Report

Coherence and Synergies of candidate European Partnerships under Horizon Europe

Directorate-General for Research and Innovation

A4 Partnership Sector

October 2020

Contents

Introduction

Horizon Europe orients European Partnerships towards the achievement of policy impacts with the expectation that they take a systematic and transformational approach to the achievement of objectives. Partnerships are expected to establish a formal and regular collaboration with other relevant research and innovation (R&I) initiatives to secure an optimum level of interconnections and ensure effective synergies. This means that the partnerships need to coordinate with other relevant R&I initiatives, including among themselves, and reflect this in their governance models and joint actions. They are expected to report on these collaborations and synergies. The strategic planning process of Horizon Europe with the early identification of priorities for partnerships and coordinated preparation process has created a unique opportunity to identify the priorities for collaboration and synergies *ex ante*.

Against this background, this document aims to further guide and structure the ongoing work on coherence and synergies. Based on inputs received so far from candidate European Partnerships[1] and the Commission services, it provides an overview on envisaged collaborations with other partnerships and synergies with other programmes at European, national, and regional level.

The overall aim is to develop a common understanding on operationalising coherence and synergies and make sure they are fully reflected in the next steps of preparation. This document will feed the further development of coherence and synergies among partnerships to agree *ex ante*:

- The priorities for collaboration and synergies;
- The purpose and scope of collaboration between partnerships and other initiatives/programmes.

Based on the mapping it draws transversal lessons and provides a framework for future thinking on developing collaborations between initiatives.

The report is composed of three parts. The first section discusses the overall policy framework and modalities for collaboration, building on the transversal lessons from the analysis of the draft proposals from partners. The second part includes overview tables with current agreements/ status on coherence and synergies. The third part includes the example of candidate partnership on Clean Hydrogen as a best practice for planning collaborations with other initiatives.

This text reflects the situation of October 2020. This is a third draft of the report on coherence and synergies of candidate European Partnerships that takes into account two rounds of inputs from the Commission services that are involved with partnerships. This document will be used as a basis for further development of collaboration among partnerships (both bilateral and multilateral). Additionally, it supports the coordination of the identification of synergies with other programmes and initiatives. The final agreements on synergies between European Partnerships and other union programmes will be reflected in the in the future programming and other documents (notably the Strategic Research and Innovation Agendas).

The report was drafted with the supported by two experts – Katharina Erbe (Federal Ministry of Education and Research) and Angus Hunter (Optimat).

[1] See the draft proposals: https://ec.europa.eu/info/horizon-europe-next-research-and-innovation-framework-programme/european-partnerships-horizon-europe_en

Part I – The framework and modalities for coherence and synergies

The what and why of collaboration and synergies

Multiple interconnections can be identified between the candidate European Partnerships, both within and among the clusters. For example, there are partnerships developing new technologies and methodologies (e.g. Photonics, Metrology, Batteries) that could team up with partnerships in industry or societal application areas (health, mobility, energy, agriculture). Also, EU investment in Research and Development will never be enough on its own to achieve the transitions that we need to see. Firstly the budget is limited, and secondly R&D only contributes a part of the necessary added value. To support areas that Horizon Europe cannot address, and to effectively leverage limited budgets, synergies with other programmes are essential.

By strengthening linkages and teaming up with other Horizon Europe initiatives, other MFF funded programmes, and national, regional, private programmes, future European Partnerships have better chances to deliver on the ambitious transitions and contribute to EU priorities and policies. Effective synergies maximise the possibility that successful research results are taken up and effectively deployed.

The main tool to develop collaborations and synergies is the **Strategic Research and Innovation Agenda (SRIA)**, which allows long-term planning and is mandatory for all European Partnerships under Horizon Europe. The Commission has an important role to play in enhancing synergies, collaboration and bridging the gaps between different partnerships. It is also important that the Horizon Europe governance arrangements bridge these gaps and delivers on the expectations for enhanced cross-fertilization between initiatives.

Developing collaborations with other European Partnerships

The consideration of options for collaboration is at least partly dependent on the type of partnership. This includes not only the generic forms (i.e. institutionalised, co-funded and co-programmed) but **also their function in the European R&I landscape.** Partnerships aim to address particular failures in the European R&I system[2]. They have been set up to address 'systematic' failures related to the functioning of the R&I systems (e.g. fragmentation of the European R&I landscape in specific fields) or 'market' failures (e.g. low private investment). Under Horizon Europe, Partnerships are expected to play a pivotal role in tackling the complex economic and societal challenges that constitute the R&I priorities of the Horizon Europe clusters. As such, the majority of candidate partnerships strive to take a step further and foster systemic transitions (addressing 'transformational failures') through increased directionality, demand articulation and policy coordination whilst remaining both flexible to changing situations.

Options for collaboration between European Partnerships under Horizon Europe can take two main forms: bilateral or multilateral:

[2] An analysis of R&I system failures for each of the candidate partnerships is included in the (soon to be published) Technopolis report on the 'Impact Assessment Study of Institutionalised European Partnerships under Horizon Europe'

- ***Bilateral Collaboration***

The simplest option for collaboration is between individual partnerships where there are clear linkages in specific areas. For example, the 'clean hydrogen' and 'clean steel' partnerships both acknowledge the logic for such collaboration, which can be differentiated from the multilateral potential for clean hydrogen in the energy, transport & mobility domains or via the increasing number of 'hydrogen valley' initiatives in European regions. Another is the 'photonics' partnership, where there are specific opportunities in areas such as healthcare diagnostics, food safety and automated transport.

In Horizon 2020, bilateral collaboration was quite common amongst some of the public-public partnerships (P2Ps), including cross-partnership joint research calls. There is also evidence of collaboration between some of the public-private partnerships (PPPs), such as joint workshops on digital health (involving IMI2 and ECSEL).

In the domain of partnerships with Member States and their programmes, the JPIs were particularly proactive in bi-lateral collaboration both with other JPIs and with ERA-NETs in areas of common interest. An example where this is being extended further into tri-lateral collaboration is the 'aquatic pollutants' ERA-NET Cofund. This was launched by three JPIs (water, oceans and antimicrobial resistance) in January 2020 and is aimed at addressing risks posed to human health and the environment by pollutants, pathogens and antimicrobial resistant bacteria in our water bodies and oceans. As well as launching joint calls, the collaborative project will also allow them to develop a joint strategy to work together, and with others, on this important subject.

- ***Multilateral Collaboration***

As mentioned in the paragraph above, in some areas there is considerable scope for multilateral collaboration between partnerships. This is particularly obvious for the partnerships that offer enabling technologies to address the socio-economic challenges of the application orientated partnerships. Some are developing new governance models or frameworks for such multilateral collaboration. For example:

- The 'European Metrology' partnership, which is planning to establish European Metrology Networks (EMNs) in various fields (e.g. advanced manufacturing, climate & energy observation, energy gases, food safety, health innovation, laboratory medicine, medical device regulation and smart electricity grids) to better meet the needs of end users. These should also offer an ideal structure to engage with relevant partnerships in the associated fields.
- The 'Photonics' partnership is planning to organise its activities through a core working group and six application working groups (agro & food; digital infrastructure; health; manufacturing; mobility & energy; and safety, security, space & defence). This will allow it to work in parallel on the further development of core photonics technologies (TRL2-7) and engage with up to 26 other partnerships on application-orientated joint calls (TRL5-9) with end user sectors and other key enabling technologies.

- The 'Clean hydrogen' partnership is planning to formalise its engagement with seven relevant end-user partnerships related to transport and industry applications through an 'Inter-Partnership Assembly'
- The 'European Open Science Cloud' partnership is planning to provide seamless access to services to store, share and re-use research data across borders and disciplines, as well as minimal standards and protocols and maximum freedom of implementation to share and reuse research data within and across scientific disciplines. It has a unique transversal role (cross-Pillar, cross-Cluster) in Horizon Europe, bringing prospects of collaboration with most the vertical and some of the horizontal European partnerships.
- The Globally competitive Space Systems is planning collaborations with industrial domains other than 'Space' to gain the competitive advantage that only technology transfers and cross-pollinations can help achieve. Such collaboration will also contribute to reinforce Europe's strategic autonomy. These are 'Smart Networks and Services', 'Artificial Intelligence, data and robotics', 'Made in Europe', 'Photonics' 'Key Digital Technologies' and 'High Performance Computing'. Links and discussions have been established. Topics of common interests have already been identified in the SRIA.

The above examples indicate that some partnerships have the potential to play a truly pivotal role in leading and fostering multilateral collaboration either because of their interdisciplinary focus and/or position in transformational supply chains. As well as playing a coordinating role to bring together synergetic partnerships they may also be well placed to lead the engagement with other key players in the European R&I landscape that may have a role to play in addressing the economic or societal challenges. These could include (and may apply for bilateral collaborations as well):

- Challenge-based partnerships, such as 'driving urban transitions[3]' that need both a strategic vision and an interdisciplinary approach. Various possible modes of interaction are being explored with coherent partnerships including clean energy transition, people-centric sustainable built environment, rescuing biodiversity, safe and sustainable food system, 2ZERO, CCAM and Water4All.
- Converging technology partnerships, such as 'smart networks and services', 'batteries' and 'circular bioeconomy' that have the potential to play a pivotal role in disruptive or transformational value chains. For example, the SNS partnership expects to collaborate with the other four 'digital' ones in the development of 5G network technologies and with key application partnerships like 'transforming Europe's rail system' and 'connected, cooperative and automated mobility' in their deployment.
- Cross-cutting challenge partnerships, such as 'rescuing biodiversity' that is proposing to set up a 'biodiversity forum' involving at least eight other partnerships across several clusters.

For collaborations that involve several partnerships, it is important to reflect how this could fit within the future governance of Horizon Europe. Assuming that the latter will be largely built around clusters, it is important to identify where there is scope for collaboration that does not easily fit within the cluster logic and requires another approach (i.e. topics of cross-cluster importance).

[3] Originally known as 'sustainable, smart and inclusive cities & communities'

Modalities for collaboration with other European Partnerships

The development of collaboration between European Partnerships requires a step-by-step approach in the policy and programme design:

- **Strategy development process** needs to ensure a clear intervention logic, objectives and activities/ responsibilities. The SRIA needs to have a wider perspective than its members and consider other relevant R&I partnerships and initiatives. It should include the *ex ante* priorities for collaboration with other Partnerships (agreed in the Commission) for which a clear strategy for the interfaces and joint activities will be developed and maintained.
- It is important to consider who needs to be involved in the **governance** in order to maintain good collaboration, identify possibilities for complementarities and overlaps. The Commission has an important role in the governance to ensure complementarities and coherence with other Horizon Europe activities (traditional calls, missions, other partnerships).
- **The legal framework** can include certain obligations for establishing structured collaborations with other relevant European Partnerships (e.g. in the objectives, tasks, monitoring and reporting).
- Agreed collaborations with other Partnerships need to be translated into **concrete activities** in the context of the **annual work plans/programmes**. Joint activities can include for example:
    - Coordinated and co-designed calls between partnerships. Here it is possible to add in the call text an obligation to collaborate with mirroring projects under other partnerships (e.g. to have common status seminars, regular annual meetings or similar). It is important to flag the call topics that are co-designed between several partnerships.
    - Joint activities / collaboration related to joint deployment, regulations and standards.
    - Joint outreach and dissemination of success stories of synergies.
- **Reporting and monitoring** is important to stimulate collaborations between partnerships, for example:
    - To use indicators that assess Partnerships from a systemic perspective – e.g. joint contribution to EU policy objectives (emissions reduction) or complementarities and synergies reached thanks to collaborations and joint calls set up with other initiatives.
    - To have regular assessments of a joint portfolio of R&I projects and their progress to identify gaps, overlaps.

Developing synergies with other programmes

There is also a need to consider how to better achieve the objectives and maximise impacts through engagement with other initiatives and parties. Many partnerships aim at demonstration and scale up, but this is generally not possible (at least not in a large scale) without synergies and joint programming with other programmes/ funding instruments. At the EU level there are a number of initiatives and funding programmes beyond the Framework Programme that offer wider synergies especially in relation to digital, transport and energy areas. Those that are mentioned most frequently are:

- Digital Europe Programme (DEP)
- EU4Health programme
- Connecting Europe Facility (CEF)
- Cohesion policy funds
- Recovery and Resilience Facility
- Important Projects of Common European Interest (IPCEI)
- ETS Innovation Fund
- Modernisation Fund

All of which can support projects closer to the market (higher TRL levels) or larger demonstrators towards deployment and commercialisation.

Other funding sources that are being considered by partnerships include EU4Health, InvestEU, the European Investment Bank and the Programme for Environment & Climate Action (LIFE) as well as sectoral-specific funds such as the European Structural and Investment Funds, the Common Agricultural Policy and the Circular Bioeconomy Thematic Investment Platform. The key point is that these funding sources can support the deployment and scale up that R&I funds cannot. Additional support for project sponsors to obtain finance from these sources could certainly be considered, similarly to the approach already taken by the European Innovation Council or BBI:

- The EIC provides guidance to project sponsors on obtaining further finance, as well as to excellent projects that cannot be funded because of budget limits;
- The BBI provides a "Synergy Label" to excellent projects that cannot be funded to support the quest for alternative funding.

Partnerships should try to be innovative in supporting projects to incorporate these other sources of funding.

There are also opportunities for partnerships to exploit synergies with national, regional & local initiatives and complementary investments. For example:

- Most of the candidate Article 187 initiatives and Co-Programmed Partnerships are proposing to include Member State advisory bodies within their governance structures to create links with the national R&I activities. This could lead to complementary joint calls using national funding or even hybrid Co-Programmed/Co-Funded calls.

- Two Article 187 initiatives, namely Key Digital Technologies (KDT) and EuroHPC, count on the participation of national funding authorities from Member States and Associated Countries which are actively funding the JU's projects. Their contribution is of equivalent proportion to that of the Union.
- European regions are increasingly prioritising particular industrial ecosystems and technology sectors that offer economic growth opportunities through smart specialisation strategies (S3) and this has relevance for some partnerships. For example, the Photonics Partnership is proposing to develop a formal 'alliance of European regional clusters' that have distinctive industrial and/or scientific strengths in photonics. Another example is the partnership on agroecology living labs that aims to build synergies with the thematic platform on agri-food.
- European cities are clearly the main focus for the 'driving urban transitions' partnership and other partnerships that can make a contribution to the 'climate-neutral and smart cities' Mission[4] by aligning and mobilising national programmes and funds.

Regional actors should be receptive to collaboration with European Partnerships in the next ERDF programming period as 'international collaboration' is included as a fulfilment criterion enabling good governance of national and regional smart specialisation strategies. This has previously been enabled through the various 'Interreg' programmes but there is scope to develop complementary links and joint activities. The development and implementation of favourable and compatible funding and reporting conditions for INTERREG will be key.

Last, but not least, is the potential for collaboration (and in some cases European leadership) at the global level in relation to the Sustainable Development Goals (SDGs). This has already been demonstrated by the predecessor of the EU-Africa Global Health Partnership, involvement of European P2P partnerships in the Belmont Forum (international partnership of research funders on environmental change research) and the Article 185 on Metrology. For example, the JPI on neurodegenerative disease (JPND) recently hosted a symposium to showcase the results of its portfolio of research projects and key global stakeholders such as the Gates Foundation and the World Dementia Council were involved.

The proposed strategic coordinating process could provide an overarching framework to monitor and encourage partnerships at the implementation stage to engage and collaborate with their relevant peers and other initiatives. This could also be encouraged by the strategic use of the Coordination and Support Actions (CSA) instrument or Policy Support Facility.

Modalities for synergies

The development of synergies requires governance structures, and implementation of the programme, that ensure coherence at different levels:

- In the development of the research base – by ensuring coherent research agendas and investment;
- In the dissemination of R&I results – ensuring that R&I results are known within and across sectors;
- In policy development – the effect of R&I results on policy needs to be assessed and presented coherently;

[4] Synergies and collaboration with Missions can be fully developed further once they have been identified.

- In support along the value chain – by ensuring that innovative ideas and successful research has the best possible chance to be taken up and deployed, either through other funding programmes or by the private sector.

The development of synergies does not therefore start with questions of financing, but rather strategy. Only when this strategy is properly developed can the means of implementation be examined.

The processes currently available provide many of the tools necessary to provide this strategy and coherence. This includes:

- Co-creation of the Strategic Plan and Work Plans in cluster groups;
- Research and Innovation Agendas created for the partnerships;
- The Dissemination and Exploitation strategy;
- The Feedback to Policy Strategy;
- Annex IV (Synergies with other programmes) of Horizon Europe and the ongoing work to make the proposed synergies, especially synergies along the value chain, a reality;
- European Partnerships and Missions as key drivers for synergies, including the work on collaboration between partnerships.

All of these tools are at different stages of development, all of them will help to ensure the coherence that we are seeking.

Part II – Results of the mapping of coherence and synergies

Descriptions of Partnership candidates that were used for this mapping exercise are available on the Horizon Europe webpage.

List of partnership candidates and abbreviations used in the tables:

EU-Africa Global Health Partnership	
European Partnership for Innovative Health	
European Partnership for Chemical Risk Assessment	
European Partnership – ERA for Health	ERA Health
European Partnership on Health and Care Systems Transformation	
European Partnership for Personalised Medicine	
European Partnership on Rare Diseases	
European Partnership on One Health / Antimicrobial Resistance (AMR)	One Health / AMR
European Partnership for High Performance Computing	HPC
European Partnership for Key Digital Technologies	KDT
European Partnership for Smart Networks and Services	SNS
European Partnership on AI, Data and Robotics	
European Partnership for Photonics	
European Partnership for Clean Steel - Low Carbon Steelmaking	Clean Steel
European Partnership on Metrology	Metrology
European Partnership Made in Europe	
European Partnership on Process4Planet	P4P
European Partnership for Globally competitive Space Systems	Space
European Partnership for Transforming Europe's rail system	
European Partnership for Integrated Air Traffic Management	ATM
European Partnership for Clean Aviation	
European Partnership on Clean Hydrogen	
People-centric sustainable built environment	Built4People
European Partnership - Towards zero-emission road transport	2ZERO
European Partnership on Connected, cooperative and Automated Mobility	CCAM
European Partnership on Zero-emission Waterborne Transport	
European industrial battery value chain	
European Partnership - Driving Urban Transitions to a sustainable future	DUT
European Partnership for Clean Energy Transition	
European Partnership Accelerating farming systems transition: agroecology living labs and research infrastrustures	Agroecology living labs/AELL
European Partnership for Animal Health and Welfare	Animal health and Welfare/PAHW
Agriculture of Data ((European Partnership on environmental observations for sustainable EU-agriculture)	Agriculture of Data
European Partnership Rescuing biodiversity to safeguard life on Earth	Rescuing Biodiversity
European Partnership for A climate neutral, sustainable and productive Blue Economy	Blue Economy
European Partnership for Safe and Sustainable Food System	Food system
European Partnership for a Circular bio-based Europe	CBE
European Partnership Water security for the planet (Water4All)	Water4All
Innovative SMEs	
European Open Science Cloud Partnership	EOSC
EIT Climate-KIC	
EIT InnoEnergy	
EIT Digital	
EIT Health	
EIT Food	
EIT Manufacturing	
EIT Raw Materials	
EIT Urban Mobility	
KIC Cultural and Creative Industries	

Coding in tables:

	Both Partnerships indicate coherence
	Only left column Partnership indicates coherence
	No Partnership mentions coherence, but might have some
x	Priority for collaboration
o	Exchange of information suggested

● Proposers indicated possible synergy

❍ Possible additional synergies

1 Health – Cluster 1

Table 1 Cluster 1 - Coherence with other partnerships

		Cluster 1								Cluster 4									Cluster5										Cluster 6								Other Pillars											
		EU-Africa Global Health	Innovative Health	Chemical Risk Assessment	ERA Health	Transforming Health and Care Systems	Personalised Medicine	Rare Diseases	One Health / AMR	HPC	Key Digital Technologies	Smart Networks and Services	AI, data and robotics	Photonics Europe	Clean Steel	Metrology	Made in Europe	P4P	Globally competitive Space Systems	Transforming Europe's rail system	Integrated Air Traffic Management	Clean Aviation	Clean Hydrogen	Built4People	2ZERO	CCAM	Zero-emission waterborne transport	European industrial battery value chain	DUT	Clean Energy Transition	Agroecology living labs	Animal Health and Welfare	Agriculture of Data	Rescuing biodiversity to safeguard life on Earth	Blue Economy	Safe and Sustainable Food System	Circular bio-based Europe	Water4All	Innovative SMEs	European Science Cloud	EIT Climate-KIC	EIT InnoEnergy	EIT Digital	EIT Health	EIT Food	EIT Manufacturing	EIT Raw Materials	EIT Urban Mobility	KIC Cultural and Creative Industries
Cluster 1	EU-Africa Global Health		x						x			o	o	o		o																						o									
	Innovative Health	x			x	x			x	x	x	o	x			o																						o				x					
	Chemical Risk Assessment		x		x	-										o		o															o	x		o	x	o								
	ERA Health	x	x	x		x	x	x	x			o	o	o		o																						o				x					
	Transforming Health and Care Systems	o	x	o	x		x	x	x		x	o	x	o		o																						o				x					
	Personalised Medicine		x		x	x		x				o	o	o		o																						o				x					
	Rare Diseases		x		x	x	x				x	o	x	o		o																						o				o					
	One Health/AMR	x	x		x	x						o	o	o		o																x						o									

Both mentioned
Only left column
Partnership indicates coherence
Suggested by COM services
x Priority
o Inform
Programme 2023-24

Table 2 Cluster 1 - Synergies with other programmes

● Proposers indicated possible synergy
❍ Possible additional synergies

	Cluster 1							
	EU-Africa Global Health	Innovative Health	Chemical Risk Assessment	ERA Health	Health and care systems transorfmation	Personalised Medicine	Rare Diseases	One Health/AMR
Other Programmes and Initiatives								
Connecting Europe Facility (CEF)		❍					❍	
Digital Europe Programme (DEP)		●		●	❍		❍	
InvestEU	❍	●		●	❍		❍	
Structural Funds (ERDF/Cohesion)		●	●	●		❍	❍	
European Social Fund + (ESF+)		●	●	❍	❍			
Important Project of Common European Interest (IPCEI)								
ETS Innovation Fund								
Modernisation Fund								
European Investment Bank	❍							
Circular Bioeconomy Thematic Investment Programme								
Programme for Environment & Climate Action (LIFE)			●					
European Maritime and Fisheries Fund (EMFF)		❍	●					
Copernicus								
GEOSS								
European Innovation Council		❍		●				
Erasmus Plus	❍		●			❍		
National Energy and Climate Change Plans								
Research Fund for Coal and Steel								
Covenant of Mayors								
EU Malaria Fund	●							
European Medicines Agency (EMA)	●							❍
European Centre for Disease Prevention and Control								
European Space Agency								
Standardisation Bodies								
HE Mission Areas								
Adaptation to Climate Change, including Societal Transformation								
Climate-neutral and Smart Cities								
Cancer		●			●	❍		
Healthy Oceans, Seas, Coastal and Inland Waters		❍	●					
Soil Health and Food			●					

2 Digital, Industry and Space – Cluster 4

Table 3 Cluster 4 - Coherence with other partnerships

Both mentioned
Only left column Partnership indicates coherence
Suggested by COM services
x Priority
o Inform

		Cluster 1								Cluster 4									Cluster 5										Cluster 6									Other Pillars										
		EU-Africa Global Health	Innovative Health	Chemical Risk Assessment	ERA Health	Health and Care Systems Transformation	Personalised Medicine	Rare Diseases	One Health / AMR	HPC	Key Digital Technologies	Smart Networks and Services	AI, data and robotics	Photonics Europe	Clean Steel	Metrology	Made in Europe	P4P	Globally competitive Space Systems	Transforming Europe's rail system	Integrated Air Traffic Management	Clean Aviation	Clean Hydrogen	Built4People	2ZERO	CCAM	Zero-emission waterborne transport	European industrial battery value chain	DUT	Clean Energy Transition	Agroecology living labs	Animal Health and Welfare	Agriculture of Data	Rescuing biodiversity to safeguard life on Earth	Blue Economy	Safe and Sustainable Food System	Circular bio-based Europe	Water4All	Innovative SMEs	European Science Cloud	EIT Climate-KIC	EIT InnoEnergy	EIT Digital	EIT Health	EIT Food	EIT Manufacturing	EIT Raw Materials	EIT Urban Mobility	KIC Cultural and Creative Industries
Cluster 4	HPC		x								x	x	x	o		o	x														o							o	x			x	o		o			
	KDT		x					o		x		x	x	x		o	x	o	x	x	x				x	x	o	x				o							o	x			x			o	x		
	SNS	o	o		o	o	o	o	o	x	x		x	x		o		o	x	o	x				o	x	o		o		o							o	o		x	x			o			
	AI, data and robotics	o	x		o	x	o	x	o	x	x	x		x		o	x			o	x				o	x	o					o							o	x			x	o		X		o	
	Photonics Europe	o	x		o	o	o	o	o	o	x	x	x			o	x									o					x					x			o	o						o			
	Clean Steel															o	x	x					x	o						x										o	o	o					o	o		
	Metrology	o	o	o	o	o	o	o	o	o	o	o	o	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o				o	o	o	o		o	o						o			
	Made in Europe		o							x	x	x	x	x	x	o		x	o			x	o	o	x	o	o	x								o			o	o	o		x			x	o		
	P4P			o								o	x		x	o	x					o	x	x	o		o	o		x							x	x		o	o	x	o				x	x		
	Space									x	x	x	x	x		o	x				x					o						x		o					o	o				o		o			

Cluster 4 has a strong potential for exploring synergies within the cluster and across pillar II and with other pillars as well. As a way of illustration the figure below highlights some of the virtuous links with the digital domain partnerships which will extended to other domains like, Health, Mobility, Energy, etc.

Example of inter-play between digital-centric partnerships

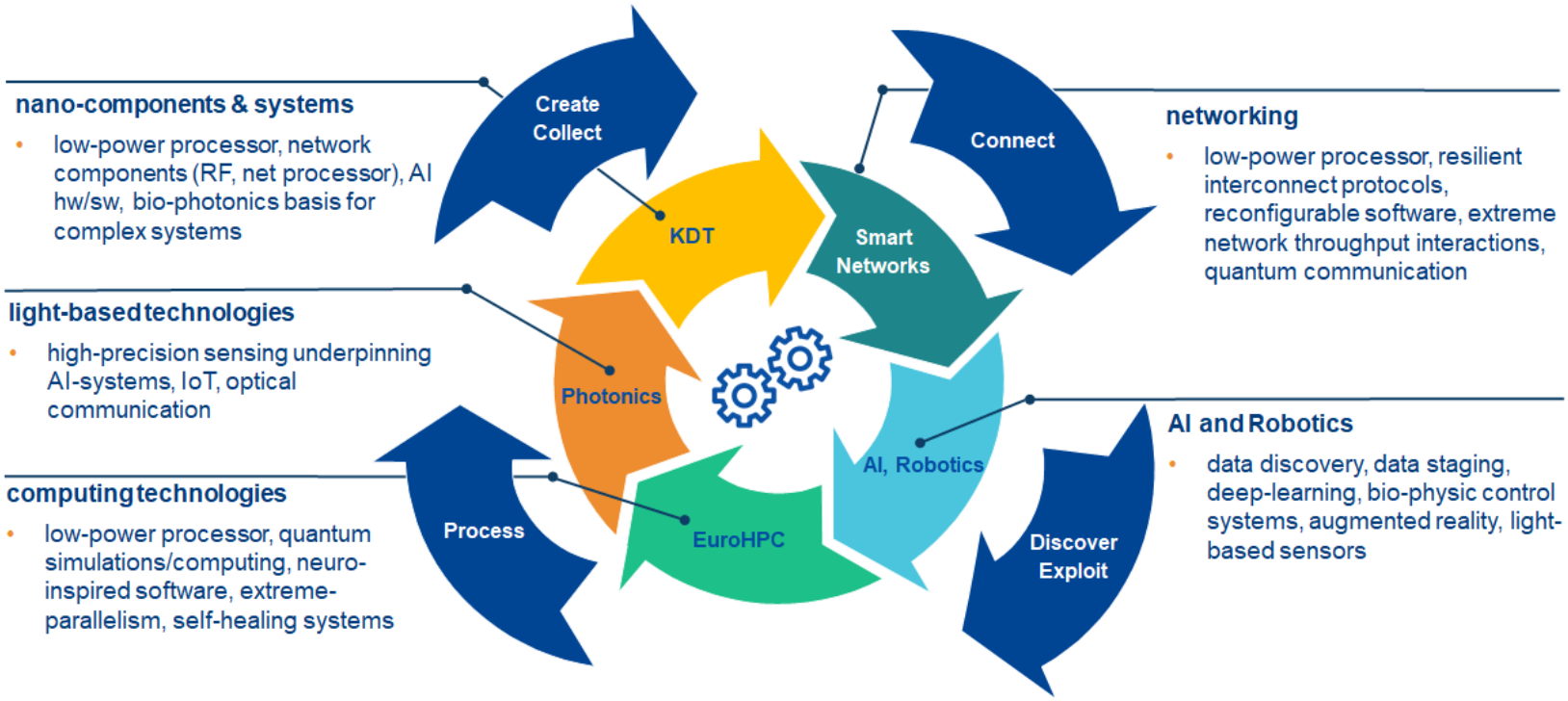

Table 4 Cluster 4 - Synergies with other Programmes

● Proposers indicated possible synergy
❍ Possible additional synergies

	Cluster 4									
	HPC	Key Digital Technologies	Smart Networks and Services	AI, data and robotics	Photonics Europe	Clean Steel	Metrology	Made in Europe	P4P	Globally competitive Space Systems
Other programmes and initatives										
Connecting Europe Facility (CEF)	●		●			❍		❍	❍	
Digital Europe Programme (DEP)	●	●	●	●	●			❍	❍	❍
InvestEU	●	●	●	●	●	❍		❍	●	●
Structural Funds (ERDF/Cohesion)	●	●	❍	●	●	❍	❍	❍	❍	❍
Important Project of Common European Interest (IPCEI)		❍				●		●	❍	
ETS Innovation Fund						●			❍	
Modernisation Fund								❍		
Just Transition Mechanism						●		❍	❍	
Recovery&Resilience Facility								❍	❍	
Green Deal Investment Plan								❍	❍	
European Investment Bank		●		●		❍		❍	❍	
Process 4 Planet								❍		
Programme for Environment & Climate Action (LIFE)						❍	❍			
Space Programme		❍					❍			●
GEOSS							❍			
European Innovation Council		●		●	●			●	❍	●
Erasmus Plus		❍						●	❍	
National Energy and Climate Change Plans						❍	❍		❍	
Research Fund for Coal and Steel						●				
Covenant of Mayors										
European Space Agency		❍								●
Standardisation Bodies		❍					●	❍	❍	
Next Generation EU - Recovery and Resilience Facility				❍						
Next Generation EU - Health Programme				❍						
HE Mission Areas										
Adaptation to Climate Change, including Societal Transformation					●	❍	❍		❍	
Climate-neutral and Smart Cities		●	❍		●	❍	❍	❍	❍	
Cancer					●		❍			
Healthy Oceans, Seas, Coastal and Inland Waters					●		❍			
Soil Health and Food					●		❍			

3 Climate, Energy and Mobility – Cluster 5

Table 5 Cluster 5 - Coherence and coordination among partnerships

Both mentioned
Only left column Partnership indicates coherence
Suggested by COM services
x Priority
o Inform

		Cluster 1								Cluster 4									Cluster 5										Cluster 6								Other Pillars										
		EU-Africa Global Health	Innovative Health	Chemical Risk Assessment	ERA Health	Health and Care Systems Transformation	Personalised Medicine	Rare Diseases	One Health / AMR	HPC	Key Digital Technologies	Smart Networks and Services	AI, Data and Robotics	Photonics	Clean Steel	Metrology	Made in Europe	P4P	Globally competitive Space Systems	Transforming Europe's rail system	Integrated Air Traffic Management	Clean Aviation	Clean Hydrogen	Built4People	2ZERO	CCAM	Zero-emission waterborne transport	European industrial battery value chain	DUT	Clean Energy Transition	Accelerating farming systems	Animal Health and Welfare	Agriculture of Data	Rescuing biodiversity to safeguard life on Earth	Blue Economy	Safe and Sustainable Food System	Circular bio-based Europe	Water4All	Innovative SMEs	European Science Cloud	EIT Climate-KIC	EIT InnoEnergy	EIT Digital-	EIT Health-	EIT Food	EIT Manufacturing	EIT Raw Materials	EIT Urban Mobility	KIC Cultural and Creative Industries
Cluster 5	Transforming Europe's rail system										x	o	o			o					x	x	x		o	x	o	x	o										o	o									
	ATM										x	x	x			o			x	x		x				o			o										o			o							
	Clean Aviation									x	x	o	o			o	x		o	x	x		x					x								o			o	o								
	Clean Hydrogen														x	o		x		x		x			X	x	x	x		x						o			o								
	Built4People														o	o	x	x							o												x		o	o	o							
	2ZERO										x	o	o			o				x			x	o		x	o	x	x								o		o							x	
	CCAM										x	x	x	o		o			o	x	o		x		X		x		x								o			o						x	
	Waterborne transport										o	o	o			o	o	o		x			x		o	x		x		o					o	x		o	x		o	o						
	Batteries										x					o	x	o		x		x	x		x		x												o		x				x	x			
	DUT											o				o				o	o			x	x	x			x						x		x			o	x	o	o					o	
	Clean Energy Transition														x	o							x	x			o	x	X						o					o	x	x				x			

Table 6 Cluster 5 - Synergies with other programmes

● Proposers indicated possible synergy
❍ Possible additional synergies

	Cluster 5										
	Transforming Europe's rail system	Integrated Air Traffic Management	Clean Aviation	Clean Hydrogen	Built4People	2ZERO	CCAM	Zero-emission waterborne transport	Batteries	DUT	Clean Energy Transition
Other programmes and initatives											
Trans-European Transport Network (TEN-T)	●										
Connecting Europe Facility (CEF)	●	●	❍	●		●	●	●	●		●
Digital Europe Programme (DEP)	●										
InvestEU	❍		❍	●	❍	●		●	❍	❍	●
Structural Funds (ERDF/Cohesion)	●	❍	❍	●	❍	●	❍	●	❍	❍	●
Strategic Forum for Important Projects of Common European Interest (IPCEI)				●							
Important Project of Common European Interest (IPCEI)			❍	●	❍	●			●		
ETS Innovation Fund	❍		❍	●							
Innovation Fund				●				●	❍		●
Modernisation Fund								●			●
European Investment Bank	●		❍	●	❍			●		❍	
Circular Bioeconomy Thematic Investment Programme											
Programme for Environment & Climate Action (LIFE)					●			●			●
Copernicus											
GEOSS											
European Innovation Council	●		❍			●		●			
National Energy and Climate Change Plans				●	❍						●
Covenant of Mayors					●						
Standardisation Bodies				●	●		❍			❍	
HE Mission Areas											
Adaptation to Climate Change, including Societal Transformation	●		❍	❍	●	●		●		❍	❍
Climate-neutral and Smart Cities	●			●	●	●		●		❍	
Cancer						●					
Healthy Oceans, Seas, Coastal and Inland Waters								●			
Soil Health and Food											

4 Food, Bioeconomy, Natural Resources, Agriculture and Environment – Cluster 6

Table 7 Cluster 6 - Coherence and coordination among partnerships

		Cluster 1								Cluster 4									Cluster 5										Cluster 6									Other Pillars										
		EU-Africa Global Health	Innovative Health	Chemical Risk Assessment	ERA Health	Health and Care Systems Transformation	Personalised Medicine	Rare Diseases	One Health / AMR	HPC	Key Digital Technologies	Smart Networks and Services	AI, Data and Robotics	Photonics	Clean Steel	Metrology	Made in Europe	P4P	Globally competitive Space Systems	Transforming Europe's rail system	Integrated Air Traffic Management	Clean Aviation	Clean Hydrogen	Built4People	Towards zero-emission road transport	CCCAM	Zero-emission waterborne transport	European industrial battery value chain	DUT	Clean Energy Transition	Agroecology living labs	Animal Health and Welfare	Agriculture of data	Rescuing biodiversity to safeguard life on Earth	Blue Economy	Safe and Sustainable Food System	Circular bio-based Europe	Water4All	Innovative SMEs	European Science Cloud	EIT Climate-KIC	EIT InnoEnergy	EIT Digital-	EIT Health-	EIT Food	EIT Manufacturing	EIT Raw Materials	EIT Urban Mobility	KIC Cultural and Creative Industries
Cluster 6	Agroecology living labs											o																		x	x	x		x	x	x		o					o				
	Animal health								x																					x			o	x	x	x			o								
	Agriculture of Data									o	o		x						x											x			x		x				o				o				
	Rescuing Biodiversity			x																						o		x		x	o	x		x	x	x	x		o	o							
	Blue Economy															o			o							x			o			x		x		x			o	o	o			o		o		
	Food System			x												o												x			x	x	x	x	x		x	x		o					x				
	Circular bio-based Europe			x												0		x				o	o	x	o		o				x	x		x		x		x		o	o	o				o	x		
	Water4All			x												o											x		x		x			x	x	x	x				o								

Both mentioned
Only left column
Partnership indicates coherence
Suggested by COM services
x Priority
o Inform

Table 8 Cluster 6 - Synergies with other Programmes

	Cluster 6							
	Accelerating farming systems	Animal health	Agriculture	Rescuing biodiversity	Blue Economy	Safe and Sustainable Food System	Circular bio-based Europe	Water4All
Other programmes and initatives								
Trans-European Transport Network (TEN-T)								
Connecting Europe Facility (CEF)								
Digital Europe Programme (DEP)						❍		
InvestEU						●	●	
Structural Funds (ERDF/Cohesion)	❍	❍		❍	●	●	●	●
Strategic Forum for Important Projects of Common European Interest (IPCEI)								
Important Project of Common European Interest (IPCEI)								
ETS Innovation Fund						❍		
Innovation Fund						❍		
Modernisation Fund								
Just Transition Mechanism						❍		
European Investment Bank						●		
Circular Bioeconomy Thematic Investment Programme						●		
Programme for Environment & Climate Action (LIFE)				●	●		●	●
Copernicus			❍		●			●
GEOSS					❍			❍
European Innovation Council						●		
Erasmus Plus								
National Energy and Climate Change Plans					❍			
Research Fund for Coal and Steel								
Covenant of Mayors						●		
European Space Agency					●	❍		●
Standardisation Bodies								
European Maritime and Fisheries Fund				❍	●		❍	
EIP Agri						●	❍	
Common Agricultural Policy					●			
HE Mission Areas								
Adaptation to Climate Change, including Societal Transformation					●		●	●
Climate-neutral and Smart Cities					●	❍	●	●
Cancer						❍		
Healthy Oceans, Seas, Coastal and Inland Waters					●	❍	●	●
Soil Health and Food	❍				●	❍	●	●

5 Other Pillars

Table 9 Other Pillars - Coherence and collaboration among partnerships

		Cluster 1								Cluster 4										Cluster 5										Cluster 6									Other Pillars										
		EU-Africa Global Health	Innovative Health	Chemical Risk Assessment	ERA Health	Health and Care Systems Transformation	Personalised Medicine	Rare Diseases	One Health / AMR	HPC	Key Digital Technologies	Smart Networks and Services	AI, Data and Robotics	Photonics	Clean Steel	Metrology	Made in Europe	P4P	Globally competitive Space Systems	Transforming Europe's rail system	Integrated Air Traffic Management	Clean Aviation	Clean Hydrogen	Built4People	Towards zero-emission road transport	Connected and Automated Driving	Zero-emission waterborne transport	European industrial battery value chain	DUT	Clean Energy Transition	Agroecology living labs	Animal Health and Welfare	Agriculture	Rescuing biodiversity to safeguard life on Earth	Blue Economy	Safe and Sustainable Food System	Circular bio-based Europe	Water4All	Innovative SMEs	European Science Cloud	EIT Climate-KIC	EIT InnoEnergy	EIT Digital	EIT Health	EIT Food	EIT Manufacturing	EIT Raw Materials	EIT Urban Mobility	KIC Cultural and Creative Industries
Other Pillars	Innovative SMEs									o	o	o	o	o	o	o	o	o	o																				o	o	o	o	o	o	o	o	o	o	
	European Science Cloud									x	x	o	x																												o	o	o	o	o	o	o	o	o	o
	EIT Climate-KIC																o			o		o		o	o			x	x					o	o		o	o	o	o								
	EIT InnoEnergy											x				o							o	o			x	o	x					o		o		o	o									
	EIT Digital									x	x	x	x			x		o		o					o			o					o						o	o									
	EIT Health		x		x	x	x	o		o			o																			o							o	o									
	EIT Food																	o													o			o	x			o	o									
	EIT Manufacturing									o	o	o	x		o		x	x										x									o	o										
	EIT Raw Materials																x	x										x		x				o		x		o	o									
	EIT Urban Mobility												o												x	x			o										o	o									
	KIC Cultural and Creative Industries																																							o									

Both mentioned
Only left column
Partnership indicates coherence
Suggested by COM services
x Priority
o Inform

Table 10 Other Pillars - Synergies with other Programmes

● Proposers indicated possible synergy
❍ Possible additional synergies

	Cluster 6										
	Innovative SMEs	European Science Cloud	EIT Climate-KIC	EIT InnoEnergy	EIT Digital	EIT Health	EIT Food	EIT Manufacturing	EIT Raw Materials	EIT Urban Mobility	KIC Cultural and Creative Industries
Other programmes and initatives											
Trans-European Transport Network (TEN-T)											
Connecting Europe Facility (CEF)		●									
Digital Europe Programme (DEP)		●		❍		❍			❍		
InvestEU			❍	❍	❍	❍	❍	❍	❍	❍	
Structural Funds (ERDF/Cohesion)		●	❍	❍	❍	❍	❍	❍	❍	❍	
Strategic Forum for Important Projects of Common European Interest (IPCEI)											
Important Project of Common European Interest (IPCEI)											
ETS Innovation Fund											
Innovation Fund											
Modernisation Fund											
Just Transition Mechanism											
European Investment Bank											
Circular Bioeconomy Thematic Investment Programme											
Programme for Environment & Climate Action (LIFE)											
Copernicus											
GEOSS											
European Innovation Council											
Erasmus Plus			❍	❍	❍	❍	❍	❍	❍	❍	
National Energy and Climate Change Plans											
Research Fund for Coal and Steel											
Covenant of Mayors											
European Space Agency											
Standardisation Bodies											
European Maritime and Fisheries Fund							❍				
EIP Agri											
HE Mission Areas											
Adaptation to Climate Change, including Societal Transformation		●	❍		❍				❍		
Climate-neutral and Smart Cities		●	❍	❍						❍	
Cancer		●			❍	❍	❍				
Healthy Oceans, Seas, Coastal and Inland Waters		●	❍	❍			❍			❍	
Soil Health and Food		●	❍				❍				

Annex – Clean Hydrogen example of coherence and synergies

Summary

Europe's ambitions will require clean hydrogen at scale. Without it, the EU will miss its climate, environmental and energy objectives as well as the opportunity to create a strong, European, competitive industry. *Clean Hydrogen*, as an institutionalised European partnership, will accelerate development and deployment of European clean hydrogen technologies, enabling them to contribute to a sustainable, decarbonised and fully integrated energy system.

Coherence and coordination among partnerships

Figure 1: Synergies with other partnerships, Source: Draft proposal Clean Hydrogen Partnership candidate - Annex I

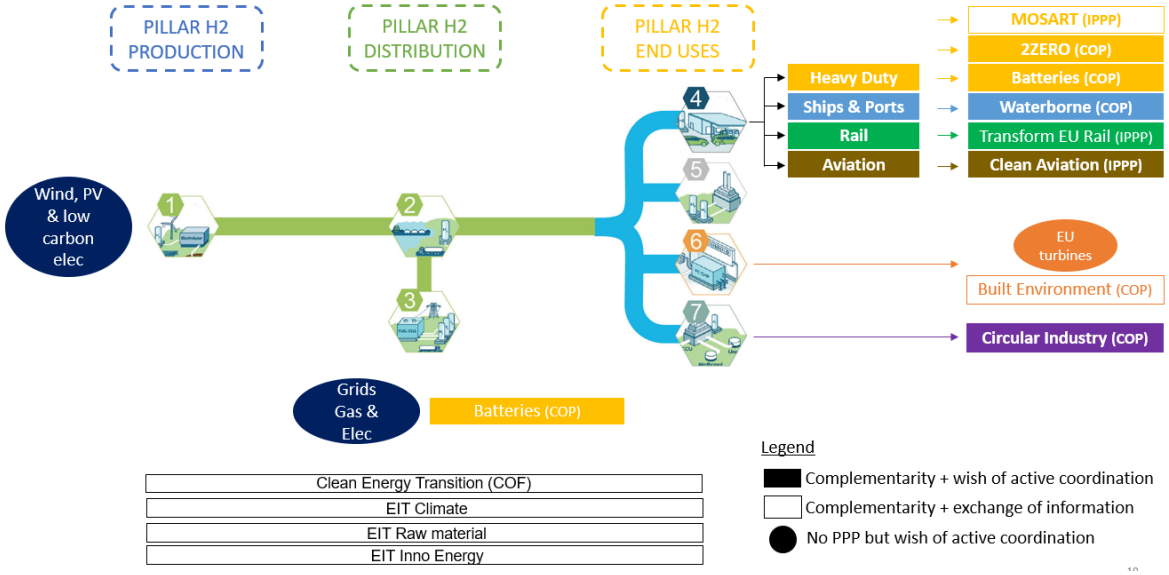

Table 11 Overview of Partnerships identified in the Clean Hydrogen proposal

Horizon Europe structure	Candidate partnerships	Areas for collaboration	Mentioned in other proposal
Digital, Industry and Space	Clean Steel	• Hydrogen as energy and reducing agent	Yes/ signed
	Carbon Neutral and Circular Industry	• Hydrogen as a feedstock. • Integration of H2 and new industrial processes • Regulation, codes and standards • Coordination within "H2 valleys" and the "Clean and circular hub"	Yes/MoU to be finalised in coming weeks
	Metrology	• Hydrogen re-fueling station meters, et.sim	No
Climate, energy and mobility	CCAM	• End-uses	No
	2ZERO	• Focus on the new generation of technology building blocks that can adapt to new automotive	Yes/MoU to be finalised in coming weeks

		platforms developed in 2Zero. • New applications (e.g. trucks and coaches) as in the transport part of *Clean Hydrogen*	
	Zero-emission waterborne transport	• It will be important to collaborate (e.g. coordinated calls), to develop multi MW fuel cell required for ship propulsion and the related fuel technology. • Ports as location for "H2 valley" projects.	Yes/ MoU to be finalised in coming weeks
	Transforming Europe`s rail system	• Rail hubs can be good candidates for H2 valleys with close proximity from ports and/or airports.	Yes/ MoU to be finalised in coming weeks
	Clean Aviation	• Electrification and hybridization of aircrafts: need to develop adapted fuel cells, adapted storage, and H2 infrastructure. • New fuels for aviation: liquid hydrogen (that requires a completely new architecture). • Airports are a privilege location for "H2 valley" projects	Yes/ MoU to be finalised in coming weeks
	European industrial battery value chain	• Design of hybrid systems combining battery and hydrogen technologies	Yes
	Built4People	• End-use	No
	Clean Energy Transition	• Exchange of information	Yes
Food, Bioeconomy, Natural Resourcesresources, Agriculture and Environment	Blue Economy	• Clean hydrogen from water	No
	Circular Biobased Europe		No
Other Pillars	EIT Climate-KIC EIT Raw materials EIT InnoEnergy EIT Urban Mobility	• Exchange of information • SMEs • Public buses and infrastructures	n/a
Horizon Europe structure	**Candidate partnerships**	**Areas for collaboration**	**Mentioned in other proposa**
Digital, Industry and Space	Clean Steel	• Hydrogen as energy and reducing agent	Yes/ MoU established

	Carbon Neutral and Circular Industry	• Hydrogen as a feedstock. • Integration of H2 and new industrial processes • Regulation, codes and standards • Coordination within "H2 valleys" and the "Clean and circular hub"	Yes/Meeting
	Metrology	• Hydrogen re-fueling station meters, et.sim	No
Climate, energy and mobility	CCAM	• End-uses	No
	2ZERO	• Focus on the new generation of technology building blocks that can adapt to new automotive platforms developed in 2Zero. • New applications (e.g. trucks and coaches) as in the transport part of *Clean Hydrogen*	Yes/MoU to be finalised
	Zero-emission waterborne transport	• It will be important to collaborate (e.g. coordinated calls), to develop multi MW fuel cell required for ship propulsion and the related fuel technology. • Ports as location for "H2 valley" projects.	Yes/ Joint declaration under discussion
	Transforming Europe`s rail system	• Rail hubs can be good candidates for H2 valleys with close proximity from ports and/or airports.	Yes/ Meeting
	Clean Aviation	• Electrification and hybridization of aircrafts: need to develop adapted fuel cells, adapted storage, and H2 infrastructure. • New fuels for aviation: liquid hydrogen (that requires a completely new architecture). • Airports are a privilege location for "H2 valley" projects	Yes/ Meeting
	European industrial battery value chain	• Design of hybrid systems combining battery and hydrogen technologies	Yes
	Built4People	• End-use	No
	Clean Energy Transition	• Exchange of information	Yes

Food, Bioeconomy, Natural Resourcesresources, Agriculture and Environment	Blue Economy	• Clean hydrogen from water	No
	Circular Biobased Europe		No
Other Pillars	EIT Climate-KIC EIT Raw materials EIT InnoEnergy EIT Urban Mobility	• Exchange of information • SMEs • Public buses and infrastructures	n/a

Notes for further development:

The proposal gives a comprehensive overview of possible collaboration with other partnerships, including KICs. Clusters 4 and 5 are most relevant for collaboration. The clean hydrogen partnership is broadly considered in the other proposals.

The proposal is detailed on cooperation and the division of tasks between partnerships. It no longer suggests to draw a fixed line between partnerships that develop technology "building blocks" (Clean Hydrogen for Europe) and partnerships that are end users (e.g. heavy duty, ships and ports, rail, aviation, steel and Circular industry). The proposal states both types of partnerships need to work together to be able to realise effective demonstrations and some coordinated/complementary calls between the hydrogen partnership and more applied partnerships are foreseen. With Batteries there is a wish for active collaboration in order to design of hybrid systems combining battery and hydrogen technologies. With other candidates there are discussions on co-working going on.

Synergies with other Programmes

Table 12 Overview of synergies identified in the Clean Hydrogen proposal

Programme	Purpose	Details (form etc)
Programmes at EU, national or regional level		
Connecting Europe Facility (CEF)	• Coordination role for Clean Hydrogen when it comes to hydrogen technologies	• For example CEF Energy and Transport • Coordinating role between the activities supported by Horizon Europe, CEF and the ETS innovation funds.
ESIF, IPCEI, national or regional programmes	• Knowledge and information sharing among relevant stakeholders	• A new IPCEI on Hydrogen is foreseen for 2021 and current JU is supporting dissemination of this and DG GROW are focussing on the build up of partnerships.
TEN-T		• Hydrogen transport and refuelling corridors
Invest-EU		

EIB		
Programme	Purpose	Details (form etc)
Programmes at EU, national or regional level		
Connecting Europe Facility (CEF)	• Coordination role for Clean Hydrogen when it comes to hydrogen technologies	• For example CEF Energy and Transport • Coordinating role between the activities supported by Horizon Europe, CEF and the ETS innovation funds.
ESIF, IPCEI, national or regional programmes	• Knowledge and information sharing among relevant stakeholders	• A new IPCEI on Hydrogen is foreseen for 2021 and current JU is supporting dissemination of this build-up of partnerships.
TEN-T		• Hydrogen transport and refuelling corridors
Invest-EU		
EIB		

Notes for further development:

- *Clean Hydrogen* has aligned its strategic and innovation agenda with national Member States policies and actions (through analysis of the draft National Energy and Climate plans (NECPs) published by all Member States in 2019).
- Synergies with other programmes is well described but it would benefit from describing more concretely the purpose and how it allows to achieve the specific objectives (e.g. demonstrators = Cohesion Funds, CEF etc.).
- The mentioned synergies consider CEF and the ETS Innovation Funds as well as funding located inside HE and at the national and regional level, additionally, ESIF is mentioned. The Commission is proposing a European Hydrogen Investment Agenda which will try and facilitate synergies between the partnerships grants and other funding mechanisms.
- The proposal should include more details on purposes, goals, governance and activities regarding synergies with the other programmes. It could be more specific on synergies within HE and at the national and regional level. Links to missions, including Climate neutral and Smart Cities, and Healthy Oceans are missing.
- Concerns around standardisation.