



# Deep-Sea Mining at a Crossroad

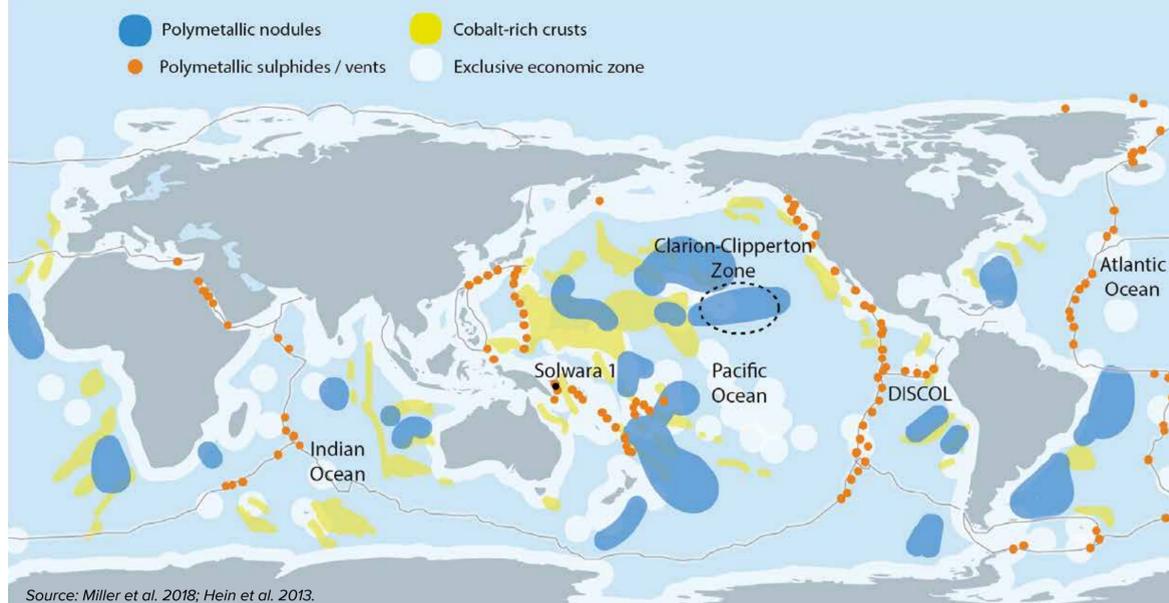
Permits won't be given until environmental, economic regulations are developed.

BY JOHN KOSOWATZ

As decarbonization pushes the economy to greater amounts of renewable energy and electric vehicles, the need for even more rare and other metals also increases. Copper, nickel, lithium, and cobalt are just some of the metals in limited supply. Demand for nickel jumped 70 percent and nickel 40 percent, according to the International Energy Agency. But finding new deposits and then building and operating the mines also poses environmental challenges and protests. There is another source that could solve many of the supply problems and it is on the bottom of the oceans.

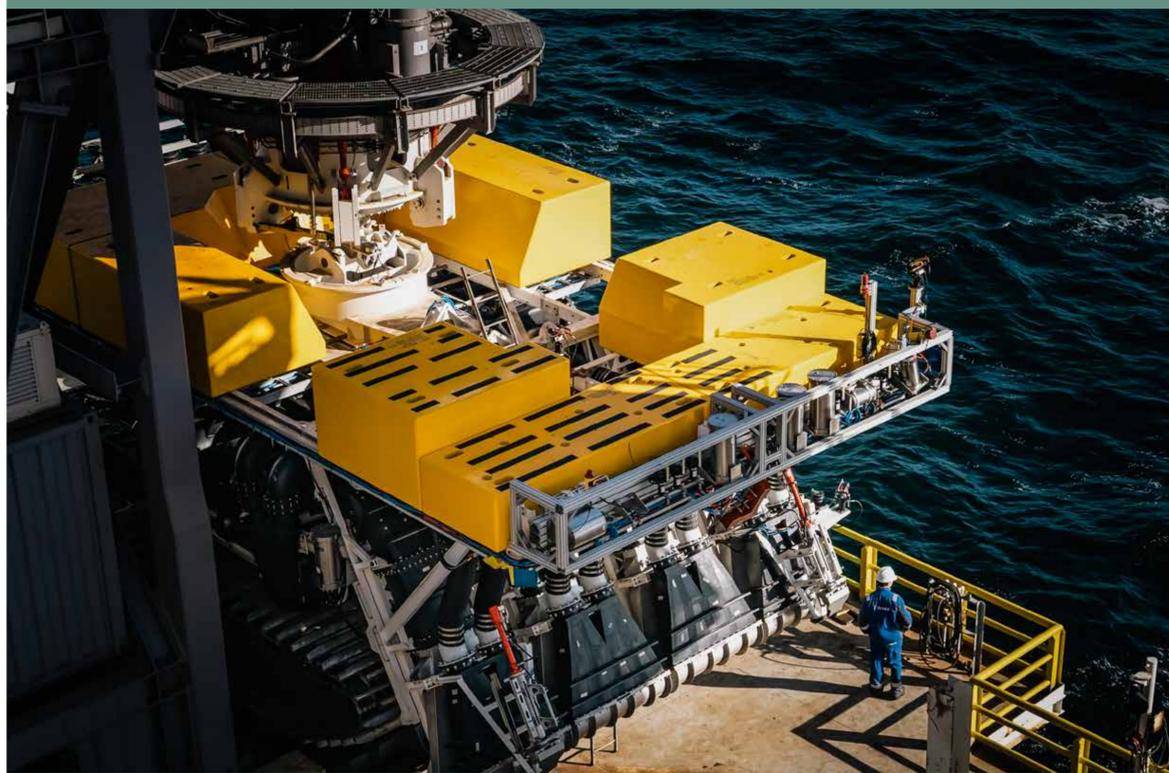
The sea floor is littered with billions of potato-size rocks called polymetallic nodules that contain large amounts of the needed metals. Private firms have been developing tractor-sized equipment to gather and collect them from the sea floor to the surface. But environmental and licensing issues are growing: Scientists worry about disruption to sea life on the ocean floor and in the water column, even at great depths. Now, Great Britain is among 22 nations backing a moratorium on commercial deep-sea mining, partly over concerns that large-scale mining could affect the ability of the ocean to absorb carbon dioxide.

## MINDING THE OCEAN FLOOR



The International Seabed Authority (ISA) is a United Nations agency tasked with regulating deep international waters. So far it has issued 30 exploration licenses to 22 countries. The authority is working to adopt a deep-sea mining code by 2025, which may open the door for mining to begin. Much of the interest is in the Clarion-Clipperton Fracture Zone, over 17 million square miles of ocean bottom at depths of 13,000 to 19,000 feet between Hawaii and Mexico. Member states have agreed that no mining will begin before environmental and economic regulations are developed and passed, according to ISA. Opponents claim the effect of mining on marine life is unknown but threatened by the dispersal of sediment that could suffocate bottom dwellers, along with noise and light.

## MINING THE OCEAN FLOOR



The Metals Company is a Canadian firm poised to deep-sea mine. In 2022, it conducted successful tests of its pilot collector vehicle over 80 kilometers of ocean floor. It achieved all production goals and reached a sustained production rate of 86.4 tonnes of nodules per hour. Over 3,000-tonnes of nodules were brought to the surface production vessel through a 4.3-kilometer riser system.

The 12-meter collector vehicle was designed and built by the Dutch firm Allseas, and launched from the production vessel Hidden Gem, a converted ultra-deepwater drill ship. It collects nodules from the ocean floor and is powered and operated from the surface using a 5,000-meter umbilical cable. Over 90 percent of entrained sediment is separated from the nodules inside the machine and discharged behind it. The control system includes artificial intelligence to create a virtual replica of the deep-ocean environment, according to Deep Metals. It plans to submit an application to operate in summer 2024.