

## Opinion –

# Research infrastructures, Horizon Europe Missions and wider policy goals

The evolving landscape of European priorities – which ones should research infrastructures address, how, and if at all

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## Introduction

For years, pan European research infrastructures (RIs) and large-scale national facilities have contributed to the excellence of the Union's science base. In European programmes, they were firmly nested in the Pillar dedicated to scientific excellence and supported through a dedicated work programme. In addition, they have contributed to training, innovation, and partly also to the other pillars of the programme, such as the one addressing societal challenges. ESFRI, the European Strategy Forum on Research Infrastructures, since 2002, has been supervising the establishment and development of a Pan-European Research Infrastructures landscape. So far, this has led to a pooling of national resources in excess of 10 billion EUR. The field even got a dedicated regulation, the ERIC Regulation, a rarity in the domain of research and innovation, which is otherwise largely based on soft law, such as Council Conclusions. Today, the European approach to the field of research infrastructures is rightfully considered a huge success, managed jointly at EU level, in collaboration with Member States and associated countries through the European Research Area (ERA).

At the onset of the next European research and innovation programme, Horizon Europe, due to start in 2021, not much appears to have changed for research infrastructures, as compared to the current funding programme, Horizon 2020. They have their dedicated chapter of the programme in Pillar I dedicated to scientific excellence, aimed at supporting similar activities for a similar amount of funding.

While not much has changed for this Pillar, there are significant changes across the rest of Horizon Europe. Most relevant to this discussion is its emphasis on delivering on the needs of society, largely reflected in Pillar II, called Global Challenges and European Industrial Competitiveness, through its five clusters, dedicated to societal challenges, including Digital and Industry. European partnerships<sup>1</sup> will have much

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<sup>1</sup> European Partnership' means an initiative in which the Union, prepared with early involvement of Member States and/or Associated Countries, together with private and/or public partners (such as industry, universities, research organisations, bodies with a public service mission at local, regional, national or international level or civil society

more prominent role than in the current programme. However, the main new element are the five mission areas. The missions stemming from each of the mission areas, when elaborated, will differ from the societal challenges in that they will focus on delivering against a specific target within a specific time frame, like taking a man to the moon and back before the 1970s.

Research infrastructures have responded to the evolving landscape of the European research and innovation policy and three meetings are proposed for February 2020 to address the topic of how the various research infrastructures can contribute to the societal priorities reflected in the new funding Programme. In meetings organized by

- ERIC Forum, a network of ERICs,
- LENS – League of Advanced European Neutron Sources and
- LEAPS – League of European Accelerator Based Photon Sources,

**the RIs are to address how the RI communities will contribute to the five mission areas of Horizon Europe.** The latter is also expected to focus on the contribution to the EU Green Deal.

CERIC warmly welcomes the initiatives proposed by the various RI communities and wishes to contribute to the discussions. With this in mind, the present opinion addresses the following issues:

- Should RIs address wider policy goals and priorities?
- What are the wider policy goals and priorities of future research and innovation in Europe?
- How can RIs currently address the wider policy objectives?

## Should RIs address wider policy goals and priorities?

Considering the strong policy push towards the solution driven approach of Horizon Europe, the research community, including research infrastructures, will be expected to deliver on the wider policy goals discussed above. One can argue that research infrastructures are primarily established to deliver on the objective of scientific excellence, or to enable research that would otherwise not be possible. A specific focus on the wider policy goals and priorities, which are not described in their Statutes, may therefore be considered an unnecessary activity, which distracts research infrastructures from delivering on their core missions. This is understandable. However, our civilisation is under a growing threat by a number of challenges, which have resulted, for example, in the European Parliament's declaration of a climate emergency. Under the increasing pressures, we have to respond collectively by focusing our activities and resources. This undeniably holds true for research infrastructures. While we should remain firmly nested within Pillar I and continue delivering on our main mission of enabling knowledge creation, more than before, a part of our activities should be specifically dedicated to supporting the higher-level priorities, elaborated in a different Pillar of Horizon Europe from that in which RIs are placed. The alternative of opting for a silo of the RIs is grim. Most importantly, we would miss on contributing to the societally relevant issues. We would also be politically marginalized, which would negatively impact, also financially, on what is so far considered one of the biggest successes of ERA – ESFRI and research infrastructures.

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organisations, including foundations and NGOs), commit to jointly support the development and implementation of a programme of research and innovation activities, including those related to market, regulatory or policy uptake.'

For these communities, it is important that RIs join their forces and present the full breadth of their potential contributions in all areas. For example, one could imagine that societal transformations needed to bring about carbon neutrality of the cities would be huge, and the contribution of research infrastructures from the domain of social sciences will be very relevant. Furthermore, RIs in the domain of physics and engineering could contribute to the development of novel technologies, while those in the field of environment would support the effort by providing high quality environmental data.

The reply to the question is therefore affirmative – **with part of their activities the RIs should contribute to wider policy goals**. This will enable them to access funding from other pillars of Horizon Europe, increase their relevance in specific research communities and increase their political visibility. Most importantly, RIs will contribute to solving pressing societal issues, which is as much needed as it is rewarding. It is certainly also expected of the RIs. A recent report<sup>2</sup> on the public consultation dedicated to Pillar II observed that ‘Research infrastructures are seen as key platforms to provide support to the activities undertaken in other Pillars and to facilitate international cooperation and interdisciplinary research activities for addressing global challenges.’ Considering that three different meetings on the contribution to the ‘missions’ are planned in February 2020, it is clear that this opinion is shared by a large number of the RIs.

## What are the wider policy goals and priorities of future research and innovation in Europe?

Understanding the policy goals and priorities, such as the missions, enables us to contribute our share to their implementation and to identify future opportunities in time to benefit from them. However, over the past year, the landscape appears to be continuously evolving, making it rather difficult for the RIs to focus.

This section very briefly outlines the main policy inputs relevant for this discussion, considers some potential future ones, and whether we can at this point establish which scientific fields and technologies are needed for their implementation. The knowledge of the latter is needed for the RIs to be able to contribute their share. A word of warning – the sheer number of policy goals and priorities might leave the reader rather confused. It is nevertheless considered important to review the current policy inputs and their stage of elaboration in order to be able to draw a conclusion on how can the RIs currently address the wider policy objectives.

The current framework programme, Horizon 2020, was built on the strategies Europe 2020 and Innovation Union, elaborated in advance of its preparation. Such high-level strategic planning did not take place before the preparation of the Horizon Europe Programme, which, however, did not prevent its design from being based on the wider policy objectives of the EU. Highly relevant for this discussion is the decision of the EU and its Member States to be fully committed to the 2030 Agenda for Sustainable Development and its implementation.<sup>3</sup> Based on this, the European Commission prepared a Reflection Paper, Towards A

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<sup>2</sup> Orientations towards the first Strategic Plan for Horizon Europe, [https://ec.europa.eu/info/files/co-design-towards-first-strategic-plan-horizon-europe\\_en](https://ec.europa.eu/info/files/co-design-towards-first-strategic-plan-horizon-europe_en)

<sup>3</sup> <https://data.consilium.europa.eu/doc/document/ST-13-2018-INIT/en/pdf>

Sustainable Europe by 2030,<sup>4</sup> which emphasizes that education, science, technology, research and innovation are prerequisites for achieving a sustainable EU economy meeting the Sustainable Development Goals. Specifically, this is reflected in the five mission areas of Horizon Europe, on which political agreement between the European Parliament and the Council was reached in the spring of 2019. The five mission areas are:

- Adaptation to Climate Change, Including Societal Transformation
- Cancer
- Healthy Oceans, Seas, Coastal and Inland Waters
- Climate-neutral and Smart Cities
- Soil Health and Food

The European Commission has established Mission Boards to determine the targets and, during 2020, together with stakeholders and citizens, to elaborate the research and innovation activities contributing to the selected targets. The Commission will communicate the missions in the fourth quarter of 2020 and they will come into effect on Jan 1<sup>st</sup>, 2021, at the launch of Horizon Europe.

Currently, the Missions are therefore not yet defined. The exception is the Mission Area Climate Neutral and Smart Cities. The Mission Board recently proposed a mission ‘100 Climate Neutral Cities by 2030 by and for citizens,’ which is expected to have a ‘direct impact on climate and associated benefits on citizens’ wellbeing (air quality, healthier lifestyle etc.) and job creation,’ and proposes implementation through Climate City Contracts with cities. However, the R&D activities that need to be implemented in the first Work Programme (2021-2022) of Horizon Europe are yet to be defined.<sup>5</sup>

Since the partial general agreement on Horizon Europe was reached, some new priorities have been decided by the Heads of Governments and the European Commission, which have also to be reflected in the Horizon Europe programme. The European Council adopted A New Strategic Agenda for 2019–2024,<sup>6</sup> which provides an overall framework and direction for shaping the future of the EU. A few months later, the new Commission President, Ursula von der Leyen, put forward Political Guidelines for the European Commission 2019 - 2024,<sup>7</sup> which contain six priorities for the next five years, which target similar overarching objectives as the Council’s document. The six priorities of the Commission are:

1. A European Green Deal;
2. An economy that works for people;
3. A Europe fit for the Digital Age;
4. Promoting our European way of life;
5. A stronger Europe in the world;

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<sup>4</sup> European Commission COM(2019)22 of 30 January 2019 REFLECTION PAPER TOWARDS A SUSTAINABLE EUROPE BY 2030, [https://ec.europa.eu/commission/sites/beta-political/files/rp\\_sustainable\\_europe\\_30-01\\_en\\_web.pdf](https://ec.europa.eu/commission/sites/beta-political/files/rp_sustainable_europe_30-01_en_web.pdf)

<sup>5</sup> European Commission presentation ‘Climate Neutral and Smart Cities’, January 2020.

<sup>6</sup> <https://www.consilium.europa.eu/media/39914/a-new-strategic-agenda-2019-2024.pdf>

<sup>7</sup> Ursula von der Leyen, A Union that strives for more My agenda for Europe, 2019, [https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/political-guidelines-next-commission_en.pdf)

## 6. A new push for European democracy.

Although published after the political agreement on Horizon Europe, research and innovation are expected to contribute to these EU priorities. To this end, the European Commission has integrated these priorities into its a document,<sup>8</sup> which will serve as a basis for the preparation of the first Strategic Plan for Horizon Europe, to be addressed largely by Pillar II. The biggest share of the targeted impacts of Pillar II should thus contribute to “The European Green Deal”, followed by “An economy that works for people” and “A Europe fit for the Digital Age”. **The European Green Deal**, which aims to turn Europe into the first climate-neutral continent by 2050, **is of particular relevance to the field of research and innovation**, and its role has been elaborated in more detail by the European Commission.<sup>9</sup> All mission areas except Cancer and several of the potential future European Partnerships<sup>10</sup> in the fields, such as transport - including batteries -, clean hydrogen, low-carbon steel, circular bio-based sectors, the built environment and biodiversity are expected significantly to contribute to the delivery of the EU Green Deal.

As in the case of the missions, the science and technologies that will be required to address it are yet to be defined in detail. Some hints about the relevant technologies can be found in The EU vision towards climate neutrality by 2050<sup>11</sup>, which states that EU research should focus on transformational carbon-neutral solutions in areas such as electrification (renewables, smart networks and batteries), hydrogen and fuel cells, energy storage, carbon-neutral transformation of energy intensive industries, the circular economy, the bio-economy and sustainable intensification of agriculture and forestry. However, the European Green Deal is broader and it can be expected that the technologies needed for it will be outlined in more detail in the EU Industrial Strategy, due in March 2020,<sup>12</sup> and in the forthcoming Strategic Plan for Horizon Europe. These will then be, together with the priorities stemming from the public co-design of Pillar II, addressed in the future Work Programmes.

The future policy goals and priorities in the field of research and innovation at the EU level do not stop here. The renewed European Research Area (ERA) might add to them in the future.

The European Research Area is defined by the Lisbon Treaty as a unified research area open to the world and based on the Internal Market. The ERA enables free circulation of researchers, scientific knowledge and technology. The current implementation of the ERA is based on the ERA Roadmap (2015-2020), which mainly focuses on national policy reforms and actions, with one of the six priorities dedicated to research infrastructures and partnerships. Since the ERA roadmap ends in 2020, a new Opinion on the future of the

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<sup>8</sup> Orientations towards the first Strategic Plan for Horizon Europe, 2020, [https://ec.europa.eu/research/pdf/horizon-europe/ec\\_rtd\\_orientations-towards-the-strategic-planning.pdf](https://ec.europa.eu/research/pdf/horizon-europe/ec_rtd_orientations-towards-the-strategic-planning.pdf)

<sup>9</sup> [https://ec.europa.eu/info/research-and-innovation/strategy/european-green-deal\\_en](https://ec.europa.eu/info/research-and-innovation/strategy/european-green-deal_en)

<sup>10</sup> Orientations towards the first Strategic Plan for Horizon Europe, Annex 7, 2020, [https://ec.europa.eu/research/pdf/horizon-europe/ec\\_rtd\\_orientations-towards-the-strategic-planning.pdf](https://ec.europa.eu/research/pdf/horizon-europe/ec_rtd_orientations-towards-the-strategic-planning.pdf)

<sup>11</sup> A clean planet for all – A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy COM (2018) 773, [https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap\\_en.pdf](https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf)

<sup>12</sup> [https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap\\_en.pdf](https://ec.europa.eu/info/sites/info/files/european-green-deal-communication-annex-roadmap_en.pdf)

ERA<sup>13</sup> has recently been adopted by the European Research Area and Innovation Committee (ERAC). According to it, ERA should no longer focus primarily on national reforms. Instead, its overall objective is to *‘exploit the significant contribution that R&I plays in achieving Europe’s wider policy goals and make ERA more responsive to society’*. To this end, **the renewed ERA should better provide the smart directionality<sup>14</sup> needed for transformative changes based on new knowledge and technologies and contribute to meeting the Sustainable Development Goals requirements and other societal needs**. This may effectively lead to additional priorities, even mission, possibly to be implemented through ERA lighthouses. No specific ones have been proposed so far and the ERAC input will be taken forward by the European Commission, which is to prepare a Communication on the topic in the second quarter of 2020,<sup>15</sup> and the EU Council over the next two years. It is hoped that the additional priorities, if introduced, will complement the existing ones, thus leading to a European Research Area, shared by the EU, national and regional levels, as proposed by the ERAC paper on the future of the ERA. With the existing policy objectives, such as contribution to the education and competitiveness of industry, open access to data and those introduced by Horizon Europe, such as missions and the European Green Deal, **the research community is approaching the limit of what it can reasonably focus on**.

## How can currently the RIs address the wider policy objectives?

While it is clear that many of the RIs agree with the necessity to support, with part of their activities, Horizon Europe Missions, the relevant European partnerships, and the European Green Deal, it is important to keep in mind that the Missions are not yet defined, nor are most of the activities linked to the European Green Deal. In addition, which of the proposed 44 partnerships of Horizon Europe will be supported, is yet to be decided.

The current problem is the following - The mission area Cancer, can, for example, end up with a mission ‘X decrease of cancer patients in y years’, or, ‘An increase in the survival of particular cancer patients by x % by year y’. The first one focuses on prevention, the second one on treatment. Consequently, our contribution to the mission would be completely different.

While it is very important that RIs start considering their potential contributions, at this point in time, when the R&D needed for the implementation of the various initiatives still needs to be elaborated, it is premature to discuss the very detailed activities of RIs for the Missions, the 6 priorities of the European Commission, including the European Green Deal and the European Partnerships, beyond the rather general statement of their support to the efforts.

However, **this is an excellent time for the RIs to prepare themselves for the future activities and their potential contributions to the wider EU priorities**. To this end, **CERIC’s General Assembly has selected energy materials as its focus area, addressing, in particular, green energy and energy storage**. The pilot Research Infrastructure Roadmap of CERIC in the field of batteries, which is to suggest the necessary

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<sup>13</sup> [https://era.gv.at/object/document/5133/attach/Opinion\\_Future\\_of\\_ERA\\_adopted.pdf](https://era.gv.at/object/document/5133/attach/Opinion_Future_of_ERA_adopted.pdf)

<sup>14</sup> The role of policy as setting the direction of change beneficial to society.

<sup>15</sup> Commission Work Programme 2020, Annex I: New initiatives , [https://ec.europa.eu/info/sites/info/files/cwp-2020-annex-1\\_en.pdf](https://ec.europa.eu/info/sites/info/files/cwp-2020-annex-1_en.pdf)

upgrades of the current instruments and services, and to identify possible gaps in CERIC's offer in order to support the field better, is due in May 2020. In addition, CERIC will fund several Ph.D.s on the topic. A document on how CERIC's current capabilities can best be used by researchers in the field of green energy and energy storage is also being prepared and will be made available to all the various groups of RIs, which currently focus on how to contribute to the Horizon Europe Missions and the European Green Deal.

**It is also important to consider which activities we can carry out ourselves, and which external funding will be needed.** This will be the case, since the RIs mostly do not have Missions and the wider policy goals among their objectives. Therefore, either the EC or the Member States would need to provide the funding for, e.g., ring-fencing a part of the open access and development of dedicated services. Such support will likely be defined in the next Work Programme for 2020, to be updated in spring 2020, and the subsequent Work Programmes. These will offer the framework to start discussions on more specific activities of the RIs on the topic.