



Type what you want to search

Search

04/12/2022



## Sand produced by Vale is a solution to sand sustainability and mine tailings reduction, according to universities

*A report by the University of Queensland and the University of Geneva also indicates that sand from iron ore production can reduce carbon emissions*

The University of Queensland (UQ), through its Sustainable Minerals Institute (SMI), and the University of Geneva (UNIGE) released this Tuesday, 12, a [report](#) indicating that sand from the ore production process may contribute to solve two important environmental issues by reducing sand extracted from the natural environment and the mining tailings generation. Vale contributed to the report and facilitated the sampling of its Sustainable Sand produced at the Brucutu mine (MG) for an independent analysis.



*Sand stocked at Brucutu Mine, in Minas Gerais, Brazil*

Vale's Sustainable Sand is a co-product of iron ore processing. Based on adjustments in the operation, the sandy material, previously disposed in piles and dams, is now processed and transformed into a product, following the same

quality controls as in the iron ore production. This year, Vale will allocate around 1 million tons of sand, between sales and donations, for use in civil construction and tests in pavement, among other uses.

The report carried out by the universities, called “Ore-sand: A potential new solution to the mining tailings and global sand sustainability crises”, investigated whether sand from ore processing, described by the term “ore-sand”, could become a sustainable source of sand and at the same time reduce the volume of tailings generated by mining.

Material characterisation results from the report indicate that the sampled material is inert and non-toxic, and can be suitable for certain applications, either on its own or as a part of a blend, such as with coarser sand, in order to meet specific grading requirements. Separating and repurposing these sand-like materials before they are added to the waste stream would not only significantly reduce the volume of waste being generated but could also create a responsible source of sand.

The report found that, from a technical perspective, sand from iron ore operations can be a direct substitute for sand extracted from the environment in brick making, pavement, in embankments, and cement manufacturing. When mixed with coarser sand and other aggregates, it can be used in the production of concrete and mortar, drainage and soil improvement, and water treatment.

The life cycle assessment of “ore-sand”, based on the case of Vale's Sustainable Sand, also shows that this material has the potential to present lower net carbon emissions during its production when compared to sand extracted from the environment. However, to get a better idea of the potential of this reduction, it is necessary to carry out an assessment of the product's transport stage, which was not covered in this report.

### **Vale's Pioneering Spirit**

The partnership between Vale and the universities was born in an event held in 2018 at the Brazilian company's office in Switzerland, where Vale's engineer Emile Scheepers presented his research on applications for sandy material for the production of quartz surfaces used in, for example, kitchen countertops. This project began in 2013 and was followed by other research initiatives in Brazil aiming at the reduction of tailings in iron ore production.

“Vale has already invested around R\$ 50 million and has partnered with more than 40 organizations, including universities, research centers and national and foreign companies, to study applications for material from iron ore processing,” explains André Vilhena, manager of New Businesses at Vale. “Our aim is to innovate to make mining more sustainable and smart, promoting the circular economy and benefiting society.”

In 2021, Vale started selling Sustainable Sand, a co-product from iron ore processing. About 250,000 tons of sand were processed and destined for sale or donation for use in concrete, mortar, prefabricated materials, artifacts, cement and road paving. Each ton of sand produced represents one ton less of tailings being disposed of in piles or dams.

Among the research initiatives, Vale has maintained since 2020 the Pico Block Factory, the first pilot plant for products for civil construction whose main raw material is mining tailings. Set up at Pico Mine, in the municipality of Itabirito (MG), the factory has the technical cooperation of the Federal Center for Technological Education of Minas Gerais (CEFET-MG). Ten researchers from the institution are working on the research during this period.

In the end of March, Vale inaugurated the first road in Brazil using “ore-sand” in all four layers of the pavement. The 425m long road at the Cauê mine, in Itabira (MG), will be monitored for two years with 96 pressure, temperature, deformation and humidity sensors. Tests carried out during five years in laboratory showed an increase in lifespan of around 50% and

a cost reduction of 20% when compared to the most commonly used materials for road construction, such as sand extracted from the environment. In addition, each kilometer of pavement can consume up to 7,000 tons of tailings.

### **Sand sustainability: a global problem**

Sand is the world's most exploited natural resource after water, with applications ranging from concrete and asphalt to the manufacture of glass and chips for the electronics industry. In the last two decades, demand has tripled due to urbanization and population growth in Asia and Africa. By 2030, demand is expected to reach 50 billion tons per year.

Findings from the “ore-sand” report were presented at the 5th United Nations Environment Assembly, held in March in Nairobi, Kenya. A new Assembly resolution on “environmental aspects of managing minerals and metals”, ratified by all member countries, advocates strengthening scientific, technical and political knowledge regarding sand to support global policies and actions related to its environmentally adequate extraction and use.

#### **More information**

---



#### **Media Relations Office**

[imprensa@vale.com](mailto:imprensa@vale.com)

[Click here](#) to see our contacts