EERA Day in Italy: Key conclusions from this landmark event

The event, co-organised by CNR and ENEA, Italian R&I members in ExCo EERA, and EERA secretariat, took place at CNR headquarters in Rome and began with a welcome from Emilio Campana, director of the department of ICT, Engineering and Technologies for Energy and Transport and CNR's delegate in the GA of EERA. He introduced the host organisation and emphasised the importance of multidisciplinarity in successfully addressing the challenges posed by climate and energy transitions.

Giorgio Graditi, ENEA Director General sent his greetings on behalf of Simona De Iuliis (ENEA), acknowledging how in recent years the ENEA community has continued to value its participation in the Alliance. In the general opinion of researchers, EERA has facilitated their participation in initiatives related to energy and climate change, even though ENEA is already widely represented in national and international programmes.

The initial session was dedicated to European R&I strategies for the clean energy transition and the perspectives of the new SET-Plan. The following is a very brief summary of the presentations.

Davide Amato (Deputy Head of Unit Clean Energy Transitions, DG RTD.C.2) presented the key goals and activities for 2023 and 2024 as per DG RTD C.2 results. He highlighted that EERA is a significant partner of DG RTD in shaping activities for developing new programmes and providing feedback on research trends. Additionally, EERA serves as a catalyst for research in the SET Plan and is useful for maintaining a structured point of view on research in policy activities in the coming years.

Adel El Gammal (EERA Secretary General) and Ivan Matejak (EERA Operations Director) described EERA's goals and objectives, emphasising the importance of the Italian presence in the Alliance. They presented the EERA strategy and deliverables in a midterm vision, with great attention to the development of the next Framework Programme.

Marcello Capra (senior advisor to the Ministry of Environment and Energy Security -MASE and MASE SET Plan delegate) presented the Set Plan and Energy R&I ecosystem in Italy. He explained how the recent revision of the SET Plan will help harmonise its initial strategic goals with the European Green Deal and related Industrial Plan, particularly the Net-Zero Emission Industry legislation, and the REPowerEU plan. Finally, it was emphasised that the education and training of the younger generation is a necessary requirement for the success of the New Green Deal.

The second session was dedicated to the Round Tables. The invited speakers at the first Round Table, moderated by Bianca Vaglieco, discussed the midterm prospects of the strategic programmes of the country.

Stefano Raimondi (Ministry of Environment and Energy Security - DG Energy Incentives), provided an overview of the National System Research Programmes and Mission Innovation priorities, and outlined the expectations of the Italian R&I community. He suggested accelerating research by improving coordination of competencies, roles, and tasks, following the example of IPCEI and best practices in cybersecurity in Italy. He also mentioned the significant investments in Hydrogen, including 30 million for enterprises, through PNRR's (110 million recovery and resilience funds).

Francesco Basile (UniBO, Italian representative in the shadow thematic configuration Climate Energy and Mobility (Cluster 5) of Horizon Europe, and representative in the shadow strategic partnership forum of Horizon Europe), was pushing for research and innovation to focus on processes that consider local peculiarities and manufacturing (e.g. the Mediterranean Area). The speaker discussed Italy's capacity for renewable energy and suggested a systematic approach to technology pathways with different technology readiness levels (TRLs) and a pre-commercial procurement (PCP) that would encourage the industry to develop innovative solutions from the demand side. The proposal involves a limited number of competing R&D providers selected from the top 10 to meet the public sector's needs.

Eleonora Riva San Severino (UNIPA, the Ministry of Research - MUR representative in the European partnership on Driving Urban Transition - DUT), discussed the co-funded DUT Partnership. Italy plays a very active role in DTU management, with shared responsibility from the Ministry of Research (MUR) and the Ministry of Enterprises and Made in Italy (MIMIT). Out of the 40 funded projects so far, 14 have Italian participants, some of whom are new to accessing EU funding. Calls from MIMIT that imply key involvement of enterprises have a lower number of proposals, this indicates that the R&I skills of enterprises for the urban transition and their ability to rely on the right partnerships need improvement.

Michele Dondi (CNR, Contributor to the National Table of Critical Raw Materials) describes the main innovation challenges in the field of materials-based RES, to which research is called upon to provide answers as soon as possible. In particular, the speaker highlights issues related to the extraction, processing and future availability of materials, even if they are not currently on the CRM list (e.g. copper).

Fabio Martinelli (CNR, Director of the European Cyber Security Organisation -ECSO Board, Director of the SPARTA pilot Partnership) illustrates the integrated project "Smart Grid" (WP Security in telecommunications coordinated by RSE, WP Resilience by ENEA, WP Bbig data and AI by CNR) activated by the national programme Ricerca di Sistema Elettrico-RdS in the 2022-2024 three-year plan and which will continue in the next three years. The digitisation of the energy sector requires important cyber measures, and with this in mind, the future Cybersecurity Observatory has been conceived in an interdisciplinary perspective, with the presence of economists. Italy is strategically aligned with research and innovation at the European level, and at this time we are also reflecting on the importance of involving citizens in these issues to increase awareness and confidence.

During the second Round Table, moderated by Roberto De Ritis, the invited speakers responded to a general question about the main activities and research priorities in their respective projects.

Mr. Giovanni B. Appetecchi (ENEA, IPCEI Batteries) discussed the perspectives of the battery value chain in the EU. The European Battery Innovation (EubatIn) project, within the framework of the Important Projects of Common European Interest (IPCEI), aims to improve existing technologies, develop new battery concepts, optimize end-of-life management, and implement innovative strategies for recovery and recycling of critical materials. R&I's priority is the construction and outfitting of a new multifunctional laboratory, the Advanced Battery Lab, in a 3,000 m2 building at the ENEA-Casaccia Centre.

Prof. Marcello Baricco (UniTO, EERA JP GCH, Clean Hydrogen Partnership -CHP) explained that the CHP had replaced the previous FC&Hydrogen Partnership. This is because it is believed that CFs have reached sufficient technological maturity and therefore do not need public resources for their industrialisation. The CHP includes the EC, which contributes 1 billion euros, several industries that commit another billion, and academic research that provides expertise and infrastructure to the hydrogen sector. The CHP comprises various entities that

advocate for funding low TRL (academic research) and high TRL (industry) activities to advance the entire value chain.

Luciano Martini (RSE, JP SG coordinator, MI Green Power Mission director) presented the R&I approach and strategy of the Green Powered Future Mission (GPFM) experience. Additionally, the speaker highlighted the significance of showcasing various innovative grid solutions that can be adapted and successfully implemented in different countries, particularly in Africa. To encourage national discussion and participation, a national mirror group was established to increase awareness of the Green Powered Future Mission among Italian researchers. The Italian grid may not be suitable for the rapid spread of renewable energy sources (RES) and may not be able to handle the energy for which permits are being verified. To ensure resilience, an appropriate mix of technologies is necessary. Electrification is one effective technological solution, but it is not the only one. It is important to consider other options as well. An example from the automotive sector illustrates that not all vehicles will be electrified, especially heavy vehicles. However, vehicle recharging can be used as an energy storage technology that can help alleviate pressure on the grid.

Viviana Cigolotti (ENEA, IPCEI H2, JP FCH) described ENEA's crucial role in IPCEI Hydrogen. She addressed the critical transition from lab-scale experimentation to pilot plant implementation, which is vital for supporting industries as they move towards the initial deployment of hydrogen-related technologies. The ALRIGH2T project, coordinated by ENEA, studies technologies, components, and systems for using hydrogen facilities within airports. Tests will take place in Milan Malpensa.

Paola Delli Veneri (ENEA, Ricerca di Sistema Elettrico -RdS High Efficiency Photovoltaic project) presented the current state of Italian research on high-efficiency photovoltaics. It was emphasised that the commitment of research groups with expertise along the entire value chain of photovoltaic systems is crucial. It was confirmed that the industry is still far from reaching the goal of 30% efficiency, not only in Italy. In this area, a project was financed by the national RDS programme and presented by ENEA, CNR, RSE, and 18 university departments. The project aims to enhance the efficiency of existing products, such as perovskites in thin-film solar cells, through a three-year plan from 2022 to 2024. The integration of systems in various sectors, from construction to agrivoltaics, is proving to be crucial.

During the afternoon session, Ivan Matejak presented the results of the survey on engagement and evaluation of the Italian EERA community in EERA JPs. The numerical distribution of the multiple-choice answers proposed by the questionnaire was illustrated for the 34 researchers who responded to the survey. All JPs were represented except for Nuclear Materials, DfE, and Energy Efficiency in Industry. It was noted that JP Energy Storage had the highest representation. Many researchers consider submitting proposals for new European projects to be highly useful. The SRIAs of the JPs are also considered a helpful guide in the context of national interest programmes such as RdS and Mission Innovation. Participating in EERA offers the greatest added value in shaping EU R&I policies. WGs on specific topics are the most interesting activities to participate in.

Adel El Gammal highlighted the importance of achieving better synergy and alignment between academic research and industry, as required by national, European, and international programmes. Negative examples, such as the underdevelopment of the PV industry in Europe, have led to the dominance of Chinese competitors.

Regarding EERA's internal organisation, the Alliance emphasizes a bottom-up approach, which has resulted in some organisational differences between Joint Programmes (JPs) and difficulties in interaction between the Executive Committee (ExCo) and the research JPs due to the increase in membership from the initial 20 to the

current 250. The need to support JPs in finding new countries, new members, and new spots on the global landscape that are not yet covered due to the global challenge of energy transition is an important issue.

Conclusion

Monica Fabrizio (CNR, EERA ExCo) and Ezilda Costanzo (ENEA, EERA ExCo) summarised the day's work and acknowledged those present. The first EERA country event brought together nearly 80 people representing the Energy R&I ecosystem in Italy. The Round Tables discussing Italian priorities for energy R&I and related national programmes (PNRR, RdS, MI) demonstrated a consistent alignment with the SET Plan, integration with EU HEU partnerships and large programmes, and links to the EERA JP SRIAs.

The Italian EERA research community appreciated participation in the Alliance, particularly for activities such as: 1) to develop a project proposal for the EU; 2) to jointly define strategic research agendas for Joint Programming that can inform EU Research and Innovation Programmes; and 3) to establish a network.

The event demonstrated the Italian energy R&I community's strong commitment to enthusiastically participating in the synergistic implementation of European strategies towards a just and sustainable clean energy transition.