

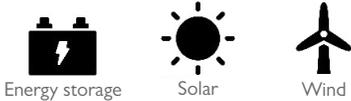
GREEN ENERGY MINERAL: KEY FACTS

Lead

US CRITICAL MINERAL?

NO

MAIN USES IN GREEN ENERGY TECHNOLOGY



KEY DEVELOPMENT ISSUES IN MINING



DEMAND PROJECTIONS

Lead is a main component of lead-acid batteries used in conventional cars as well as renewable energy storage. While lithium-ion batteries are lighter and more efficient, lead-acid batteries are low-cost and are projected to maintain a third of market share in decentralized energy storage by 2050. At centralized grid levels, however, lead-acid batteries are projected to hold a maximum market share of 5%. Lead is also used in soldering electronic components of photovoltaic panels and wind turbines. Lead usage stemming from renewable energies is projected to reach 781,000 tons per year by 2050 under a two-degree scenario, representing an 18% increase over 2018 global production levels (Hund et al, 2020).

PRODUCTION/RESERVES



Source: OECD

China is the largest producer of lead. In 2020, Chinese mines and smelters produced 1.9 million tons representing around 40% of global production. **Australia** was a distant second with 480,000 tons produced in 2020. However, Australia has the world's largest known lead reserves. The most common ore for lead is galena, which can also contain 1-2% silver. Galena tends to occur together with sphalerite, the main ore for zinc. As such, lead and zinc (and sometimes silver) are often produced from the same mines, and the lead-zinc industries are intertwined. Identified worldwide resources of lead are more than 2 billion tons. In the last five years, lead has hovered around \$2,000 per ton, with a high of \$2,700 in 2018 and a low near \$1,600 in early 2020.

MINING IN USAID-PRESENCE COUNTRIES

In 2020, medium-size lead producers in descending order of production volumes were **Mexico, Peru, India, Bolivia, Tajikistan, and Kazakhstan**. Smaller and emerging producers include **Bosnia-Herzegovina, Brazil, Burma, Cuba, Guatemala, Honduras, Indonesia, Kosovo, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nigeria, North Macedonia, Pakistan, South Africa, Uzbekistan, and Vietnam**.

MAJOR INDUSTRIAL COMPANIES

Teck Resources in Canada is a major producer of lead. Chinese mines and smelters are numerous and data is limited, but **Zijin Mining Group** operates the second largest zinc/lead mine in China Xinjiang's region, where major zinc/lead reserves are located, in addition to Inner Mongolia. State-owned company **China Minmetals Corp** is a major miner, trader, and smelter for numerous metals, including lead.

ARTISANAL AND SMALL-SCALE MINING (ASM)

A study from 20 years ago noted that 30% of China's lead and zinc comes from ASM (Gunson & Jian, 2001), but there is no recent information on this.

ISSUES IN USAID-PRESENCE COUNTRIES

Large lead/zinc mines have similar environmental and social challenges to other large-scale mining operations. For example, a large lead/zinc project in Indonesia faced opposition due to the placement of a tailings dam in a seismically unstable area of Sumatra above a dozen villages (Pearce, 2021). This has led to advocacy from local and international environmental organizations (Inclusive Development International, n.d.).

Lead's well-known toxicity also poses a health hazard to miners as well as surrounding community water supply. Often issues of lead poisoning occur during other types of mining, such as the case in Zamfara state in Nigeria in 2010 when hundreds of children died from lead exposure linked to artisanal gold mining (Avakian, n.d.). Lead exposure has also been a growing concern in China around its smelters (Hornby, 2009). In USAID-presence countries, some studies have been produced on drinking water contamination in or near lead mining areas, such as in Nigeria (Obiora et al., 2019).

MINE DEVELOPMENT AND SUPPLY CHAIN DYNAMICS

Lead demand and prices are likely to remain relatively stable in the coming decades. However, the increasing price of scrap metal combined with flat recycled (secondary) lead prices means margins will tight for secondary smelters.

ORGANIZATIONS AND INDUSTRY GROUPS

The **International Lead and Zinc Study Group**, founded in 1959, is an intergovernmental organization that produces research (International Lead and Zinc Study Group, n.d.).