DIGIECOQUARRY
INNOVATIVE DIGITAL SUSTAINABLE AGGREGATES SYSTEMS

Horizon 2020 research and innovation programme (Nº 101003750)

Deliverable D8.1

CLUSTERING PLAN

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Deliverable report

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Disclaimer

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List of Abbreviations

ABBREVIATION	DESCRIPTION
CA	Consortium Agreement
CFS	Certificate on the Financial Statements
DoA	Description of Action
EB	Exploitation Board
EC	European Commission
GA	Grant Agreement
IFS	Individual Financial Statement
KPI	Key Performance Indicator
MoM	Minutes of Meetings
PFSIGN	Project Financial Statement
PRC	Project Research Committee
RP	Reporting Period
WP	Work Package

1 Executive Summary

This document constitutes the first version of the Clustering Plan of the DIGIECOQUARRY project. This deliverable corresponds to the Task 8.1 of Work Package (WP) 8 'Clustering activities for a solid EU knowledge base on raw materials'. The Clustering Plan will be updated yearly, but ad hoc revisions could be made, if necessary, according to the progress of the project. In this regard, reports on interactions with other organizations, projects and the International Advisory Board will be published by the end of 2023 and 2025.

The Project INNOVATIVE DIGITAL SUSTAINABLE AGGREGATES SYSTEMS (H2020-SC5-2020-2) will exploit the aggregates industry´s great potential through a coordinated approach towards construction materials management with the final goal of reducing EU external supply dependency as well as leading to an efficient use of resources. DIGIECOQUARRY will develop systems, technology and processes for integrated digitization and automation real-time process control, to be piloted in 5 EU quarries with the target of improving health and safety conditions for workers. The pilot campaigns will lead to improved efficiency of processes maximizing quarry resources and sustainable management of water, energy emissions, minimized environmental impact and expanding the EU aggregates and construction business. Coupling Artificial Intelligence approaches with cyber-physical systems and the Internet of Things concept, make Industry 4.0 approach possible and the smart sustainable extractive site a reality. All phases of the process, from extraction to the end user are covered by DIGIECOQUARRY, ensuring communication with policy makers, social acceptance activities and international cooperation with the Colombia and South Africa partners to share knowledge and best practices. The development of an innovative Intelligent Quarrying System (IQS) will increase the sustainable supply of minerals for the construction sector as well as enabling the sustainable extraction of EU´s mineral resources in existing and new quarries.

This Project includes 25 partners and will last for 48 months, starting on 1st June 2021. It is divided into 11 Work Packages. One of them is Work Package 8 (WP8), named Clustering activities for a solid EU knowledge base on raw materials, which will cover the complete duration of the Project.

The main objective of WP8 is to conduct clustering activities to ensure transfer of knowledge and cooperation among the relevant stakeholders, also feeding results from the pilots into the Raw Materials Information System (RMIS) and European Raw Materials Knowledge Base (EURMKB) databases.

WP8 will work to establish a powerful and solid network of key stakeholders and end users with potential interest in the project's successful execution and results that will expand the project's scope towards new market opportunities to maximize its impact. Specifically, WP8 will: (1) Define a Clustering plan to build progressively a collaborative network, consolidating the presence of the consortium partners in clusters and other relevant platforms; (2) Ensure transfer of knowledge and cooperation among the relevant stakeholders, also feeding results and findings from the pilots into the RMIS and EURMKB databases; and (3) Organize an International Advisory Board (IAB) composed of relevant stakeholders of the aggregates value chain to provide external input, advice and feedback when the project is experiencing difficulties during its execution.

2 Introduction and scope

This report, titled '**D8.1: Clustering Plan**' aims to design the strategy, plan and activities to be implemented under the DIGIECOQUARRY project, with a view to build progressively a collaborative network, consolidating the presence of the consortium partners in clusters and other relevant platforms

In this regard, the consortium intends to build up a solid and self-sufficient **International contact network** around the project. To jump-start the creation and growth of this collaborative network, a Clustering plan is defined in close collaboration with the Dissemination strategy in WP9.

The aim is that the partners will work to consolidate their presence and rallying up additional support from the following areas: (1) Quarry-related organizations, platforms and clusters (European, International & national) linked to the 24 partners (to increase this, the European Cluster Collaboration Platform and the EIT Raw Materials will also be followed); and (2) Relevant projects and initiatives.

Thus, DIGIECOQUARRY partners are committed to ensure the transfer of knowledge and cooperation (in line with EURMKB and RMIS), facilitating the sharing of information and results from the pilots to be discussed and analyzed with the target audiences. This will be guaranteed due to the large experience demonstrated by the partner organizations, who have participated in several projects, initiatives networks, associations and/or communities. To that end, the following clustering channels have been defined:

2.1 Clustering with Key European Initiatives and projects

- The DIGIECOQUARRY consortium will perform a continuous watch to follow-up the main agreements achieved, and key initiatives created at EU and national level, as well as the evolution of key indicators established by the EC in the Raw Materials sector. Due to the presence of several partners in key European committees, they will establish significant connections with on-going initiatives/projects and organize several workshops to disseminate results and share knowledge among different stakeholders.

2.2 Interaction with key European Communities

- DIGIECOQUARRY partners are very well positioned within the aggregates value chain and related areas.
- ANEFA is member of FdA (Spanish Aggregates Federation), UNE (Spanish Association for Standardization), COMINROC (Spanish Confederation of extractive industries of rock and industrial minerals), PRIMIGEA (Spanish Confederation of Mineral RM Industries), CEPCO (Spanish Confederation of Associations of Manufacturers of Construction Products), PTEH (Spanish Concrete Technical Platform), CEOE (Spanish Confederation of Business Organizations), CEPYME (Spanish Confederation of Small and Medium-sized Enterprises), UEPG (European Aggregates Association), NEEIP (No Energy Extractive Industries Panel; on behalf of UEPG), GAIN (Global Aggregates Information Network), FIPA (Iberoamerican Aggregates Federation), ENSQM (European Network for Sustainable Quarrying and Mining), among others. Additionally, ANEFA is involved in relevant sectorial plans.
- Quarry partners are members of their national Aggregates Federations / Associations.
- University partners: MUL is an International Competence Centre for Mining-Engineering Education under the auspices of UNESCO, member of World Forum of Universities of Resources on Sustainability and partner European Rock Extraction Research Group; CHALMERS is member of Global comminution collaborative, SBMI (Swedish aggregate producers' association) and closely working with EPD

international; UPM to Knowledge and Innovation Community (KIC) RM. All of them are members of the EIT Raw Materials.

- ASO is member of the Global Aggregates Information Network, Colombian Building Materials Partnership, Reserves and Resources Colombian Commission, Aggregates Iberoamerican Federation and H&S Colombian Commission.
- MINTEK is an affiliate member of the Southern African Institute of Mining and Metallurgy, which has agreements with international agencies including BDT, CIM and PDAC (Canada), Mines and Money Asia, MiningWorld (Russia), Molten (Korea), EMPRC (Germany), MassMin (Chile) and IMPC (multi-national).
- Additionally, the IAB formed by relevant stakeholders will participate in clustering activities to consolidate the International contact network. (see 3.3)

Within the Clustering Framework and based on the input of WP8, this report will provide a planning of the clustering activities of DIGIECOQUARRY, including:

- Attendance to conferences and organization of workshops.
- Clustering events.
- Attendance to EU project meetings and events (on interactions with other organizations and projects).
- Cooperation with the Raw Materials Information System (RMIS) and European Raw Materials Knowledge Base (EURMKB).
- Meetings and interaction with the International Advisory Board.

The document also outlines the exchange of information between projects/initiatives and designs a potential framework for cooperation that would ensure interaction among relevant players after the end of the DIGIECOQUARRY Project.

2.3 Relation to other activities and deliverables

Clustering activities are a part of both Dissemination Strategy and Communication Strategy, which are led by WP9 (DISSEMINATION, COMMUNICATION AND EXPLOITATION). Thus, the Clustering Plan will serve as the basis for activities foreseen in Tasks 8.1, 8.2 and 8.3 and to complement the dissemination, communication, exploitation in WP9 and WP7. Thus, WP8 will work very close to WP7 and, especially, WP9 to establish a powerful and solid network of key stakeholders and end users with potential interest in the project's successful execution and results that will expand the project's scope towards new market opportunities to maximize its impact. This deliverable will follow the guidelines for the organization of the events and workshops of the project as well as for the participation in external events of relevant initiatives described in D9.1.

In particular a close cooperation and coordination will be undertaken between actions of WP8 and WP9, described in D9.1 sections 5.5; 5.6.2, 5.6.4, 5.6.5, 5.6.6 and 5.6.8, to maximize synergies.

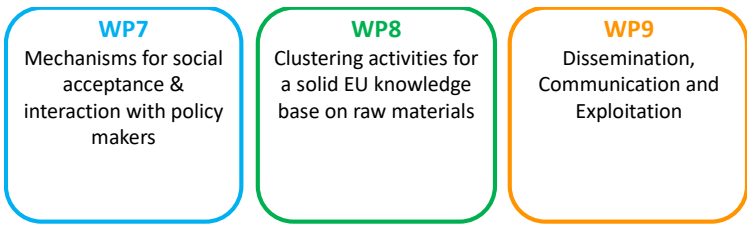

Figure 1. Relationship between WPs 7, 8 and 9.

2.4 Structure of the deliverable

With the above in mind, the "Clustering Plan" is structured as follows:

Section 1 - Executive summary: Contains a brief statement of the project.

Section 2 – Introduction and scope: Provides introductory information with respect to the Clustering Plan and its structure as well as its scope and its relation to other tasks, activities and deliverables.

Section 3 – Plan for Clustering activities: Presents the main project's clustering events, including meetings, technical conferences, interaction with the RIMS and EURMKB and interaction with the IAB.

Section 4 - Conclusions: Pertains the conclusions of the Clustering Plan as well as the way forward.

3 Plan for clustering activities

3.1 Clustering events

Diverse type of clustering events are to be organized during the project:

a) Technical & scientific workshops, conferences, events and trade fairs.

b) Meetings with other projects and organizations.

c) Clustering events with the Raw Materials Information system.

3.1.1 Organization and assistance to technical & scientific workshops, conferences, events and trade fairs

All partners will actively participate and contribute to dissemination and stakeholder engagement efforts both at organizational as well as individual level. In the frame of WP8 and WP9, a list of events including trade fairs and exhibitions, business events, information days, scientific events, seminars and conferences that can be relevant for DIGIECOQUARRY will be kept up to date and circulated to project partners. This activity allows us to identify the main technical conferences in which DIGIECOQUARRY should be presented and coordinating the participation of all project partners.

The aim is to keep in touch with the latest advances in the research and industry across Europe, share knowledge with respective communities, and establish contacts and interactions with key stakeholders, while at the same time communicating the results of the project.

In this regard, it is planned to hold 4 Project workshops (1 per year) organized by ANEFA (KPIs). The first workshop aims to familiarize all interested parties with the project and platform and to obtain insights from relevant stakeholders. The rest of workshops will include parallel demonstration and training sessions, so as to showcase the project's benefits, gather end-user feedback for further improvements, as well as to investigate the interest for the commercial exploitation of the DIGIECOQUARRY solution. Local dissemination campaigns for the workshops will be under the responsibility of the organizing partner, with the support of ANEFA for central level dissemination. The DIGIECOQUARRY's workshops will be included and announced in the agenda of the website (https://digiecoquarry.eu/) together with the programmes, presentations or articles of DIGIECOQUARRY's workshops.

By the end of the project, a closing event will take place, organized by all project partners under the lead of ANEFA. The event will probably be organized as a satellite event at a larger international conference or fair and it will include networking sessions about the future research and challenges in the field. The aim of the conference will be to spread the accumulated knowledge and present the final achievements to scientists, industry, health care providers, insurance companies, policy makers and generally to all interested parties, with a view to fostering policy impact and industry, research and societal use of the project results.

Additionally, it is expected that the Project partners will attend diverse events to promote clustering. In order to measure the success of the strategy, at least, the following relevant KPIs have been defined to monitor the progress of the strategy on a regular basis:

- 1 new Global Innovation and Technology Conference in the Raw Materials (quarry) sector.
- 1 new Sector and Expert Forum: Digitalization in the Raw Materials (quarry) sector.
- At UEPG level, 8 presentations in different Committee Meetings for panel discussion + 2 presentations in the Entrepreneurs Forum with all the representatives of EU national member associations.

- 2 Seminars & panel discussion & networking meeting in the Spanish National Aggregates Congress 2022 & 2025 with 15 to 20 countries represented.
- 1 Workshop in the ANEFA Chair in Aggregate Technology.
- 1 Workshop in the European Network for Sustainable Quarrying and Mining.

When partners of the DIGIECOQUARRY consortium are to participate in external events, they will have to follow the guidelines described in Deliverable 9.1, section 5.4.2. In the case of events organized by a project partner, that partner must contact ANEFA and WP8 leader prior to the event, and has to prepare an Event Report, in the form described in Deliverable 9.1, at the latest three, weeks after the event.

Project leaflets, brochures and posters presenting general information on the project developed by WP9 (see D9.1 clause 5.2.1) will be very important for dissemination and clustering activities, as well as other specific printable material for the promotion of DIGIECOQUARRY's events and pilot schemes. Furthermore, the webpage (https://digiecoquarry.eu/) and the regular newsletter about the activities of the Project will be essential for clustering activities.

3.1.2 Meetings with other projects and organizations

One of the goals of DIGIECOQUARRY is to establish links and synergies with international organizations and other interested stakeholders to provide wider dissemination. A list of organizations having synergies with DIGIECOQUARRY is shown in Annex I and will be contacted (see also D9.1 clauses 5.6.8, 5.6.9 and Annex I).

Synergies with other relevant EU-funded or international research projects and initiatives will be pursued by all partners in project's research domains and industry sectors to facilitate knowledge interchange, gain mutual dissemination benefits and to exploit potential cooperation. Possible synergies may comprise the inclusion of the project's web-portal and social media as links in websites and social media of other projects, participation in events of similar projects, dissemination of DIGIECOQUARRY's promotional material in events of similar projects, invitations to participate in DIGIECOQUARRY's events and exchange of news through each projects' channels.

A list of active H2020 and other European funded projects related to Raw Materials which may have synergies with DIGIECOQUARRY has been selected (Annex II). Initially, preliminary meetings with some of these projects will be organised to have an idea of their main objectives to explore future collaborations. These may include:

- Joint workshops.
- Open webinars on common aspects of the projects.
- Roadmaps for the industry.
- Scientific and non-scientific publications.
- Joint participation in conferences and events.
- Other they may propose.

Additionally, project partners are asked to provide a list and description of projects in which they are involved, raw materials organizations with relationships with the partners, and dissemination activities in which they have participated for DIGIECOQUARRY and should regularly enrich the list. Further information is given in D9.1 clause 5.6.5.

This information will allow WP8 to organize meetings (virtual or some face-to-face), with partners of other projects. The aim of these meetings will be to explore their synergies with DIGIECOQUARRY. Additionally, it

was agreed that the DIGIECOQUARRY progress meetings and workshops may be combined with the presentation of other funded projects, and that DIGIECOQUARRY could participate in workshops organized by the other projects. Much depends on the interest from the invited projects in exchanging and sharing data, enriching information knowledge that must probably will foster synergies, including efficient use of resources between the projects.

The aim is to cooperate with other similar projects and initiatives. As mentioned, individual meetings are planned to be held with other Raw Materials European projects, but DIGIECOQUARRY will explore a possible consortium including partners of these projects. For this purpose, clustering events consisting of general meetings are planned to be suggested and may coincide with the annual Raw Materials Information System (RMIS) workshop.

All these contacts will allow WP8 and WP9 partners to monitor the efficiency of the dissemination and clustering activities.

This will be achieved in coordination with WP9 leader ANEFA.

3.1.3 Clustering events with RMIS

These type of clustering events are planned to take place yearly in the frame of the RMIS Workshop. The first event will be held in December 2021 and DIGIECOQUARRY Consortium has been invited to participate and present the characteristics and objectives of the project. This workshop will be organized in co-operation with the Executive Agency for Small and Medium-sized Enterprises (EASME) and the European Health and Digital Executive Agency (HaDEA). The RMIS Workshop is aimed at professionals involved in designing and developing policies, projects and programmes around primary and secondary raw materials, in accordance with the Strategic Implementation Plan designed by the European Innovation Partnership on Raw Materials, chaired by the European Commission. This Workshop will again focus on the links and knowledge exchanges between the RMIS and most relevant EU funded projects on raw materials. The aim is to provide an overview, improve the interactions between various H2020 projects and streamline the information flow and availability of these projects to the European Commission's RMIS. In this regard, this event will be used to understand the synergies, gaps, overlaps and future research needs in relation to raw material (aggregates) projects.

3.2 Cooperation with the Raw Materials Information System and European Raw Materials Knowledge Base

To disseminate international public information about DIGIECOQUARRY Project, it is planned to provide the required data to Raw Materials Information System and European Raw Materials Knowledge Base.

The Raw Materials Information System (RMIS) aims to be a central European Union gateway of knowledge on primary and secondary raw materials. RMIS 2.0 was officially launched in November 2017, its structure supports the collection, organization, storage and communication of information on raw materials and, to a certain degree, on products derived from them.

RMIS 2.0 is organized in thematic sections, one of which being the "Raw Materials Knowledge Gateway" (RMKG). The RMKG constitutes a key part of the RMIS because it provides a unified access point to knowledge on raw materials from different providers at national, European and international level. Through the RMKG, it is intended to engage a broad range of knowledge providers into the development of the RMIS (Fig. 2). In turn, this gateway allows knowledge providers to promote and increase the visibility of their data, information and knowledge on raw materials, among various stakeholders. The RMIS 2.0 also facilitates knowledge coordination and harmonization, as well as other joint activities. In this way, DIGIECOQUARRY will be able to actively contribute to consolidate and expand EU knowledge on raw materials.

The Joint Research Centre (JRC) developed a detailed guideline for exchanging various types of project information for inclusion in the RMIS – Raw Materials Gateway (http://rmis.jrc.ec.europa.eu/).

By now, we provided a first input of information to the RMKG (Annex III), including a supporting link to our website. In the RMIS we will have a dedicated webpage space (Fig. 3) to show the type of raw materials' related knowledge that our Project has available and that we want to include into the RMKG. We can freely structure that content and propose the way of presenting it. We should include a visual identifier of the Project (e.g. logo, picture) and a short description with different thematic sections. The future updates will then be coordinated together with the RMKG. Knowledge is divided in "National level", and "European level". The RMIS team will interact closely with us.

As mentioned in section 3.1.3 it is planned to participate in the annual RMIS workshops, the next one will be held on December 2021.

Figure 2. RMIS webpage with the RMKG marked in red

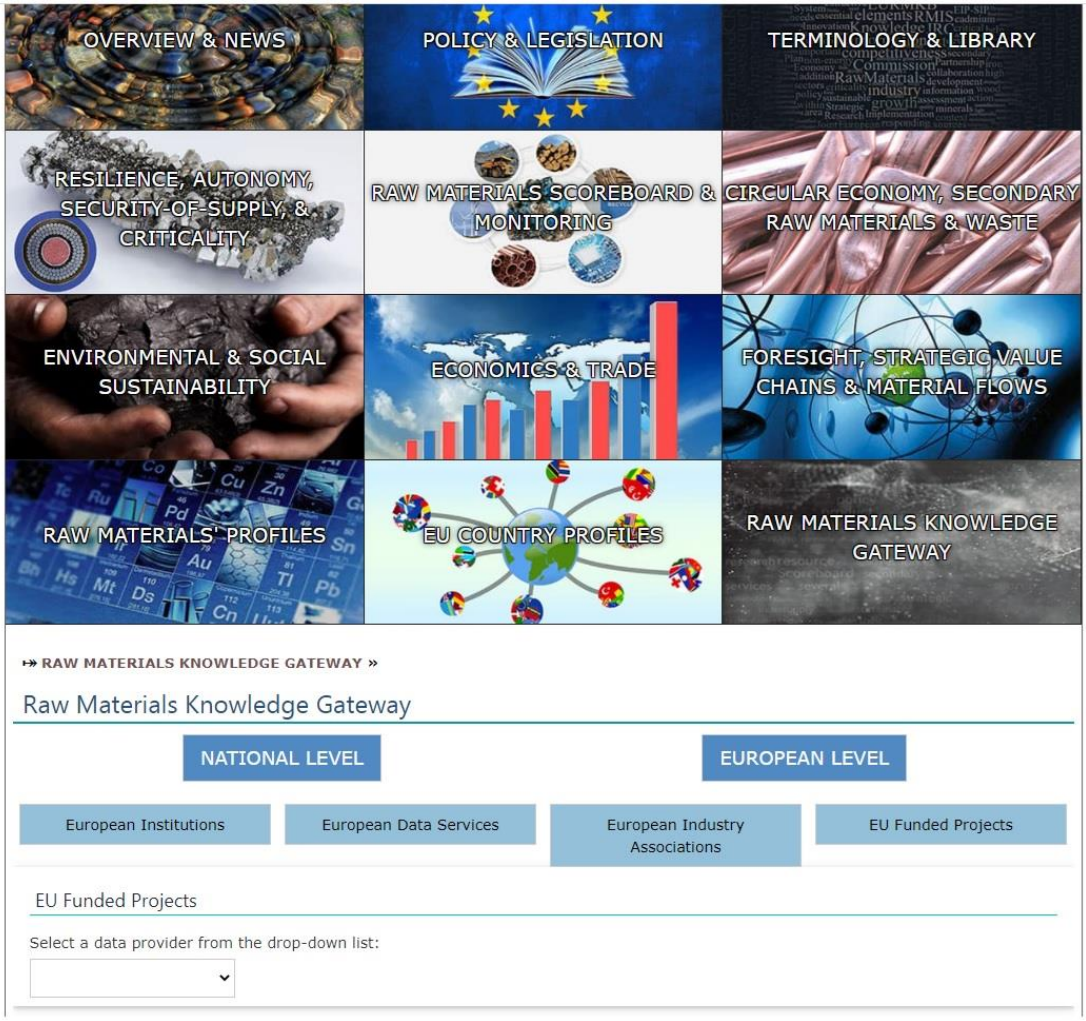

Figure 3. RMKG with the two main divisions in which EU funded Projects can have a webpage space.

The **European Union Raw Materials Knowledge Base** (EURMKB) is a part of the European Innovation Partnership's Strategic Implementation Plan (http://ec.europa.eu/growth/sectors/raw-materials/specific-interest/knowledge-base_en). Its aim is to be a one-stop-shop for all information on raw materials in the EU. With the help of EU countries, the service will collect, store, maintain, upgrade, analyze, and disseminate information on the raw materials. This knowledge base will serve industry and policy makers as a valuable source of data (Fig. 4).

The information on primary and secondary sources of raw materials, together with expertise, will form the three main blocks of the EURMKB. One of them is the Data collection: data and information will be collected from different sources, such as EUROSTAT, the Joint Research Centre, agencies (such as geological surveys) in EU countries, other national and international organizations, European projects and programmes, and industry. By now we have contacted the EURMKB and the Joint Research Centre.

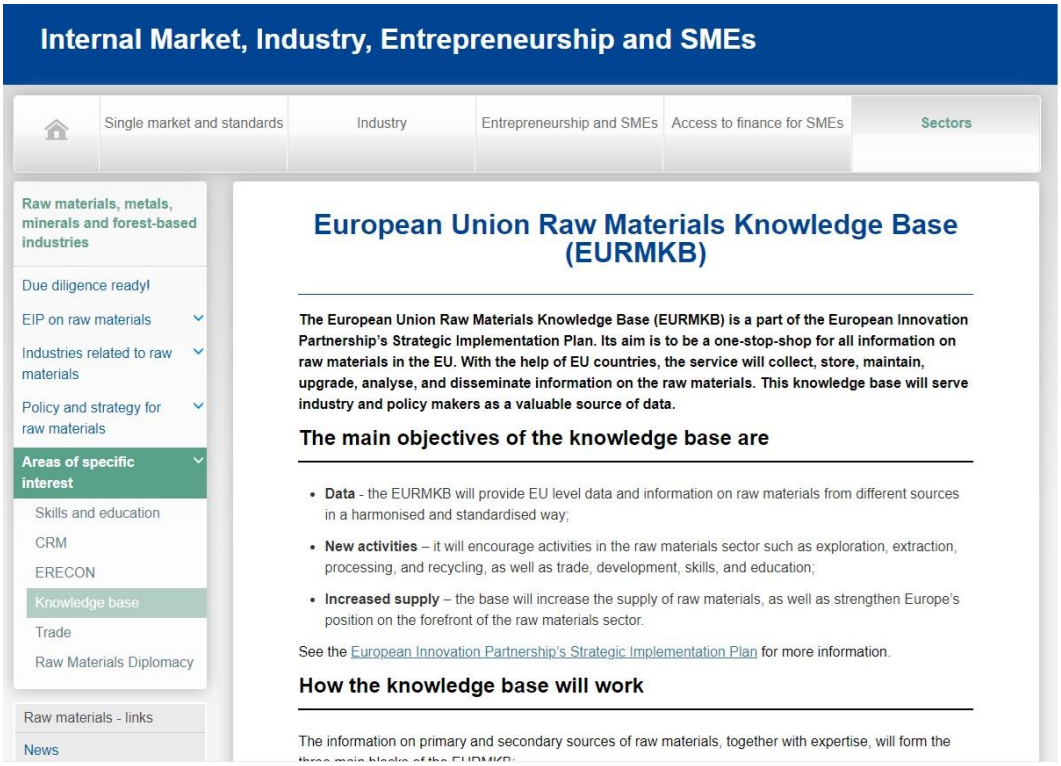

Figure 4. EU Raw Materials Knowledge Base.

3.3 Cooperation with the International Advisory Board (IAB)

Diverse organizations of Europe including companies, press media and policy makers related to the aggregates and quarrying sector are included in the IAB (Table 1) in order to provide valuable external input, advice and feedback, especially when the project may experience difficulties. Nevertheless, members of the IAB will be contacted as necessary during the execution of the Project. The aim is also to attract as many key stakeholders as necessary to maximize the impact of the Project.

At this point, all partners of the IAB have been already contacted and the first meeting will be held at the beginning of September 2021. It is also planned to have another Meeting with the IAB by the end of the Project.

Table 1. Members of the International Advisory Board.

MEMBER	COUNTRY	CHARACTERISTICS
EU – OSHA – European Agency for Safety & Health (From European Union)	EU (Bilbao /Brussels)	H&S policy maker
Global Aggregates Information Network– GAIN	World (Ireland)	Aggregates organization
International Union for Conservation of Nature's -IUCN	World (Switzerland)	Environmental NGO
Aggregates Business Europe	United Kingdom	Press media
UEPG –European Aggregates Association	EU (Brussels)	Aggregates Association
European Geological Surveys	EU (Brussels)	European Association of Geological Surveys

Federal Association of Mineral Raw Materials E.V. (BV MIRO)	Germany	Aggregates organization

The IAB will provide input, advice and feedback to:

- System validation, replicability and up-scaling: as an entity made up of aggregates companies, explosive and machinery, manufacturers and potential end users, their feedback during the validation phase of the project will prove to be fundamental in the refining of the final solution and the definition of key quality standards.
- Transition to market: the IAB will aid in the easing of the transition of the DIGIECOQUARRY solution from a prototype to a commercial product by building up a realistic customer base and identifying target markets.
- Broadening the project's reach: working directly with relevant agents in the sector will contribute to widening the project's horizons regarding international relevance and overall impact, since the IAB will be kept informed of any new developments and events and will be encouraged to take part in the project's execution.

4 Conclusions

Task 8.1 identified clustering possibilities during the full length of DIGIECOQUARRY Project, including different aspects, such as:

- Identification of European and other international projects, initiatives and organizations that may have synergies and may be relevant both for DIGIECOQUARRY project.
- Organization and assistance to technical workshops/conferences.
- Clustering events with RMIS.
- Cooperation with the Raw Materials Information System and European Raw Materials Knowledge Base.
- Cooperation with the IAB.

It is aimed to establish two-way communication pathways with the coordinators and/or leaders of the projects, organizations and initiatives with a view to:

- Setting up meetings (virtual/ face to face) and organize clustering events.
- Maintaining regular contact to follow up on potential synergies.
- Participation in Project events and workshops.
- Proposing, and potentially providing, a framework for structured co-operation among relevant players also after the end of the DIGIECOQUARRY Project.

Outcomes of the clustering activities will provide input not only to all DIGIECOQUARRY´s WPs, but also to other stakeholders. The outcomes will be disseminated via the planned activities and channels described here and in the communication plan (WP9).

At the middle and end of the DIGIECOQUARRY project (2023 & 2025) WP8 will produce “Deliverable 8.3: Report on interactions with other organizations, projects and the IAB (1|2)”, and “Deliverable 8.4: Report on interactions with other organizations, projects and the IAB (2|2)”. These Deliverables will compile the results of the clustering plan carried out during the full length of the Project and a summary of the clustering events and activities organized.

5 References

DIGIECOQUARRY Project Description of Action Annex A.

DIGIECOQUARRY Project Description of Action Annex B.

6 Annex I. List of organizations related to Raw Materials

Table 2. Organizations related to Raw Materials.

ACRONYM & WEBSITE	FULL NAME OF THE ORGANIZATION
ABBM	Working group of bavarian mining and mineral mining companies
AGGBUSINES (https://www.aggbusiness.com/)	Aggregates Business
AGH (https://www.agh.edu.pl/en/)	AGH University of Science and Technology
Aggregate Research https://www.aggregateresearch.com/	Aggregate Research
AINDEX (https://aindex.es/)	Extractive and Allied Industries National Association -
ANCADE (https://www.ancade.es/)	Lime Producers Association -
ANEPLA (http://www.anepla.it)	Associazione Nazionale Estrattori Produttori Lapidei ed Affini
ANIET (http://www.aniet.pt/pt/)	Associaçao Nacional da Industria Extractiva e Transformadora
ATEDY (https://atedy.es/)	Technical and Business Gypsum Association
Atlantic Copper (https://www.atlantic-copper.es/)	Atlantic Copper
Basalt (https://www.basalt.de/)	Basalt-Actien-Gesellschaft
Berger Group (https://bergerholding.eu/en/poland/berger-group/company)	Berger Group
BIRDLIFE (http://www.birdlife.org)	BIRDLIFE International
BMK (http://www.bmk-steinbruchbetriebe.com/unternehmen.html)	bmk Steinbruchbetriebe GmbH & Co. KG
Business Europe (https://www.businesseurope.eu)	Business Europe
CECE (https://www.cece.eu/home)	Committee for European Construction Equipment
CEMBUREAU (https://www.cembureau.eu)	European Cement Association
CEOE (https://www.ceoe.es/es)	Confederación Española de organizaciones
CEPCO (http://www.cepco.es)	Confederación Española de Asociaciones de Fabricantes de Productos de Construcción (Spanish Construction Product Manufacturers Associations Confederation)
Cluster Piedra (https://clusterpiedra.com/)	Stone Cluster
COMINROC (https://www.cominroc.es)	Confederación Española de Industrias Extractivas de Rocas y Minerales Industriales (Industrial Rock and Mineral Extractive Industries Confederation)
CONFEDEM (http://confedem.com)	Confederación Nacional de Empresarios de la Minería y Metalurgia

ACRONYM & WEBSITE	FULL NAME OF THE ORGANIZATION
CPE (https://www.construction-products.eu)	Construction Products Europe
Cronenberg (https://www.cronenberger-steinindustrie.de/)	Cronenberger Steinindustrie Franz Triches GmbH & Co. KG
Dyckerhoff (https://www.dyckerhoff.com/)	Dyckerhoff GmbH
EAPA (https://eapa.org)	European Asphalt Pavement Association
EEA (https://www.eea.europa.eu)	European Environment Agency
EIT Raw Materials (https://eit.europa.eu/)	European Institute of Innovation & Technology
ENSQM (https://ensqm.weebly.com/)	European Network for Sustainable Quarrying and Mining
EPIROC (https://www.epiroc.com/es-es)	EPIROC
ERMCO (http://ermco.eu)	European Ready Mixed Concrete Organization
EuroGypsum (https://www.eurogypsum.org)	EuroGypsum
EuroMines (http://www.euromines.org/)	European Association of Mining Industries, Metal Ores & Industrial Minerals
FdA (https://aridos.info)	Spanish Aggregates Federation
FEDIEX (https://www.fediex.be)	Fédération de l'industrie extractive en Belgique
Federación Española de la Pizarra	National Slate Federation
FIPA (http://www.fiparidos.info)	Iberoamerican Aggregates Producers Federation (Federación Iberoamericana de Productores de Áridos)
FRAGBLAST (http://minasyenergia.upm.es/326-investigacion/fragblast.html)	FRAGBLAST
FVSK (https://www.baustoffindustrie.at/)	Fachverband der Stein- und keramischen Industrie Österreich
GAIN (https://www.gain.ie/)	Global Aggregates Information Network
Grupo Ferrar (https://www.grupoferrar.com/en/2/company)	Grupo Ferrar
HeidelbergCement (https://www.heidelbergcement.com/en)	HeidelbergCement AG
HISPALYT (https://www.hispalyt.es/es)	Spanish Clay Bricks and Tiles Manufacturers Association -
IGF (https://www.igfmining.org/)	Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development
ISRM	International Society for Rock Mechanics
ISWA (https://www.iswa.org/?v=04c19fa1e772)	International Solid Waste Association
Knauf (https://www.knauf.com/en/)	Knauf Gips KG
ISEE https://isee.org/	International Society of Explosives engineering

ACRONYM & WEBSITE	FULL NAME OF THE ORGANIZATION
Lhoist (https://www.lhoist.com/de_de)	Lhoist Rheinkalk GmbH
MAGES	Spanish Magnesium Manufacturers Association -
MIRO	German aggregate association
MITERD https://energia.gob.es/mineria/Seguridad/Paginas/Comision.aspx	Mining Safety Committee -
MPA (https://www.mineralproducts.org)	Mineral Products Association
PRIMIGEA (https://primigea.es)	Confederación Española de las Industrias de las Materias Primas Minerales (Spanish Mineral Raw Materials Industries Confederation)
PTEH http://ptehormigon.org/	Spanish Technological Concrete Platform
Quarzwerke (https://www.quarzwerke.com/)	Quarzwerke GmbH
Schwenk (https://www.schwenk.de/)	Schwenk Zement GmbH & Co. KG
Sibelco (https://www.sibelco.com/)	SCR-Sibelco
UEPG https://uepg.eu/	European Aggregates Association
UNPG (https://www.unpg.fr)	Union Nationale des Producteurs de Granulats

7 Annex II. List of List of active projects and initiatives related to Raw Materials

Legend: POT. TOP. REL.: Potential topic related to DIGIECOQUARRY. Topics: (1) Mining operations & raw materials; (2) Digitalisation; (3) Health & security; (4) Energy efficiency; (5) Environment.

Table 3. List of active projects and initiatives related to Raw Materials.

ACRONYM	TITLE	CALL	POT. TOP. REL.
3beLiEVe	Delivering the 3b generation of LNMO cells for the xEV market of 2025 and beyond	H2020-LC-BAT-2019	5
3TANIUM	Evaluation of NDT Techniques for Assessment of Critical Process and Manufacturing Related Flaws and Defects for a Ti-alloy	H2020-CS2-CFP11-2020-01	3
ABIONYS	Artificial Enzyme Modules as Tools in a Tailor-made Biosynthesis	ERC-2019-COG	
AccelWater	Accelerating Water Circularity in Food and Beverage Industrial Areas around Europe	H2020-LCCI-2020-EASME-singlestage	4
ACOSENSE	ACOSENSE: The first Acoustic online instrument for intelligent fluids analysis	H2020-SMEInst-2018-2020-2	4
ADaPTIVE	Analysing Diversity with a Phenomic approach: Trends in Vertebrate Evolution	ERC-2014-STG	-
AgriMax	Agri and food waste valorisation co-ops based on flexible multi-feedstocks biorefinery processing technologies for new high added value applications	H2020-BBI-PPP-2015-2-1	5
ALEHOOP	Biorefineries for the valorisation of macroalgal residual biomass and legume processing by-products to obtain new protein value chains for high-value food and feed applications	H2020-BBI-JTI-2019	5
AlSiCal	Towards sustainable mineral and metal industry: ZERO Bauxite Residue and ZERO CO2 from co-production of Alumina, Silica and precipitated Calcium carbonate by the Aranda-Mastin technology	H2020-SC5-2018-2	1, 4
AniMOC	Directional Assembly of Emergent Luminescent and Anisotropic d10 Coinage Metal Organic Chalcogenolate Nanomaterials for Fabrication of Pressure Sensitive Devices	H2020-MSCA-IF-2020	4
ANIONE	Anion Exchange Membrane Electrolysis for Renewable Hydrogen Production on a Wide-Scale	H2020-JTI-FCH-2019-1	-
APPFlow	Active Pharmaceutical Production in Flow	H2020-MSCA-ITN-2018	-
APPLICAL	Assessing the technical and business feasibility of Callose Enriched Plant Biomass as a solution for improving Biorefinery Industry processes and profit margins	ERC-2019-PoC	5
ATHOR	Advanced THermomechanical mOdelling of Refractory linings	H2020-MSCA-ITN-2017	2
B-FERST	Bio-based FERtilising products as the best practice for agricultural management SusTainability	H2020-BBI-JTI-2018	4
B4EST	Adaptive BREEDING for productive, sustainable and resilient FORESTs under climate change	H2020-BB-2017-2	5
BAMBOO	Boosting new Approaches for flexibility Management By Optimizing process Off-gas and waste use	H2020-NMBP-SPIRE-2018	5
BASAJAUN	BASAJAUN - Building A SustainAble Joint between rurAl and UrbaN Areas Through Circular And Innovative Wood Construction Value Chains	H2020-RUR-2019-1	4
BaTEx	Wear traces on Basalt Tools: an Experimental case for archaeological interpretation	H2020-MSCA-IF-2020	-
BENEFICCE	BioENErgy from biomass and bio-oil Fermentation using mIcrobial Communities to produce Chemicals and Enzymes	H2020-MSCA-IF-2019	5

ACRONYM	TITLE	CALL	POT. TOP. REL.
BeonNAT	Innovative value chains from tree & shrub species grown in marginal lands as a source of biomass for bio-based industries	H2020-BBI-JTI-2019	4
BEST4Hy	SustainaBlE SoluTions FOR recycling of end of life Hydrogen technologies	H2020-JTI-FCH-2020-1	5
Big Mac	Microfluidic Approaches mimicking BIoGeological conditions to investigate subsurface CO2 recycling	ERC-2016-COG	4
BIO-CC	Bio-based carbon fiber - commercialization	ERC-2019-PoC	-
Bioflex	Second life of wood: BioFlex technology to dissolve waste wood to get raw materials	H2020-EIC-SMEInst-2018-2020-3	5
Biomass4Synthons	Straightening training, research and innovation capacities in the valorization of bio-renewable resource	H2020-WIDESPREAD-2020-5	5
BIOMOTIVE	Advanced BIObased polyurethanes and fibres for the autoMOTIVE industry with increased environmental sustainability	H2020-BBI-JTI-2016	5
BIONANOPOLYS	OPEN INNOVATION TEST BED FOR DEVELOPING SAFE NANO-ENABLED BIO-BASED MATERIALS AND POLYMER BIONANOCOMPOSITES FOR MULTIFUNCTIONAL AND NEW ADVANCED APPLICATIONS	H2020-NMBP-TO-IND-2020-twostage	4
BIORECOVER	Development of an innovative sustainable strategy for selective biorecover of critical raw materials from Primary and Secondary sources	H2020-SC5-2018-2	1
BIOSIC	Biopolymer based Single-Ion Conducting Gel Polymer Electrolytes for Highly Performant and more Sustainable Batteries	H2020-MSCA-IF-2020	5
BiotaMet	A novel biotreatment technology for sustainable metal extraction from low-grade ores, tailings and WEEE	H2020-EIC-SMEInst-2018-2020-4	1
BIZEOLCAT	Bifunctional Zeolite based Catalysts and Innovative process for Sustainable Hydrocarbon Transformation	H2020-NMBP-ST-IND-2018	1
BlackCycle	FOR THE CIRCULAR ECONOMY OF TYRE DOMAIN: RECYCLING END OF LIFE TYRES INTO SECONDARY RAW MATERIALS FOR TYRES AND OTHER PRODUCT APPLICATIONS	H2020-SC5-2019-2	5
BreadCell	Upgrading of cellulose fibers into porous materials	H2020-FETOPEN-2018-2019-2020-01	-
BUNT	Colorful Indications of (Ex)Change.	H2020-MSCA-IF-2018	-
C-stemGMP	c-GMP compliance of C-stem, an IPSc based cell therapies production technology	H2020-SMEInst-2018-2020-2	-
CARBOFLOW	Streamlined carbon dioxide conversion in ionic liquids – a platform strategy for modern carbonylation chemistry	ERC-2019-COG	5
CELISE	Sustainable production of Cellulose-based products and additives to be used in SMEs and rural areas	H2020-MSCA-RISE-2020	5
cesmine	Cultural ecosystem services of post-mining sites: socio-economic rehabilitation after quarrying	H2020-MSCA-IF-2018	1, 3
CHAIR	C-H Activation for Industrial Renewal	H2020-MSCA-ITN-2019	4
CHBTECH	Sulphur-free production method for non-food biopolymers (dissolving pulp, hemicellulose and lignin)	H2020-SMEInst-2018-2020-2	-
CINDERELA	New Circular Economy Business Model for More Sustainable Urban Construction	H2020-CIRC-2017TwoStage	2
CircThread	Building the Digital Thread for Circular Economy Product, Resource & Service Management	H2020-LCCI-2020-EASME-twostage	2
CIRCuIT	Circular Construction In Regenerative Cities (CIRCuIT)	H2020-SC5-2018-2	5
CIRCULAR FLOORING	New products from waste PVC flooring and safe end-of-life treatment of plasticisers	H2020-SC5-2018-2	5
CIRCULAR FoodPack	Circular Packaging for Direct Food Contact Applications	H2020-SC5-2020-2	-

ACRONYM	TITLE	CALL	POT. TOP. REL.
CISUFLO	CIrcular SUstainable FLOor coverings	H2020-SC5-2020-2	-
CNF	The role of microfibrillated cellulose fibres to tune the rheological behaviour of fibre-cementitious and fibre-clay mixture for 3D printing application	H2020-MSCA-IF-2020	5
CoFBAT	Advanced material solutions for safer and long-lasting high capacity Cobalt Free Batteries for stationary storage applications	H2020-LC-BAT-2019	5
ComPAS	Commercial Patterns Across the Sea: The interdisciplinary study of Maritime Transport Containers from Cyprus and the elucidation of Mediterranean connectivity during the Late Bronze Age-Early Iron Age	ERC-2020-STG	-
CONDOR	COmbined suN-Driven Oxidation and CO2 Reduction for renewable energy storage	H2020-LC-SC3-2020-RES-RIA	4, 5
COSMHYC XL	COmbined hybrid Solution of Metal HYdride and mechanical Compressors for eXtra Large scale hydrogen refuelling stations	H2020-JTI-FCH-2018-1	5
CREAToR	Collection of raw materials, Removal of flAme reTardants and Reuse of secondary raw materials	H2020-SC5-2018-2	1
DACOTA	Demonstration And Commercialisation Of The AORTA-innovation	H2020-EIC-SMEInst-2018-2020-4	-
DEBIMAX	Carbon coated Silicon Production Scaling Up for Li-ion batteries	H2020-SMEInst-2018-2020-2	5
DELTA	Development and Execution of innovative test procedures for vaLidation of Thermoplastic Aircraft fuselage panels	H2020-CS2-CFP08-2018-01	5
DESTINY	Development of an Efficient Microwave System for Material Transformation in energy INtensive processes for an improved Yield	H2020-NMBP-SPIRE-2018	4
DeToxSea	Demographical effects of toxic contamination on Arctic seabirds	H2020-MSCA-IF-2020	-
Dig_IT	A Human-centred Internet of Things Platform for the Sustainable Digital Mine of the Future	H2020-SC5-2019-2	1, 2, 3, 4, 5
DIGIECOQUARRY	INNOVATIVE DIGITAL SUSTAINABLE AGGREGATES SYSTEMS	H2020-SC5-2020-2	-
DuRSAAM	PhD Training Network on Durable, Reliable and Sustainable Structures with Alkali-Activated Materials	H2020-MSCA-ITN-2018	5
e.THROUGH	Thinking rough towards sustainability	H2020-MSCA-RISE-2017	2, 4
EDENE	European Doctoral programme on ENergy and Environment	H2020-MSCA-COFUND-2019	5
EDGE	Cutting edge technology: understanding Palaeolithic stone tool design and use from a modern mechanical engineering perspective	H2020-MSCA-IF-2018	-
EGREMPLARE	Enabling greasy mixed plastics recycling	H2020-EIC-SMEInst-2018-2020-4	5
ELECTROION	Process engineering for sustainable recovery of valuable metals by ELECTRO-IONometallugy	H2020-MSCA-IF-2020	5
EPISTORE	Thin Film Reversible Solid Oxide Cells for Ultracompact Electrical Energy Storage	H2020-FETPROACT-2020-2	5
ERA-MIN 2	Implement a European-wide coordination of research and innovation programs on raw materials to strengthen the industry competitiveness and the shift to a circular economy	H2020-SC5-2016-OneStageB	1
ERA-MIN3	Raw Materials for the Sustainable Development and the Circular Economy	H2020-SC5-2020-1	4
FertiCycle	New bio-based fertilisers from organic waste upcycling	H2020-MSCA-ITN-2019	4
FineFuture	Innovative technologies and concepts for fine particle flotation: unlocking future fine-grained deposits and Critical Raw Materials resources for the EU	H2020-SC5-2018-2	1

ACRONYM	TITLE	CALL	POT. TOP. REL.
FINEPRINT	Spatially explicit material footprints: fine-scale assessment of Europe's global environmental and social impacts	ERC-2016-COG	1
Fish-AI	Developing an Artificial Intestine for the sustainable farming of healthy fish	H2020-FETOPEN-2018-2019-2020-01	-
FISHSkin	Developing Fish Skin as a sustainable raw material for the fashion industry	H2020-MSCA-RISE-2018	-
FlashPhos	The complete thermochemical recycling of sewage sludge	H2020-LCCI-2020-EASME-twostage	5
FlexPack2Circle	Transfer of Multimaterial Flexible Packaging to Circular Economy	H2020-SMEInst-2018-2020-2	1
FlotSim	Leveraging Multiphase Flow and Physical Chemistry to Engineer the Next Generation of Flotation Processes	H2020-MSCA-ITN-2020	5
ForestValue	ForestValue - Innovating forest-based bioeconomy	H2020-SFS-2017-1	-
FOXES	Fully Oxide-based Zero-Emission and Portable Energy Supply	H2020-EIC-FETPROACT-2019	5
FRAMES	Fibre Reinforced thermoplAstics Manufacturing for stiffEned, complex, double curved Structures.	H2020-CS2-CFP10-2019-01	5
FRGeo-Crete	Natural Fibre Reinforced Crack-resistant and spalling-controlled sustainable Geopolymer Concrete	H2020-MSCA-IF-2018	5
GALIRUMI	Galileo-assisted robot to tackle the weed Rumex obtusifolius and increase the profitability and sustainability of dairy farming	H2020-SPACE-EGNSS-2019	5
GeoERA	Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe	H2020-LCE-2016-ERA	1
GeoRes	Geomaterials: from Waste to Resource	H2020-MSCA-RISE-2017	1
GLOBALGUNS	Guns for a Global Empire: Deployment of Artillery Technology in the Iberian Colonial Space (1580-1640)	H2020-MSCA-IF-2018	-
GloRI	A Global Value Chain of Research and Innovation: Governance and Power in designing research for sustainable mineral-material uses	H2020-MSCA-IF-2020	1
GoJelly	GoJelly - A gelatinous solution to plastic pollution	H2020-BG-2017-1	5
Grasspaper	Grassfibre raw material and grasspaper products for the retail, paper and packaging industry, helping to reduce plastic and textile pollution and CO2 emissions on a global scale	H2020-EIC-SMEInst-2018-2020-3	5
GREENPEG	New Exploration Tools for European Pegmatite Green-Tech Resources	H2020-SC5-2019-2	1
GRETE	Green chemicals and technologies for the wood-to-textile value chain	H2020-BBI-JTI-2018	5
GRIP-ARM	Green Industrial Policy in the Age of Rare Metals: A Transregional Comparison of Growth Strategies in Rare Earth Mining	ERC-2020-STG	1
HARARE	Hydrogen As the Reducing Agent in the REcovery of metals and minerals from metallurgical waste	H2020-LCCI-2020-EASME-twostage	1, 5
HighThroughFROGS	Reviving ghosts of taxonomy past: Identifying cryptic species using high-throughput sequencing of historical museum specimens for Asian ranids with gastromyzophorous tadpoles	H2020-MSCA-IF-2018	-
HiStabJuice	Establishing a strong and lasting international training network for innovation in food and juice industries: a 4D-research approach for fruit juice processing	H2020-MSCA-ITN-2020	2
Hydra	Hybrid power-energy electrodes for next generation lithium-ion batteries	H2020-LC-BAT-2019	5
OilandEmp	Crude Empire. British 'Oil Imperialism' and the making of the modern Middle East (c.1901-c.1935).	H2020-MSCA-IF-2017	-
OLEAF4VALUE	OLIVE LEAF MULTI-PRODUCT CASCADE BASED BIOREFINERY: FROM AN UNDER-USED BIOMASS IN THE PRIMARY SECTOR TO	H2020-BBI-JTI-2020	-

ACRONYM	TITLE	CALL	POT. TOP. REL.
	TAILORMADE SOLUTIONS FOR HIGH ADDED VALUE INTERNATIONAL MARKET APPLICATIONS		
PASSENGER	Pilot Action for Securing a Sustainable European Next Generation of Efficient RE-free magnets	H2020-SC5-2020-2	1
PAST	Phytolith Analysis and Stone Tools: A socio-ecological analysis of stone tools assemblage of North-Western South Asia	H2020-MSCA-IF-2019	-
PATTENZYME	Sequential and selective patterning of enzymes in modular electrochemical based biorreactor for continuos production of pharmaceutical materials	H2020-MSCA-IF-2020	-
PEACOC	Pre-commercial pilot for the efficient recovery of Precious Metals from European end of life resources with novel low cost technologies	H2020-LCCI-2020-EASME-twostage	1
PEFerence	From bio-based feedstocks via di-acids to multiple advanced bio-based materials with a preference for polyethylene furanoate	H2020-BBI-JTI-2016	
PHOTORAMA	PHOtovoltaic waste management – advanced Technologies for recOvery and recycling of secondary RAw MAterials from end-of-life modules	H2020-LCCI-2020-EASME-twostage	1, 5
Pipes.One	Pipes.One - Technology for Onsite 3D Welding Production of Lengthy Large Diameter Polymer Pipes with Cellular Walls	H2020-EIC-SMEInst-2018-2020-4	5
PlaCe	Training the next generation of archaeological scientists: Interdisciplinary studies of pre-modern Plasters and Ceramics from the eastern Mediterranean	H2020-MSCA-ITN-2020	-
Pop-Machina	Collaborative production for the circular economy; a community approach	H2020-SC5-2018-2	5
PVadapt	Prefabrication, Recyclability and Modularity for cost reductions in Smart BIPV systems	H2020-LC-SC3-2018-RES-SingleStage	4
QuinaWorld	Tracking Neanderthals in Time and Space: was the “Quina World” the first regional cultural entity in the history of Europe?	ERC-2019-STG	-
Ramp-PV	Raw material up-cycling for circular PV	H2020-EIC-SMEInst-2018-2020-4	1
RAWMINA	Integrated innovative pilot system for Critical Raw Materials recovery from mines wastes in a circular economy context	H2020-LCCI-2020-EASME-twostage	1
RE-SOURCING	Global Stakeholder Platform for Responsible Sourcing	H2020-SC5-2019-1	
REACT	REcycling of waste ACrylic Textiles	H2020-SC5-2018-2	5
RECaPHOS	Development of an innovative sustainable process for simultaneous sewage sludge fluidized bed combustion and REcovery of PHOsphorus in a Ca bed	H2020-MSCA-IF-2018	5
RECOVER	Development of innovative biotic symbiosis for plastic biodegradation and synthesis to solve their end of life challenges in the agriculture and food industries	H2020-BBI-JTI-2019	5
RECYCALYSE	New sustainable and recyclable catalytic materials for proton exchange membrane electrolysers	H2020-NMBP-ST-IND-2019	5
REDEBA	Revamping the Desalination Battery	H2020-MSCA-IF-2018	5
REDEFINE	Re-orienting development: the dynamics and effects of Chinese infrastructure investment in Europe	ERC-2019-ADG	-
REMAT	Unique patented technology for recycling mixed plastic waste and other hard-to-recycle waste streams to REMATerialize them to valuable products	H2020-EIC-SMEInst-2018-2020-3	5
REMIND	Renewable Energies for Water Treatment and REuse in Mining Industries	H2020-MSCA-RISE-2018	1, 5
RemovAL	Removing the waste streams from the primary Aluminium production and other metal sectors in Europe	H2020-SC5-2017-TwoStage	5

ACRONYM	TITLE	CALL	POT. TOP. REL.
ReMTW	Re-making the World: Women, Humanitarian Agencies and Handicrafts Programmes	H2020-MSCA-IF-2020	-
REVaMP	Retrofitting equipment for efficient use of variable feedstock in metal making processes	H2020-NMBP-SPIRE-2019	2
ROBOMINERS	Resilient Bio-inspired Modular Robotic Miners	H2020-SC5-2018-2	1
ROSEWOOD4.0	EU NETWORK OF REGIONS ON SUSTAINABLE WOOD MOBILISATION READY FOR DIGITALISATION	H2020-RUR-2019-1	2
RUMBA	Selective Recovery of Critical Raw Materials by Using Metal-Organic Framework Based Adsorbents	H2020-MSCA-IF-2020	1
RUN4LIFE	RECOVERY AND UTILIZATION OF NUTRIENTS 4 LOW IMPACT FERTILIZER	H2020-CIRC-2016TwoStage	5
SAbDA	Sustainability Assessment based on Decision Aiding	H2020-MSCA-IF-2016	4
SafeGlov	Safety Gloves for Protection of Health Care Professionals	H2020-SMEInst-2018-2020-2	3
SALEMA	Substitution of Critical Raw Materials on Aluminium Alloys for electrical vehicles	H2020-SC5-2020-2	4
SANDLINKS	Framing sand sustainability in a telecoupled world	H2020-MSCA-IF-2018	5
SCRREEN2	Solutions for CRitical Raw materials - a European Expert Network 2	H2020-LCCI-2020-EASME-singlestage	1
SDGine	SDGine for Healthy People and Cities	H2020-MSCA-COFUND-2019	3
SEA4VALUE	Development of radical innovations to recover minerals and metals from seawater desalination brines	H2020-SC5-2019-2	1
SEALIVE	Strategies of circular Economy and Advanced bio-based solutions to keep our Lands and seas alIVE from plastics contamination	H2020-BG-2019-1	1
SEArcularMINE	Circular Processing of Seawater Brines from Saltworks for Recovery of Valuable Raw Materials	H2020-SC5-2019-2	1
SecREEts	Secure European Critical Rare Earth Elements	H2020-SC5-2017-TwoStage	1
SEDILAND	Sediment regime disturbance of river catchments in a changing land cover context: Geoenvironmental and population dynamics	H2020-MSCA-IF-2018	5
SeNSE	Lithium-ion battery with silicon anode, nickel-rich cathode and in-cell sensor for electric vehicles	H2020-LC-BAT-2019	4
SHEALTHY	Non-Thermal physical technologies to preserve fresh and minimally processed fruit and vegetables	H2020-SFS-2018-2	-
SHIFT	Shaping Innovative Designs for Sustainable Tissue Engineering Products	H2020-MSCA-RISE-2020	-
single-C	Automatized Catalysis and Single-Carbon Insertion	ERC-2016-STG	2
SisAl Pilot	Innovative pilot for Silicon production with low environmental impact using secondary Aluminium and silicon raw materials	H2020-SC5-2019-2	4
So2Sat	Big Data for 4D Global Urban Mapping – 10^16 Bytes from Social Media to EO Satellites	ERC-2016-STG	2
Sol-Rec2	Innovative digital watermarks and green solvents for the recovery and recycling of multi-layer materials	H2020-SC5-2020-2	2, 5
SOLSTICE	Sodium-Zinc molten salt batteries for low-cost stationary storage	H2020-LC-BAT-2020	4
SPE	Silicon-Carbide-Fiber Pilot-production in Europe	H2020-SMEInst-2018-2020-2	4
SPECTROKIN	Operando-Spectroscopy Annular Reactor for Spectro-kinetic Analysis in Heterogeneous Catalysis	ERC-2020-PoC	-
SPIDER	Safe and Prelithiated hIgh energy DEnsity batteries based on sulphur Rocksalt and silicon chemistries	H2020-NMBP-ST-IND-2018	4

ACRONYM	TITLE	CALL	POT. TOP. REL.
STARGATE	Sensors and daTA tRaininG towards high-performance Agri-food sysTEms	H2020-WIDESPREAD-2020-5	5
SULTAN	European Training Network for the remediation and reprocessing of sulfidic mining waste sites	H2020-MSCA-ITN-2018	1, 5
SUMEX	SUstainable Management in EXtractive industries	H2020-SC5-2020-1	1
SUSTONABLE	From bottle to stone. Recyclable engineered stone for kitchen countertops.	H2020-SMEInst-2018-2020-2	4
SWOP	The first non-toxic bio-based polymer resin to revolutionize the wood panel industry	H2020-EIC-FTI-2018-2020	5
TARANTULA	Recovery of Tungsten, Niobium and Tantalum occurring as by-products in mining and processing waste streams	H2020-SC5-2018-2	1, 5
Tech4Win	Disruptive sustainable TECHnologies FOR next generation pvWINdows	H2020-LC-SC3-2018-Joint-Actions-3	2
topAM	Tailoring ODS materials processing routes for additive manufacturing of high temperature devices for aggressive environments	H2020-NMBP-ST-IND-2020-singlestage	3
TOPIS-BioCirc	Integrating torrefaction of pulp and paper industry sludge with microbial conversion: A new approach to produce bioenergy carriers and biochemicals in a view of bio and circular economy.	H2020-MSCA-IF-2018	4
TRADElam	Trade at the Sea of the Rising Sun: Neo-Elamite commercial involvement in the Persian Gulf network (1000-525 BC)	H2020-MSCA-IF-2020	1
TREASURE	leading the TRansion of the European Automotive SUpply chain towards a circulaR futurE	H2020-SC5-2020-2	4
triboREMEDY	The triboreactor as breakthrough remediation strategy for safeguarding human and environmental health	H2020-FETOPEN-2018-2019-2020-01	3
TRICK	Product data traceability from cradle to cradle by blockchains interoperability and sustainability service marketplace	H2020-LCCI-2020-EASME-twostage	4
TULIPZ	The world's first Terahertz application for Inspection-As-A-Service: Ensure quality and reduce waste in industrial production through inline inspection	H2020-EIC-SMEInst-2018-2020-3	4
UNLOCK	Unlocking a feather bioeconomy for keratin-based agricultural products	H2020-BBI-JTI-2020	4
upPE-T	Upcycling of PE and PET wastes to generate biodegradable bioplastics for food and drink packaging	H2020-NMBP-TR-IND-2020-twostage	4
URBIOFIN	Demonstration of an integrated innovative biorefinery for the transformation of Municipal Solid Waste (MSW) into new BioBased products (URBIOFIN)	H2020-BBI-JTI-2016	4
USABLE PACKAGING	Unlocking the potential of Sustainable BiodegradabLe Packaging	H2020-BBI-JTI-2018	4
VALEMA	VALidation tests of ElectroMechanical Actuators and its dedicated control units at TRL 6 level	H2020-CS2-CFP04-2016-02	2
VALORTECH	ERA Chair for Food (By-) Products Valorisation Technologies of the Estonian University of Life Sciences	H2020-WIDESPREAD-03-2017-ERAChairs	-
VALUEWASTE	Unlocking new VALUE from urban bioWASTE	H2020-SFS-2018-1	4, 5
VIPCOAT	Virtual Open Innovation Platform for Active Protective Coatings Guided by Modelling and Optimization	H2020-NMBP-TO-IND-2020-twostage	2
W2W	Waste to Wealth (W2W): A total solution for municipal solid waste incinerated ash in geopolymer concrete	H2020-MSCA-IF-2018	3, 5
WalNUT	Closing waste water cycles for nutrient recovery	H2020-RUR-2020-2	5
WASEABI	Optimal utilization of seafood side-streams through the design of new holistic process lines	H2020-BBI-JTI-2018	-
Water2REturn	REcovery and REcycling of nutrients TURNing wasteWATER into added-value products for a circular economy in agriculture	H2020-CIRC-2016TwoStage	5

ACRONYM	TITLE	CALL	POT. TOP. REL.
WEIGHTANDVALUE	Weight metrology and its economic and social impact on Bronze Age Europe, West and South Asia	ERC-2014-CoG	-
WoCaFi	Unlocking the Entire Wood Matrix for the Next Generation of Carbon Fibers	ERC-2016-STG	4
WoodCircus	Underpinning the vital role of the forest-based sector in the Circular Bio-Economy	H2020-SC5-2018-1	5
WoodTRACES	Exploring Prehispanic woodworking technologies in the isolated context of the Canary Islands: Innovative and adaptive responses	H2020-MSCA-IF-2020	-
WORLD	Waste Oils RecycLe and Development	H2020-MSCA-RISE-2019	5

8 Projects with a dedicated webpage space in the RMIS:

Table 4. Projects with a dedicated webpage space in the RMIS.

ACRONYM	TITLE	CALL
C2CA	Advanced Technologies for the Production of Cement and Clean Aggregates from Construction and Demolition Waste	FP7-ENV-2010
ECO-SANDWICH	Energy efficient, recycled concrete sandwich facade panel	CIP-EIP-Eco-Innovation 2011 Programme
FuRIC	Future Recycled Inert Concrete Made of Steelworks Residues	H2020-SMEINST-1-2016-2017
MULSEDRO	Multi-sensor drones for geology mapping	EIT-KIC raw
SARMa	Sustainable Approach to Aggregates	Programme 2007 - 2013 South East Europe
SNAP-SEE	Planning Aggregates Supply in South East Europe	H2020-4-2014
STOICISM	Sustainable Technologies for Calcined Industrial Minerals in Europe	FP7-NMP-2012-LARGE-6
STORM	Industrial Symbiosis for the Sustainable Management of Raw Materials	EIT-KIC raw
STRADE	Strategic Dialogue on Sustainable Raw Materials for Europe	H2020-SC5-2015-one-stage
SUPRIM	SUstainable management of PRIMary raw materials through a better approach in Life Cycle Sustainability Assessment	EIT-KIC raw
SUS-CON	Sustainable, innovative and energy-efficient concrete, based on the integration of all-waste materials	FP7-2011-NMP-ENV-ENERGY-ICT-EeB
VEEP	Cost-effective recycling of CDW in high added value energy efficient prefabricated concrete components for massive retrofitting of our built environment	H2020-EU.2.1.5.2

9 Annex III. Information provided to the RMKG for the dedicated webpage space in the RMIS


INNOVATIVE DIGITAL SUSTAINABLE AGGREGATES SYSTEMS
(DIGIECOQUARRY)- (H2020-SC5-2020-2)

DIGIECOQUARRY
INNOVATIVE DIGITAL SUSTAINABLE
AGGREGATES SYSTEMS

Horizon 2020 research
and innovation programme
(N° 101003750)

Web page: http://digiecoquarry.eu/

Overview

DIGIECOQUARRY is a H2020 Project addressing the topic C5-10-2019-2020, which will exploit the aggregates industry´s great potential through a coordinated approach towards construction materials management with the final goal of reducing EU external supply dependency as well as leading an efficient use of resources. The project will develop systems, technology and processes for integrated digitisation and automation real-time process control, to be piloted in 5 EU quarries. The development of innovative an Intelligent Quarrying System will increase the sustainable supply of minerals for the construction sector as well as enabling the sustainable extraction of EU´s mineral resources in existing and new quarries.

Activities on raw materials

DIGIECOQUARRY aims to **design, develop and validate in 5 pilot environments an Innovative Quarrying System (IQS)** comprising sensors, processes, tools and methods for data capture, processing and sharing to **provide integrated digitalised, automatic and real-time process control for aggregates quarries.** This will translate into:
1. Improved Health, Safety and Security conditions for workers, avoiding their exposure to dangerous operations through automated and controlled processes.
2. Improved Selectivity and Efficiency of the aggregates extractive sites, thus increasing the **profitability** of the quarrying processes, ensuring long-term operational sustainability.
3. **Maximised Sustainability and Resource Efficiency in the quarry operations** by reducing emissions, improving the management of water and fostering a sustainable supply of raw materials to feed new and existing value chains closing minerals loops and ensuring a long-lasting production.
4. Improved social acceptance through the communication with policy makers, citizens and relevant actors to get them involved in the value chain. DIGIECOQUARRY will seek for international cooperation within the EU but also beyond, to share knowledge and best practices and improve the general perception of the quarrying industry.
The novel technologies will be piloted in 5 EU quarries with different characteristics to demonstrate ensure representative and transferable results, with a market-oriented approach.

Raw materials of interest

The cases investigated comprise a range of aggregates, including primary extraction of different types of materials (limestones, sands and gravels, andesites,...), and recycling processes in treatment plants.

Statutory, IPR issues

This project receives funding from the European Union's Horizon 2020 program, delivered by the European Health and Digital Executive Agency addressing the topic "Raw materials innovation actions: exploration and Earth observations in support of sustainable mining (C5-10-2019-2020)".

2

Most results and documents will be public, while few will be confidential (only avalilable for members of the consortium, including the Commission Services).

Public data and documents will be hosted in the web page of the project (http://digiecoquarry.eu/). Use of the data constitutes citation to the original source

The following IPR components have been identified:

- Data from participants: Collected data will be treated with the highest confidentiality. Procedures for data collection, storage, protection, retention and destruction will comply with national and the EU General Data Protection Regulation (GDPR, Regulation (EU) 2016/679).

- Technical reports for project monitoring and reporting: Technical reports shall be elaborated considering a fluent workflow. Therefore, the Project Management Handbook will include the procedures required to guarantee that project documents are produced, updated, distributed and stored correctly and efficiently

- Data from the pilots: This information will reflect the impacts that the proposed concepts/solutions have had under real operation. Key results will be disseminated among all the involved stakeholders. A particular effort will be made towards policy makers to highlight the benefits of adopting such strategies. All the results generated during the course of the project will be subject to the decision of the Partners with the supervision of the PC and the EB if they will be disseminated/shared or exploited/protected.

- Scientific Publications in International Journals, Scientific Conferences, EU Events, Trade Fairs and Workshops: Results on scientific achievements in field test site validations will be disseminated among the scientific community, industry, and further stakeholders in specific events. The publications shall include acknowledgements to the project and shall be communicated to the technical coordination.

- Partners will have to provide open access to peer-reviewed scientific publications, relating to its results scientific, that can be read online according to H2020 Guidelines on OA to Scientific Publications. Peer-reviewed publications will be stored in an open access repository (i.e. green open access), during and after the project.

Raw materials knowledge

Raw materials value chain

DIGIECOQUARRY covers all key processes of a standard aggregates quarry in the 5 pilots, from Site preparation to Business management (Fig. 1), preserving the circular economy and social innovation approaches as cross-cutting innovations.

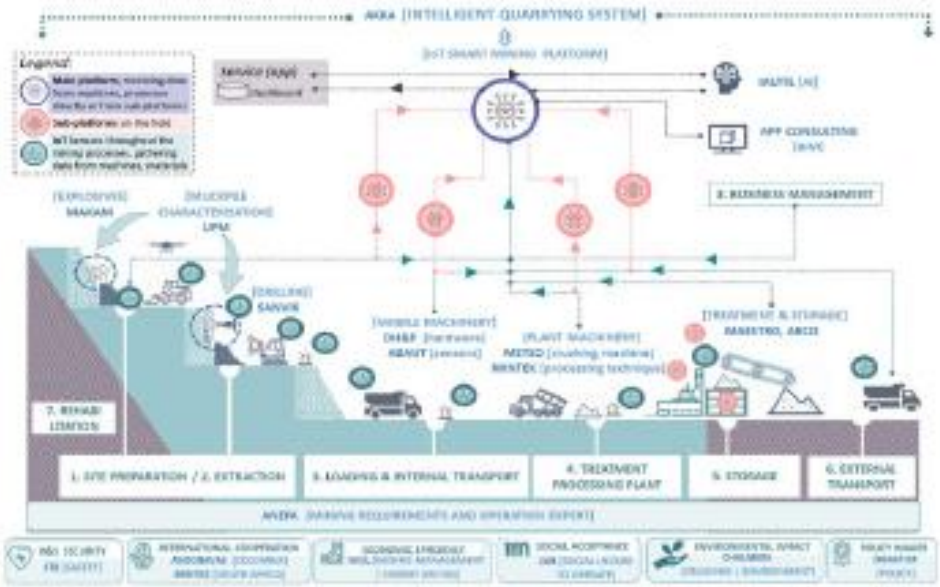

Figure 1. DIGIECOQUARRY's concept quarrying processes and main roles.

Environmental and social sustainability

One of the aims of DIGIECOQUARRY is to lead improved efficiency of processes maximizing quarry resources and sustainable management of water, energy emissions, minimised environmental impact and expanding the EU aggregates and construction business.
Moreover, action is taken on a pre-existing mining process that has been duly authorized by the competent administrations, based on a mining project that takes into account the intrinsic safety of operations and the prevention of occupational accidents as well as the environmental impacts. In most cases, sites have even been subjected to environmental impact assessments. In addition, they are subject to periodic (annual) inspections by the mining and environmental authorities. In all cases, the sites have very strict security protocols that are applicable to workers and visitors. In the case of this project, it is planned to establish a special work protocol with each of the pilot sites that guarantees safety in all works.

4

Economics and trade

This project will demonstrate a market potential and the competitive technology advantage that will be gained through the pilot leading to expanding the EU business and to be implemented across the EU after the project is finished.
DIGIECOQUARRY will revolutionise the aggregates industry with a set of products and services with proven market potential to be up-taken across the EU and beyond, as detailed in the Exploitation strategy. Specifically, with clear economic impacts, including a rise of total incomes, cost reduction, more investment in research and development, reduce of consumables, etc.

The exploitation methodology created in the project is fully aligned with the structure suggested in the Raw Materials Work Programme. DIGIECOQUARRY already satisfies all exploitation requirements listed below:
- Improved product robustness and reliability.
- Matching European value chains.
- Standardisation.
- IPR and technology transfer.
- Sustainability of financing.
- Improving the social acceptance of the quarrying industry.

It is planned to provide patent/utility models applications and new/enhanced products and services as DIGIECOQUARRY portfolio.

Secondary raw materials & circular economy

The EU Green Deal presents a roadmap with several actions aiming to boost the efficient use of resources by moving to a clean and circular economy; and restoring biodiversity and cut pollution. DIGIECOQUARRY will run within 6/9 EU Green Deal's policy areas: [1] Biodiversity, protecting existing fragile ecosystems and creating new biodiversity rich habitats; [2] Sustainable industry, ensuring more sustainable and environmentally friendly production cycles including circular economy; [3] Building and renovating, supplying huge amounts of local aggregates needed for renovation and improving the energy performance, [4] Sustainable mobility and [5] Climate action by climate change prevention and adaptation; and [6] Eliminating pollution, reducing impacts to enhance air quality, clean water, and prevent soil contamination from the quarry installations/equipment.
Aiming to meet the 2030 climate goals this project envisages a significant cut in the greenhouse gas emissions and improvement of energy efficiency in the production process. The following achievements are expected in the long term: [1] Expected achievements by 2030: a quarry operation based on the DIGIECOQUARRY concept will have its deposit digitalised (converted by AI planning procedures into operational activities) based on the principles of responsible production. The whole machinery of a production site will operate autonomously and run on efficient, environmental and safety-based principles. Production control and material flow management will be based on maximising the RM use. These step change technologies are designed to work in both big and SME-fit operations, helping the huge amount of small to medium

sized operations to work under sustainable principles; [2] Expected achievements by 2050: the next improvement step will involve operational site control by satellite technologies (Copernicus), realising operations on the principles of zero-impact in terms of water, wastes and carbon emissions, lowering energy consumption. Thus, every Quarry operation will contribute to increase biodiversity and create new attractive living areas of enriched status, both for people, animals and plants.

Monitoring raw materials sectors

One of the aims is to lead improved efficiency of processes maximizing quarry resources and sustainable management of water, energy emissions, minimised environmental impact and expanding the EU aggregates and construction business. Coupling Artificial Intelligence approaches with cyber-physical systems and the Internet of Things concept, make Industry 4.0 approach possible and the smart sustainable extractive site a reality. All phases of the process, from extraction to the end user are covered by DIGIECOQUARRY, ensuring communication with policy makers, social acceptance activities and international cooperation to share knowledge and best practices. The development of innovative an Intelligent Quarrying System (IQS) will increase the sustainable supply of minerals for the construction sector as well as enabling the sustainable extraction of EU's mineral resources in existing and new quarries.
Artificial Intelligence will be used to close the circle around the optimisation of a digital quarry, it allows the information to be an asset in economic, environmental or human terms since it will automatically evolve and improve over time. Aartifical Intelligence will be divided into six essential phases comprising: 1) Information analysis and filtering; 2) Design of the algorithm; 3) Algorithm training; 4) Industrial architecture design; 5) Testing of the algorithm; 6) Coordination and iteration.

Data accessibility

Data will be reported in the project deliveries and relevant extracts will be linked to the project website (http://digiecoquarry.eu/) most of them will be public, while few of them confidential.
Research will be published in scientific and professional journals, and presented in international congresses and technical conferences.
The Project will also contribute to improve the awareness of relevant external stakeholders and the general public across the EU about the importance of Raw Materials for society, the challenges related to their supply within the EU and about proposed solutions which could help to improve society's acceptance of and trust in sustainable Raw Material production in the EU, duly taking into account the applicable EU environmental legislation.
DIGIECOQUARRY will ensure transfer of knowledge and cooperation among the relevant stakeholders, also feeding results from the pilots into the Raw Materials Information System (RMIS) and European Raw Materials Knowledge Base (EURAMKB) databases. Workshops will be organized involving stakeholders, users, potential clients.
All data information security management will follow the guidelines of ISO (IEC 27002).
The project will define specific business models and exploitation plans for the new products and services implemented in the project in order to ensure their future market uptake.

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Research and Innovation

Results of this project are planned to be published in several scientific journals and presented in numerous scientific conferences. Moreover, partners will participate in diverse events (technical conferenecs/fairs) and 3 guidance roadmaps for the extractive industry will be developed.

Links and contacts

The partners of the Consortium are listed below:

Asociación Nacional de Empresarios Fabricantes de Áridos (ANEFA)
GRANULATS VICAT (VICAT)
HANSON HISPANIA SA (HANSON)
Holcim Aggregati Calcestruzzi SRL(HOLCIM)
CRONENBERGER STEININDUSTRIE FRANZ TRICHES GMBH & CO KG (CSI)
AGREPOR AGREGADOS –EXTRACCAO DE INERTES, SA (CIMPOR)
SANDVIK MINING AND CONSTRUCTION OY (SANDVIK)
METSO OUTOTEC FINLAND OY (Metso Minerals)
MAXAMCORP INTERNATIONAL SL (Maxam corp)
ITK ENGINEERING GMBH (ITK)
MONTANUNIVERSITAET LEOBEN (MUL)
CHALMERS TEKNISKA HOEGSKOLA AB (CHALMERS)
UNIVERSIDAD POLITÉCNICA DE MADRID (UPM)
AKKA HIGH TECH (AKKA)
ARCO ELECTRONICA SOCIEDAD ANONIMA (ARCO)
MA ESTRO SRL (Ma-estro SRL)
DOHMEN HERZOG & PARTNER GMBH (DH&P) /
ABAUT GMBH (Abaut GmbH)
APP CONSULTORIA DE GESTION DE PROYECTOS S.L. (APP Consultoria)
SIGMA TECHNOLOGIES SLU (SIGMA)
CONSEJERIA DE INDUSTRIA, EMPLEO Y PROMOCION ECONOMICA (DGASTUR)
ASOCIACION COLOMBIANA DE PRODUCTORES DE AGREGADOS PETREOS (Asogravas)
MINTEK (MINTEK)
ZABALA INNOVATION CONSULTING, S.A. (ZABALA)
ROCTIM AB (ROCTIM)

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