

PANORAMA Dissemination Report

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Name of the author/Responsible partner: José M. Mogollón, Tales Yamamoto, Levon Amatuni, Stefano Merciai.

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**Universiteit
Leiden**
Institute of
Environmental Sciences



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Executive Summary

The vision of the EIT RawMaterials (RM) is to develop economies related to raw materials into a major strength for Europe. Its mission is to boost competitiveness and quality of life through for instance new educational approaches and guided entrepreneurship. Focusing on EIT RM's aim to introduce society to the importance and relevance of raw materials, the Physical Accounts Of Raw Material stock and flow Information Service (PANORAMA) will compile, combine, and balance supply chain and stock-flow material databases into one comprehensive global supply chain database compatible with economic statistics.

This document presents the dissemination activities to be carried out during by the consortium members of the PANORAMA project. It details the methodology for communicating the various results to both stakeholders and the general public, and the steps that will be carried out in order to ensure such tasks are carried out. This document may be updated during the duration of the project, provided there are activities that warrant a new approach for communication and dissemination.

1. Introduction

1.1. Defining PANORAMA

The Physical AccouNts Of RAW MAterial stock and flow Information Service (PANORAMA) project will compile, combine, and balance supply chain and stock-flow material databases into one comprehensive global supply chain database compatible with economic statistics. This Communication and Dissemination plan is a Deliverable of WP1, which seeks to ensure the dissemination of PANORAMA results. In order to ensure that this constructed database receives wide usage within both the scientific and raw material community, the consortium has proposed a web-based information service system business model. This dissemination will be closely coordinated with the EU's Raw Material Information System. Specifically this PANORAMA dissemination methodology consists of:

- Describe the various target audiences.
- Describing the strategy to communicate the project's activities and results among stakeholders (including the Joint Research Centre's (JRC's) Raw Materials Information System (RMIS) and the general public.
- Define the set of initiatives that comprise the action plan for communication to the various stakeholders.
- Link the PANORAMA activities with the EU Raw Materials Information Systems.
- Ensure that the various KPIs guidelines are met.

1.2. Background: The PANORAMA project

The Sustainable Development Goals (SDGs), the transition to a low-carbon and circular economy, realizing resource-efficiency, and ensuring resource supply security are ambitions that require transformations with regard to the economies' use of natural resources, and the resulting emissions and waste. Realizing these goals requires a robust information base regarding the current and future economic demands for natural resources. Ideally such an information system links physical and economic information about industry sectors, product flows and stocks, and material flows and stocks, all in a coherent classification system usable in forward looking models. Such an information system would allow for forecasting resource demand, economic implications

of resource supply problems, and provide a deep understanding of the societal metabolism of products and materials, including the structure of urban mines.

There are many data mining efforts ongoing via e.g. DG Eurostat, EEA, DG ENV, OECD, the UN International Resources Panel, Geological surveys and numerous H2020 projects (e.g. PROSUM, MICA, ORAMA, SCRREEN, etc.). Among these, the development of a Raw Materials Information System (RMIS) by the EU DG JRC is one of the most prominent ones. This data effort, however, is still rather scattered with each actor or project focusing on specific data gathering activities (e.g. geosurveys on material extraction, H2020 projects on specific materials). Such separate data sets are not consistently linked over the life cycle of products and materials. Data sets often cannot be linked consistently to forward looking economic models. While conceptually it is clear how to build a combined accounting system that can provide information on economic and physical flows and stocks from an sector, product and material perspective, in practice such databases do not exist. Moreover, many data originate from single projects and not from continuously updated and maintained data sources: methodology how to reconcile such varying data backgrounds is lacking. All this hampers the assessment of the environmental, economic and social trade-offs of improvement options with regard to materials management.

PANORAMA seeks to create a reproducible process that harmonizes and balances various datasets, leading to a physical-economic, stock-flow materials database. PANORAMA builds upon previous projects (e.g. EXIOBASE, PROSUM, MICA, ORAMA) and user needs identified in KIC EIT EMFIS Network of Infrastructure (NoI). It will provide a crucial information system for the EIT KIC RM itself, allowing for priority setting of areas where solutions to reduce risks of supply disruptions, environmental impacts, and enhance resource-efficiency and circularity, specifically by aligning itself with the JRC's RMIS. At the international level, PANORAMA will cooperate with the UN International Resources Panel, the Japanese National Institute for Material Studies, and Yale University in the US. This will result in an information service relevant for governments, research organisations and industries that have to decide about innovations in sustainable materials management. The continued operations of this service can be realised as a public service via the EIT KIC RM Infocentre, the RMIS, or the European Geological Data Infrastructure (EGDI) set up by the European geological surveys and supported by the GeoERA ERANET (<http://geoera.eu/>).

2. Dissemination Strategy

The dissemination strategy for the PANORAMA project ultimately seeks to ensure that the (non-confidential) results are efficiently communicated to the various target groups throughout its duration, and to ensure that the results remain open to the public and the stakeholders until after the project has finalized.

During the first 6 months of the project, the consortium partners defined the project identity and the project visibility, specifically how to reach the various target groups. The next phase involves engaging with these target audience groups. These will follow the various deliverables for the project, specifically those related to WP0, the go-to-market strategy, and WP2 Professional development, learning and education.

2.1. Objective

The objective of disseminating PANORAMA is to ensure that the project results have a lasting and permanent impact and are effectively disseminated to the various stakeholders. The results from PANORAMA are likely to have diverse audiences, such as researchers, industry, and policy-makers.

2.2. Logo

The PANORAMA project has a series of logos to be used to depict the global character of the project (Figure 1).



Figure 1: Alternate versions of the PANORAMA project logos

2.3. Target groups

The target groups are defined as the stakeholders, and other information recipients. The PANORAMA related aims of these target groups, in addition to how PANORAMA can fulfil these are given in Table 1.

Stakeholders:

- The EIT-Raw Materials (EIT-RM). The funders of the project. Communication with this stakeholder will ensure oversight of the project.
- The EU JRC, who host the Raw Materials Information System (RMIS): Communication with this stakeholder will describe how to best integrate the results into the RMIS.

Other information recipients:

- The science community. Academics and researchers interested in understanding better input-output models, data balancing routines/ harmonization efforts, and overall frameworks for showcasing the physical stock and flow dynamics of the global economy.
- Industry interested in understanding better global supply chains and the resilience of various markets dependent on different raw materials, including the effects of substitution. For more information on our approach to this target group, see Deliverable 0.1 Go-to-market strategy.
- The general public also has a vested interest in the project as a better understanding of the resilience of supply chains for various products, and to elucidate the environmental impacts of their consumption habits.
- Other consortia
- Policy-makers

Table 1: Target groups for PANORAMA project dissemination

Target group	Type	Target group goal	How PANORAMA contributes	Dissemination tools
EIT RM	Stakeholder	Develop the EU raw material sector	Update stock and flow datasets for various materials	Project deliverables
JRC	Stakeholder	Web-based knowledge of primary and	Deliver the data model and the datasets that can	Coordinated scientific and workshop

Target group	Type	Target group goal	How PANORAMA contributes	Dissemination tools
		secondary raw material resources	account for various raw materials and elements	events
Other (similar) consortia	Information recipient	Develop raw material stock and flow datasets	Coordinate to ensure that groups cooperate and join forces in updating/creating global stock-flow datasets	Journal articles, deliverables, direct exchange, website exposure
Scientific community	Information recipient	Further the development of science	Provide datasets for scientific scrutiny and interpretation	Journal articles, presentations at conferences
Policy-makers	Information recipient	Develop policy for the raw materials sector	Provide data to evaluate the resilience and sustainability of various raw materials as they flow through the global economy	Press releases, contact, workshop events
Industry	Information recipient	Develop a profitable, sustainable business	Provide data to evaluate supply chains involving various raw materials	Deliverables, coordinated scientific and workshop events
Public	Information recipient	Obtain more knowledge from scientists	Provide information	<u>Twitter</u>

3. Dissemination Tools/Activities

These tools aim to showcase the PANORAMA project results, to enhance their impact, and facilitate their integration within other projects, while diffusing key messages and findings throughout for industry and policy-makers.

The consortium will promote the project throughout the world (see Appendix 1) creating synergies with other associations. All the knowledge will contribute to EIT-RM objectives, and, in conjunction with the JRC, will continue to be updated after the end of the project, a key goal in the development of the project. The KPIs listed will allow the consortium to monitor the performance of Dissemination activities, in order to take corrective measures if needed. This Dissemination plan is a live document, subject to continuous update, following the progress of the project and its results.

3.1. Dissemination methods

Project website

A public website has been setup (<https://liacs.panorama.nl>). The website provides general information about the project and information about the publicly available deliverables, presentation, and posters, thus acting as a repository for the various results. It includes PANORAMA's calendar, including the various dissemination events and workshops, in addition to academic activities.

Twitter

A Twitter account has also been set up (@PanoramaProj). This will be used to disseminate information among followers regarding PANORAMA-related subjects, from both the consortium and the raw material community as a whole. These communications will always be informative, to the point, and keeping in mind the importance for the recipient. The goal is ultimately to best exchange information with professionals and researchers.

Press releases

The global movement of materials throughout the economy is a key interest to many parties throughout the world. PANORAMA will disseminate any academic work from the project relevant

to the non-academic parties via press releases coordinated together with the research support offices of the various partners.

Internal reports/Deliverables

Upon completion, all reports will be made available to the EIT-RM and posted on the project's website. Specific reports that are of interest to a target audience will be delivered specifically to that party.

Scientific articles

The academic nature of the research will result in various scientific publications acknowledging both the EIT-RM and the PANORAMA project. These will be published open access when possible and also be made available in the website. If no open-access option is possible with the specific journal, then the project will post a pre-print in accordance to the green open access policies of the journal.

Datasets

Beyond establishing a framework and a detailed procedure for generating physical stock flow systems, the project will also showcase the system for various elements and materials. These datasets will also be made available via the PANORAMA website.

4. Messages to be disseminated

A set of key messages will be developed specifically to inform and educate the general public on critical raw materials, in order to build knowledge that will allow engaging in a dialogue. These messages will focus on the main issues at stake, listed below:

- Raw materials, essential elements in today's industrial production, are crucial for the sustainable functioning of our economy.
- A shortage of rare earth elements, used in everything from electric car batteries to solar panels to wind turbines, will hamper the growth of renewable energy technologies.

- The increasing demand for raw materials has become a geopolitical issue as a great share of the worldwide production of critical raw materials is concentrated in a few countries, threatening to affect our economies if these countries cut back on exports.
- Although Europe's dependence on foreign imports of raw materials poses serious risks in terms of supply, price volatility and market distortions, many potential business opportunities have risen in recent years.
- Waste recycling can allow for a more sustainable use of valuable raw materials and may be one of the solutions to the environmental impacts of mining and to Europe's dependence on foreign resources.
- Europe must find substitutes and develop innovative, clean and sustainable technologies for the exploration extraction and processing of raw materials.
- The development of the specific messages above will be used to build the general awareness campaign.

5. Consortium

Leiden University, CML

The Institute of Environmental Sciences (CML) is an institute of the Faculty of Science of Leiden University, and part of the Leiden-Delft-Erasmus Centre for Sustainability (LDE CfS). CML focuses on the multidisciplinary field of environmental sciences. CML's Industrial Ecology department (CML-IE) deals with research in the area of Industrial Ecology. A core activity is the development of analytic tools such as LCA, MFA, SFA, EE-IOA and combining them into integrated tools such as hybrid LCA, IPAT LCA or more broadly LCSA. Such tools can be used for decision making on sustainable production and consumption and on further bringing society toward a circular economy. CML-IE has moreover expertise in the areas of resource scarcity / management, renewable energy technologies and agriculture.

TNO Netherlands Organisation for Applied Scientific Research

TNO was founded in 1932 by an act of the Dutch parliament to make scientific research accessible and applicable for businesses and government. TNO is a not for profit organisation which by law is required to operate in an independent and objective way. TNO's trademark is the application of rigorous scientific principles to a wide variety of disciplines.

Fraunhofer Institute for Systems and Innovation Research (ISI)

The Fraunhofer Institute for Systems and Innovation Research ISI is part of the Fraunhofer-Gesellschaft, the largest organisation for applied research in Europe. The work at the Competence Centre Sustainability and Infrastructure Systems analyses and encourages the transformation of whole systems towards environmental and societal compatibility, taking into account economic, political, ecological and social aspects. Some of the tools employed and developed include criticality assessments, dynamic material flow analysis, model-based quantitative scenarios of raw material demand especially regarding emerging technologies, and the combination of economic, environmental and physical flows/effects at the macro level, e.g. through (environmentally-extended) input-output modelling and life-cycle assessment.

Bureau de Recherches Géologiques et Minières

The BRGM teams from the GeoResource and IT Divisions involved in PANORAMA have a strong experience in European projects and covering all the value chain from data production and management, to data models conception, and to Knowledge Data Platforms development. BRGM is a main contributor of (i) the EU- project OneGeology-Europe to make available metadata and map services of the national geological maps to build on-line the geological map of Europe, (ii) the pan-European Geological Data Infrastructure (EGDI-Scope, EGDI), an action which will provide the backbone for serving interoperable, pan-European geological data currently held by Geological Surveys, and data from past (notably the flagship EU-FP7 ProMine project), ongoing and future European projects and (iii) the INspired GEOdata CLOUD Services project (InGeoClouds) which aims at demonstrating the feasibility of employing a cloud-based infrastructure coupled with the necessary services to provide seam-less access to geospatial public sector information, especially targeting the geological, geo-physical and other geoscientific information. Additional projects include the EU-FP7 Minerals4EU project (dealing notably with Critical Raw Materials (CRM) in Europe), the EURARE EU-FP7 project (REE in Europe), the H2020 ProSUM project (CRM and the urban mine), the H2020 MICA project (Mineral Resources Expert System), the H2020 SCRREEN project (CRM dedicated platform linked to an expert system) and the REFRAM (Refractory Metals) and IMP@CT (Low-impact Mining of Small High-grade Deposits) projects.

Geological Survey of Denmark and Greenland (GEUS)

GEUS serves an advisory role for the Danish and Greenlandic Governments including the ministries for Energy, Utilities and Climate, Environment, Foreign Affairs and Science, Technology

and Innovation. GEUS also operates in the private sector. GEUS is the national geological data centre by law and has worked intensively with the development and operation of databases and exchange-formats for geological and geophysical data and for data about mineral resources for more than 25 years. The institution runs nationwide databases for boreholes, geochemistry, geophysics, geological samples, digital reports, digital maps and geological models. GEUS has vast experience in setting up web services and web portals with interactive GIS functionality. GEUS furthermore hosts the mineral intelligence unit, Centre for Minerals and Materials (MiMa). MiMa investigates various aspects of mineral criticality related to the entire value chain from exploration to consumption, and is presently involved in projects related to identification and characterisation of secondary resources and to identify leakages in the circular economy flow.

GEUS has also participated in a number of EU-cofunded projects and is coordinating the implementation of the EuroGeoSurveys initiative for a European Geological Data Infrastructure (EGDI) including a leading role in the development of the first version of the EGDI-portal (www.europe-geology.eu). Finally GEUS has a central role in the contributed to the specification and implementation of INSPIRE on EU as well as national level. GEUS co-operates with numerous scientific institutions and networks, and other organizations including EuroGeoSurveys (EGS) and European Environmental Agency (EEA).

Ghent University

The ENVOC research group of Ghent University is a part of the Department of Sustainable Organic Chemistry and Technology (Faculty of Bioscience engineering of Ghent University), and focuses its research, educational and service activities on clean technology and environmental sustainability in the agro-food industry, fine chemicals and pharmaceuticals and the raw materials sector. Apart from methodological improvements such as in the FP7 project PROSUITE (Prospective Sustainability Assessment of Technologies) and the H2020 MEASURE project (SPIRE), implementations and bilateral collaborations with industrial partners have been put in practice. Also, activities in this field with Essenscia (federation of the Belgian chemical industry) have been set up, funded by the Flemish IWT/VLAIO and by EU-EFRD. ENVOC is also partner of the Flemish Policy Research Center on Sustainable Materials Management to give sustainability support to policy and was partner in the SPIRE project MEASURE to develop a roadmap for sustainability assessment methods for the European Commission and industry. Since 2015, Ghent University is very active in EIT RM.

United Nations University

The United Nations University (UNU) is an international community of scholars, engaged in research, postgraduate teaching and capacity development and dissemination of knowledge in furthering the purposes and principles of the Charter of the United Nations. UNU ViE-SCYCLE is an independent Programme hosted by UNU-Vice Rectorate in Europe in Bonn (Germany). SCYCLE envisions enabling societies to reduce the environmental load from production, use, and the disposal of ubiquitous goods, especially electrical and electronic equipment, to sustainable levels. SCYCLE leads the global e-waste discussion and advances sustainable e-waste management strategies based on life-cycle thinking.

University of Bordeaux

The University of Bordeaux (UBx) has developed a solid expertise in the development of joint curricula in the frame of European programmes, especially within the frame of Erasmus Mundus. UB is participating in 10 EM joint programmes at master and PhD levels (incl. 6 as a coordinator) and regularly takes part in networks to support the internationalization of studies through the exchange of good practices (EUA-CDE, JOIMAN and JOI.CON). Based at the UBx in the Institute of Molecular Sciences (ISM), the CyVi Group is an interdisciplinary group of scientists working on research methods and applications to sustainable chemistry and life-cycle approaches. The objectives of the group's research is to implement green and sustainable chemistry and engineering to advance the state of the science while providing services for key economic sectors in the region and beyond, such as aerospace and agri-food. The group expertise is brought together under one research setting to provide systems analysis to problems addressing environmental implications of technology, green chemistry, and sustainable manufacturing. Current projects involve a wide-array of stakeholders and specialties including nanotechnology, renewable energy, aerospace technology, metals recycling, and urban planning.

Appendix 1: List of attended meetings

Note these will be updated throughout the project.

Meeting Name	Year(s)	Month	Day	Location	Country
ISIE2019 conference	2019	July	7-11	Beijing	China
JRC 3rd RMIS Workshop	2019	June	11-12	Ispra	Italy
Raw Materials week	2019	November	18-22	Brussels	Belgium