

# New methodology assesses risk of scarce metals

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Yale researchers have developed a methodology for governments and corporations to determine the availability of critical metals, according to a paper in *Environmental Science & Technology*.

In "[Methodology](#) of Metal Criticality Determination," the researchers evaluate the importance of scarce metals using a methodology that determines their supply risk, environmental implications, and vulnerability to supply restriction.

"In the past few years, a number of organizations have attempted to evaluate metal criticality, but the methods used have varied widely and so have the results," said Thomas Graedel, Clifton R. Musser Professor of Industrial Ecology at Yale. "This is the first time that this topic has been addressed in the peer-reviewed literature."

The criticality methodology, based on a U.S. National Research Council template, is designed to help corporations and national governments evaluate the risk of not having access to critical metals and to inform strategic decision-making around resource use.

"If you're a corporation, you don't want to design and manufacture something only to find out that you don't have important materials," he said.

The criticality methodology evaluates supply risk for entities that use metals on the basis of three components: geological, technological and

economic; social and regulatory; and geological. The first of these components measures the potential availability of a metal's supplies, and the latter two address the degree to which the availability of the supply might be constrained.

According to the paper, the most obvious questions related to a metal's availability in the ground are how much there is, whether it is technologically feasible to obtain, and whether it is economically practical to do so.

Regulations and social attitudes can either impede or expedite the development of mineral resources. For example, communities are aware of the potential for environmental damage from tailings ponds and may resist the development of a new mine.

Governmental policies, actions and stability can significantly affect the ability to obtain mineral resources. Graedel said that, in general, the more concentrated the mineral deposits in one area, the higher the risk of supply restriction.

"This work was stimulated by China's attempt to hoard rare earth metals, which are being almost entirely mined and processed in China," said Graedel. "We asked ourselves: How do you know what's scarce? If you know a [metal](#) is scarce, how do you know if you should worry about it? We think this methodology has substantial legitimacy."

**More information:** Criticality of the Geological Copper Family, *Environ. Sci. Technol.*, 2012, 46 (2), pp 1071–1078. DOI: 10.1021/es203535w

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