Fourth virtual event addresses the importance of Mining 4.0 and Territorial Technological Development in the process of the Just Transition

__Lilia M. Sant'Agostino__, Deputy Secretary of Geology, Mining and Mineral Transformation (SGM), Ministry of Mines and Energy of Brazil (MME); __Karina Marzano__, Associate Fellow, Institute for Advanced Studies in Sustainability, (IASS) Potsdam, Germany; __Alexandre Valadares Mello__, Director of Associate and Municipal Relations, Brazilian Mining Institute (IBRAM); __Renato de Souza Costa__, Director of Mining, Energy and Infrastructure, Minas Gerais Development Company (Codemge); __Alessandro Colucci__, Director of the Center of Competence for Mining and Mineral Resources, Brazil-Germany Chamber of Commerce and Industry (AHK) of São Paulo; __Eloi Perez__, Account Manager, Minerals and Metals Industry, Siemens; __Mac Kinley Ferreira Cardoso__, Technology Manager, Brazilian Metallurgical and Mining Company (CBMM) attended the virtual event.

On October 14, 2020, the fourth virtual seminar was held to discuss the importance of developing local technological competence and innovation centers in the Just Transition process, and to present the potential of Mining 4.0 as a strategic factor to promote the transfer and adoption of technologies to empower other productive sectors in mining territories. This webinar is part of an agenda of activities planned until December included in the bilateral technical cooperation initiative Brazil - Germany "Toward a Just Transition: An Opportunity for Minas Gerais".

The 4th Webinar, hosted by FGV's Senior Economist Marco Saverio Ristuccia, began with the speaker Lília M. Sant'Agostinho, Deputy Secretary of Geology, Mining and Mineral Transformation (SGM), Ministry of Mines and Energy of Brazil (MME), discussing programs aimed at technological innovation. According to Lília, the action and development program of SGM is based on developing mining as the basis and support for the development of Brazil, with a qualitative and quantitative approach aimed at expanding the sector together with socioeconomic and environmental sustainability. This program has a selective plan of actions for the sector, it has 10 goals, such as: promote the attraction of investments in the chain of mineral transformation with aggregate technology, promote technological research and innovation in the production of remineralizers and their application in agriculture. In this way, a vision of mining from the present to the future is proposed.

Karina Marzano, Associate Fellow at the Advanced Institute for Sustainability, (IASS) Potsdam, Germany, brought up the topic "Private Environmental Governance: Sustainable Mining for the Energy Transition", analyzed from a transdisciplinary perspective, considering international law and politics. Three topics are at the center of his approach: First, mining and energy transition, which generates a dilemma in relation to the " decarbonization " of energy, since the decrease in the use of fossil fuels generates a very significant increase in the demand for strategic minerals for the generation of energy from renewable sources. The geographical factor is also very relevant, as in order to ensure that the energy transition occurs at a global level, many minerals will come from the southern countries of the world. Mining itself, in order to become environmentally sustainable, needs to use renewable energy and implement energy efficiency and water use measures in its operations. The second theme addressed the creation of sustainability standards and certifications from private initiative. Finally, the third topic addressed the creation and capture of value, in which there are often inequalities related to cost-benefit distribution to achieve these sustainability standards.

Alessandro Colucci, Director of the Competence Center for Mining and Mineral Resources, Chamber of Commerce and Industry Brazil-Germany (AHK) São Paulo spoke about the mission of the Center - intermediation between Brazilian Mining and the German Industry through strategic partnerships to increase productivity, added value and security in the supply of mineral resources. The potential of

Mining 4.0 as a strategic factor in the transfer and absorption of technology was highlighted. Mining 4.0 is a process of transition from manual to automated work, among others. According to Alessandro, the pandemic has accelerated the process of virtualization and digitalization. The Director also reinforced that Germany today has an almost complete ecosystem, among companies that produce, extract and transport machines, and a good network of research institutions. "*Minas Gerais can be a development hub for Mining 4.0 technologies. Brazilian mining has the adaptive capacity to operate in highly industrialized countries, but the lack of capital can be an obstacle, partially bypassed through international partnerships*".

Alexandre Valadares Mello, Director of Relations with Associates and Municipalities, Brazilian Mining Institute (IBRAM), presented the point of view of the mining companies in the promotion of technological action, showing the vision of the companies to create a shared value relationship. Alexandre presented IBRAM and its pillars of action, and the main technologies of industry 4.0 used in mining, such as drones, autonomous network robots, air vehicles, mining projects using virtual reality, etc. In the transportation area they have autonomous railway systems and *trackless mining*. In the mining phase: autonomous equipment controlled by GPS; in underground mining, remote detonation, mathematical modeling, etc. IBRAM is the institutional supporter of the *Mining Hub*, the First *Mining Hub* in the World, an open innovation initiative that seeks solutions to common challenges in the sector, integrating mining companies, suppliers, *startups*, researchers and investors, generating opportunities and connections for different mining actors.

The Director of Mining, Energy and Infrastructure, Minas Gerais Development Company (Codemge), Renato de Souza Costa, showed Codemge's vision of policies to promote technological innovation in the mining sector. Minas Gerais (MG) is the global leader in the production of niobium, with more than 300 operating mines in the state. The innovations in mining in MG, with a technology replicated for several other similar deposits in the Iron Quadrangle, in which there is currently a use of compact ore for reverse flotation. Renato reaffirmed the rich history of mining in MG, emphasizing that this year, MG completes 300 years. The technology import started in 1908, with a contract to promote the mining production with technology and knowledge, also counting on English companies that acquired gold deposits, thus bringing new underground mining techniques. Renato shared his vision of the future, containing a social charter, promoting transparent communication with the community, for a just and organized transition from the end of the mining operation to the community without mineral.

Eloi Perez, Account Manager, Minerals and Metals Industry, Siemens, presented *Mining 4.0 through Digital Solutions*, talking about the mines of the future, with a more sustainable operation. With digitalization it is possible to reduce the environmental impacts of mining companies, improving productivity. With digital architecture, the management of this operation becomes more visible. This improvement of the mining companies promotes a new mining process that is safer, profitable, and ecologically correct. Mining 4.0 is becoming a process of future opportunities.

Concluding the debate, Mac Kinley Ferreira Cardoso, Technology Manager, Brazilian Metallurgical and Mining Company (CBMM), highlighted CBMM's performance in the implementation of technological solutions to foster sustainability in mining activities with positive impact for the territorial technological development. The company has several representations around the world, with a great variety of products, Iron Niobium one of the main ones, is applied in several productive chains around the world. One of the company's successes is the implementation of 4.0 Industry Concepts. Mac spoke about Data Integration and Transformation, based on sensing and artificial intelligence (PIMS system) that help in the early decision making. Another successful case was the use of Niobium to increase the resistance of steel in truck containers, making the operation more efficient among other examples cited. With the application of Industry 4.0, it is possible to reduce the consumption of inputs in production, waste and *setup time*, increasing the useful life of the dam.

For more information visit our websites:

Website FGV Europe:
https://fgveurope.fgv.br/

Website FGV Europe dedicated to Just Transition:
https://fgveurope.fgv.br/projects

Exclusive website for the Just Transition initiative/event, in Portuguese and English:
https://eventos.fgv.br/transicao-justa

https://eventos.fgv.br/en/just-transition

If you wish to contact our experts, please send an email to:
FGV Europe: fgveurope@eu.fgv.br