow sustainability advocates".

More information on the event: <https://www.rome2024.sdewes.org/onsite-programme>



17 SEPTEMBER 2024

Francesca Panaccione speaks about hydrogen at NanoInnovation2024

Last September 11, our researcher Francesca Panaccione was in Rome to participate as invited speaker in the event [NanoInnovation 2024](#).

Through plenary sessions, parallel thematic symposia, round tables and different meeting opportunities, the event aims to update participants on the latest technologies developments and the latest results achieved in research activities. NanoInnovation hosts high-quality scientific sessions where world-renowned speakers will present the most recent results, newest updates and technical developments in the fields of nanotechnology and nano research.

Francesca made the speech entitled "Hydrogen production chain from water to energy" which covered the entire hydrogen supply chain, describing its pillars as the production, distribution, storage and final uses. Different projects were also taken as example, such as the Hydrogen Valleys that aims at replicating the whole hydrogen value chain in small and controlled environments, with the purpose of supporting and fostering the H2 economy creation and development.

18 SEPTEMBER 2024

Michele Bolognese and Michele Urbani presents a poster at "Model Reduction and Machine Learning for solids, fluids and controls"



Our researchers **Michele Bolognese** and **Michele Urbani** presented the poster "Model order reduction for hydrogen applications in the Modelica environment" during the summer school titled "MODEL REDUCTION AND MACHINE LEARNING FOR SOLIDS, FLUIDS AND CONTROLS," organized by ETH Zurich (Switzerland) and TU Delft (The Netherlands).

The two FBK researchers of the HyRES Unit presented their applications related to hydrogen systems, aiming to use reduced-order models derived from CFD simulations or experimental data to assess phenomena like electrolyzer stack degradation or implement complex PDE systems in a Modelica environment, allowing for robust control strategies with reduced computational effort.

The summer school introduced participants to advanced techniques in nonlinear model reduction, focusing on practical applications and covering methods such as projection-based approaches, invariant manifolds (including inertial manifolds, attractors, and spectral submanifolds), and neural-network-based techniques for reduced-order modeling (ROM) across various scientific and engineering fields. The event featured internationally renowned professors such as Charbel Farhat (Stanford University, USA), Michael Graham (University of Wisconsin, USA), George Haller (ETH Zurich, Switzerland), Balakumar Balachandran (University of Maryland, USA), Shobhit Jain (TU Delft, The Netherlands), and Gianluigi Rozza (International School for Advanced Studies, Italy).

19 SEPTEMBER 2024

Gloria Gottardi and Chandra ChandraKanth Reddy Chandraiahgari at the 2024 Spoke 9 Annual General Assembly of NEST project

On September 12th, our researchers Gloria Gottardi and ChandraKanth Reddy Chandraiahgari took part in the annual assembly of the NEST project (Spoke 9) held in Rome, at the CNR headquarters. The [NEST project - Network 4 Energy Sustainable Transition](#), is funded by the European Union under the NextGenerationEU program and at the Italian level by the National Recovery and Resilience Plan (PNRR).

The NEST project has the ambitious goal of connecting the main university laboratories and research groups and the main national research institutions, building a competent Italian leadership, strongly integrated with the territory and businesses, capable of supporting future development towards sustainable and decarbonized energy production and distribution.

The project is organized in 9 spokes. FBK, is involved in 2 spokes (spoke 4 and spoke 9).

The meeting was aimed in particular at the partners involved in spoke 9 - Energy-Sustainable Advanced Materials, dedicated to developing advanced materials and technologies capable of improving the efficiency of materials and devices, reducing their carbon footprint and offering environmental and economic benefits in applications in the energy sector.

Gloria Gottardi is the scientific manager of Spoke 9 and leads the Work Package related to characterisation. FBK conducts multiple research activities, both in the development of nanocatalysts for hydrogen production and in analytical support to project partners through chemical-physical characterization techniques of materials.

Read more on: <https://fondazioneest.it/>

30 SEPTEMBER 2024

Center SE in Rijeka for NAHV Project

Partners of the North Adriatic Hydrogen Valley (NAHV) have gathered in Rijeka at the annual Consortium meeting to review the implementation of key projects, assess risks along the way and focus on integration into their respective social and industrial environments.

Among them there was also the Center for Sustainable Energy of FBK: Marco Tomasi, Sasan Jorjani and Emanuele Martinelli had the opportunity to meet the Partners in person and discuss with the industrial ones about the test-beds development and the replication of the hydrogen valley.

The North Adriatic Hydrogen Valley (NAHV) project's high-level objective is the creation of a hydrogen-based economic, social and industrial ecosystem based on the capacity of the quadruple helix actors. Green hydrogen is essential to decarbonize hard-to-abate, distribution and end user sectors, as it can potentially be produced with no CO2 emission.

FBK leads the project activities related to Exploitation and Replication and is involved in the establishment of a safety plan of the hydrogen valley, the creation of a digital twin to replicate the entire valley, study of a new market scheme for transnational hydrogen trading.

Marco Tomasi presented the general situation of the progress of WP11, in particular in relation to the activities that have already started and the steps to be taken in the next months.

Read the entire press release [at this link](#)



1 OCTOBER 2024

Elena Crespi speaks about the hydrogen at the Wired Next Fest in Rovereto

"The role of renewable hydrogen in the energy transition has been recognized at European level, with the publication of the European hydrogen strategy, and also at Italian level, where the guidelines for the national hydrogen strategy have been published and where with the National Resilience Plan has allocated more than 3 billion euros to the development of projects in the sector" reports Elena Crespi, researcher at the Sustainable Energy Center of the Bruno Kessler Foundation, in her speech this afternoon at the Wired Next Fest in Rovereto.

"When we talk about hydrogen," explained the FBK researcher, "we need to distinguish between hydrogen produced from fossil fuels with the emission of carbon dioxide, and renewable hydrogen produced without polluting emissions. Renewable hydrogen can be used for clean electricity storage and converted back into electricity when demand is greatest. In this way, hydrogen can allow greater penetration of renewables into the electricity grid. Furthermore, hydrogen can be used for the decarbonisation of sectors defined as "Hard to abate", difficult to decarbonise, i.e. those sectors in which electrification is not a viable option, as in the case of the steel industries, cement factories, chemicals. Finally, it can contribute to the decarbonisation of the transport sector, where it can be used as a fuel for both road transport and rail and water transport".

During the debate at Palazzo del Ben in connection with Francesco Sciortino, CEO and co-founder of the startup Proxima Fusion, moderated by the journalist Gialuca Dotti, Elena Crespi also spoke about the scientific and technological frontiers on which she is working and her research activities at the Bruno Kessler Foundation: "From a research point of view, we are active on the entire hydrogen value chain. On the one hand, the focus is on the optimization of electrolyzers. The research is focused, for example, on the use of new, less expensive and better performing materials, but also on better integration with renewables and better management of these systems. At the same time, we are focusing on new hydrogen storage systems, which can complement the more traditional storage of hydrogen under pressure at 200 bar, also facilitating its transport. Finally, the research is also dealing with fuel cells, i.e. systems for converting hydrogen into electricity, which can be used both for stationary purposes and in the transport sector. At FBK, in the Sustainable Energy center, we follow various projects funded by the European Union and research projects to support industries. I'm mainly dealing with electrolysis. I am following experimental activities in which we test different electrolysis cells, to select the components with the best performance. Among the European projects I followed the SWITCH project, which has the aim of optimizing the functioning of a particular reversible system, capable of producing hydrogen both from water and from biogas, at a lower cost".

Read the article in Italian: <https://magazine.fbk.eu/it/news/idrogeno-rinnovabile/>

2 OCTOBER 2024

Luigi Crema invited at the Big Science Business Forum

In these days the third edition of the Big Science Business Forum is taking place in Trieste. The event is a business oriented congress, focused on high technology and innovation with the aim to be the main meeting point between Research Infrastructures and industry in Europe.

Our Director Luigi Crema has been invited as speaker in the roundtable entitled Hydrogen and Big Science: Innovation, Challenges and Future. An Italian-European Perspective.

This specific event was organised by Area Science Park and Ceric-Eric. The panel was dedicated to the entire hydrogen production chain: from scientific research to industry to Italian and European institutions. The speakers outlined the main innovations in scientific research and industrial applications, discussed policies under development and addressed challenges concerning the hydrogen supply chain.

More information on the website: <https://www.bsf2024.org/>

2 OCTOBER 2024

Silvia Ricciuti and Marcin Buchajczyk presents at the AEIT Conference

Last week, from 25 to 27 September, Trento hosted the AEIT2024 International Annual Conference and the Center for Sustainable Energy of FBK couldn't miss the opportunity to participate!

Marcin Buchajczyk - researcher of the BET Unit - presented the paper "Techno-Economic Analysis and Sizing of RFB and Supercapacitor-Based HESS for an EV Charging Station" written with the colleagues Saman Korjani, Mattia Durante, Edoardo Gino Macchi.

The researcher Silvia Ricciuti presented the paper "Emerging security and legal challenges within renewable energy communities: key prevention and defence strategies".

The paper sees the involvement of the Cybersecurity center of FBK and focuses on how the growth of renewable energy communities leads to incredible opportunities for sustainable development and energy independence. However, with these advancements come complex security and legal challenges that need to be addressed.

Silvia outlined three main focuses explored in the paper:

- The cybersecurity risks tied to decentralized energy sharing
- Legal frameworks needed to safeguard community privacy and data
- Strategies for preventing threats and building robust defence mechanisms.

AEIT2024 explored digitalisation and AI's profound impact on energy systems, from optimising renewable energy integration or managing the flexibility of distributed energy resources and multi-vector energy systems to enhancing energy system adequacy, security and resiliency.

More information on the conference: <https://convegni.aeit.it/> and final programme: <https://convegni.aeit.it/aeit2024/documenti/aeit2024finalprogr.pdf>

24 OCTOBER 2024

Luigi Crema at AGICI Conference "Il futuro dell'idrogeno: dalle strategie nazionali al mercato globale"

AGICI is a research and consultancy company specialized in the utilities, renewables, infrastructure and energy efficiency sectors. It collaborates with companies, associations, public administrations and institutions to implement development policies capable of creating value. Hydrogen is one of the topic AGICI deals with through the International Hydrogen Market Observatory.

On October 24, AGICI organised and hosted the final workshop of the International Hydrogen Market Observatory to discuss with operators, associations and institutions about the most recent developments, the actions necessary to launch a global hydrogen market and Italy's role in the European and international context to contribute to the achievement of European objectives for 2030.

Our Director **Luigi Crema** is among the invited speakers of the event entitled *The future of hydrogen: from national strategies to the global market*.

Luigi participated in the panel "Elementi cardine del mercato: domanda e filiera italiana" and discussed about the key elements of the market and the needs of the Italian value chain with representatives of important companies and association such us Sasol Italy, Federacciai, Elettricità Futura, Proxigas.

More information (in Italian) at : <https://agici.it/evento/il-futuro-dellidrogeno-dalle-strategie-nazionali-al-mercato-globale/>

29 OCTOBER 2024

Focus on batteries: a week of events!

What a busy week for our Head of BET Unit!

From October 14 to 16, Edoardo Gino Macchi participated in two high-level and important events for the battery sector that took place in Lyon (France).

On October 14 and 15 took place the General Assembly of the two Important Projects of Common European Interest (IPCEI) on Batteries:

- IPCEI on Batteries
- IPCEI European Battery Innovation (EuBatIn).

Both IPCEIs have in common that their participants represent the complete value chain, from material through the cells to the battery system and the final step of recycling. At the same time, there is a high degree of networking between the companies themselves and the two IPCEIs.

The event was organised by Direction Générale des Entreprises (DGE) and VDI|VDE|IT and participants had the opportunity to discuss the state of art of the projects and exchange views on the battery ecosystem in Europe.

The event also included an exciting visit to the TOKAI KOBEX Savoie (part of the Tokai COBEX Group), a world leader for the supply of cathodic solutions for the aluminium industry, based on graphite materials and as developed an extensive know-how on carbonaceous raw materials selection and graphitization and more generally very high temperature processes through its 125 years of existence.

On October 16, Edoardo Gino Macchi participated to the conference Batteries Event, one of the main event of the sector with an interesting participation of both academia and industry representatives. The event organised 5 panel sessions on different topics: Li-metal batteries, safety, manufacturing, raw materials and trends.

LinkedIn post of the IPCEI General Assembly at this link.

More information on IPCEI Batteries: <https://www.ipcei-batteries.eu/>

More information on Batteries Event: <https://batteriesevent.com/>



30 OCTOBER 2024

Toward district heating of the future: efficiency and sustainability in focus in USES4HEAT project

At the General Assembly at FBK, 27 European partners discuss innovations in geothermal district heating for a sustainable energy transition with focus on demonstrators in Riva del Garda and Oslo.

How to build the district heating of the future with efficiency, sustainability and flexibility in mind? This was the question posed by the 27 partners attending the General Assembly of the USES4HEAT European project, organized at FBK on Wednesday, October 30.

The General Assembly, which saw **50 representatives at the European level gathered at FBK in Povo**, discussed the progress of the USES4HEAT European project, which started in December 2023 for a duration of 4 years. USES4HEAT has received funding for 9.7 million euros from the European research program Horizon Europe out of a total budget of 12.4 million and is coordinated by the KTH Royal Institute of Technology, Sweden's leading technical university.

USES4HEAT will specifically develop at two demonstration sites – **Oslo in Norway and Riva del Garda in Italy** – two units for seasonal **thermal energy storage in an underground environment** (Borehole Thermal Energy Storage – BTES and Aquifer Thermal Energy Storage – ATES). The two units will be connected to large-scale district heating networks capable of storing and using various **sustainable heat sources**. The Riva del Garda district heating system, built since 2007 and operated by **Alto Garda Servizi**, currently supplies more than **300 customers in a 27-km grid**. Heat is generated by **Alto Garda Power's cogeneration plant**, which also supplies Cartiere del Garda paper mills. The primary power source is methane gas.

Eight partners will be engaged in **the Riva del Garda project**, which can count on a budget of **4.1 million euros**, 3 of which will come from Europe: Fondazione Bruno Kessler, through the Sustainable Energy Center, Cartiere del Garda, Alto Garda Power, Alto Garda Servizi, Hydra, Hiref, Endef, and Energenius.

The goal is to integrate **four different innovative technologies**:

1. new seasonal, large-scale ATES through advanced drilling technologies – provided by Hydra;
2. new groundwater high-temperature, low Global Warming Potential (GWP) heat pump connected to both ATES and district heating – provided by Hiref;
3. hybrid solar panels (PVT) – provided by Endef;
4. intelligent energy management through artificial intelligence, big-data and cloud-based computing tools – provided by Energenius.

FBK has been engaged in research projects on **geothermal energy for more than 10 years**, mainly on the province of Trento territory, characterizing its potential through special mapping and monitoring the operation of various plants in different locations across Trentino, also supporting the PAT Geological Service.

FBK's Center for Sustainable Energy is involved in several activities for the USES4HEAT project, including baseline monitoring and planning of demonstration activities, modeling of district heating decarbonization through geospatial mapping and multi-objective dynamic optimization, transient modeling of the plant system, support for plant layout design, supervision of the experimental campaign and critical assessment.

The European project aligns well with the results of the scenarios developed by FBK for the new 2023-2030 PEAP Provincial Environmental Energy Plan, according to which **methane gas usage will have to decrease by at least 22 percent over the 2016-2030 period**, in a trajectory consistent with the full decarbonization (and fossil sources, including methane gas, phase-out) planned for 2050.

Also worth mentioning is that, following the European Union's **RED III directives on decarbonization and energy system security**, **the district heating and cooling sector will have to incorporate incremental shares of renewable energy, from 1 percent in 2024 to 34 percent in 2030**.

In the first 11 months of the project, preliminary geological and engineering design was initiated and completed, and the first exploratory survey will be conducted in early 2025.

Source: FBK Magazine <https://magazine.fbk.eu/en/news/toward-district-heating-of-the-future-efficiency-and-sustainability-in-focus-in-uses4heat-project/>

Read it in **Italian**: <https://magazine.fbk.eu/it/news/verso-il-teleriscaldamento-del-futuro-efficienza-e-sostenibilita-in-primo-piano-nel-progetto-uses4heat/>

More information on the project: <https://www.uses4heat.eu/>

31 OCTOBER 2024

Luigi Crema at the conference "Le imprese italiane e la sfida del SouthH2Corridor"

On October 30, in collaboration with the Italian Ministry of the Environment and Energy Security (MASE), Confindustria organized and hosted in Rome the conference Italian companies and the challenge of the SouthH2Corridor.

The conference saw the participation of institutions and many sector associations and focused on the opportunities for the country system linked to the Southern Hydrogen Corridor, a trans-national project for a hydrogen transport infrastructure which, by connecting the Italian and Central European centers of potential consumption, will also be able to enable the import of green hydrogen, produced at competitive costs in Mediterranean Africa.

The role of the Corridor within the Italian Strategy and the relevance of the regulation for the development of hydrogen transport infrastructures were explored in depth both for the construction of local sustainable hydrogen production plants and for the export of technological know-how.

Our Director Luigi Crema, in his role of **H2IT** VicePresident, participated in the panel "Le partnership con i Paesi dell'Africa mediterranea per la produzione di idrogeno rinnovabile e low carbon: potenzialità e strumenti". Luigi discussed about the potential and tools to produce green hydrogen in the North African countries with representatives of Confindustria, Proxigas, SACE, Cassa Depositi e Prestiti S.p.A.

8 NOVEMBER 2024

Luigi Crema at the SNAM Innovation Day | Evolving Horizons

Today, Snam organised and hosted the event "Evolving Horizons - Innovation Day" which aimed to highlight the latest advancements in technological innovation, discuss the emerging trends that are transforming the energy sector, and forge connections that will drive the future of the energy transition. After the Inspirational Speech and some Startup Spotlights, the event proceeded with three parallel panel sessions:

1. CORPORATE VENTURE BUILDING: The new frontier of Open Innovation.
2. CLEAN TECH AND INNOVATION: Leading the Green Revolution
3. TOMORROW'S ENERGY COMPANY: Transforming Industrial Processes through Cutting-Edge Technology

Our Director Luigi Crema, in his role of Hydrogen Europe Research President, participated in the second round table.

Luigi discussed with Pere Margalef-Valdeperez - Director Decarbonization Technologies at Snam and Andrés Galnares - CEO of H2SITE about the latest research and innovations in Clean Tech technologies, identifying opportunities and challenges.

Read more about it here: <https://lu.ma/dga2tvqh>

12 NOVEMBER 2024

Michele Bolognese at Festival Città Impresa

Last November 8, Michele Bolognese was an invited speaker in "Festival Città Impresa" that took place in Bergamo.

Michele discussed with Silvia Bodoardo (Politecnico di Torino) and Andrea Bolla (VIVI Energia) different aspects of the energy transition. In fact, the HyRES Unit researcher participated in the panel "TRANSIZIONE ENERGETICA: RICERCA, INNOVAZIONE E SFIDE GLOBALI" chaired by the journalist Luca Pagni.

While Silvia Bodoardo focused on batteries and the challenge with bigger countries as China, Michele Bolognese outlined how to produce green hydrogen and how to face the challenge of high costs. The researcher underlined the need for different technologies to exist to reach the energy transition and the importance to use green hydrogen, e.g. produced by renewables energy sources. The production costs will be decreased through the reduction of the costs to produce the technology and through incentives that will support the creation of the supply chain and a new market.

In the case you could not participate in the event, you can still see it online: <https://www.youtube.com/live/V097S1N2Trk>

13 NOVEMBER 2024

Paving the Way for a Hydrogen-Powered Future in the Alps

The Midterm-Conference of AMETHyST Project

The **AMETHyST Project's** mid-term conference, "Hydrogen for the Future of the Alps," brought together local and European leaders, researchers, and industry experts to discuss the critical role of hydrogen in advancing a sustainable energy transition in the Alpine region. The presence of Key stakeholders was also the occasion to launch the **SkHyline platform**, a collaborative initiative designed to unite efforts across regions, fostering knowledge-sharing and accelerating hydrogen deployment in sectors essential to the Alpine economy, such as transport, industry, and tourism.

Hydrogen as a Pillar of Alpine Sustainability

The conference underscored the growing potential of hydrogen as a flexible, clean energy source uniquely suited to meet the specific needs of the Alpine environment. Hydrogen is viewed as a fundamental pillar for decarbonizing energy-intensive sectors and creating a sustainable, self-sufficient ecosystem for transport, tourism, and heavy industries in mountainous areas. Highlighted projects and strategies showcased how hydrogen can contribute to reduced emissions, particularly in traditionally challenging sectors like heavy mobility, industrial applications, and remote energy access.

Building a Local Hydrogen Ecosystem

A wide range of stakeholders from Trentino public and private sectors discussed about the potential, current situation and local synergies for hydrogen in the region. Infrastructure are being created for large H₂ plants, projects are being implemented in collaboration with multinational companies, innovative systems have emerged and are being tested in industries. It is clear that expectations and interest in this energy vector are high. Network, policies and fundings are needed to place the various stakeholders on the entire supply chain.

AMETHyST is developing a holistic approach to hydrogen, envisioning an ecosystem that integrates production, storage, transport, and multi-sector applications. Notable initiatives include the establishment of "hydrogen valleys" for industrial clusters, hydrogen-fueled transport networks, and eco-friendly energy solutions for tourism infrastructure. Large projects representatives brought their experiences and expectations, as well as challenges and solutions. The Alpine region's unique environmental challenges make hydrogen an ideal energy vector, with projects aimed at powering snow groomers, boats on Alpine lakes, and even supporting grid stability through energy storage.

A Call for Cross-Regional Collaboration and Policy Support

The Alpine macro-regional strategy provided the political foundation for the conference, with representatives advocating for policies and funding to advance hydrogen initiatives. Presenters emphasized the importance of a unified, cross-regional framework to foster public-private partnerships, incentivize renewable hydrogen projects to address the high upfront costs and technical complexities of hydrogen infrastructure, but also the need to raise awareness to promote public acceptance and improve skills through trainings. In this context, the newly launched SkHyline platform will facilitate ongoing collaboration, providing a structured network to support innovation, resource-sharing, and coordinated project development across borders.

Challenges in Hydrogen Deployment

A recurring theme throughout the conference was the challenge of scaling hydrogen technologies due to high production costs and limited existing applications. The need for financial support mechanisms and market incentives, for clear regulatory standards and certified operators emerged as critical factors to enable cost-effective hydrogen adoption. Experts from both local and European levels called for long-term investment strategies and cohesive policies to create demand and reduce economic risks for early adopters, as the current high cost of hydrogen technology presents a barrier to widespread deployment.

Education and Awareness Initiatives

The increasing interest and number of activities with hydrogen showed the need for skilled and trained workers in all fields that will need to deal with this vector through the entire supply chain. There is the need for continuous learning, during university but also within companies and through synergies with sectorial associations.

Recognizing the need for greater awareness and of educating policymakers, industry stakeholders, and the public on the benefits of hydrogen as part of the Alpine region's clean energy future. Knowledge dissemination is central to AMETHYST's objectives, ensuring that decision-makers understand hydrogen's role in reducing greenhouse gases, boosting energy independence, and fostering sustainable growth.

Conclusion of the Conference

The "Hydrogen for the Future of the Alps" conference concluded with a resounding consensus on hydrogen's potential as a transformative energy source for the Alpine region. The event highlighted the collective ambition to overcome technical and economic challenges through coordinated action, knowledge-sharing, and supportive policy frameworks. With the establishment of the SkHyline platform and the strong backing of regional governments and industry partners, the Alpine hydrogen community is well-positioned to lead Europe's transition to a resilient and sustainable hydrogen economy.

The event "Hydrogen for the Future of the Alps" took place on 16 October 2024 organised and hosted by Fondazione Bruno Kessler in Trento.

The individual parts of the conference are published on the project Youtube-Chanel: <https://www.youtube.com/playlist?list=PLG660u7JJMTs3G3vONbbfVuqK1bxAAIBo>

Read the press release on FBK Magazine: <https://magazine.fbk.eu/it/news/paving-the-way-for-a-hydrogen-powered-future-in-the-alps/>

Read the press release in Italian: <https://magazine.fbk.eu/it/news/preparare-il-terreno-per-un-futuro-a-idrogeno-nelle-alpi/>



15 NOVEMBER 2024

Luigi Crema at the 18th SET Plan conference

the 18th Strategic Energy Technology Plan Conference is a high-level conference organised under the patronage of the Hungarian Presidency of the Council of the EU in cooperation with the Commission.

The conference that is concluding today focused on "Scaling up research, innovation and competitiveness in clean energy technologies" and aimed at (i) enhancing cooperation and synergies between national and European policies, (ii) facilitating collaboration within energy R&I, (iii) gathering the most promising results of energy R&I.

Our Director Luigi Crema as Hydrogen Europe Research President participated in the panel session "Innovating with Hydrogen: Research, Policy, and Market Synergies" and discussed with the other panelists on how to develop hydrogen at full scale in EU territory, not only at European level but also nationally and regionally.

Luigi outlined the key changes necessary in legislative frameworks to enable the development of a thriving hydrogen economy and described the challenges faced hydrogen technologies in their deployment phase. Our Director also spoke about the importance to align national and regional hydrogen strategies ensuring synergy across all levels and reported the key research and innovation breakthroughs that are critical for reducing the costs and scaling hydrogen production across Europe.

The event: <https://setplan2024.eu/>

18 NOVEMBER 2024

Matteo Testi at GIEF 2024 as key note speaker

Matteo Testi - Head of HyRES Unit - participated as key note speaker in the 3rd edition of the German-Italian Energy Forum 2024, which took place on November 14 at the Chamber of Commerce and Industry in Frankfurt.

The event, under the patronage of the Italian Embassy in Berlin, focused on the energy transition and aimed to bring together leading representatives from business, science and politics from both countries to discuss key topics of German-Italian relations with a view to the green transformation and to open up new business opportunities.

ITKAM - Italian Chamber of Commerce for Germany: <http://www.itkam.org/>
Programme [at this link](#).

19 NOVEMBER 2024

ALCHEMHY: Alternative routes for basic chemicals production using hydrogen as feedstock

A new project just started which sees the participation of the Center for Sustainable Energy of Fondazione Bruno Kessler!

Eleonora Cordioli and Michele Bolognese - researchers of the Hydrogen Technologies and Resilient Energy Systems Unit (HyRES) - participated in the kick off meeting of the ALCHEMHY project!

The event took place on November 6 and 7, hosted by the project coordinator [Fundacion CIRCE - Centro de Investigacion de Recursos y Consumo energeticos](#) in Zaragoza, Spain.

The project consortium consists of 16 partners from 7 EU countries, with diversified expertise and knowledge in the addressed processes and access to the required lab and pilot infrastructure. The project will contribute to the development of a sustainable chemical industry while contributing to a more resilient and secure energy system for the EU, reducing its dependence on imported fossil fuels.

ALCHEMHY aims to develop a set of innovative electrified processes to produce platform chemicals, particularly ammonia and methanol. To this end, processes configuration will be optimised and novel materials and catalysts compatible with the electric input will be developed, optimising their performance, ramp-up times and enabling milder conditions. This will support the intensification and downscaling of the ammonia and methanol production, facilitating decentralised production integrated with downstream processes and renewable energy generation. This is crucial

to decarbonise the production of both chemicals, as current production heavily relies on fossil natural gas for hydrogen generation. The investigated processes will be demonstrated at TRL 6 in relevant experimental facilities, while the technical and economic feasibility of the processes will be studied through a techno-economic assessment (TEA). The processes upscaling, operation and TEA will be supported through dynamic modelling of the processes, generating a digital twin of the processes and a Decision Support System (DSS) to support H2 value chain design.

Fondazione Bruno Kessler, through the Center for Sustainable Energy will be in charge of two main and fundamental tasks: (i) the development of process control from the analysis of the component and the system requirements, to the identification of operational states and transitions for plant commissioning; (ii) the evaluation of environmental, social and economic impact performing a Life Cycle Assessment of the proposed ALCHEMHY technologies, according to pre-defined widely acceptable standards and by including all the intermediate stages of manufacturing, operation, and end-of-life of key parts of the examined processes.

Read the press release of the project [at this link](#)



5 DECEMBER 2024

CELINE, the European project to develop innovative digital services in energy communities, has kicked off

The European project CELINE (Cross-sectorial integrated digital services Enabling energy Localized InnovatiON and community Empowerment), coordinated by Spindox Labs, was officially launched on December 5, 2024. The three-year project has received funding for 4 million euros from the Horizon Europe program and can count on a consortium of 15 partners from 6 European countries: Italy, Spain, Finland, France, Austria, and Belgium.

"The main objective is to foster the adoption of community-based and digitization-oriented innovations in energy," Diego Viesi, FBK researcher, explained. "Indeed, end-user-centered energy initiatives and practices that rely on innovative digital technologies and services will be supported to address the energy needs and local circumstances of specific geographic areas."

The following have been identified as energy end users: communities and community groups (households, prosumers, society as a whole, including social groups at risk of exclusion, citizen associations, energy communities and energy cooperatives, energy living labs) and other energy actors (energy suppliers, local public authorities). In particular, CELINE will focus on energy communities, i.e. living labs and community groups that have expressed interest or that have already participated in citizen-led energy and digital transition processes and will involve two different energy communities (Green Land in Italy and Sapiens Energia in Spain) and an energy living lab (city of Lappeenranta in Finland) as demonstrators of the tools and services.

For Trentino, [Green Land Società Cooperativa di Comunità \(Alpe Cimbra\)](#) has been identified as a pilot site to develop innovative digital services during the project. Thanks to the presence of a renewable energy community (REC) in the process of growth and consolidation, Green Land will be able to be an example of how the sharing of data from different sectors (energy, production, tourism, mobility and climate) can create an ecosystem useful for the development of products and services aimed at efficiency in the use of resources, primarily energy.

"Created in 2023 at the urging of the municipality of Lavarone, the Green Land Community Cooperative aims to transform the Alpe Cimbra (territory that includes the Municipalities of Folgaria, Lavarone, Luserna and Vigolana) into a lively center for the renewable energy adoption center. The cooperative has nearly 200 members, including local authorities, consumer cooperatives, local banks, ski lift companies and private citizens, and involves a total population of about 10,000. Green Land's mission is twofold and embraces both the energy and social fields," Christian Caneppele, Green Land president said.

On the energy side, the Renewable Energy Community (REC) aims to develop community investments, including establishing conventions to support private investment in renewable energy. Incentives generated by the REC will be reinvested in social projects within the community, giving further pushing the economic and social innovation projects promoted by the Community Cooperative: proximity medicine, sustainable tourism, initiatives for childhood, youth, senior citizens and active aging, collaborative living, local welfare, work-life balance, training and outreach.

"With Fondazione Bruno Kessler (FBK)", said Luigi Crema, Director of the Center for Sustainable Energy "we are engaged through the Center for Sustainable Energy in innovation projects and initiatives for the Province of Trento. With the CELINE project, we will support Green Land in the implementation and adoption of services developed for the Renewable Energy Community (REC). This initiative will be a key element in the decarbonization process of the entire Alpe Cimbra area, in which it will also be important to broaden the participation of citizens and other local players as much as possible."

"Overall," commented Matteo Varesco, FBK researcher "CELINE will work toward the process of digitization of the energy system that is already underway, for example through smart technologies in electric vehicles, photovoltaic systems and heat pumps, which generate huge amounts of data and facilitate remote control. The project will capitalize on the benefits brought by the digitization of the energy system by enabling the interconnection of all system components, giving end consumers direct access to the market, facilitating seamless integration of renewable energy, and supporting flexible power systems with demand-side management and energy storage solutions."

Read the press release in Italian: <https://magazine.fbk.eu/it/news/al-via-celine-il-progetto-europeo-per-lo-sviluppo-di-servizi-digitali-innovativi-nelle-comunita-energetiche/>

5 DECEMBER 2024

Large scale use of industrial quality hydrogen for power generation and heat

Do you know that Fondazione Bruno Kessler is part of CLEANER Project?

Led by SINTEF - the largest independent research organisation in Scandinavia, CLEANER has the overarching objective is to develop and demonstrate for more than 5000 hours a >100 kW PEM fuel cell system operating on industrial quality hydrogen. This will contribute to the required decarbonization of the power generation and heating sectors by using highly efficient technology to produce clean energy with zero emission. This overall objective leads to a series of specific goals:

1. Development of a >100 kW PEMFC system tolerant of impurities in industrial H2
2. Demonstrate more than 5000 hours for a > 100 kW PEM fuel cell system operated with industrial quality hydrogen
3. Increase tolerance of impurities in hydrogen while reducing cost of catalyst
4. Reduce TCO through lower cost materials, modelling and increasing efficiency
5. Assure economically and environmentally sustainable development
6. Exploit project results through dissemination to and dialogue with key stakeholders.

In this context, the Center for Sustainable Energy and the Center for Digital Industries of FBK will be leading the activities related to Work Package 5. This WP focuses on system modelling to analyze the dynamic behaviour and system reaction to contaminants. The model of the complete system will be developed based on the real system design of the CLEANER fuel cell, and will be based on a Modelica-based environment. Through a physical approach and coupled with an AI-based data-driven electrochemical model, the degradation of PEM fuel cells caused by impurities will be analysed. Furthermore, the model will provide a control system and a diagnostic tool to replicate the real system, which will be analyzed by looking at the system's fault detection and diagnosability capabilities.

Luca Prattico' is the researcher of the Center SE involved in CLEANER. In February 2024, Luca participated in the kick-off meeting which took place at SINTEF facilities, while in last month PowerCell Group hosted the first project meeting.

More information on the CLEANER project: <https://www.cleaner-h2project.eu/>

More information on meetings: <https://www.cleaner-h2project.eu/index.php/activities/meetings>



9 DECEMBER 2024

FBK at the Settimana della Bioarchitettura e della Sostenibilità

From 3 to 6 December, Modena hosted the event "La Settimana della Bioarchitettura e Sostenibilità", which started in 2006 as initiative of the Agenzia per l'Energia e lo Sviluppo Sostenibile.

The event is the occasion that gathers administrators, professionals, researchers and experts from the fields of energy, urban planning, landscape and human sciences, who are daily committed to responding to the challenges of sustainability and urban well-being.

This year, the Center for Sustainable Energy was also present!

Our researcher Cinzia Morisco as Coordinator of ECOEMPOWER participated in the roundtable HUBs Territoriali per le Comunità Energetiche.

The panel saw the participation of the representatives of three LIFE EU projects: ENCOM HUB, ECOEMPOWER and DISCOVER.

Cinzia discussed with Felipe Barroco (Agenzia per l'Energia e lo Sviluppo Sostenibile) and Marina Varvesi (Agenzia per l'Innovazione, lo Sviluppo e la Formazione) about the crucial role of renewable energy communities in an Italian context of electrification of consumption.

The energy communities are the opportunity to contribute to the decentralization of electricity production, promote the spread of production plants close to consumers, optimize electricity production and consumption and promote energy independence linked to fossil fuels.

More information on the programme at: https://settimanabioarchitettura.it/wp-content/uploads/2024/12/programma-dett_2024-DEF.pdf

18 DECEMBER 2024

FBK at the Joint General Assembly of the four waves of the IPCEI Hydrogen



On Tuesday 17th December 2024, the Joint General Assembly of the four waves of IPCEI Hydrogen took place at the Center Pierre Mendès France in Paris organised by the French Ministère de l'Économie, des Finances et de l'Industrie.

In the morning, a meeting for IPCEI participants was organised to report the status of the four IPCEI Projects and receive a feedback from the European Commission.

The meeting was then followed by two parallel sessions, one for IPCEI members, the other for member states and the European Commission representatives and aimed at exchanging best practices and issues faced by Member States and national agreement processes.

In the afternoon, a public event took place. The conference was a unique platform for hydrogen stakeholders to disseminate knowledge in the nascent hydrogen market, and raise awareness on the 4 waves of IPCEI Projects.

The event also included panel sessions on different topics such as the consolidation on a pan-European hydrogen value chain, the creation of ecosystem, the future of mobility and the challenges of establishing infrastructures, as well as financial and regulatory discussions.

Luigi Crema and **Matteo Testi** participated in this crucial event and our Director presented the FBK project following its entrance as Associated Partner. The Center for Sustainable Energy of FBK is realizing a large-scale testing facility for R&D&I of hydrogen technologies, supporting research, development and innovation activities of European stakeholders and fostering real-life testing in relevant conditions and cost reductions. Thus, FBK will support the enabling and speeding-up the large-scale deployment of hydrogen technologies for enterprises.

What is IPCEI Hydrogen?

As reported on the [website of IPCEI Hydrogen](#), this Important Project is aimed at innovation as well as demonstration and deployment of hydrogen technology. IPCEI Hydrogen consists of four combined clusters of projects from more than half of the European Union member states and from Norway. The projects take place in the complete value chain of hydrogen: production, import, transportation as well as end use.

Currently four clusters of projects – or “waves” – have been notified by the European Commission under State Aid rules: Hy2Tech, Hy2Use, Hy2Infra and Hy2Move.

More information on IPCEIs on hydrogen: https://single-market-economy.ec.europa.eu/industry/strategy/hydrogen/ipceis-hydrogen_en

H2 Projects withing the framework of IPCEI: https://commission.europa.eu/projects/hydrogen-projects-within-framework-ipceis_en

Website of IPCEI Hydrogen: <https://ipcei-hydrogen.eu/>