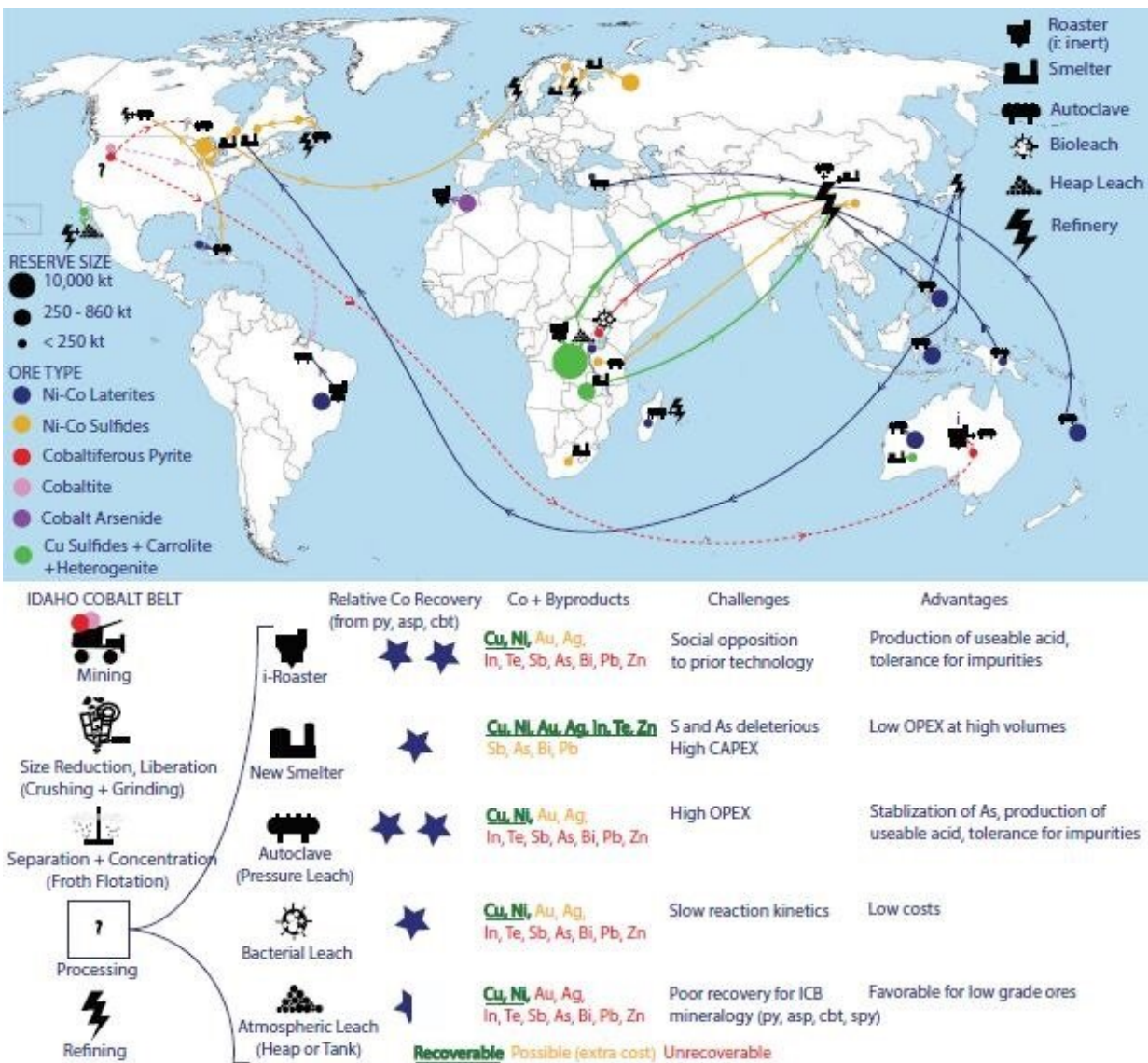


How much cobalt can be mined in the US?

Study examines domestic mining site in Idaho

June 6 2023, by Laura Fattaruso



Global cobalt mining and processing facilities. Credit: *Geology* (2023). DOI: 10.1130/G51160.1

A new study published in *Geology* evaluates the potential for cobalt extraction from the Idaho Cobalt Belt (ICB) of east-central Idaho, using a detailed study of the Iron Creek deposit. The ICB hosts the second-largest known domestic resource of the critical mineral cobalt, one of the key ingredients in many rechargeable batteries needed for the green energy transition.

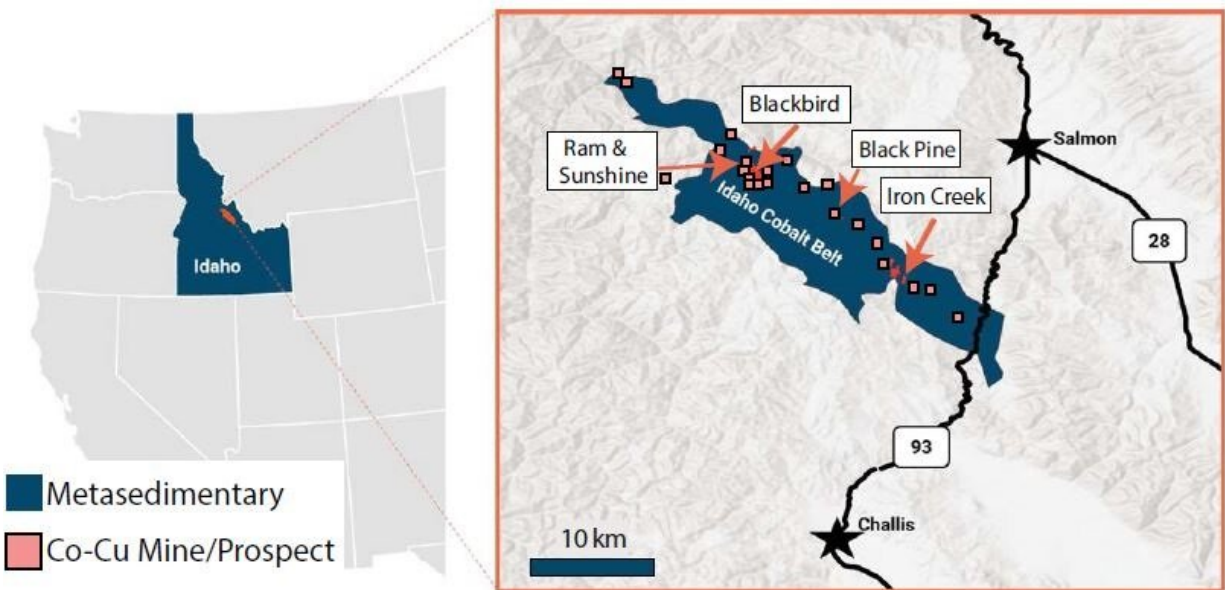
Demand for [cobalt](#) is projected to increase more than 500% by 2050. Roughly 70% of the cobalt mined globally is from the Democratic Republic of the Congo, where mining practices have been criticized for [human rights violations](#) including hazardous working conditions, child labor, and human trafficking. The Biden administration has prioritized increasing the domestic production of critical minerals in the United States, invoking the Defense Production Act in 2022 to increase [mineral](#) development, and generating renewed interest in the ICB.

Understanding the mineralogy of the Iron Creek deposit is core to evaluating the amount of cobalt and other critical minerals that could be extracted from the site, and what methods are best for processing the ore. Cobalt was mined intermittently in the ICB during the 1900s, and the Blackbird Mine was designated as a Superfund site by the U.S. Environmental Protection Agency after closing. In 2022, the Australian mining company Jervois commenced mining at another site in the ICB. The Canadian company Electra Battery Materials has been exploring the Iron Creek deposit.

The rocks at Iron Creek are metasedimentary rocks of the Apple Creek Formation in the southwest Belt-Purcell Basin. The rocks of the Belt-

Purcell Basin, which stretches between the U.S. and Canada, are more than one billion years old and have historically been mined for lead, zinc, silver, copper, cobalt, and gold.

The Iron Creek site could produce at least 6,000 metric tons of cobalt, but possibly much more. According to the new study, the cobalt at Iron Creek is mainly found in cobaltiferous pyrite. Other deposits in the ICB host cobalt in two other minerals—cobaltiferous arsenopyrite and cobaltite. In Iron Creek pyrite, the cobalt is bound up in the [crystal lattice](#) where it is substituted for iron, which has the same elemental charge as cobalt. Elizabeth Holley, Associate Professor of Mining Engineering at the Colorado School of Mines, and lead author of the study explains, "The cobalt is sitting in the pyrite itself, which means that in order to get it out, you essentially have to wreck the pyrite structure."



ICB hosts the second largest known domestic resource of cobalt. Credit: Iron Creek deposit location, Idaho cobalt belt / Electra Battery Materials (2022)

The researchers also found inclusions within the pyrite of other critical minerals like tellurium, silver, and bismuth, but likely not enough to be economically viable for extraction under today's economic and technical constraints. Chalcopyrite in the rocks is also a potential source for copper. Despite renewed interest in domestic mining, the U.S. currently lacks the facilities needed to process the ore from the ICB into usable cobalt.

Holley explains, "If indeed the U.S. is interested in domestic supply chains for mining and processing of critical minerals, we don't have the infrastructure in the United States to process the cobalt that would come from the Idaho Cobalt Belt."

The study authors conclude that the ore from Idaho should be divided and processed for copper and cobalt separately. Chalcopyrite can be processed for copper in existing copper smelting facilities within the U.S., and minerals with cobalt would ideally be processed in an autoclave—either an existing facility in Canada, or a new one to be built in the U.S.

The study also documents existing global cobalt mining and processing facilities and the connections between them—highlighting that the vast majority of the global cobalt supply is mined in the Democratic Republic of the Congo and then processed in China.

Despite a high projected need for cobalt, [battery technologies](#) that use other ingredients have been gaining attention and popularity, such as lithium-[iron](#)-phosphate batteries, also called LFPs.

"Technology is evolving, and one of the new trendy research areas focuses on reducing the amount of cobalt in batteries. Will we still need the projected amounts of cobalt in the future? We don't know." says Holley.

More information: E.A. Holley et al, Cobalt mineralogy at the Iron Creek deposit, Idaho cobalt belt, USA: Implications for domestic critical mineral production, *Geology* (2023). [DOI: 10.1130/G51160.1](https://doi.org/10.1130/G51160.1)

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