



The Geological Surveys of Europe

Appendix to the Non-Paper on the European Partnership on the Geological Service for Europe (EP-GSE)

1. Introduction

The European Partnership on a Geological Service for Europe (EP-GSE) has a strong community of national geological surveys that provides services for a **sustainable subsurface management**, the integration of **geo-resources** (geo-energy, groundwater, mineral raw materials) and the management of **environmental conditions** (natural hazards, anthropogenic impacts). The strong added value of the partnership is a comprehensive research related to societal needs, particularly EU and MS policies. In this frame the partnership also will integrate, align and centralize the **state-of-the-art science needed to support sound data/knowledge policy cycle and other relevant purposes**.

The EP-GSE will build on the current **ERA-NET Cofund Action GeoERA**: “Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe” (2017-2021), a 30M EUR programme supported by **45 national and regional Geological Survey Organisations** from **33 countries in Europe** comprising **15 projects**. GeoERA was established with the vision to test the synergy between National Geological Surveys on the European level. Its ongoing activities and delivered results have already proven to be successful in terms of the networking of the national geological surveys. In 2014, DG RTD suggested a follow up of the ERA-NET Cofund Action GeoERA and the proposed partnership follows this advice.

The EP-GSE is seen as a necessary step after GeoERA, that will expand not only on the current topics on geo-resources but will also expand the geo-scientific community related to subsurface. Geo-resources (geo-energy, groundwater, mineral raw materials) will continue to play a central role. In addition, cross thematic research on wider issues involving **natural hazards, Earth observation, urban geology, geochemistry and integrated 2D to 4D geological models of the European lithosphere** will be included in the EP-GSE. The national and regional Geological Survey Organizations will remain as the main drivers and coordinators of the Partnership programme, forming a structured network of European Geological Surveys. In addition, the Partnership will expand on the network established under GeoERA, opening the calls to participation to key stakeholders from **academia, research institutes and industry**. Establishing closer collaboration with the wider community will provide them with the opportunity to bring new, innovative ideas to the market and develop business opportunities in Europe and abroad.

2. Current impact and ongoing activities of EP-GSE experts

As an example, EuroGeoSurveys' (EGS) experts through GeoERA Raw Materials theme contribute to the **Raw Materials Initiative (RMI)** and to the aims of the Strategic Implementation Plan (SIP) of the European

Innovation Partnership (EIP) on Raw Materials, by providing raw materials maps for policy purposes and open access to Pan-European and national geological data and information through the European Geological Data Infrastructure (EGDI), that is under preparation to become interoperable with the Raw Materials Information System (RMIS). Moreover, EGS experts are active in mineral exploration, inventory, assessment and classification using **United Nations Framework Classification (UNFC)**, modeling subsurface environments, Earth observation for raw materials, marine geo-resources and recycling and re-use potential of mineral-based secondary resources. Similar links also exist for other expert themes.

EuroGeoSurveys is strongly related to the **Joint Africa-EU Strategy** through the **PanAfGeo project**, as a part of the Pan-African programme and has signed a Memorandum of Understanding with the Organization of African Geological Surveys (OAGS), initiating continental-scale long-term cooperation, support and development. In addition, EGS has signed an agreement with the Association of Iberoamerican Geological and Mining Surveys (ASGMI), aiming to strengthen **EU - Latin America Earth Science cooperation**.

3. Future impact of the proposed partnership (EP-GSE)

The European Partnership on a Geological Service for Europe (EP-GSE) provides an effective tool to include national agencies and other Member State institutions with mandates on national/regional level with the excellent science and expertise needed at hand. Proposed EP-GSE activities will address the **EU Policies** and the future **Strategic Plan for Horizon Europe**, impacting national, European and global levels.

At the **national level**, it will help **align national programmes**, reinforce **knowledge sharing** and stimulate **cross-border, regional cooperation**. This will have impact on national research programmes, that usually target national priorities. The integration and alignment of individual R&I programmes of the EU geological surveys has already started through the GeoERA programme.

Links with **industry**, either using geo-resources and impacting the environment, shall be indirectly established through the mechanism of valorization of natural endowments (such as energy storage, groundwater bodies, mineral deposits...), and to some degree also through the assessment of impacts on the environment due to economic activities (through geochemistry, geo-energy...).

At the **European level**, EP-GSE will provide an **integrated approach to updated knowledge of the 4D subsurface management** and deliver **harmonized, standardized and integrated EU geoscientific data**. **This will benefit both international geoscientific research and EU policy development.**

It is in the responsibility of each national geological surveys to provide independent, reliable and high-quality subsurface data on their national territory. The availability of a merged, comprehensive European coverage for such data at a homogenous level of quality is the basis for fact-based political decision finding related to climate change adaptation and sustainable geo-resources management on European level. However, currently the quality level of national geo-data is very inhomogeneous, and therefore no pan-European geo-data sets with enough quality for the whole EU exists. It is in the scope of this partnership to exchange national knowledge, services and infrastructure **to advance the data quality and data availability at national level** in order to produce merged pan-European geo-information at the highest possible quality and provide such information to the European society. Therefore, this partnership will have **a strong impact on national development** as well as on European governance.

The EP-GSE shall address “**A European Green Deal**” and “**A stronger Europe in the world**”, two among six priorities of the President-Elect of the Commission (2019-2024) Ms Ursula von der Leyen. In particular, EP-GSE will support the European Climate Pact, Biodiversity Strategy for 2030, Sustainable Europe Investment Plan and New Circular Economy Action Plan and will provide a firm basis in building a stronger Europe in the world with its established continental-scale long-term cooperation relations with Africa and Latin America.

EP-GSE members shall respond to the **Clean Planet for All** – a European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy – with their activities related to maximizing the deployment of renewables and the use of electricity to fully decarbonize Europe’s energy supply, reducing or reverting CO₂ emissions with carbon capture and storage, and creating a competitive EU industry and circular economy as a key enabler to reduce greenhouse gas emissions.

In relation to the **Circular Economy Package** and its objectives to improve the availability of data on secondary raw materials, EP-GSE shall support the transition towards a circular economy by delivering multinational, distributed, derived spatial and temporal datasets through the **European Geological Data Infrastructure (EGDI)** (<http://www.europe-geology.eu/>). EP-GSE will also contribute to the continued updating of the Raw Materials Scoreboard. By analysing raw materials flows, EP-GSE will contribute to the development of a monitoring framework for the circular economy. Improving the knowledge base and data availability is crucial to measuring progress of the circular economy and the EU’s critical raw materials supply.

The ambition of the EP-GSE is to provide a unique gateway for subsurface management for several Commission Services, as is currently the case of the strategic raw materials topics, where EGS is advising DG GROW based on the Member States knowledge. For raw materials, the European Geological Surveys are the biggest knowledge network in the EU. European Geological Surveys already have the capacity to provide quality subsurface data on national levels, which the EP-GSE will aggregate to the Pan European level.

At the **global level**, the EP-GSE will contribute to **international cooperation**, with a special focus on **Africa** and **Latin America**, maintaining and reinforcing links with key international initiatives and partnerships, including EPOS, RMI, EMODnet, GMES, GEO/GEOSS and INSPIRE.

4. Relation to the first Strategic Plan implementing Horizon Europe

When it comes to the **general orientations** of the future **Strategic Plan for Horizon Europe**, EP-GSE is addressing three policy priorities: a Competitive, Sustainable and Influential Europe. The detailed overview of interlinkages between the EP-GSE activities and EU future policy priorities and targeted impacts is provided in Annex 1.

The Strategic Plan also sets out key strategic orientations for the support of research and innovation, including a description of targeted impacts, cross-cluster issues and intervention areas, following the three pillars of Horizon Europe – the European Union Framework Programme for Research and Innovation 2021 – 2027.

EP-GSE activities have the most direct impact on **Pillar II, Global Challenges and European Industrial Competitiveness** and the following clusters: Cluster 4 - **Digital, Industry and Space**, Cluster 5 - **Climate, Energy and Mobility**, Cluster 6 - **Food, bioeconomy, natural resources, agriculture and environment**. The

overview of EP-GSE activities related to respective cluster's policy objectives, targeted impacts and key R&I Orientations is given in the Annex 2.

5. Proposed organizational structure of EP-GSE

EP-GSE will be a network with national and regional Geological Surveys at the core, and with other earth science / expertise-oriented organizations grouped around it. The network community of the national and regional Geological Surveys will be thus formulated as an open structure for the potential inclusion of organisations with national mandates, as well as, organizations with EU policy relevant scientific domains.

In order to ensure the successful implementation of the EP-GSE activities, a strong, stable organizational structure is needed, with a high-level steering committee (Governing Board), an owner (General Assembly), a high-level advisory committee (Advisory Board), a Management Board, responsible for operational activities of the Partnership and a Secretariat in charge for the operational level of work. The Secretariat would be composed of a Project Coordinator, three Scientists (a Chief Scientist for subsurface management, and leads on Geo-resources and Environment), IT Manager, EU Policy Officer, Communication Officers and a Financial Manager. The budget for such a structure would be up to 3% of the total budget of EP-GSE.

The partnership shall be organized as a unique structure with the subsurface management overseeing the geo-resources and environmental units. Each unit shall include certain domains, such as geo-energy, raw materials, and within these domains topics and projects will be placed. Flexibility to respond to the EU policy needs will be worked out through annual programming cycles when and if needed. After the strategic planning phase, the operational planning will include the budget proposal which will consider the absorption capacity of all involved organizations.

6. Sustainability of the partnership

Setting up the EP GSE structure and carrying out its programme will facilitate the post European Partnership period in at least three ways. Firstly, an operational structure (with the Secretariat and the Pan European Network of Geological Service for Europe) will be formed, secondly the aligned national geological programmes, the knowledge sharing mechanisms and the established cross-border and regional cooperation will demonstrate the need for further cooperation at European level, and thirdly relevant science-based information will continuously provided to support EU and MS policy decision-making throughout the entire policy cycle.

Five factors will be crucial for the sustainability of the European Partnership: (1) sharing knowledge, capacities and infrastructure, (2) strong involvement of researchers, (3) funding mechanism, (4) developing collaborative strategy and (5) common vision with aligned national and European agendas.

(1) **Sharing knowledge, capacities and infrastructure** is one of the fundamental principles of EuroGeoSurveys, that is being accomplished through strong participation in numerous multinational and multidisciplinary research projects, with GeoERA being at the top of EGS success stories. Through EP-GSE, sharing knowledge, capacities and infrastructure will be reinforced and further developed as an operational basis of the partnership.

(2) **Strong involvement of researchers** from national geological surveys requires a bottom-up approach, that will be fostered during the Horizon Europe partnership period by giving researchers prominent and active positions within the geo-resources and environmental units. Strong cooperation of researchers among Geological Surveys has been proven highly beneficial in the last decade through EuroGeoSurveys Expert Groups, as well as within GeoERA.

(3) **A funding mechanism** beyond Horizon Europe shall be agreed upon during the implementation of the partnership. Halfway through the project, a feasibility study that will define specific funding model will be carried out to envision the sustainability of the partnership beyond Horizon Europe.

(4) **Developing a collaborative strategy** to sustain and straighten the increased level of the sharing of knowledge, capacities and infrastructure (point 1). The collaborative strategy will be built on the long-term strategy of EuroGeoSurveys, with all participating countries having well defined institutional positioning towards common benefits of such a strategy and partnership.

(5) **Having a common vision with aligned national and European agendas** will build upon the established Geological Service for Europe which aims to align national programmes and has a mandate to provide key advice and data services to the European Union. Through EP-GSE involvement of the broader community mechanisms of identifying European and transnational societal issues will be further improved. This process, to some degree, has started for the research themes that are part of the ERANET GeoERA.

There are already foreseen several options where the EP-GSE could be directed. These options vary on the level of integration. Within these options the model of EIONET seems a strong partnership network, other options could be different modalities of existing EU structures and networks that are not dependent on Framework Programme. It should be noted that scientific research will still stay as one of its core activities.

Annex 1

The overview of links between the EU future policy priorities and targeted impacts and EP-GSE activities

EU GENERAL ORIENTATIONS		Geological Service for Europe	
EU future policy priorities	EU Targeted impacts	DOMAIN	TOPICS / ONGOING ACTIVITIES
b) Competitive Europe	- increased autonomy in CRM	Mineral Resources Earth Observation Marine Geology	1. Minerals: inventory / assessment / classification 2. Exploration / undiscovered deposits 3. Earth observation for raw materials 4. Marine Georesources (minerals)
d) Sustainable Europe	- advanced climate science and solutions - novel competitive cross-sectorial solutions for decarbonization - novel energy system - side solutions to decarbonize the energy and transport systems - reduction of greenhouse gas emission and successful adaptation to climate change - halt of biodiversity decline and restoration of ecosystems - sustainable and circular management and use of natural resources	Spatial Information Mineral Resources GeoEnergy Water Resources Geochemistry Earth Observation Urban Geology	1. European Geological Data Infrastructure (EGDI) 2. Recycling and re-use potential of mineral-based secondary resources 3. Geothermal assessment/ inventory, Energy storage, Carbon capture storage 4. Climate change and water – food – energy nexus 5. Groundwater and the biosphere, biodiversity and ecosystem services 6. Soil chemical status in EU 7. Chemical status of European Groundwater 8. Climate related geohazards 9. Modeling subsurface environment 10. Cities typologies / urbanized catchment pressures 11. Chemical quality of the urban and suburban environment
e) Influential Europe	- international cooperation, promoting European values and standards	International cooperation and development Earth Observation	1. Cooperation with Africa (OAGS) 2. Cooperation with Latin America (ASGMI) 3. EuroGEOSS: Earth Observation of Urban Geohazards

Annex 2

The overview of links between the Horizon Europe policy objectives and EP-GSE activities

EU STRATEGIC ORIENTATIONS		Geological Service for Europe	
CLUSTER 4 - DIGITAL, INDUSTRY AND SPACE		DOMAIN	TOPICS / ONGOING ACTIVITIES
CLUSTER 4 - EU Policy Objectives	1. Ensuring the competitive edge and autonomy of EU industry 2. Fostering climate-neutral, circular and clean industry	Mineral Resources Earth Observation Marine Geology Spatial Information GeoEnergy	1. Minerals: inventory / assessment / classification 2. Exploration / undiscovered deposits 3. Earth observation for raw materials 4. Marine Georesources (minerals) 5. European Geological Data Infrastructure (EGDI) 6. Recycling and re-use potential of mineral-based secondary resources 7. Geothermal assessment/ inventory, Energy storage, Carbon capture storage
CLUSTER 4 – Targeted impacts and Key R&I Orientations	4.1 Manufacturing Technologies 4.8 A globally competitive space sector reinforcing EU autonomy 4.9 Circular Industries 4.10 Low-carbon and Clean Industries a. New services from Space for the EU society and economy	Mineral Resources GeoEnergy Earth Observation	1. Recycling and re-use potential of mineral-based secondary resources 2. Geothermal assessment/ inventory, Energy storage, Carbon capture storage 3. Earth observation for raw materials 4. EuroGEOSS: Earth Observation of Urban Geohazards
CLUSTER 5 CLIMATE, ENERGY AND MOBILITY		DOMAIN	TOPICS / ONGOING ACTIVITIES
CLUSTER 5- EU Policy Objectives	- Sustainable resource management - Reduced dependency on fossil fuels - GHG emission reduction	Urban Geology Mineral Resources Spatial Information GeoEnergy	1. Modeling subsurface environment 2. Minerals: inventory / assessment / classification 3. European Geological Data Infrastructure (EGDI) 4. Geothermal assessment/ inventory, Energy storage, Carbon capture storage 5. Recycling and re-use potential of mineral-based secondary resources 6. Sustainable subsurface management
CLUSTER 5 - Targeted impacts and Key R&I Orientations	1. Advance climate science and solutions for a climate neutral and resilient society 2. Cross-sectoral solutions for decarbonisation 3. Develop cost-efficient, net zero-greenhouse gas energy system centred on renewables	Spatial Information GeoEnergy Earth Observation Water Resources Urban Geology	1. European Geological Data Infrastructure (EGDI) 2. Geothermal assessment/ inventory, Energy storage, Carbon capture storage incl. from biomass 3. EuroGEOSS: Earth Observation of Urban Geohazards 4. Climate related geohazards 5. Recycling and re-use potential of mineral-based secondary resources

			6. Cities typologies / urbanized catchment pressures 7. Chemical quality of the urban and suburban environment
CLUSTER 6 - FOOD, BIOECONOMY, NATURAL RESOURCES, AGRICULTURE AND ENVIRONMENT			
CLUSTER 6 - EU Policy Objectives	<ul style="list-style-type: none"> - meeting the goals of sustainable development - mitigating and adapting to climate change - ensuring access to clean water, soil and air for all 	Mineral Resources Spatial Information GeoEnergy Earth Observation Water Resources Geochemistry	1. Modeling subsurface environment 2. European Geological Data Infrastructure (EGDI) 3. Geothermal assessment/ inventory, Energy storage, Carbon capture storage 4. EuroGEOSS: Earth Observation of Urban Geohazards 5. Climate related geohazards 6. Climate change and water – food – energy nexus 7. Groundwater and the biosphere, biodiversity and ecosystem services 8. Soil chemical status in EU 9. Chemical status of European Groundwater 10. Chemical quality of the urban and suburban environment
CLUSTER 6 - Targeted impacts and Key R&I Orientations	1. Environmental Observation 2. Biodiversity and Natural Capital 4. Seas, Oceans and Inland Waters 7. Circular Systems	Earth Observation Spatial Information Water Resources Mineral Resources GeoEnergy	1. EuroGEOSS: Earth Observation of Urban Geohazards 2. European Geological Data Infrastructure (EGDI) 3. Groundwater and the biosphere, biodiversity and ecosystem services 4. Climate change and water – food – energy nexus 5. Recycling and re-use potential of mineral-based secondary resources 5. Geothermal assessment/ inventory, Energy storage, Carbon capture storage