



# TOWARDS IMPROVED GLOBAL RAW MATERIALS COOPERATION

Meeting Report FORAM18, Nancy,  
27 June 2018

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### Pilot Event Meeting Report

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## EXECUTIVE SUMMARY

The FORAM 18 Pilot Event, a key milestone of the Horizon 2020 project, towards a World Forum on Raw Materials (FORAM), was held on 27 June 2018 in Nancy. Since the start of the project in 2016, FORAM has set up a platform of international experts and stakeholders coming from different sectors of the raw materials value chain. The main objective of the project is to initiate a dialogue between these stakeholders on the challenges, needs and opportunities towards enhancing international cooperation on raw materials. The FORAM 18 Pilot Event was the second phase of the consultation process and aimed at bringing the stakeholders into face to face discussions.

During plenary sessions, panel discussions and three interactive working sessions on Knowledge Management, Policies and Strategies, and International Cooperation, the challenges, gaps as well as best approaches towards enhancing international cooperation on raw materials were presented and discussed.

On the topic of Knowledge Management, there was a consensus among the participants that “Data” is a solution towards increasing international cooperation. Creating accurate data, improving unified data presentation systems, sharing the data and standard reporting are the first steps to take. It was recommended that the European Union can set up an institute to take the responsibility of addressing all these issues.

In the area of Policies and Strategies and after presenting examples of good practices at EU level, it was concluded that the real challenge of politicians is not making the policy but enforcing it. Developing public awareness, acceptance and trust, capacity building of state administration, effective taxation and environmental funds were among the recommendations given to enforce policies. It was stressed that promoting, facilitating and monitoring transparency within the entire value chain of the raw materials is a necessity for the policy makers to consider.

Today, scarcity of raw materials is a global challenge and International Cooperation is a necessity to secure a sustainable supply. Even resource-rich countries need to remain committed to international cooperation agreements. Participants believed that the main barriers to international cooperation are mismatch priorities (of countries and stakeholders), challenge of data harmonization and ownership, fiscal regulatory uncertainties or inverse fiscal desires, lack of clear objectives, communication barriers and lack of knowledge.

This event aimed to evaluate the need for a World Forum on Raw Materials. There was a consensus among the participants that there is a need for an international platform to initiate a global dialogue and develop global raw materials governance. It was recommended that the extensive network of the FORAM project (in synergy with other relevant projects) can evolve into a platform for discussing global rules under standard protocols and outside UN events and negotiations.



FORAM

Furthermore, FORAM can be a platform to hold the data and knowledge together while leaving the ownership to others. For such a platform to succeed, it is important to define concrete objective and clear target groups.



## INTRODUCTION

The FORAM 18 Pilot Event was held on 27 June 2018, back to back with the World Materials Forum in Nancy, France. Representatives from governments, research institutes, geological surveys, businesses and other stakeholders coming from 26 countries were engaged into lively discussions on how to “Enhance International Cooperation on Raw Materials Policies” focusing on the need for a World Forum on Raw Materials.

This Pilot Event marked an important milestone of the EU-funded project Towards a World Forum on Raw Materials (FORAM) that has developed a platform of international experts and stakeholders that will together work to improve the international cooperation on raw material policies worldwide. FORAM Stakeholders Platform gathers extensive network of contacts representing major raw materials communities extending all over the world. As the first attempt to bring together the worldwide network of stakeholders and initiate the dialogue among them, a series of web-videoconferences were organized in February and May 2018. These online conferences were structured around five important issues in raw material sector today: 1. Innovation, Security of Supply and Growth, 2. Resource Efficiency, Environmental and Social Aspects, 3. Policies, Legal and Financial Frameworks, 4. International Cooperation and Outreach, 5. Research, Capacity building and Education. The outcomes of these videoconferences are summarized in Deliverable 2.2 of the FORAM project.

The FORAM 18 Pilot Event was the second phase of the consultation process and aimed at bringing the stakeholders into face to face discussions. During three interactive working sessions and a related panel discussion, the state-of-the art of available and missing data on primary and secondary raw materials, recommended policies and strategies as well as best approaches towards enhancing international cooperation on raw materials, were presented and discussed. Briefings and discussions about security of supply for the European economy, resource-efficiency, Circular Economy, and Sustainable Development Goals, were presented during plenary sessions in an open format.

High-level speakers were Member of European Parliament Gerben-Jan Gerbrandy, Jonas Hedberg (European Commission), Barbara Reck (Yale University), Peder Jensen (UN Environment, International Resource Panel), Stefan Bringezu (University of Kassel), Julian Hilton (UNECE SDG Working Group), Constantin Ciupagea (DG Growth), Slavko Solar (European Geological Survey), Vitor Correia (European Federation of Geologists), Federico Magalini (United Nations University), WMF Chairman Victoire de Margerie, Gregory Mulholland (Citrine Informatics), Mathias Schluep (World Resources Forum) and Jelena Vidovic (EuroGeoSurveys). The event was moderated by Bas de Leeuw, Managing Director World Resources Forum and Member of the Club of Rome.

The following report will present a summary of the main highlights of the event, including the challenges and opportunities debated during the plenary sessions and the outcomes of the working sessions.



Prouvé Congress Center, Nancy, France



Prouvé Congress Center – Arrival of participants



Arrival of participants





## PLENARY SESSION I – SETTING THE SCENE & SPECIAL KEYNOTE

**Chair:** Bas de Leeuw, Managing Director, World Resources Forum

**Speakers:**

- Jonas Hedberg (Senior Project Officer, European Commission's Executive Agency for Small and Medium-sized Enterprises, EASME)
- Gerben-Jan Gerbrandy (Member of European Parliament)
- Mathias Schluep (Program Director, World Resources Forum)
- Jelena Vidovic (Scientific Officer, EuroGeoSurveys)

### Presentation of the keynote speaker

Following the welcoming words given by **Bas de Leeuw**, the plenary session was started by **Jonas Hedberg** who presented the main objectives and strategies of the European Commission Horizon 2020 Work Programme. This funding scheme aims at achieving a sustainable raw materials supply in a circular economy. To achieve this objective, three main action areas, i.e. Technology, Non-Technology and International Cooperation have been introduced. By highlighting the work carried out by other projects (STRADE, INTRAW and MinFuture) active in the area of International Cooperation, Jonas Hedberg stated that FORAM project aims to advance the idea of a World Forum on Raw Materials by tackling the challenge in a global level. He presented the goals and the structure of the Framework Programme "Horizon Europe" which was recently proposed by the European Commission.

**Gerben-Jan Gerbrandy** started his keynote by focusing on the criticality of the current international challenges of unpredicted and fast political changes, overpopulation, overconsumption and the consequences of the climate change. By 2020, the middle class will become a majority of the global population for the first time ever. Efficiency improvements have not secured long-term resilience. Energy transition strategies require more and more variety of raw materials and many of these are among critical metals. It is essential to have an international coalition to harmonize the resources governance in a global level, said Gerbrandy.

To make his argument, he presented four strategies towards tackling the challenges: 1) increased and responsible mining, 2) resource efficiency, 3) developing alternatives and 4) resilient supply chains.

Gerbrandy noted that the increasing demand for raw materials will automatically lead to more mining and resource extraction. Therefore, it is necessary to develop new technologies for sustainable mining, develop long term strategies when investing in mining sector and promote responsible mining practices. He emphasized that "resource efficiency is so much more than waste policy. With the current consumption rates and practices, Europe loses 95% of energy and material

value”. By referencing to a study by McKenzie, he added that by moving towards Circular Economy, Europe can add 7% more to its GDP.

Giving the example of Tesla, he stressed that there is a need for developing alternatives as a way to overcome the dependency on critical materials. Talking about the importance of resilient supply chains, he mentioned that there is a lack of knowledge within the stakeholders in the raw materials value chain. This includes also the policy makers who need better information to design the appropriate policies. Europe needs to improve its data collection strategies in the field of raw materials.

Taking all these elements into consideration, Gerbrandy concluded that scarcity is an international problem therefore there is a need for a global governance of raw materials. International agreements such as the SDGs Paris Agreement should be translated to national plans. This can be done through international fora or organizations such as a World Forum on Raw Materials where representatives from all over the world can sit together and have an open dialogue about their needs and challenges. Consensus achieved in multistakeholder dialogue format is key, as he said, referring to the Dutch verb “poldering”.

Which steps has the FORAM project taken toward advancing the idea of a World Forum on Raw Materials? According to **Mathias Schluep**, coordinator of the project, the first step of the project was to identify, characterize and assess the existing EU and global actions and initiatives, databases as well as individual stakeholders. He invited the participants to check the results available on project’s website<sup>1</sup> and add more initiatives if they are aware of any other option<sup>2</sup>. As the next step, the project has established a Stakeholder Network, structured them into target groups and has started the dialogue between the stakeholders by first understanding their needs. By analyzing the global raw materials policy context, project partners have developed a strategic position for such a World Forum on Raw Materials and today in Nancy, they are testing its feasibility by organizing the FORAM 18 Pilot Event.

**Jelena Vidovic**, FORAM project partner and responsible for initiating the dialogue between the stakeholders, presented more details about the first step in the stakeholder engagement process. During a series of online videoconferences being previously organized (in February and May 2018), FORAM stakeholders were actively engaged into lively discussions around four main topics: Knowledge Management, Policies, Responsible Sourcing, and International Cooperation and Outreach. After presenting the outcomes of these discussions, she mentioned that the Pilot Event and more specifically three workshop sessions scheduled after this plenary session, will be the next

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<sup>1</sup> <http://www.foramproject.net/index.php/geo-map-and-results/>

<sup>2</sup> <http://www.foramproject.net/index.php/mapping-of-initiatives/>

phase in project's consultation process and participants are invited to actively contribute and add their insights to the main discussion topics on: Knowledge Management, Policies and Strategies, International Cooperation and Outreach.

In the Q&A session, the need for involvement of resource rich countries (e.g. China) and more stakeholders from the industry and production sector in the dialogue was mentioned. Participants were interested to know whether FORAM project or a potential World Forum on Raw Materials can be used for designing rules for better global cooperation.

### Highlights of the Q&A session - Plenary Session I

- There is a silent fight all over the world for access to raw materials. World population is increasing, by 2020, the middle class will become a majority of the global population for the first time ever. To have a fair and sustainable supply of raw materials, global cooperation for resource efficiency and a circular economy is needed.
- International cooperation is a need for all countries and is the only way forward. Even resource rich countries are forcing policies to secure their resources by joining international cooperation strategies.
- Even if resource efficiency practices are in place and are improving in some sectors of the raw materials value chain, the challenge is to encourage all sectors to practice resource efficiency strategies and be involved into the dialogue. Current lack of processing, production and industry representatives needs to be considered for a future network of stakeholders or a World Forum on Raw Materials.
- Achieving transparency in mining industry is an essential step towards having fair and sustainable access to raw materials. Learning from the good practices such as the National Instrument 43-101 of Canada used in mine reporting can pave the ground towards achieving transparency in a global level.
- The FORAM project identifies a pro-active international cooperation strategy by advancing the idea of a World Forum on Raw Materials. The project has potential to facilitate more dialogue, building upon the work of institutions such as UN and OECD.



Bas de Leeuw (WRFA)



Jelena Vidovic (EGS), Mathias Schluep (WRFA), Gerben-Jan Gerbrandy (EU Parliament), Jonas Hedberg (EC EASME)



Plenary Session I - Panel Discussion

## WORKSHOP SESSIONS

### Workshop 1 - Knowledge Management

**Chair:** Federico Magalini (Project Manager, United Nations University)

**Keynote speaker:** Barbara Reck (Senior Research Scientist, Yale University)

#### Introduction to the workshop topic and main questions

The main focus of this workshop was on the management of knowledge on both primary and secondary raw materials. As an introduction to the session, **Federico Magalini** stressed that the cycle of the knowledge management includes creation, curate, organization, sharing and utilization of the knowledge. To cover all essential parts of this cycle, the workshop involved the participants into the following discussion topics:

- Which knowledge gaps exist that hinder progress in improving global raw materials management?
  - What knowledge exist, in what format, what are the gaps, and priority topics?
- Which infrastructures are needed to centralize and share existing knowledge?
  - which platforms can be used or developed to share data?
  - how can we improve the effectiveness of relevant initiatives?
  - Which approaches can be taken to centralize and share materials (harmonization)?
- Which actions can you take to the address the knowledge gaps and create or improve the infrastructures to share and centralize data?

In order to start with the first topic, it is important to identify which knowledge exists. Federico Magalini presented the results of the mapping exercise done by the FORAM project and gave a brief overview of the current Horizon 2020 projects working in the area of raw materials (FORAM, MinFuture, SMART Ground, STRADE, MICA, INTRAW, MINATURA 2020, IMPACTPaperRec, ProSUM, SCREEN, MIN-GUIDE, VERAM and MSP-REFRAM) and presented the main actions that each of these projects are involved in. At a clustering workshop organized by the FORAM project during the World Resources Forum conference, October 2017 in Geneva, representatives of these projects had the opportunity to introduce their projects and seek synergies and areas for cooperation with other projects. Since that event, a new project, ORAMA<sup>3</sup>, is funded by the European Commission.

According to Pascal Leroy from WEEE Forum and partner of the ORAMA project, the main objective of this project is to develop a clear strategy for improving the quality of collected raw materials data and harmonise the data collected in accordance with the INSPIRE Directive. Furthermore, the

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<sup>3</sup> <https://orama-h2020.eu/>



project will ensure and extend the sharing of the RM data, information and best practices in data collection at national and EU level.

## Presentation of the Keynote Speaker

*“Knowledge Management & Raw Materials”, Barbara Reck*

**Barbara Reck** started her presentation by giving a general introduction to the life cycle of the raw materials and noted that to require knowledge on raw materials it is essential to understand their corresponding systems and to find the appropriate data related to all sectors of their value chain. By giving an example from nickel life cycle and processes involved, she stressed that the underlying detailed sub-processes in the life cycle of a metal are complex and differ from metal to metal.

She noted that a lot of data are needed to calculate simple recycling metrics and finding these data is difficult. Currently data is dispersed among many different stakeholders without a publicly accessible central repository. She then continued by giving the example of the Yale Stocks and Flows (STAF) project<sup>4</sup> as a successful effort towards developing an open material database on a global level. Since 2000, this project has collected and characterized the most comprehensive set of integrated material stocks and flows (62 metals and metalloids) which are often completed by selected country cycles. She informed the participants that all STAF data were recently integrated into the Yale STAF Database, using the newly developed UMIS data structure<sup>5</sup>. The Yale STAF Database has been transferred to the U.S. Geological Survey for public access and will be periodically updated together with USGS data. By organizing a US centered workshop in July 2018, the STAF stakeholders are planning to explore the general interest in an open and crowd-sourced materials database.



Federico Magalini and Susan van den Brink (UNU), Chairs of Workshop 1



Group discussion at Workshop 1

<sup>5</sup> Myers, Fishman, Reck, and Graedel. 2018. Unified Materials Information System (UMIS): An integrated material stocks and flows data structure. *Journal of Industrial Ecology*, 10.1111/jiec.12730.

## Workshop 2 – Policies and Strategies

**Chair:** Slavko Solar (Secretary General, EuroGeoSurveys)

**Keynote speaker:** Peder Jensen (Head of Secretariat of International Resource Panel, UN Environment)

### Introduction to the workshop topic and main questions

The main focus of this workshop was on the policies and strategies that need to be in place in order to enhance international cooperation on raw materials. As an introduction to the session, **Slavko Solar**, presented the main discussion topics of the workshop:

- How to formulate, adapt and implement strategies and policies, that would have as broad a consensus as possible, from global to local level, within and outside society, at the same time being concerned and compliant to other strategies and policies.
- Provide recommendations on important elements of minerals strategies and policies, as well as the roles of relevant stakeholders (governments, expert community, industry, academia, NGOs, local community, citizens).
- Strategies and policies in the context of potential World Forum on Raw Materials, outcome of FORAM project

After informing the participants about the outcomes of previously organized online consultations with the FORAM stakeholders, Slavko Solar presented some examples of good practices, reports, guidelines and projects from European Commission. He reported that, in the course of DG ENTR / GROW studies, the following activities were performed:

- **Exchange of Best Practices** - the Commission established an ad-hoc expert group on the exchange of best practices in land use planning and administrative conditions for exploration and extraction. The group submitted two reports:
  - the first Report in June 2011 –the Abridged report and Full report.
  - the second Report in November 2014.
- **Good Practice Report** - the report identifies good practices in the raw materials sector and evaluates their effectiveness. By sharing 25 concrete examples, the report assists other countries and regions in developing similar approaches.
- **Guidelines on Extraction** – at the EU level guidelines were developed to provide clarity on how to reconcile extractive activities in or near Natura 2000 areas with environmental protection.
- **National Minerals Policy Indicators** – the Commission proposed to develop indicators showing how the legislation impacts on the performance of the extractive sector. The Report on policy indicators was delivered by the ad-hoc expert group in 2014:
  - Report on National Minerals Policy Indicators.

Furthermore, he gave examples from H2020 projects which were defined based on the three priority areas of EIP's Strategic Implementation Plan (SIP) (MINATURA2020, MIN-GUIDE, MINLAND, MIREU).

The participants of the workshop were then invited to work in group and deal with the following questions:

- Is there an existing mineral policy cycle support structure?
- How to shape less resource conflict futures with better strategies and policies in short-, mid- or long-term perspective? Which actions would support that?
- Are there examples of good practices? What are the elements, factors and conditions of a good policy or strategy?

### Presentation of the keynote speaker

*"Towards a Sustainable Development License to Operate in Resource Extraction", Peder Jensen*

**Peder Jensen** started his presentation by posing the question: How can we protect the environment, reduce poverty and maintain economic growth? He then continued with giving a general introduction of the International Resource Panel (IRP) and its work. The International Resource Panel has helped to promote the idea of decoupling economic growth from resource use and environmental degradation, and this is central to its mission. The notion of "decoupling" is premised on the idea that countries can continue to experience economic growth, while at the same time reducing the actual quantity of resources extracted and used (resource decoupling), as well as the associated environmental impacts from extraction and use (impact decoupling).

Peder Jensen informed the participants about the ongoing report that IRP is developing: "Mineral Resource Governance in the 21 Century: Gearing industries towards sustainable development". The main objective of this report is to improve understanding of how the extractive sector can help achieve the transition towards sustainable development, the governance architecture that will facilitate the transition, and the incentives package that will make it a reality. The scope of the report is global, but it will also feature illustrative case studies from all world regions (including the Polar regions).

According to Jensen, the need for such a new governance document is mainly because of a global increase in demand for metals and minerals, despite progress towards a circular economy, and furthermore because of the importance of the extractive industry in achieving the 17 SDGs (referring to the report on "Mapping Mining to the Sustainable Development Goals: A Preliminary



Atlas, 2015<sup>6</sup>). The new governance framework is needed to cover the limitations and the shortcomings of the “Social License to Operate” and reformulate and design it into “Sustainable Development License to Operate”. SDLO includes multiple actors and encompasses principles, policy options and best practices to enhance the contribution of mining towards achieving SDGs. Jensen informed the participants that the report is planned to be published by the end of 2018.



Slavko Solar (EGS) and Peder Jensen (UN IRP), Chair and Keynote Speaker at Workshop 2



Group discussion at Workshop 2



Group discussions at Workshop 2

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<sup>6</sup> White Paper on “Mapping Mining to the Sustainable Development Goals: An Atlas”, July 2016, by UNSDSN, CCSI, UNDP and WEF and with the support of GiZ. Available online: [http://unsdsn.org/wp-content/uploads/2016/11/Mapping\\_Mining\\_SDGs\\_An\\_Atlas.pdf](http://unsdsn.org/wp-content/uploads/2016/11/Mapping_Mining_SDGs_An_Atlas.pdf)

## Workshop 3 – International Cooperation (Mineral Raw Materials Sourcing - From Competition to Cooperation)

**Chair:** Vitor Correia (President, European Federation of Geologists)

**Keynote speaker:** Julian Hilton (Chair, UNECE Working Group on Delivery of UN Sustainable Development Goals)

### Introduction to the workshop topic and main questions

This workshop aimed to discuss how to advance international cooperation in the raw materials domain, said **Vitor Correia**. With increasing global consumption of raw materials in response to new technologies, international cooperation and free trade of raw materials are paramount to tackle the expectations of a growing world population.

As an introduction to the topic, the example of the International Reporting Template on Exploration Results, Mineral Resources and Mineral Reserves developed by CRIRSCO (Committee for Mineral Reserves International Reporting Standards) was mentioned. Recognizing the global nature of the mineral industry, the international consensus should not be limited to the reporting standards and must be applied to all aspects of the raw materials policies. This is even more important at times where free-trade seems to be weakening, nationalism is rising, and population growth and climate change are posing new challenges to society.

During this workshop the participants dealt with the following questions:

- What are the main barriers to international cooperation?
- How can these barriers be overcome? Which initiatives? Which structures to implement initiatives.

### Presentation of the keynote speaker

According to **Julian Hilton**, the three main agenda points towards achieving circular economy and delivering the Sustainable Development Goals are: Data (Evidence), Dialogue (Consultation) and Regulation (Policy).

For a transparent access to Data, it is essential to have a platform to share the information, to foster data harmonization, perform a coordinating mechanism between different data sources and to establish a working group with the main task to develop a data format for reporting raw materials extraction and provisions. International organizations and initiatives such as UNFC, WRF and FORAM can be considered as key players in implementing this process. He believes that for an efficient Dialogue, it is essential to promote interaction between different disciplines and sectors and improve the dialogue between science and society. Furthermore, constructive Regulations will lead to diminish or eliminate the barriers between waste and materials and stimulate the transition

to circular economy. International cooperation is needed to bring all these agenda points into action.

He then continued with introducing the United Nations Economic Commission for Europe (UNECE) and focused on the main objectives and features of the United Nations Framework Classification (UNFC) toolkit and the core tasks of the SDG Delivery Working Group (SDG DWG).



Group discussions at Workshop 3



Group discussions at Workshop 3

## PLENARY SESSION II – DISCUSSION ON WORKSHOP OUTCOMES

**Chair:** Bas de Leeuw, Managing Director, World Resources Forum

**Keynote Speaker:** Stefan Bringezu, Director Sustainable Resource Futures Group, Center for Environmental Systems Research, Kassel University

**Panelists:** Stefan Bringezu, Federico Magalini, Barbara Reck, Slavko Solar, Peder Jensen, Vitor Correia, Julian Hilton

### Presentation of the keynote speaker

*“Towards Sustainable Mineral Resource Use: Key challenges and options to improve the information base”, Stefan Bringezu*

**Stefan Bringezu** started his keynote by focusing on the importance of studying mineral resources; their positive role in shaping our life and their negative impact on environment and landscapes. Based on his predictions (IRP report, 2017<sup>7</sup>), global extraction and use of resources (among them 75% minerals) will be doubled from 2017 to 2050. Increasing extraction has had an inevitable recoupling effect on global GDP since 2003. On the other hand, increasing “unused” extraction of resources has led to more waste, more water distraction and more landscape change, hence negative impact on environment. By citing a study by Murguia et al. 2016, he added that most of the mining practices hit higher biodiversity areas. Taking all these elements into consideration, there is an urgent need for standard protocol for mining/querying operations and planning.

Bringezu continued with focusing on the high potential of secondary metals and urban mining and noted that the mass metal recycling contributes increasingly to the global supply of raw materials. Regions which are closer to saturation of infrastructure stock are getting more independent from primary mining. The challenge is that recycled input rates are still poor for new technology metals and the main reasons are that the stocks of products are steeply growing and End of Life (EoL) recycling rates are poor. Material flow management requires data. Although first studies on anthropogenic stocks are available, more research is required. More specifically, geo-services and mapping needs to be complemented with urban mine information systems.

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<sup>7</sup> IRP (2017). Assessing global resource use: A systems approach to resource efficiency and pollution reduction. Bringezu, S., Ramaswami, A., Schandl, H., O’Brien, M., Pelton, R., Acquatella, J., Ayuk, E., Chiu, A., Flanegin, R., Fry, J., Giljum, S., Hashimoto, S., Hellweg, S., Hosking, K., Hu, Y., Lenzen, M., Lieber, M., Lutter, S., Miatto, A., Singh Nagpure, A., Obersteiner, M., van Oers, L., Pfister, S., Pichler, P., Russell, A., Spini, L., Tanikawa, H., van der Voet, E., Weisz, H., West, J., Wijkman, A., Zhu, B., Zivy, R. A Report of the International Resource Panel. United Nations Environment Programme. Nairobi, Kenya. Available online: [http://www.resourcepanel.org/sites/default/files/documents/document/media/assessing\\_global\\_resource\\_use\\_amended\\_130318.pdf](http://www.resourcepanel.org/sites/default/files/documents/document/media/assessing_global_resource_use_amended_130318.pdf)



## Presentation and discussion on the outcomes of the workshops

### Results and highlights of workshop 1 – Knowledge Management

**Federico Magalini** summarized the main outcomes of the workshop on Knowledge Management:

*Where are the knowledge gaps?*

- Important to identify who the user is of the knowledge and for what purpose is the knowledge needed
- Acceptance that company data is confidential and cannot be made accessible
- Examples of knowledge gaps are: -) data on product level, -) data on alloy level and –) data on the content of scrap

*Which knowledge format is required?*

- It is essential to use the same criteria for primary and secondary raw materials
- For the existing databases, there is a need for information on the quality and the last update of the data

*What is the priority area for knowledge management?*

- Gathering and harmonization of data

*Sharing and Centralizing Data*

- There is a need for databases that can be accessed and used by everyone (having the same format)
- Need for long-term sustainability of project results. The current challenge is that, once funding and therefore the project is over, data is stuck with the original owner
- Need for clarity on the customers of the projects

*Recommended action points*

- European Union to set up institute that will take responsibility for sharing all the data that is collected
  - Example: Minerals for EU foundation
  - Budget should be allocated
- This data should be taken to the global level

### Results and highlights of workshop 2 – Policies and Strategies

Decoupling, 17 SDGs, Sustainable Development License to Operate (SDLO), System Perspective and Transparency were among the buzz words used at this workshop session, mentioned **Slavko Solar**. He then continued with summarizing the comments and responses to the questions discussed during this session:

*Is there an existing mineral policy cycle support structure? / horizontal and vertical integration*

- Transparency reporting is essential within the whole value chain
- Important role of fortifying institutions
- Diversity of examples of integration
- Multi-dimensional policy making in EU

*How to shape less resource conflict futures with better strategies and policies? Which actions would support that? / balance between process (SLO > SDLO) and outcomes (policy, strategy)*

- Engaging people
- Developing Public Awareness, Acceptance and Trust (PAAT)
- More control (before and after)
- SDG global commitment

*Are there examples of good practices?*

- Capacity building of state administration
- Effective taxation
- Environmental fund
- Ownership of locals/regions
- Examples from France (COMES: Critical metals value chain policy), Japan (knowledge base society / resource poor country) and Netherlands (Circular Economy policy)

As concluding words, Slavko Solar noted that there was a consensus among the participants in his workshop that there is a need for a global dialogue platform to achieve global raw materials governance. For each stakeholder, there will be a business case with win-win situation if there is level playing field.

## Results and highlights of workshop 3 – International Cooperation

**Vitor Correia** summarized the main outcomes of the workshop on International Cooperation:

*What are the main barriers to international cooperation?*

- Communication/language barriers
- Mismatch in priorities
- Challenge of data harmonization and data ownership
- Fiscal regulatory uncertainties/inverse financial desires
- Lack of objectives
- Lack (access) to knowledge

*How can these barriers be overcome?*

- Training/Education/Exchange of best practices
- Setting standards

- Improving unified data presentation systems
- Improve transparency
- Finding a common communication strategy
- Clear definition of needs of different sectors of the value chain
- Provide mutual benefits/Develop win-win situation

## Highlights of the Q&A session - Plenary Session II

- The main challenge towards enhancing international cooperation is to involve all sectors of raw materials into a dialogue and try to find a common language and solution. Level playing field is essential, all stakeholders should follow the same rules.
- Policy making is not the real challenge but the lack of enforcement.
- Although transparency in mining sector is a necessity, monitoring transparency is even more important.
- “Data” is seen as a solution towards increasing international cooperation. Creating accurate data, improving unified data presentation systems, sharing the data and standard reporting are the first steps to take. Example of implanting block-chain technologies was mentioned.
- For a potential World Forum on Raw Materials to succeed, it is crucial to define specific goals, objectives or even a “product”.
- Sustainability of projects such as FORAM and creating synergies between their results is a necessity that the European Commission needs to consider.



Stefan Bringezu (Uni. Kassel)

Plenary Session II – Panel Discussion



Vitor Correia (EFG), Julian Hilton (UNECE SDG Working Group), Peder Jensen (UN IRP), Slavko Solar (EGS), Barbara Reck (Yale University), Federico Magalini (UNU)



## PLENARY SESSION III – CONCLUDING REMARKS

**Chair:** Bas de Leeuw, Managing Director, World Resources Forum

**Keynote Speakers:**

Constantin Ciupagea, Head of Unit Land Resources, DG Joint Research Center (JRC), European Commission

Victoire de Margerie, Chairman, World Materials Forum

Gregory Mulholland, CEO, Citrine Informatics

**Concluding Words:** Mathias Schluep, Program Director, World Resources Forum

### Presentation of the keynote speakers

As an introduction to his speech, **Constantin Ciupagea** gave an overview of the policies and strategies that European Union is implementing to ensure the sustainable supply of raw materials to the European economy. The Commission will, within the framework of the EU Raw Materials Strategy, identify bottlenecks and supply risks linked to the materials that are necessary for the development of key capabilities. Under the Strategic Implementation Plan of the European Innovation Partnership on Raw Materials (EIP-RM) priority areas and action plans have been identified.

He then presented the areas in which the Joint Research Center (JRC) supports the EIP-RM objectives and the Circular Economy Action Plan. Raw Materials Information System<sup>8</sup> (RMIS) is a knowledge platform managed by JRC with the main objective to integrate and develop data/information intended to support directly new EU policies, commitments and actions. Different features and selected sections of this online tool were briefly presented. Among others, the section on Raw Materials Knowledge Gateway (RMKG) aims to link the data provided in national level, European level and global level by various institutions, data services, industry associations and EU-funded projects into one single platform. As a consequence, this tool will also contribute to more networking and enhanced international cooperation on raw materials.

**Victoire de Margerie** started her speech with introducing the main goals, objectives, target groups, approach and achievements of the World Materials Forum. She stressed in her closing words that the FORAM and the World Materials Forum have a complementary approach towards offering tangible solutions in using materials Smarter, Less and Longer. By implementing this concept and support of WMF several new business ideas have been developed.

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<sup>8</sup> <http://rmis.jrc.ec.europa.eu/>



The presentation given by **Gregory Mulholland**, the CEO of Citrine Informatics on “Artificial Intelligence for Accelerated Materials Discovery” was an example of Smarter, Less and Longer use of materials. According to Mulholland, by creating new aluminium alloys with higher mechanical strength for 3D printing, they have been able to reduce the buy-to-fly ratio of metals by 50-80% and therefore enable lighter weight products. These alloys can be used in many other materials domains.

FORAM project coordinator, **Mathias Schluep** wrapped up and presented the main outcomes and conclusions derived from the interactive discussions at the event:

- European Commission is continuously committing to pro-active international cooperation strategy in the field of raw materials by convincing the politicians
- The world looks different today than 10 years ago and international cooperation is even more important. Even a resource-rich country needs to remain committed to international cooperation agreements because scarcity of raw materials is a global challenge and we all depend on each other.
- FORAM network could evolve into a platform for discussing global rules under standard protocols,
- FORAM can be a platform for discussing level playing field outside UN events and negotiation process,
- Furthermore, FORAM can be a platform to hold the data and knowledge together while leaving ownership to others,
- Objectives of a FORAM platform can be defined depending on where the process will be starting.

He added that in the next phase, the project consortium will analyse the inputs received during the pilot event and present a roadmap and key recommendations for a structured approach by October 2018.

The closing words were given by **Bas de Leeuw** who thanked the participants for their active participation and valuable contribution to the FORAM 18 Pilot Event.



Greg Mulholland (Citrine Informatics), Victoire de Margerie (WMF), Constantin Ciupagea (DG Grow), Mathias Schluep (WRFA) – Plenary Session III



Mathias Schluep (WRFA) – Plenary Session III



FORAM

## PARTICIPANTS SURVEY

In order to evaluate the general impression of the participants about the organization of the event and know about their expectations and prospects for the future, a survey was conducted after the event in the first of July 2018. The responses were positive and overall satisfaction rate of the event and the workshops was high. Furthermore, this survey was a way to receive more suggestions on how to increase the international cooperation on raw materials policies.

## APPENDICES

### APPENDIX A – EVENT PROGRAM

### APPENDIX B – LIST OF PARTICIPANTS



## APPENDIX A – EVENT PROGRAM



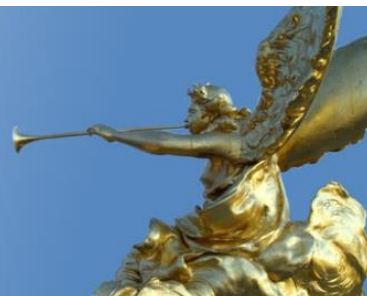
### FORAM 18 Pilot Event in Nancy, France

27 June 2018

organised back-to-back with the World Materials Forum



This project is funded  
by the European Union  
Grant Agreement No 730127



## INFORMATION PACKAGE

### FORAM 18 Pilot Event

27 June 2018, Nancy, France

## INTRODUCTION

### FORAM 18 Pilot Event: Important Milestone of the FORAM Project

The project **Towards a World Forum on Raw Materials (FORAM)** is a Horizon 2020 project funded by the European Commission. The main objective of FORAM is to develop a platform of international experts and stakeholders that will together help to improve international cooperation on raw materials and investments worldwide. By closely working with the relevant stakeholders in industry, European and international organisations, governments, academia and civil society the project is contributing to consolidate the efforts towards a more joint and coherent approach towards raw materials policies. FORAM in particular seeks to engage the international stakeholders coming from different sectors of the value chain of the raw materials into a dialogue, so that experiences will be shared and understanding of all aspects of raw materials will be increased. FORAM is led by World Resources Forum Association and coordinated by 11 other international organizations. Please visit FORAM project's website more details (<http://www.foramproject.net/>).

To achieve this goal, the project has reviewed and mapped the activities of existing national and international initiatives, programmes and policy documents (To see the results of mapping, please visit: <http://www.foramproject.net/index.php/geo-map-and-results/>). In parallel, the project has set up a Stakeholder Network composed of more than 170 experts from relevant organizations, coming from G20 and other countries active in the non-energy abiotic raw materials sector.

After more than a year of desk research and online web dialogue sessions with hundreds of stakeholders from around the world the **FORAM 18 Pilot Event** will be the next step in our stakeholder consultation process. Its main purpose is to deepen the insights from the dialogue by means of face-to-face discussions and present and discuss the state-of-the-art of available and missing data on primary and secondary raw materials, and recommended policies and business strategies. The event will include briefings and discussions about security of supply, innovation, growth, resource-efficiency, Circular Economy, and Sustainable Development Goals, in an open interactive format.

The Pilot Event's programme will incorporate lively plenary sessions, panel discussions and engaging working sessions. In these sessions, we will focus on three clusters of issues:

- Knowledge Management - What knowledge exists, in what format and what are the gaps? (WHAT: SCIENCE)
- Policies and Strategies – Is there sufficient political attention? Has the business case been made? (WHO – SOCIETY)
- International Cooperation– What organizational format would result in a more efficient international cooperation? (HOW – ROADMAP)

**DRAFT AGENDA**  
**FORAM 18 Pilot Event**  
 Date: Wednesday 27 June 2018,  
 Location: Prouvé Congress Center, Nancy, France

8.00 – 9.00	Registration
9.00 – 10.30	<b>Plenary Session - Setting the Scene</b> (Auditorium 300) <b>Opening</b> 9.00 – 9.10 Bas de Leeuw (Managing Director, World Resources Forum) 9.10 – 9.20 Jonas Hedberg (Senior Project Adviser, European Commission EASME) <b>Keynote external speaker</b> 9.20 – 9.45 Gerben-Jan Gerbrandy (Member of European Parliament) <b>Introducing the FORAM Project</b> 9.45 – 10.00 Mathias Schluep (Programme Director, World Resources Forum) <b>Introducing Workshop Topics</b> 10.00 – 10.15 Outcomes of Stakeholder Videoconferences: Jelena Vidovic (Scientific Officer, EuroGeoSurveys) 10.15 – 10.30 Interactive session to receive comments and inputs from the participants
10.30 – 11.00	Coffee Break (Foyer 300)
11.00 – 13.00	<b>Workshops WS 1, WS 2, WS 3 (Parallel Sessions)</b> <b>WS1: Knowledge Management (WHAT: SCIENCE)</b> (Room 103) Chair: Federico Magalini (Project Manager, United Nations University) Keynote speaker: Barbara Reck (Senior Research Scientist, Yale University) <b>WS2: Policies and Strategies (WHY: SOCIETY)</b> (Room 104) Chair: Slavko Solar (Secretary General, EuroGeoSurveys) Keynote speaker: Peder Jensen (Head of the Secretariat of IRP, UN Environment) <b>WS3: International Cooperation - Mineral Raw Materials Sourcing: from Competition to Cooperation (HOW: ROADMAP)</b> Chair: Vitor Correia (President, European Federation of Geologists) (Room 105) Keynote speaker: Julian Hilton (Chair, UNECE/EGRC Sustainable Development Goals Delivery)



**FORAM**

	Working Group)
13:00 – 14.00	Lunch (Foyer 300)
14.00 – 16.00	<b>Plenary Session: Outcomes of the Workshops</b> (Auditorium 300)
	<b>Keynote Speaker</b>
14.00 – 14.15	Stefan Bringezu (Professor and Director at Center for Environmental Systems Research Sustainable Resource Futures Group, University of Kassel)
	<b>Panel Discussion with Workshop Chairs &amp; Speakers</b>
14.15 – 16.00	Open Discussion with the Audience
16.00 – 16.30	Coffee Break (Foyer 300)
16.30 – 17.30	<b>Closing Session</b> (Auditorium 300)
	<b>Concluding Remarks</b>
16.30 – 16.45	Constantin Ciupagea (Directorate General Joint Research Centre, European Commission)
	<b>Closing Words</b>
16.50 – 17.00	Victoire de Margerie (Vice Chairman, World Materials Forum)
17.00 – 17.10	Greg Mulholland (CEO, Citrine Informatics)
17.10 – 17.30	<b>Summary and Next Steps</b>
17.30 – 18.30	Aperitif (Foyer 300)

For program updates, please visit:

<http://www.foramproject.net/index.php/pilot-event/agenda/>

To know more about our speakers please visit:

<http://www.foramproject.net/index.php/pilot-event/speakers/>



## DESCRIPTION OF THE WORKSHOPS

### WS 1: Knowledge Management (WHAT: SCIENCE), Room 103

**Chair:** Federico Magalini (Project Manager, United Nations University)

**Keynote speaker:** Barbara Reck, Senior Research Scientist, Yale University

#### Description and objective of the workshop:

This workshop focuses on knowledge management, in other words: what knowledge exist, in what format, what are the gaps, and priority topics; those might include data on primary versus secondary raw materials, analysis of flows, prices and stocks for commodities, technological as well socio-economic aspects. Generated knowledge on raw materials is important for research, education and capacity building: a growing number of stakeholders globally (academia, NGOs, industries, IOs) gather data on raw materials. To be able to share this data, efficient infrastructures are needed. The workshop will be the occasion to discuss which platforms can be used or developed to share data.

At the same time, in the field of education and capacity building there are different approaches to centralize and share materials; those include curricula for students and online education programs, such as massive open online courses (MOOCs), but also dedicated material and trainings for practitioners like face-to-face or online trainings.

During the workshop and within the overall context of the FORAM project, we will discuss and identify major knowledge gaps that hinder progress in improving global raw materials management; we will discuss how to improve the effectiveness of relevant initiatives; and we will finally define a roadmap to engage worldwide network of stakeholders to manage knowledge management in an efficient and effective way.

### WS 2: Policies and Strategies (WHY: SOCIETY), Room 104

**Chair:** Slavko Solar (Secretary General, EuroGeoSurveys)

**Keynote speaker:** Peder Jensen (Head of the Secretariat of IRP, UN Environment)

#### Description and objective of the workshop:

Every country, region and smaller administrative unit need strategies and policies to balance supply and demand of raw materials in manner acceptable to society – a sustainable manner. These strategies and policies define how the sourcing of raw materials (primary and secondary raw materials) take place; how the full cost of their production and processing is accounted for; as well as other elements of the value chain (product design, manufacturing, use of product, collection, reuse, recycling, etc.).



Strategies and policies must be in line with the broader societal goals laid down in strategies at all levels, be that policies such as industrial policy, environmental protection, social well-being, etc. but also broad frameworks such as the Sustainable Development Goals. For setting strategies and policies, process and outcome are of equal importance. Process is a social interaction, stakeholder consultation with transparent sharing of related data and knowledge, with known and respected roles and timelines. Outcomes are strategies or policies that should be implementable in a way to increase social well-being. Good strategies and policies would be easy to monitor, review and adapt if needed.

The workshop objective is to place policies and strategies in overall context of the FORAM project by creating a few important recommendations to main EU stakeholders, with the special focus on: (a) strategies / policies horizontal and vertical integration, (b) balance between process (including social license to mine) and outcomes (implementable minerals strategies and policies), and (c) examples of good practice.

### **WS 3: International Cooperation (HOW: ROADMAP), Room 105**

**Chair:** Vitor Correia (President, European Federation of Geologists)

**Keynote speaker:** Julian Hilton (Chair, UNECE/EGRC, SDG Delivery Working Group)

#### **Description and objective of the workshop:**

No country has all raw materials it needs. This explains why the trade of mineral resources has been with humankind since our ancestors started developing tools. There is evidence of the exchange of obsidian and flint during the Stone Age. Later, gold, silver, precious stones, copper, tin, iron ore and many other elements were traded in all major civilisations, including Mesopotamia, Greece, Egypt, China, India and the Roman Empire. And in modern times coal became the fuel of the industrial revolution, and the trade of coal (and later oil and natural gas) and iron had a massive impact on transport infrastructures (ports, canals and railways), facilitating the movement of goods, people and ideas.

Technology has enlarged the range of raw materials used in industrial applications. Nowadays, the list of raw materials used in industry encompasses a more significant share of the elements in the periodic table, and undoubtedly, international cooperation and free trade of raw materials are paramount to tackle the expectations of a growing world population.

This workshop aims to discuss how to advance international cooperation in the raw materials domain, at times where free-trade seems to be weakening, nationalism is rising, and population growth and climate change are posing new challenges to society.

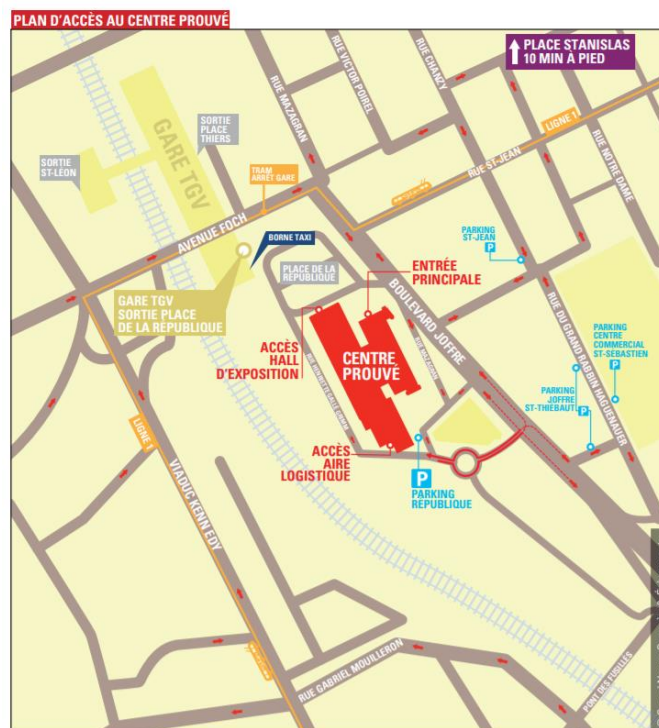
For updates and to know more about workshop chairs and speakers please visit:

<http://www.foramproject.net/index.php/pilot-event/agenda/>

## LOCATION OF THE VENUE

### Prouvé Congress Centre

Centre de congrès Prouvé 1 Place de la République  
54063 Nancy Cedex, France



[Prouvé Congress Centre](#) is located right in the city centre, just 1 minute walk from Nancy (TGV) train station and the public transport hub. It is easily accessible by all modes of transport and has 455 parking spaces for those who prefer to travel by their cars.

#### Nancy Train Station:

3, Place Thiers

Tel: +33 836 353 535 (daily from 7am to 10pm)

SNCF website: [www.sncf.com](http://www.sncf.com)

#### Taxi in Nancy:

Phone: +33 (0)3 83 37 65 37

Web: [www.taxis-nancy.com](http://www.taxis-nancy.com)

More maps and details about the location of the venue can be found on: <https://www.grandnancy-congresetevenements.com/venir-au-centre-prouve.html>.

## HOW TO GET TO NANCY

### By Plane

- 30 minutes to the Metz-Nancy-Lorraine regional airport by car or shuttle from the Nancy train station
- 1 hr 15 min to the Luxembourg International Airport from Nancy by car
- 10 minutes to the Greater Nancy Tomblaine Aeropole from Nancy by car

### By Train

- 1 hr 30 min from Paris
- 1 hr 15 min from Strasbourg
- 1 hr 30 min from Luxembourg
- 2 hr 30 min from Dijon
- 4 hr from Lyon

### By Bus

- 5 hr 40min from Paris – Roissy CDG Airport
- 2 hr from Strasbourg
- 2 hr 40 min from Luxembourg
- 2 hr 50 min from Dijon
- 5 hr 20 min from Lyon Perrache Bus station

### By Car

- Via the A4 from Paris, Strasbourg, Berlin
- Via the A31 from Brussels, Luxembourg, Dijon, Lyon, Marseilles

Kindly be aware that there is a possibility of interruption of rail traffic in France. A so called alternating strike is going on, which includes the dates June 27 and 28, as can be seen on the following website <https://ch.oui.sncf/en/train/strike>. In case your travel is affected by the strike, please consider choosing train lines that are not affected by the strike or even other means of transport (e.g. interregional buses). Furthermore, we advise you to contact the airline or the travel agency that issued your ticket and try to rebook it at your earliest convenience.

## MORE INFORMATION & CONTACTS

### Dress Code

Participants are recommended to wear comfortable business casual clothes.

### Internet Connection

Wireless internet connection will be available at [Prouvé Congress Centre](#) free of charge.

### Electrical Appliances

The standard voltage in France is 230 Volts. Please bring any adapters if required.

### Visit Nancy

If interested to visit the city of Nancy, you will find useful information here:

<https://www.youtube.com/watch?v=jLafM5r8UI4>

### Weather

You can use this link to check the weather in Nancy: <http://www.meteofrance.com/previsions-meteo-france/nancy/54000>

For **updates about the FORAM 18 Pilot Event** program, registration and the logistics, please visit: <http://www.foramproject.net/index.php/pilot-event/>

For more information about the **FORAM project**, please visit: <http://www.foramproject.net/>

### For further questions please contact us:

Ms. Shahrzad Manoochchri, [Shahrzad.manoochchri@wrforum.org](mailto:Shahrzad.manoochchri@wrforum.org), Phone: +41 71 554 0903

Ms. Jelena Vidovic, [jelena.vidovic@eurogeosurveys.org](mailto:jelena.vidovic@eurogeosurveys.org), Phone: +32 2 888 75 53



## APPENDIX B – LIST OF PARTICIPANTS

Last Name	First Name	Affiliation
Bangyikhan	Kittiphan	Department of Primary Industries and Mines Ministry of Industry
Bideau	Charles	World Materials Forum
Bookhagen	Britta	Geological Survey of Germany
Brady	Aoife	Irish Center for Research in Applied Geosciences (iCRAG)
Bringezu	Stefan	Universität Kassel / University Kassel, Center for Environmental Systems Research
Brink, van den	Susan	United Nations University
Cabello	José	Geological Society of Chile, Mineralium company
Carolino	Alexandra	Pegmatítica-sociedade Mineira De Pegmatites Lda
Christmann	Patrice	Independent Expert
Ciupagea	Constantin	European Commission - DG Joint Research Centre
Correia	Vítor	Fédération Européenne des Géologues / European Federation of Geologists
Cseko	Adrienn	La Palma Research Centre for Future Studies sl
Delgado	Pedro	Instituto Geológico y Minero de Espana/Geological Survey of Spain
De Margerie	Victoire	World Materials Forum





Last Name	First Name	Affiliation
Diego Gomez Olmos	Angel	Mexico - Ministry of Economy
Dils	Evelien	VITO
Falck	Eberhard	International Raw Materials Observatory (INTRAW)
Gabriel Siteo	Jacinto	Mozambique
Gerbrandy	Gerben-Jan	Member of European Parliament
Gizdavec	Nikola	Hrvatski Geoloski Institut (Croatian Geological Survey)
Grados Gomez	Karlo A.	Peru Bio-Economy Solutions
Grasser	Lisa	Mineral Resources at Ministère des Affaires étrangères français
Greco	Roberto	Universidade Estadual de Campinas
Hamadová	Blazena	Agency for International Mineral Policy, MinPol GmbH
Hanghoj	Karen	European Institute of Innovation & Technology / KIC Raw Materials
Havryliuk	Ruslan	Institute of Geological Sciences of the NAS of Ukraine
Hedberg	Jonas	European Commission, Executive Agency for Small and Medium-sized Enterprises (EASME)
Held	Martin	Federation of German Scientists
Hilton	Julian	UNECE/EGRC SDG Delivery Working Group





Last Name	First Name	Affiliation
Hool	Alessandra	Entwicklungsfonds Seltene Metalle, MatSearch Consulting Hofmann
Jensen	Peder	UN Environment - International Resource Panel
Keane	Christopher	American Geosciences Institute
Kennedy	Jim	ThREE Consulting, Thorium & Rare Earth Elements, Mining Minerals and Metals (ThREEM3)
Koukouzas	Nikolaos	Centre for Research and Technology Hellas Chemical Process and Energy Resources Institute
Kuehr	Ruediger	United Nations University
Lazaro	Isabel	Instituto de Metalurgia de la Universidad Autónoma de San Luis Potosí
Leeuw, de	Bas	World Resources Forum Association
Lefebvre	Gaetan	French Geological Survey
Lehmann	Harry	Umweltbundesamt (UBA)
Leroy	Pascal	Waste Electrical and Electronic Equipment Forum (WEEE Forum)
Lugeri	Francesca	ISPRA
Magalini	Federico	United Nations University
Malunga	Grain	Geomine Services
Malyuk	Boris	State Geological Information Fund of Ukraine





Last Name	First Name	Affiliation
Mancheri	Nabeel	Universiteit Leiden / Leiden University, Institute of Environmental Sciences
Manoochchri	Shahrazad	World Resources Forum Association
Marques	João	Gondwana Empreendimentos e Consultorias
McCombe	Deborah	RPA Inc.
Mulholland	Gregory	Citrine Informatics
Morais	Paula	University of Coimbra
Mostert	Clemens	Universität Kassel / University Kassel, Center for Environmental Systems Research
Moussaid	Malika	Aleff Group/Member of the UNECE/EGRC SDG Delivery Working Group
Mrotzek-Bloess	Asja	Technische Universitaet Clausthal /Clausthal University of Technology
Nelen	Dirk	VITO
O'Brien	Maria	Irish Center for Research in Applied Geosciences (iCRAG)
Ottiger	Fabian	World Resources Forum Association
Ortega	Ariadna	La Palma Research Centre for Future Studies sl
Ovadia	David	IAPG-UK
Ponce de Leon	Diana	Association of Ibero-American Geological and Mining Surveys







Last Name	First Name	Affiliation
Ponsard	Christophe	JONG CD&V Vlaams-Brabant
Prieto	Gloria	Servicio Geológico Colombiano
Ramdoo	Isabelle	International Institute for Sustainable Development (IISD)
Reck	Barbara	Yale School of Forestry & Environmental Studies
Rios Ravello	Luis	Peru Bio-Economy Solutions
Rohn-Brossard	Martine	Federal Office for the Environment (FOEN)
Rosendo	Luís	Generator Consulting
Savall	Nancy	EuroGeoSurveys
Schluep	Mathias	World Resources Forum Association
Shtiza	Aurela	IMA - Industrial Minerals Association
Solar	Slavko	EuroGeoSurveys
Stein	Anita	European Federation of Geologists
Strothmann	Philip	Forum for Sustainability through Life Cycle Innovation
Szkop	Rafał	Employers' Organization of Polish Copper/ ETP SMR
Tukker	Arnold	Leiden University, Department of Industrial Ecology Institute of Environmental Sciences





FORAM

Last Name	First Name	Affiliation
Tyrologou	Pavlos	ENVISPEC or EFG Panel of Experts on Natural Hazards and Climate Change
Vidovic	Jelena	EuroGeoSurveys
Wang	Meng	Young Earth Scientists (YES) Network

