

BIOMORE

An Alternative Mining Concept

A new mining concept for extraction
metals from deep ore deposits by
using biotechnology

D6.8

Report summarising dialogue
activities and results with user groups



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Horizon 2020 research and innovation programme
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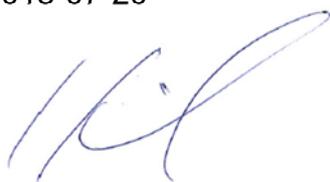
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“ D6.8 Report summarising dialogue activities and results with user groups “

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1. Introduction

“Mining, minerals and metals are important to the economic and social development of many countries. Minerals are essential for modern living” (United Nations 2002, p. 29). However, while mining is indispensable for modern industrial economies, it comes at a price: environmental and social impacts can be minimised but not entirely avoided. People living in the vicinity of mine sites are affected in a variety of ways, positively as well as negatively, by mining operations, and, therefore, have a natural and vested interest in the sustainable development of these sites and the adjacent regions. In the past, mining companies have often exhibited a nonchalant attitude towards such impacts; the global collection of environmental justice conflicts compiled by the EU-funded EJOLT project (www.ejolt.org) illustrates the significant share of mining operations in such conflicts, caused by past social and environmental indifference. However, it also shows a significant number of on-going and emerging conflicts. Obviously, obtaining the support or at least acceptance of an operation, “the social license to operate” as Thomson and Boutilier (2011) call it, increasingly faces difficulties, anywhere in the world. This is a challenge to mine operators, for the extension of existing mining projects as much as for the development of new ones, as securing this ‘licence’ necessarily is an important factor in their (economic) risk management (IIED, 2002). Gaining it involves not only technical measures to reduce and minimise environmental impacts, thus improving the environmental and economic sustainability of mining operations, but also to “enhance the participation of stakeholders [...] to play an active role in minerals, metals and mining development throughout the life cycles of mining operations, including after closure for rehabilitation purposes” (United Nations 2002, p. 29-30).

One of the stated objectives of the European Commission’s H2020 project BIOMore is to develop strong awareness and meaningful dialogue within stakeholders, target and user groups and to be recognized as an innovative research project with huge potential for the European economy and the international mining industry.

These objectives have been formulated on the basis of experts’ expectations. It remains, however, to the stakeholders in general to decide, whether these objectives are sufficient to accept mining and whether the projected impacts are acceptable. Various activities to engage stakeholders in order to solicit their views on the proposed technological developments form part of the BIOMore project.

The FP7 project EO-Miners (www.eo-miners.eu) faced a similar challenge of soliciting stakeholder input into the development of techniques for monitoring the environmental and socio-economic development at mine sites (Wittmer et al., 2013). It is primarily the local-level stakeholders who are concerned by this, but also stakeholders at national or supra-national level (e.g. EU level) may be concerned with the overall development in the industry. The three major categories of stakeholders are the mine operators, regulatory or policy-making government bodies, and the general public. Social licensing is achieved in a tri-lateral dialogue between these groups, respecting their values and concerns. To this end, discussion fora were organised, where the stakeholders could voice their concerns over technology



developments and formulate demands on technology developers. Often, however, such dialogue processes were not feasible due to pre-existing and continuing social processes between the different actors. In such cases social demand-based requirements were formulated on the basis of more limited focus groups or one-to-one interviews with individual stakeholders (Falck & Spangenberg, 2013, 2104).

The social license to proceed with a mining project requires trust. As trust legitimises - in a social sense - decision finding processes, it is also the basis for good governance (Braithwhite & Levi, 1998). A lack of trust between the different stakeholders, including the licensing authorities, often has its origin in a lack of knowledge. Thus, a lack of specific knowledge is likely to seriously impede a meaningful interaction between (local) stakeholders and mine operators. Building and re-building of trust requires establishing a rather level playing field with respect to site-specific knowledge. Some stakeholders may have a reasonably good understanding of mining operations in general, but may share with other stakeholder groups the lack of specific knowledge about the mine operation in their vicinity; public authorities can belong to each of both camps, the fully informed or the information deficit one. Information may not be considered very trustworthy, if supplied only by the mine operators. Stakeholders will require independent and unbiased information to enter into a trustful and constructive dialogue with mine operators, and the opportunity to double-check and verify information provided by the mining company throughout the dialogue. Conversely, mine operators may be more willing to enter into dialogues with knowledgeable stakeholders, than with stakeholders who base their positions on hearsay and assumptions.

Resistance against mining projects is often grounded in a lack of knowledge and/or reliable information, resulting in distrust between key stakeholders. The social license is an expression of trust that is based on shared knowledge. Therefore, a key issue is to make information on mine development and mine legacy management, including their socio-economic and environmental implications, accessible to all stakeholders (Falck & Spangenberg, 2013). As trust legitimises - in a social sense - decision finding processes, it is also the basis for good governance. Distrust between the different stakeholders often has its origin in an unequal distribution of knowledge and/or inadequate knowledge transfer. Thus, a lack of specific knowledge is likely to seriously impede a meaningful interaction between stakeholders. Building and re-building of trust requires a shared information base to establish a rather level playing field with respect to site-specific knowledge. Some stakeholders may have a reasonably good understanding of mining in general, but lack specific knowledge about the mine operation in their vicinity; public authorities can belong to each of both groups, the fully informed or the information deficit one. Information may not be considered very trustworthy, if supplied only by the mine operators. Stakeholders will require independent and unbiased information to enter into a trustful and constructive dialogue with mine operators, and the opportunity to double-check and verify information provided by them, but they are often perplexed by the complexity of issues. Conversely, mine operators may be more willing to enter into a dialogue with knowledgeable and informed stakeholders.



The BIOMore project faces comparable situations as to the interaction with stakeholders, although the conditions are different. The current project is not looking for and not aimed at a full-scale mining installation whatsoever. The project will develop the basic processes of a potential full-scale installation and come over with an estimation about the feasibility of the approach. Nevertheless, BIOMore was regarded from its start in a different way, especially in the Weisswasser region in Eastern Germany.

This report will summarise the dialogue activities that have been carried out in the frame of BIOMore. The activities targeted fulfilling one of the objectives of the stakeholder interaction activities, i.e. (i) to inform almost all stakeholder groups about the work of BIOMore and (ii) receive feedback that might be worth considering in the further course of the project.



2. The stakeholders in a mining project

2.1. Identifying stakeholders

A stakeholder is any person or group who claims to have an interest in a project. The interest may be vested or not, this is not relevant for the social processes that lead to social licensing or otherwise. In the first instance it is the local-level stakeholders who are concerned directly. However, individuals or groups at national or supra-national level, who are concerned by the overall development in the mining industry, can also become active stakeholders. Stakeholders can be grouped in various ways, for instance according to the interests they are likely to represent or whether they are internal or external to the project. Comprehensive social licensing can only be achieved in a multi-lateral dialogue between these groups, respecting their values and concerns.

2.2. Target groups and user groups in BIOMore

The target and user groups that should be addressed in the frame of BIOMore, have already been identified in the work phase finalised with the formulation of the project's "Dissemination, Exploitation and Communication Strategy". The process is described in BIOMore deliverable D6.1 and further outlined in deliverable D6.2.

Please find following a detailed list of these groups:

Organisations affected by BIOMore results

- European mining companies (junior and senior mining companies)
- Overseas mining houses
- Mining investors and insurers
- Residues producers
- Finance & insurers
- R&D community (research Institutes and University)
- Trade companies

Research and academia

- Research facilities
- Universities

Multipliers, disseminators

- Raw Materials Supply Group (RMSG)
- European Innovation Partnership on Raw Materials (EIP RM)
- EIT Raw Materials (Knowledge and Innovation Centre (KIC) on Raw Materials of the European Institute of Technology (EIT))
- European Federation of Explosives Engineers (EFEE)
- International Society of Explosives Engineers (ISEE)



- European Technology Platform on Sustainable Mineral Resources (ETP SMR)
- United Nations Economic Commission for Europe (UNECE)
- United Nations Environment Programme (UNEP)

Public bodies and authorities

- Mining authorities incl. regional and local ones
- Cities, towns, municipalities in potential mining regions
- European Commission
- European Parliament
- Raw Materials Supply Group (RMSG)

Media

- Dailies
- Periodicals
- Specialised journals
- TV, Radio
- Internet
- Social media

Public

- Citizens
- Consumer organisations
- Trade unions
- NGOs



3. Dialogue activities

The following chapters will summarise the various dialogue activities that have been carried out within BIOMore. Except of the conferences participation, we tried to mobilise almost all user groups for participation. However, it is not surprising that not all user groups participated in each event.

3.1. Stakeholder interaction for technology assessment

One objective of the stakeholder interactions was to receive feedback about the BIOMore process from those stakeholders familiar with mining and activities related to the scope of BIOMore. This technology assessment aimed at obtaining information that could be included in the scope of work of the project and could influence the development activities.

The technology assessment was planned to be carried out by basically two means:

- Discussing the BIOMore process in workshops
- Obtaining feedback through a questionnaire survey

3.1.1. Workshops planned in the course of the project

The general format of the intended workshops is shown in Annex I. Annex III shows the general presentation about BIOMore as it was given at the workshops. The workshops were planned as half day workshops, where the participants should not spend too much time of their presence at the workshop location. Further, we planned to have the stakeholder workshops aside suitable bigger events, so that we assumed to have a higher number of participant than in a workshop organised individually.

Due to the timing of the project, the workshops had to be carried out in 2016 until beginning of autumn. We identified a couple of conferences or events, where a workshop should have been possible in principle.

The first workshop was organised aside the Aachen International Mining Symposia (AIMS 2016), First International Conference MINING IN EUROPE in Aachen, Germany, on 17 May 2016. Unfortunately, we had to cancel this event because we did not receive any registration for the workshop.

The second attempt to organise a stakeholder workshop was prior to the 8th International Symposium on Biohydrometallurgy – Biohydromet '16 in the St Michael's Hotel in Falmouth, Cornwall, UK, on 19 June 2016. We received about 12 registrations for this event. Unfortunately, also this workshop had to be cancelled due to personal reasons.

A third trial was made by organising a stakeholder workshop aside the Annual Conference of the International Mine Water Association – IMWA2016 in the KUBUS,



Leipzig, Germany, on 13 July 2016. We received 10 registrations from stakeholders. The workshop took place as planned with only 5 participants.

Despite the rather low number of participants, the workshop was quite successful. We had very interesting and fruitful discussions about several topics of the BIOMore project activities. The workshop started with a comprehensive presentation of the BIOMore background and objectives. After completion of the questionnaire (see chapter 3.1.2), the participants started an intensive discussion about particular issues around the BIOMore process.

There were a couple of questions and remarks concerning technical details of particular issues of the BIOMore process. As the intention of the workshop was not so much to discuss technical details of the process rather than about the participant's expectations and view about a potential future of the BIOMore process, the technical questions were referred to individuals of the project team being experts in the particular fields in question.

The discussion around the more general issues of the BIOMore project led to basically two main messages:

1. The participants were very much in favour of the BIOMore approach as to get in touch with all relevant stakeholder groups at a very early stage of process development. Technical problems can likely be solved but the acceptance of the society is a different issue. The participants felt that the SLO (Social Licence to Operate) for a BIOMore process may be obtained if the society can be convinced that a mining operation is absolutely unavoidable at a certain location and that the BIOMore process is the method with lowest impact during operation and afterwards.
2. It was a general opinion of the participants that technical problems can be solved in almost all cases. However, a clear statement of the political side is missing that there is a strong will to produce mineral raw materials from domestic resources and deposits. Raw materials initiatives and strategies have been implemented in the recent past but not promoted in a way that the society got the feeling that mineral raw material production in the EU is one unavoidable option if the citizens and the economy like to maintain the current standards.

Drawing conclusions and statements from only one workshop is not a targeting approach. As there were no more external events taking place in the period foreseen and the experience shows that organising individual BIOMore workshops not linked to any other event would not make sense, we were planning for a remote workshop, where potential participant may follow the workshop via suitable conferencing tools like Skype for Business or Teamviewer. The remote workshop was announced via BIOMore newsletter and individual mailings and was planned for late September or early October 2016.



Unfortunately, we again did not receive any registration for the remote workshop. Therefore, we had to cancel this activity as well and had to stay with the results obtained so far.

3.1.2. Questionnaire

The questionnaire survey was designed

1. to receive information about the knowledge of stakeholders about the subject covered by BIOMore and
2. to receive feedback about the views of stakeholders as to the technology used in the BIOMore process.

Annex II shows the questionnaire in paper format. An identical version only visually adapted to online use was made available on the BIOMore website.

This low number of replies does of course not allow any statistical evaluation whatsoever. However, we could at least show some indications and formulate some feedback remarks. Those are not representative but may indicate a certain direction (see BIOMore deliverable D6.2).

To improve the situation and on advice coming from the project review meeting of the first reporting period, we asked first our BIOMore partners to complete the questionnaire and then made another mailing approach to our stakeholders.

The responses received in the second attempt were limited as well. Despite announcing the availability several times by email, newsletter and other communication means, we only received 8 completed questionnaires online. 6 questionnaires were completed by BIOMore partners and 2 questionnaires were completed by “outsiders”.

Summarising, we obtained in total 15 completed questionnaires. We decided to evaluate them together, without any regard to the origin.

3.1.2.1. Participation

The 15 questionnaires received were completed by people from 7 or 8 different countries (country was not indicated in one case). The following Figure 1 shows this result. Most questionnaires were received from organisations from Germany, where we received 6 in total. However, the regional coverage was unexpectedly wide, even the contribution from outside Europe provided some information that we did not expect at the start. Anyway, this result was only obtained by coincidence.



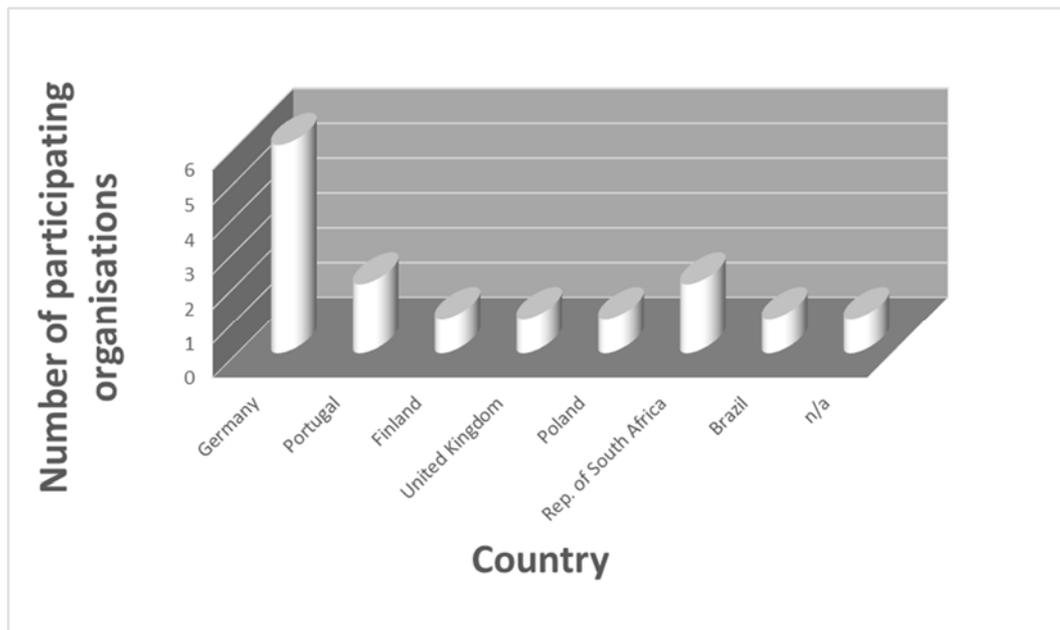


Figure 1 Regional spread of participating organisations

9 of the organisations that completed the questionnaires came from the public sector and 5 from the private sector. From the private sector 5 organisations were universities or science organisations. This seems to be a good mixture between theory and practice.

The following Figure 2 shows the size of the organisations that were represented. The participating group showed a rather balanced distribution of organisation sizes measured with the number of employees. Only the large size organisations were a bit “over-represented”.

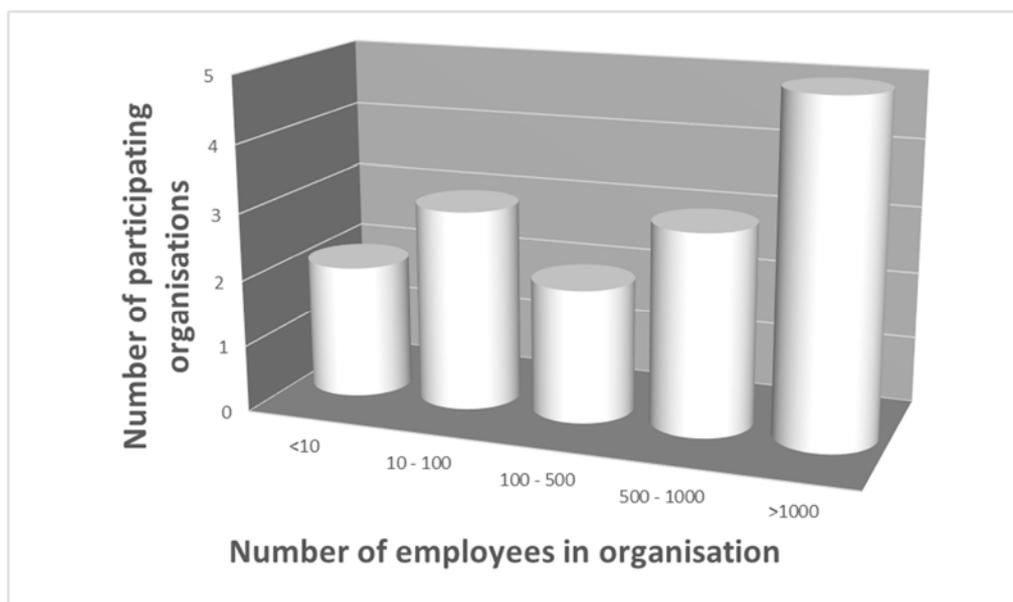


Figure 2 Size of participating organisations



Figure 3 shows the sectors or fields of activities of the participating organisations. More than one answer was possible here. The figure indicated that there were 5 organisations from universities or the science field (same as above). Most of the other organisations were active in the minerals production field (from exploration to extraction), which is right to the heart of the BIOMore approach.

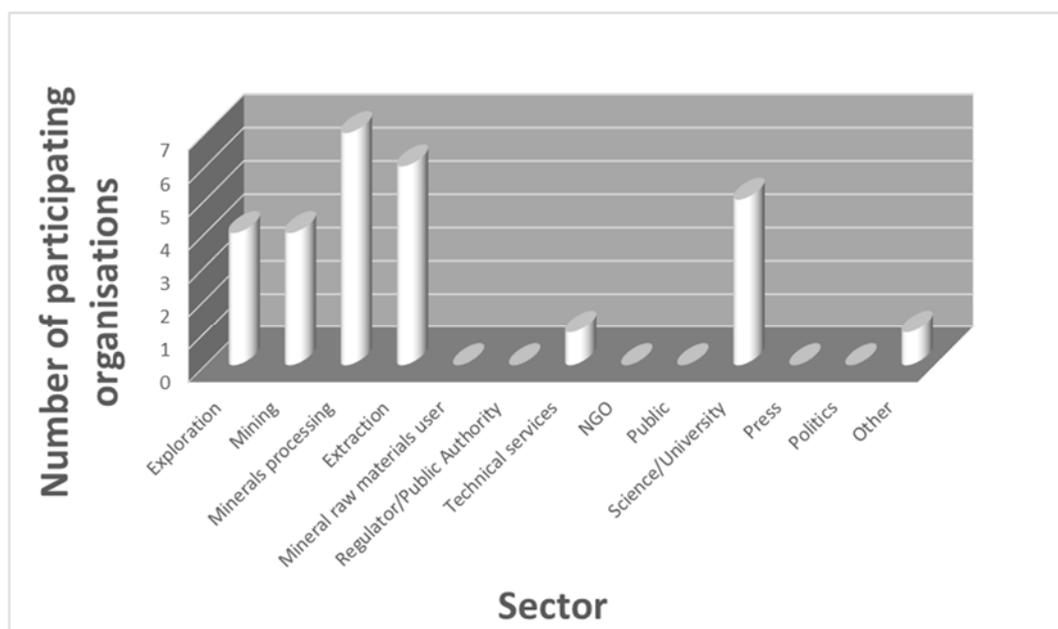


Figure 3 Fields of activities of the participating organisations

Finally, Figure 4 shows where the participating organisation are active. None of them were active on local scale only, whereas 10 were active worldwide, 3 on European level and 6 on their individual national level (multiple answers were possible here). The statements and messages obtained are therefore only valid for a greater scale or coverage. They cannot be related to local or regional scale.



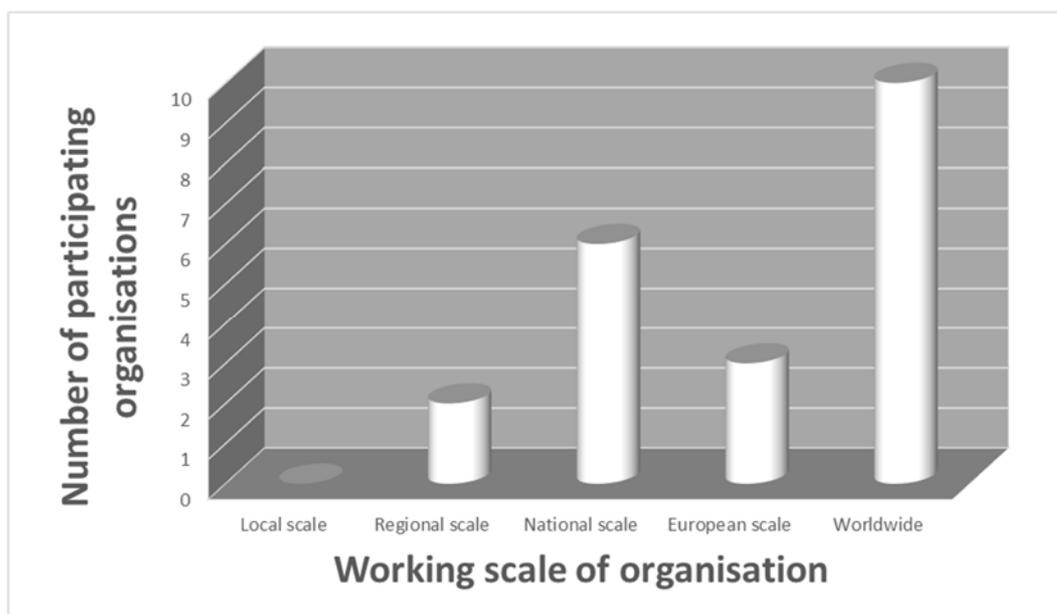


Figure 4 Geographical spread of activities of participating organisations

3.1.2.2. Statements

The questionnaire asked for the level of agreement to in total 11 statements related to the scope of BIOMore. The participants were asked to provide their level of agreement with the statement on a scale from 0 to 5, where 0 means ‘absolute no agreement’, whereas 5 means ‘total agreement’.

In order to get to at least some indication about the agreement or non-agreement with the statements, we calculated the average of the indications for each statement. Regarding the low number of inputs, further distinguishing regarding parameters like size of the organisation or field of activities did not make sense. Therefore, the following results are only basic indications.

The following Table 1 shows the average level of agreement for each statement.

Table 1 Average agreement to statements provided in the questionnaire

| State-ment No | Statement | Average level of agreement |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| 1 | The BIOMore process is a sustainable mining process | 3,71 |
| 2 | The BIOMore process can turn mineralization into accessible commodities (metals) that are located at depths greater than 1km and normally not accessible by standard mining methods | 3,80 |
| 3 | The BIOMore concept will decrease costs of extraction and processing of metals by avoiding tailings and conventional mining operations (open cast as well as underground), and by lowering infrastructure investments and subsequent excessive cost for remediation | 3,73 |



| | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 4 | BIOMore avoids production of environmentally hazardous waste material by utilizing in-situ recovery as a proven minimal footprint mining technique | 3,86 |
| 5 | The increasing shortage of metals in the EU requires new and innovative yet sustainable mining technologies to secure the continued development of high technologies as economic backbone of our society | 4,93 |
| 6 | The BIOMore concept has a lot of environmental benefits as there are no waste heaps, dust exposure, minimum infrastructure on surface, less noise or chemical impact, innocuous bacteria etc. | 4,67 |
| 7 | BIOMore is an in-situ biochemical leaching mining technology suitable for densely populated areas | 3,21 |
| 8 | BIOMore reduces many of the costs (infrastructure, energy, tailings remediation) and environmental/sociological problems or issues associated with conventional mining | 4,13 |
| 9 | The EU is net importer of needed metals; therefore, this import dependency must be reduced | 4,38 |
| 10 | The people in the EU have a rather high standard of living that should be maintained | 4,07 |
| 11 | The bacteria, which are foreseen to be used in the leaching process are naturally occurring bacteria. Their activity will be stimulated by the supply of nutrients. Therefore, the development of the population can be completely controlled by the control of the nutrients supply. The bacteria themselves are completely innocuous and carry no health risk | 3,71 |

There is no doubt among the participants that the increasing shortage of metals in the EU requires new and innovative yet sustainable mining technologies to secure the continued development of high technologies as economic backbone of our society (Statement No 5). This principle agreement shows that people are fully in line with the objectives of the EU Raw Materials initiative or other political statements issued from various sides.

There is also high agreement with the objective to reduce the import dependency of Europe for metals in particular and mineral raw materials in general (Statement No 9). Further the participants agreed that the people in the EU have a rather high standard of living that should be maintained (Statement No 10).

This rather high average agreement with the principle objectives of the European raw materials policy is not very surprising. The policy is well regarded and implemented in the national policies to a large degree and is unquestioned by people working in the sector in one way or the other.

The picture slightly changed when it comes to statements directly related to the BIOMore concept. The participants agree to the general assumption that application of the BIOMore process would be more sustainable and more cost-effective than conventional mining (Statements No 6 and 8, average above 4,0). But when it comes to more detailed statements, the average level of agreement is constantly decreasing (Statements No 4 > 2 > 3).



It is interesting that participants have concerns with Statement No 7 that the BIOMore concept will be suitable for densely populated areas. This lowest level of agreement might be because mining in general has a bad image and that the Social Licence to Operate will be very hard to obtain. Further, mining would step into competition with other ways of land uses. All that would lead to the assumption that the probability even of a BIOMore type mining site to receive a permit is currently rather low. Therefore, the project should put more emphasis on showing the advantages of the BIOMore concept compared to conventional mining and work on revising the currently still bad image of mining in general.

It is even more interesting that participants on one hand agree to a rather high degree to statements concerning environmental benefit, waste reduction, etc. (Statements No 6 and 8) but on the other hand only agree to a less extent to Statement No 1 that the BIOMore process is a sustainable mining process. The participants agree to individual sustainability aspects of the BIOMore concept but have concerns that the entire process will be sustainable. This is an indication that BIOMore should point out sustainability issues more clearly.

Finally, the participants are concerned about the Statement No 11 about the use and type of bacteria used in the process. This lowest level of average agreement mirrors the general fear of things that people do not see or understand properly. And the logical consequence is that something that you do not see you cannot control either. This has to be taken seriously by the project. BIOMore should discuss about a revision of the way how to communicate issues of the BIOMore process related to microbes.

3.1.2.3. Expectations

Part C of the questionnaire had the purpose to receive feedback from the participants about the individual expectation they have related to the BIOMore process and concept.

The first question was about consumer products where the BIOMore process could contribute to future availability. The answers to this question were not a surprise. Participants mentioned all the products that are in the common sense as dependent on metals or other mineral raw materials. The following products have been mentioned (in alphabetic order):

- Advanced composites
- Airplanes
- Automobiles
- Cables
- Communication technology
- Construction sector
- Copper pipe



- E-mobility
- Electronic devices
- Energy technology
- Energy storage
- Fungicides in agriculture
- Heat exchangers
- Jet engines
- Jewellery
- Medicine
- Metal alloys
- Microelectronics
- Mobiles
- New materials
- Photovoltaics
- Railway
- Tracer in medicine
- Wind turbines

The second question was about expected positive societal impacts of BIOMore. The following answers were given (in alphabetic order):

- Developing industry
- Generation of new knowledge
- Higher public welfare
- High-Tech applications
- Improved environment through reuse
- Improved industry development
- Improved public acceptance
- Increased competence of mining in Europe
- Increased quality of life of workers
- Increased regional economy
- Infrastructure improvement
- Less import dependence of the EU for metals
- Less land use by mining



- Less (visible) impact
- More jobs in rural areas
- More jobs in the EU
- Overcome Chinese monopoly on CRM
- Positive ecological aspects
- Quality of life of workers
- Reduced environmental impact on surface
- Scientific outreach

It could be noted that the participants expect positive impacts of the BIOMore concept mainly in the improvement of the standing of the raw materials sector as well as improvements in environmental compliance. Especially the latter is interesting because the participants see the BIOMore concept as positively contributing to environmental protection. In this way, the perception of BIOMore in the raw materials related community seems to be rather well. BIOMore has to continue spreading related information not only in the raw materials community but also beyond, especially to the public.

The question related to the expected negative impacts of the BIOMore concept showed the following answers (in alphabetic order):

- Application more a political than a technical question
- Control of bacteria unclear
- Destabilisation of underground environment
- Groundwater contamination
- High consumption of acids
- High production of CO₂
- Land use competition
- Negative environmental impact
- Negative image of mining activities
- Negative image of novel large-scale technologies
- Polarising societies
- Protests against field work
- Technology needs highly informed people
- Uncertainty about which law applies
- Unknown long-term environmental impacts
- Use of non-renewable resources in EU



- Water treatment after closure

The answers were rather unspecific in some cases and not to the point in other cases. However, there are few general fields of concerns. The first one is that the policy framework which has to be applied in case of BIOMore application is not clear. The second field is the big field of Social Licence to Operate. The third field relates to environmental impacts or risks.

All in all, the answers indicate the general fields of concerns more or less each technical application raises in the community. BIOMore should deal with this and look for spreading information about the project and achievements as wide as possible.

The next question was about the conditions that should apply that the BIOMore process can be used in practice. The participants had the opportunity to choose as many conditions as appropriate from their point of view. The following Table 2 shows the results.

Table 2 Conditions for the technical application of the BIOMore process

| Condition No | Condition | Number of agreements |
|--------------|------------------------------------------------------------------------------------------------|----------------------|
| 1 | The BIOMore process must run as foreseen | 2 |
| 2 | The BIOMore process is promising; therefore, it should be applied in any case (if feasible) | 4 |
| 3 | The BIOMore process should undergo a new and stricter permitting procedure | 2 |
| 4 | The BIOMore process should only be applied if it proves to use Best Available Technology (BAT) | 5 |
| 5 | The BIOMore process must be thoroughly controlled and supervised | 12 |
| 6 | The environmental impact assessment must show almost no environment risks | 10 |
| 7 | There must be a reasonable economic perspective behind the BIOMore process | 10 |
| 8 | The BIOMore process should be used as alternative to conventional (deep or open cast) mining | 6 |
| 9 | None of the above, the BIOMore process should never be applied (please specify why) | 0 |

It was good to recognise that nobody chose Condition No 9 and only 2 participants chose Condition No 3. This means that all participants are basically in favour of applying the BIOMore concept under certain conditions and that the project is on the right way. This is also mirrored by the rather low score of Conditions No 1 and 2.

The mostly chosen condition was No 5 that the BIOMore process must be thoroughly controlled and supervised. This should basically be the case in all technical applications. This is in line with Conditions No 6 and 8. The BIOMore process should be applied as alternative to conventional mining if an environmental



impact assessment shows almost no environmental risks. We are quite confident that these conditions can be assured after the end of the project. We can most likely also assure that we will only use Best Available Technology (BAT) in the process (Condition No 4).

It is also rather clear that the BIOMore process will only be technically applied if there will be a reasonable economic perspective (Condition No 7). No mining house will invest in a technology without foreseeing reasonable profit. Especially this point is subject to intensive calculations and modelling within the further course of the project.

3.1.2.4. Conclusions

The questionnaire survey showed that in general the project was on the right track. There are few issues that need improvement in the communication and dissemination efforts of potential future BIOMore follow-up projects. The participants of the survey, although from the mineral raw materials community, gave some indications, where BIOMore should invest a bit more to obtain an even better recognition in the community and beyond.

The given interpretations cannot be treated as being absolutely correct because the overall number of participants in the survey was by far too low to get to statistically proven results. Anyway, the obtained results are useful for the further course of the project.

3.2. Activities in the Weisswasser region in Saxony, Germany

At the beginning of the BIOMore project, the Sächsische Zeitung (a newspaper, issued in Dresden, Germany) published an article on the topic of “copper fracking in the Lausitz region” in Saxony, Eastern Germany. This article referred to other articles published in different media and mixed up exploration activities (targeted at conventional copper mining) carried out by KGHM Kupfer in this region with the BIOMore project. The public initiative “Against raw material piracy” was mainly responsible for the resistance raised in that region in the context of exploiting raw materials. One of the main concerns was that in the context of the BIOMore project “fracking” would be applied for winning copper. They mobilised the public among other things with slogans like “Fracking-Alarm in der Lausitz!” (fracking alarm in the Lausitz region, issued in Dresdener Morgenpost on 26 February 2015) or the one shown in Figure 5.





Figure 5 Article in Lausitzer Rundschau of 18 January 2016

To correct the article of the Sächsische Zeitung and providing objective and reliable information about the project and its targets, some representatives of BIOMore had an interview with the magazine on 02 April 2015. Some written information were provided as well. The response from Sächsische Zeitung can be found at the following link.

<http://www.sz-online.de/sachsen/kupfer-fracking-fuer-die-lausitz-3078256.html>

The situation calmed down, mainly due to the objective and reliable information provided by the project representatives and the open discussion held between the project and members of the public initiative. The project representatives were able to explain the project and clarify certain topics in relation of what was going on in the region and the intentions of the project. The public initiative started to understand that there were some misunderstandings at the beginning of the campaign and they appreciated the open and transparent way the project representatives showed in several discussions. Nevertheless, the public initiative was not convinced of the technology BIOMore was going to develop. They still have concerns. But they also now rely on the BIOMore project providing news whenever available.



One of the meeting with the public initiative was held on 10 May 2016 at the premises of the Technical University in Freiberg. The representatives of the BIOMore project were Knut Hirsch (DMT), Prof. Dr. Heinz Konietzky (TU BAF), Dr. Horst Hejny (MIRO) and Dr. Rene Kahnt (GEOS). They discussed with the executive board of the initiative against raw material piracy, represented by Ivonne Obst-Mantel and Roland Schmidt. The aims of the dialogue were to understand the concerns of the initiative against mining activities in general and in particular, to access, evaluate and discuss the initiative's attitude toward the idea and the concepts of the BIOMore project. Therefore, the BIOMore delegation introduced the pros and cons of the alternative mining concept of BIOMore and pointed out that our approach will have a significantly lower impact on the environment in comparison with conventional mining methods and should generate economic growth and employment opportunities. Furthermore, the delegation responded to detailed questions related to BIOMore, fracking and mining in Europe.

As results, the initiative stated that they were satisfied with the open and transparent dialogue, that they are willing to re-evaluate the BIOMore project with the new information they received, that they will observe both actively and critically the project and finally, that they see us as partners at eye level to establish a better dialogue.

The BIOMore representatives stated that BIOMore will take the concerns of the initiative seriously, that they understand the concerns and that BIOMore will continue to provide objective information about the project.

Another event was organised by the local Member of the German Parliament on 13 June 2016 near Görlitz, Germany. It was intended to be an information event about copper mining in the region. The Member of the German Parliament, representatives of the mining authority, representatives of the BIOMore project and some national expert in Geology were invited and present. The discussion with the public was mainly about the relation between the exploration activities that have been regarded in the Lausitz region and the BIOMore project and its intentions.

Also in this event, the BIOMore project was able to show its position based on information from the project. In the course of the event, the public (public initiative, one or two NGOs and citizens) criticised more the politicians and the mining authority rather than BIOMore. BIOMore could show that based on geological information the copper ore body in that region will not be suitable for the BIOMore process. Thus, there will be no "fracking" in that region in the future.

3.3. Conferences

Conferences are excellent opportunities to get in touch with stakeholders. Depending on the purpose of a particular conference, different stakeholder groups will attend.

BIOMore attended quite a lot of different conferences during its lifetime. Several hundreds of stakeholders were met and fruitful discussions with the stakeholders were conducted by the attending partners of BIOMore.



Another type of events are the so-called clustering events. Their purpose is to get different projects together to discuss about common activities in form clusters in the identified activities. BIOMore attended one of those events organised by the European Commission with the purpose to get the mining related projects together.

A compilation of all conferences and other events attended can be found in BIOMore deliverable D6.7 Report on activities of the press bureau.

3.4. Press conference

The press conference took place at KGHM premises on 28th of September 2017 in Lubin, Poland. For this purpose, we sent out invitations to about 320 interested parties including international journalists. Since only representatives from Poland and Polish press were registered, this was not called an international press conference. So, the attendance of other (non-Polish) stakeholders was missing. The main reason was likely that the efforts for travelling to Poland was supposed to be too high for almost all invited people.

Press kits with pen drives with pictures from the mine and BIOMore flyers were distributed and BIOMore posters were set up. Simultaneous interpreters were present.

In addition, the press conference was filmed by KGHM and BIOMore-Partner were interviewed by KGHM and a film crew.

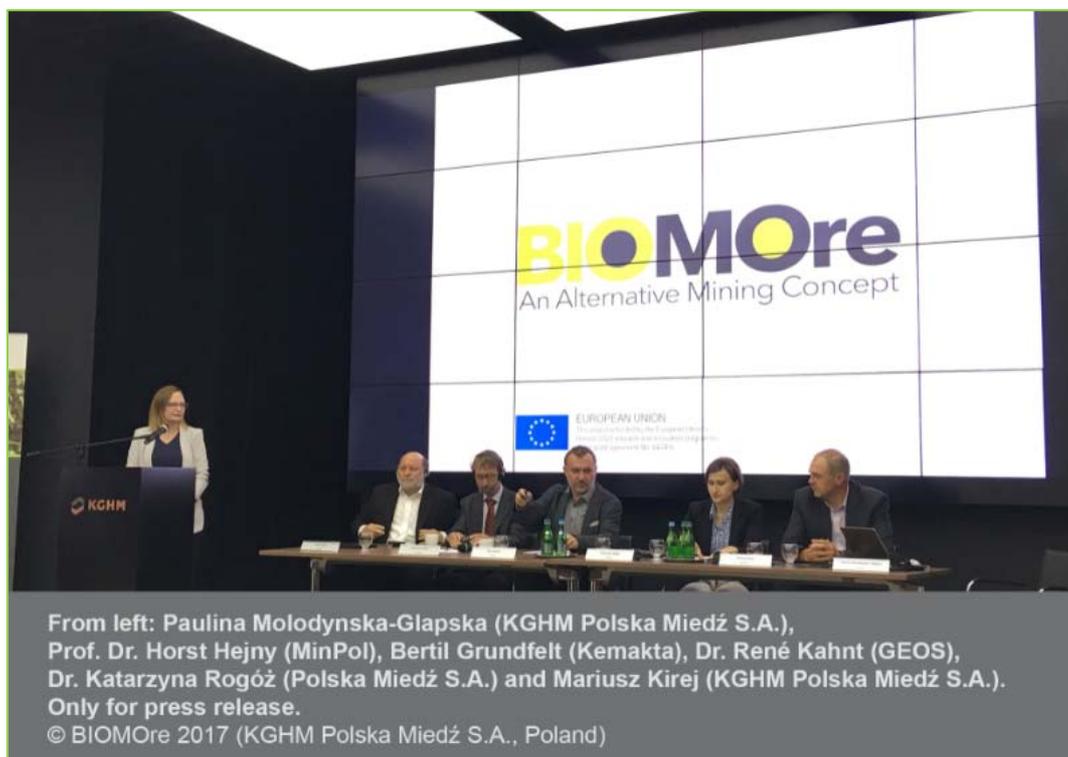


Figure 6 Picture from the press conference



On 29th of September 2017, KGHM invited local and national press as well as stakeholders to celebrate the signing of a cooperation agreement on innovation with the Polish EU National Contact Point. This agreement should show the willingness of KGHM to invest significantly into innovation.

As one example for and international collaborative innovation project already in place, the organisers asked Horst Hejny to present BIOMore at this occasion. Horst Hejny gave a brief overview of the project and pointed out the importance of research and innovation in the raw materials sector.

3.5. Final event

On July 8th, 2018, the BIOMore project had its final event in Brussels. The workshop was attended by some 45 people. It was a very successful meeting, because the participants recognized the amount and quality of results of the project work.

After keynote speeches from the EIT RawMaterials and the EASME of the European Commission, presentations were given about all main topics of the project, i.e. the development work in lab-scale and the underground tests, the modelling toolbox, the work on sustainability assessment of the BIOMore process and finally the conditions for the economic viability of the process.

In the afternoon, the participants and project partners discussed about the potential future of the BIOMore process. Several application scenarios were discussed. The main outcome of the discussion was that we should focus on the major challenges for the process, i.e. generation of sufficient permeability for the in-situ operation.





Figure 7 Some pictures from the BIOMore Final Event



4. Conclusions

To finally assess the success of stakeholder interaction activities, we have to distinguish between two groups of activities:

1. The activities directly initiated by the project.
2. The activities organised by somebody else, where BIOMore partners “only” participated.

The second type of activities (conferences, workshops, etc.) assembled usually quite a lot of experts and other stakeholders around a particular aspect in science or technological development that also related to BIOMore. Here, the “experts” in a field got together and were able to discuss, among other issues, also about particular aspects of BIOMore. The participation in those events was usually highly valuable for the project and its progress.

The picture turns out to be different when talking about the first group of activities. The stakeholder interaction activities within BIOMore to establish a dialogue on the objectives and outcomes of the project and to receive feedback about this has once again shown, that it is difficult to mobilise individuals unless they have specific and vested interest. There is little incentive in participating in discussions that appear to have limited stakes and are of largely theoretical relevance for the stakeholders potentially concerned. For this reason, the turn-out and participation in the events organised and the questionnaire survey launched in the context of the BIOMore project was low. Nevertheless, that what could be obtained was rather useful and showed that the project is on the right track.

The approach of the project to act with objective and reliable information in an open and transparent way was very useful in the interaction with local initiatives in the Weisswasser region in Saxony, Germany, where a lot of concerns against the BIOMore project were raised based on some misleading and sometimes wrong information. The project representatives could shift the highly emotional discussions back on a factual level.

The discussions in the stakeholder workshop resulted in two important statements:

1. The participants were very much in favour of the BIOMore approach as to get in touch with all relevant stakeholder groups at a very early stage of process development. Technical problems can likely be solved but the acceptance of the society is a different issue. The participants felt that the SLO (Social Licence to Operate) for a BIOMore process may be obtained if the society can be convinced that a mining operation is absolutely unavoidable at a certain location and that the BIOMore process is the method with lowest impact during operation and afterwards.
2. It was a general opinion of the participants that technical problems can be solved in almost all cases. However, a clear statement of the political side is missing that there is a strong will to produce mineral raw materials from domestic resources and deposits. Raw materials initiatives and strategies



have been implemented in the recent past but not promoted in a way that the society got the feeling that mineral raw material production in the EU is one unavoidable option if the citizens and the economy like to maintain the current standards.

This shows that the BIOMore process cannot easily be seen as a mining method as covered by current mining legislation. A suitable policy framework seems to be missing.

The questionnaire survey, although of no statistical relevance, gave some indications, where BIOMore should invest a bit more to obtain an even better recognition in the community and beyond. Although the project is on the right track in general, there are few issues that need improvement in the communication and dissemination efforts. E. g., we should point out more the relevance of the project in the context of environmental compliance and sustainability.

Although the participation in the stakeholder interaction activities was rather low, the activities were successful. We obtained some indications that will feed back into the scope of work of the BIOMore project.



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