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Recommendations. Accelerating the uptake of new technologies facing systemic and cross-sectorial barriers

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EXECUTIVE SUMMARY

The present Deliverable concludes the work carried out in Work Package 2, with the objective to develop a set of recommendations based on inputs from key stakeholders (i.e., research organisations, industrial stakeholders, and public authorities/decision makers). These inputs were gathered through workshops and webinars organised by SUPEERA, focusing on the six technological pathways identified in Task 2.1: bioenergy, hydrogen, energy storage, solar energy (photovoltaics and concentrated solar power), wind energy, and energy systems integration.

Furthermore, the recommendations regarding cross-cutting and systemic topics are derived from previous SUPEERA studies that analysed the Implementation Plans (IPs) of the SET Plan and the National Energy and Climate Plans (NECPs). Additionally, these recommendations are provided to facilitate coordinated input to decision-makers in considering cross-cutting and systemic aspects within the energy sector, thereby supporting the Clean Energy Transition.

This deliverable consists of two main chapters: a) Recommendations to support uptake of new technologies by the industry; and b) Recommendations regarding cross-sectorial and systemic topics.

While the first chapter focuses on those aspects to support the uptake of new technologies by the industry, with a particular emphasis on fostering collaboration between research and industry; the second chapter is considering those cross-cutting and systemic aspects to enable and speed up the Clean Energy Transition.

LIST OF ACRONYMS

AC(s)	Associated Countries
AI	Artificial Intelligence
CEAP	Circular Economy Action Plan
CET	Clean Energy Transition
CSP	Concentrated Solar Power
CSS	Carbon Capture and storage
EAWE	European Academy of Wind Energy
EC	European Commission
EERA	European Energy Research Alliance
ETIP	European Technology and Innovation Platform
ICT	Information Communication Technology
IP	Implementation Plan
IWG	Implementation Working Group
JP	Joint Programme
MS	Member State
NECP	National Energy and Climate Plan
PV	Photovoltaics
R&I	Research and Innovation
RTO	Research and Technology Organisation
SET Plan	Strategic Energy Technology Plan
SSH	Social Sciences and Humanities
SMEs	Small and Medium-sized Enterprises
SRIA	Strategic Research and Innovation Agenda
TRL	Technology Readiness Level

INTRODUCTION

The proposed recommendations are formulated based on a series of consecutive and interrelated activities conducted throughout the project implementation.

Initially, in 2020, an extensive analysis (see Deliverable 2.1) was conducted on the 27 National Energy and Climate Plans, the SET Plan Implementation Plans, and the Long-Term Strategies of Member States. This analysis resulted in the identification of six common pathways: Bioenergy, Hydrogen, Energy Storage, Solar Energy, Wind Energy, and Energy Systems Integration.

Facilitated discussions were held among industry stakeholders, energy experts, and policymakers regarding the selected pathways. Due to the COVID-19 pandemic in the first years of the project, these dialogues took place in the form of webinars and were further elaborated through five physical workshops, with the final workshop scheduled for June 2023 (on Bioenergy). Each workshop and discussion focused on crucial aspects such as research and innovation, industry uptake of the technologies, policy aspects, and novel components (e.g., citizens' engagement for the Fair Transition), as well as collaboration with public bodies (e.g., governments).

The insights gathered from these topical workshops contributed to the formulation of a transnational collaboration model for the six selected technological pathways (see Deliverable 2.1). The model describes the collaboration between research, industry, and governments (so-called collaboration triangle) at European, national and regional levels, as well as the interfaces across geographical levels, presenting at the same time best practices that could be replicated in other sectors and/or countries/regions.

Clean Energy Transition calls for the adoption of holistic approach, and as such, policy interventions and regulations should trigger transformative actions across the entire socio-technical landscape. Such approach implies examining different parts of the system in their interconnection without separating the technological domain from social, economic and environmental ones.

To understand this better within the scope of the SUPEERA project, two primary activities have been undertaken. Firstly, a thorough examination of existing cross-cutting and interdisciplinary topics was conducted, both technological and non-technological (for more information see Deliverable 2.2). This included analysing the activities outlined in the updated Implementation Plans (IPs) of the SET Plan. Secondly, a template was developed for the identification and categorisation of cross-cutting aspects in the energy sector. This template serves as a tool to assist coordinated input for decision-makers, enabling them to address systemic and cross-sectorial solutions when developing energy and climate transition plans.

Based on the above, a set of recommendations has been formulated aiming to assist decision makers to design policies that support the uptake of new technologies by the industry, with a particular emphasis on its collaboration with research and, especially on cross-cutting and systemic aspects.

I RECOMMENDATIONS TO SUPPORT UPTAKE OF NEW TECHNOLOGIES BY THE INDUSTRY

The proposed recommendations are structured into five distinct pillars, namely funding, guidance and vision, results and exploitation, collaborative ecosystems, and policy.

Funding

- Enhance the accessibility of available funding and financing mechanisms to attract more interest and participation from potential stakeholders in R&I programmes, including, e.g., grants, loans, tenders, and other financial incentives offered by the EC, national and regional governments, and private organisations.
- Organise and promote match-making events to enhance the collaboration between research and industry partners in order to apply for joint funding.
- Foster the alignment of national and European efforts and funding on research and innovation.
- Encourage the participation of less involved countries in EU R&I programmes.
- Reduce bureaucracy to streamline the collaboration process between industry and research. This can be achieved by simplifying administrative procedures, such as the application process for funding, providing more flexible timelines and reporting methodologies.
- Continue supporting MS/ACs – SET Plan IWGs – in the realization of the SET Plan Implementation Plans through Coordination and Support Action-based projects.
- Guarantee long-term financial support to central collaborative networks such as the European Energy Research Alliance which facilitate harmonization of R&I national agendas and provide strategic advice to policymakers.
- Ensure that the R&I priorities defined by experts from the research community and industry who are participating in relevant initiatives/collaborative platforms (ETIPs, SET Plan IWGs, Partnerships, etc.) are integrated in relevant R&I funding programmes, both national and European.
- De-risk initial investments and support startups. On the one hand, the financial risks associated with early-stage investments should be mitigated by implementing measures such as seed funding, grants, or loan guarantees in order to encourage investors to support innovative projects and initiatives in the field of sustainable energy. On the other hand, comprehensive support to startup companies operating in the sustainable energy sector should be provided. This can include mentorship programs, access to networks and resources, technical assistance, and financial incentives. By nurturing and empowering startups, the development of new and ground-breaking technologies in the field of sustainable energy can be fostered.

Guidance and Vision

- Develop a long-term vision identifying energy technologies' priorities and funding needs to ensure that research is aligned with industry needs. This vision can help guide research and development efforts and ensure that they are focused on meeting industry needs in the long term.
- Provide clear long-term R&I resources and plans in the Member States Plans (NECPs). Most NECPs fail to provide clarity on to R&I needs, national objectives and funding targets relevant to 2030 and 2050 goals.

Results and Exploitation

- Foster the development of patents and impactful publications. Patents can protect intellectual property while also creating opportunities for commercialisation, enhancing the competitiveness of the companies in the marketplace. Additionally, publications can enhance researchers' reputation and visibility and provide them with opportunities to advance their work.
- Expand the creation of centralised platforms for sharing knowledge and best practices, such as virtual platforms, innovation hubs, technology transfer offices, and industry associations/clusters.

Collaborative ecosystem

- Establish an open and sustainable collaborative network of research infrastructures offering world-class services to researchers, universities, institutes, industries, high-profile SMEs, and European research consortia.
- Foster the participation of MS/AC representatives in ETIPs to align research and industrial needs with national priorities. A best practice on that is found in ETIP Bioenergy where an advisory board consisting of technical experts appointed by MS/ACs involved in relevant bioenergy issues as identified in the SET Plan priorities. This group is fully aligned with the country representatives in IWG8 and has the objective to give advice/direction and feedback on the activities of the platform and can be considered as the interface between ETIP Bioenergy and national governments.
- Foster an inclusive ecosystem engaging all relevant stakeholders, including citizens, from the outset.
- Facilitate the translation of lab concepts into industrial processes through a clear definition of the pathways. This can include identifying key performance indicators, developing standardised testing protocols, and creating collaborative partnerships between research institutions and manufacturing facilities.

- Encourage the development of training programs and educational initiatives that can enhance collaboration and build a shared understanding of the challenges and opportunities.
- Promote the sharing of data, resources, and knowledge between industry and research to accelerate progress and minimise duplication of effort.
- Establish supporting tools such as national-funded programmes, particularly relevant for newcomers with non or limited experience on EU matters to assist them in engaging with the energy policy and the strategy ecosystem. These tools could provide, for example, clear guidelines on how to engage, a platform for stakeholder-policymaker dialogue, and capacity-building activities like training and workshops to improve stakeholder understanding of the ecosystem and engagement effectiveness. An example of a best practice is the Specialisation Programme for Innovation Managers in European R&I programmes offered by CDTI-SOST, whose main objective is to contribute to improving the strategic positioning of Spanish entities in the European R&I ecosystem.
- Replicate existing well-functioning national and regional technological collaborative platforms/programs either in other geographical areas and/or levels (regions, countries) in Europe and/or in other technological fields. Examples of best-practices are (see Deliverable 2.3):
    - The Veturi program (national program for Finnish companies to become business network locomotives)
    - Centres for Environment-friendly Energy Research in Norway (national Centres of Excellence on renewable energy, energy efficiency, CCS, and social science aspects of energy research)
    - Innomissions in Denmark (national Partnerships on green transition themes)
- Ensure regional-national-EU harmonisation/alignment of priorities on R&I policy through the participation of at least a key players with relevant roles in collaborative platforms across geographical levels. Examples of best-practices are:
    - CIEMAT (Spain), with roles in regional (EU-SOLARIS, as a central hub fostering collaboration between regional entities), national (Plataforma Solar de Almería) and European (SET Plan IWG-CSP, EU-SOLARIS ERIC, EERA JP CSP) networks
    - SINTEF (Norway), with roles in regional (Norwegian Offshore Wind), national (FME NorthWind) and European (SET Plan IWG Wind, ETIP Wind, SETWind and EERA JP Wind)
- Simplify and clarify governance in certain ecosystems where multiple bodies have overlapping roles, often leading to duplication and confusion. Best-practice of efficient governance is found in the European ecosystem on Hydrogen, where Clean Hydrogen Partnership is the major player/reference, committed to all roadmaps and strategies on hydrogen in Europe.

Policy

- Advocate for stable policies and legislation to secure the necessary innovation and private investment and lead to a more flexible renewable energy system at an affordable cost.
- Remove regulatory barriers of demonstration projects since such projects are a very effective route to pull technologies into commercialisation.
- Increase the visibility of renewable energy auctions as a suitable mechanism for energy procurement.
- Establish clarity on energy market access. This can include streamlining regulatory processes and removing barriers to entry for energy providers. Clear market rules will provide certainty for energy companies and encourage investment and innovation in the sector.
- Offer tax incentives and regulatory support for companies that invest in research and development in collaboration with research institutions.
- Establish joint policy and regulatory frameworks shared by multiple countries, regions, or entities. This approach is critical in the energy sector, which often involves complex and interconnected systems that cross multiple jurisdictions and involve many different stakeholders. For example, neighbouring countries may collaborate to establish joint policies and regulations to promote the development of cross-border energy infrastructure, such as interconnectors for electricity or gas pipelines.

1.1 Technical discussions for the six pathways

During the workshops (see Annex of Deliverable 2.3), participants engaged in technical discussions and put forth potential suggestions regarding research and innovation priorities for the six selected pathways. Here below follows a summary of some of the key points discussed.

On Bioenergy, experts debated the **electrification of the transportation sector**. One speaker highlighted the importance of developing and implementing innovative infrastructure and logistic concepts that can support this transition effectively. Another topic of discussion centred around the potential **role of biomass in connecting energy storage and hydrogen**. The participants emphasised the benefits of biomass exploitation, as it can be used as a resource for synthesising hydrogen without combustion, thereby reducing emissions.

The focus shifted to **exploring alternatives to lithium-ion batteries** for Energy Storage. One speaker advocated for considering sodium-ion batteries as a cost-effective and sustainable solution for stationary energy storage applications. They emphasised the need for specific regulations tailored to storage technologies rather than applying the existing regulations for generation. The participants also stressed the importance of broadening research and development efforts beyond batteries, urging the **exploration of other energy storage methods**.

Additionally, there were discussions about the necessity of establishing new policies to facilitate **large-scale battery cell production in Europe**. Coordinated efforts at the European level to eliminate unwarranted or double charging in energy storage systems were also stressed. The participants agreed that energy storage should be market-based, and the procurement of energy and ancillary services should reflect this principle. Furthermore, the participants proposed **mapping the geographical distribution of different energy storage technologies in Europe**, taking into account each area's unique characteristics and potential for green energy production.

Regarding Energy System Integration, it was highlighted the need to **establish multi-modal renewable power plant laboratories** capable of producing solar, wind, storage, and hydrogen energy to test system impacts and behaviours. The participants stressed the importance of conducting **joint research projects on hybrid systems**, recognising the significance of integrating various renewable energy sources into a cohesive and efficient energy system.

On Hydrogen, experts highlighted the need to **adapt existing gas caverns and surface facilities** as part of the transition to a hydrogen economy. The participants recognised the potential of repurposing these facilities to support the storage and distribution of hydrogen.

In regard to Wind, it was highlighted the importance of **developing lighthouse projects** aligned with the priorities identified in the strategic research and innovation agenda of ETIP Wind, the R&I priorities of the EERA JP Wind, the Grand Challenges of the International Energy Agency's Wind Technology Collaboration Programme, and the long-term research priorities of the European Academy of Wind Energy (EAWE). The participants emphasised the need for accessible data for all interested parties, including **open data models** for multi-gigawatt floating wind farms and scaled wind farm models.

Concerning Solar (PV and CSP), the discussions revolved around consolidating and improving the technology of **Line-Focusing CSP systems**, reducing capital and operating costs, and enhancing the materials used in CSP plants. The participants emphasised the need to improve the **scalability and construction techniques of hot tanks**. They also advocated for utilising CSP technologies to **decarbonise energy-intensive industrial processes**, particularly for industrial heat production. The participants agreed that increased investment in research and development was necessary to lower the cost and improve the reliability of CSP technologies, making them more attractive for widespread deployment. **Separating the processes of awarding CSP tenders from gaining access to the grid** was also considered important. The participants emphasised the need to enhance the perception of CSP as a reliable technology in the energy market to drive increased deployment and lower electricity generation costs.

Regarding PV systems, the participants in the workshop discussed various strategies to improve performance, reduce costs, and increase the reliability and lifespan of PV components. They advocated for **strengthening the Solar Photovoltaic Industry Alliance** through joint advocacy efforts, shared research agendas, and coordinated large-scale PV projects. Collaborating on second-life battery technology for PV systems was also highlighted as a priority. The participants called for the introduction of regulations that encourage the adoption of solar panels, such as

feed-in tariffs, net metering policies, and building codes mandating solar panel installations. Additionally, they emphasised the need to prioritise the development and implementation of **sustainable and efficient supply chain strategies** to address challenges in the commodity market.

II Recommendations regarding cross-sectorial and systemic topics

In this section, recommendations to consider cross-cutting and systemic topics are drawn from previous SUPEERA work (Deliverables 1.6, 2.2 and 1.7) analysing the SET Plan Implementation Plans (IPs) and the National Energy and Climate Plans (NECPs). This section begins with specific recommendations for the inclusion of different cross-cutting and systemic topics into the SET Plan Implementation Plans. This is then followed by the recommendations for coordinating input to decision-makers for considering cross-cutting and systemic aspects in the energy sector to support the Clean Energy Transition.

2.1 Recommendations for the SET Plan Implementation Plans

From the analysis of the IPs, recommendations are made for each of the different cross-cutting and systemic topics. This is split into technological and non-technological cross-cutting topics.

2.1.1 Technological cross-cutting topics

1. **Energy Efficiency.** Energy efficiency aspects are only included in activities in half of the IPs, even though the Union's energy efficiency targets are essential towards the low-carbon economy. Energy efficiency should be considered in all IPs, and synergies for the cogeneration of heat & power, the use of waste heat, and digitalisation within industry and Positive Energy Districts should be considered and exploited.
2. **Energy System Integration.** Energy system integration as a horizontal topic to all IPs is present in nearly all IPs (missing from IP Nuclear), and synergies between different technologies are identified. Energy system integration aspects should be covered in IP Nuclear to integrate nuclear energy. It is further proposed that cooperation across the IPs should be included in the integration activities.
3. **High Temperature & Advanced Materials.** Development of materials for energy applications plays an important role in the IPs where activities have been identified in seven of the ten analysed IPs. The applications differ from IP to IP, but the cooperation on materials development could produce technological benefits for several IPs. Synergies here are more prevalent at low-mid TRL, encompassing the research and development of new materials and building the supply chain/manufacturing processes; thus, this is where cooperation should be focussed.
4. **Energy Storage.** Energy storage includes activities in two of the ten analysed IPs and is identified as an enabler in a further four IPs. R&I of new energy storage technologies is tightly connected to Energy Systems Integration and the associated regulations and standards to facilitate the best choice of storage technologies depending on the regions. It is thus

recommended that the interconnections between Energy Storage and Energy Systems Integration are identified to ensure a coordinated approach that retains the required flexibility.

5. **Digitalisation.** Digitalisation is much more frequently identified by the IPs than the previous categories. This reflects that the IWGs recognise that digital technologies such as AI, blockchain and internet of things as the key technologies driving the next wave of digital transformation and that could enhance existing processes, create new business models, and develop innovative products and services for consumers. To effectively leverage the potential of digitalisation in the clean energy transition, it is important to consider the intersections between these technologies and new legislation regarding digitalisation, for example, the recent draft legislation on open data.

6. **Security & safety.** This topic is the least covered by the IPs and has strong links to digitalisation via cyber security, as well as links to topics that address the security of supply, such as energy efficiency, energy systems integration, and energy storage. For better coverage of this topic in future IPs, IWGs can include the security priorities mentioned in REPowerEU and the Security & Safety Issues in the IPs listed as activities or enablers.

2.1.2 Non-technological cross-cutting topics

1. **Circular Economy.** The IPs without funding associated with circular economy activities should consider including it, in particular considering the new circular economy action plan (CEAP)[1] where the objectives (make sustainable products the norm in the EU; empower consumers and public buyers; focus on the sectors that use most resources and where the potential for circularity is high such as electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water and nutrients; ensure less waste; make circularity work for people, regions and cities; and lead global efforts on the circular economy) cover a wide spectrum of technologies.

2. **Education & Training.** Despite many IPs mentioning education and training, it is not always clear which type of activities are implemented; moreover, in most cases, there is no funding tied to this activity – there are only three activities across the IPs identified in this topic. Given the recent council adoption of "recommendation to stimulate learning for the green transition and sustainable development"[2], it is key to quickly recognise the necessary knowledge, skills, and attitudes for a more sustainable economy and society. It could be relevant to, e.g., map education and skills needed in evolving energy fields, and to address the education gaps. All IPs that have activities within education & training (or have identified it as an enabling topic) explicitly

[1] eur-lex.europa.eu
[2] data.consilium.europa.eu

include the re-skilling of workers towards green technologies; thus, the IPs are aligned with REPowerEU and efforts should be coordinated for interconnected learning across the cross-sectorial and systemic topics.

3. **Policy & Regulation.** Most IPs mention the presence of regulatory bottlenecks at both EU and National levels. However, there are only two IPs with associated activities (i.e. Geothermal and Ocean). IPs should consider what activities would create a transparent and stable regulatory environment guaranteeing investors' confidence as a necessary condition to achieve the identified targets. Regarding policy, in addition to advancing research on identified political priorities, researchers can also provide valuable advice and expertise to policymakers, helping to guide decision-making and identify the most effective strategies for achieving the EU's clean energy goals – this overview is currently lacking across most of the IPs, and this should not be overlooked.

4. **R&I Funding Programmes and Measures.** The allocation of R&I funding, and vital resources is a necessary precondition for addressing many of the activities indicated in the IPs. Information such as the implementation instruments (funding programmes) to be mobilised and their associated indicative financing contribution to support R&I activities should be mentioned in the IP. This is a complex exercise since there is a variety of funding opportunities available at European, national, and regional levels. Therefore, this information is scattered through different funding agencies and databases, resulting in partial and non-uniformised information across the different IPs and funding overlaps (mainly between national and EU funding). A common database should be established that includes information about the most relevant programmes at European, national, and regional level for added value for the whole SET Plan community. Development of ad-hoc financial schemes could be promoted to improve access to loans for R&D projects with high uncertainty/risk. It would also be useful for IPs to identify funding spent, funding secured, and funding needed along the development pathways, as well as estimations for the funding required at critical time points or key TRLs in the IPs.

5. **Social Awareness-Acceptance-Engagement.** To achieve the EU goals towards a climate-neutral future for Europe in terms of speed, effectiveness and equality, specific actions to engage with citizens in novel ways and improve societal relevance and impact are needed. Therefore, any revisions to the IPs should have dedicated sections related to Social Sciences and Humanities (SSH), including tangible recommendations. IP Wind, IP Nuclear, and IP Geothermal could be used as examples as they include specific activities in SSH research and innovation. In addition, they should move beyond social awareness/ acceptance and consider all relevant aspects of SSH, such as: early participation of stakeholders in meaningful ways; learning from

innovative bottom-up approaches; and the recognition of the important roles of professionals in the energy system (not just 'end-users')[3].

6. **Standardisation.** By documenting and sharing information on state-of-the-art technology and providing a framework for technology-related policies, standardisation represents an essential tool for policymakers in defining and supporting national legislation and regulation for renewable energy. There are four IPs with related activities and a further IP that identifies Standardisation as an enabler. This topic has strong links to Policy & Regulation. Most notably, IP EE for Industry and IP PV do not have activities or identified enablers in either Standardisation or Policy & Regulation. An explicit requirement for the IWGs to address this point together with Policy & Regulation would be relevant for all IPs.

7. **International cooperation.** International cooperation is seen as having a key role in contributing to the implementation mechanisms indicated in the IPs. However, there are few related activities and very few note international cooperation as an enabler (beyond the funding mechanisms). As International cooperation is a broad term, it could be more effective for the achievement of the actions described in the IP if references to the specific types and scales of collaborations are included: e.g. transnational, European, bilateral, gov-to-gov collaboration/exchange. This could further be expanded to specify the types of stakeholders within the different collaborations (e.g. government, research organisations, or industry).

2.2 Recommendations for other issues to accelerate the CET

As elaborated above, the Clean Energy Transition does not just pose technological and non-technological challenges. Analysis of the SET Plan Implementation Plans (IPs) and the National Energy and Climate Plans (NECPs) provides a better understanding of cross-cutting topics related to both technological and non-technological aspects of the Clean Energy Transition. However, when outlining clean energy policies, decision-makers are exclusively depending on coordinated input in order to support the Clean Energy Transition. The way templates, guidelines, and communications are designed by policymakers and the expected requirements described in, e.g., IPs and NECPs, eventually defines the quality of the plans produced by different collaboration structures (e.g. working groups) and the information included. Poorly defined templates can stimulate policy uncertainty.

Considering this, the work conducted by SUPEERA addresses the gaps in designing templates and guidelines by explicitly separating technological and non-technological cross-cutting topics and suggesting a topics' classification principle within each of these two categories. The template provided in Deliverable 2.2 does not aim to serve as an exhaustive list of the technological and

[3] energy-shifts.eu

non-technological cross-cutting topics. Instead, it is seen as a preliminary exercise that can be elaborated further to eventually provide a universal template that can be used for developing energy and climate transition plans and which will serve as a guide for including the key action points essential for achieving net-zero goals in an environmentally, socially and economically sustainable way. As such, it is recommended that future templates consider the template on cross-cutting topics provided by Deliverable 2.2 (both technological and non-technological). This will facilitate a common understanding of which activities could be relevant and the level of detail that should be collected. Future templates should be clear and very detailed to collect uniformised and comparable data, especially on cross-cutting topics between e.g., IPs and NECPs.

Specifically, regarding the IP activity template, the future template should specify what activities are relevant as well as the level of detail. The experience from analysing IPs and IWGs was that the collected information and the activities were quite different. It is recommended that the template should be clearer and more detailed to collect uniformised and comparable data between different IPs. There should be a clear definition of cross-cutting topics (both technological and non-technological) to have a common understanding of which activities could be relevant and the level of detail that should be collected. These aspects should not be underestimated taking into consideration the role played by the IPs in accelerating the energy transition. Beyond cross-cutting topics, there is a variety of specifications regarding the budgets and TRLs associated with each activity. Some IPs give no information on budgets and TRLs, some give very wide estimations, and other more detailed IPs give budgets with their expected number of projects. In all cases, there is no information on the progress of a specific activity. This is both regarding what financing has been secured and whether the technology is on track to reach its projected targets. This makes it challenging to determine what future financing is required and, in particular for technological cross-cutting topics, where synergies can be best exploited in line the TRL of the activity.