

GREEN ENERGY MINERAL: KEY FACTS

Zinc

US CRITICAL MINERAL?

Not yet, but under review for inclusion

MAIN USES IN GREEN ENERGY TECHNOLOGY



KEY DEVELOPMENT ISSUES IN MINING



DEMAND PROJECTIONS

Zinc is used to coat (galvanize) steel in order to prevent rusting, providing many of the benefits of stainless steel at a lower cost. Nearly 98% of zinc demand from renewables comes from its use to galvanize wind turbines. Zinc is also used in less-used zinc-ion batteries as well as experimental zinc-air batteries for grid-level storage. Zinc oxide is used to increase the efficiency of newer solar panel technologies through increased conversion of solar energy into electricity. Zinc demand from renewables is projected to reach 1.2 million tons per year by 2050, which is around 9% more than 2018 global production levels (Hund et al., 2020).

PRODUCTION/RESERVES



The main zinc ore is sphalerite which tends to co-occur with galena, the main ore for lead. As such mines are general “lead-zinc” mines or “lead-zinc-silver” mines for galena that contains silver. Like lead, China is world’s largest producer of zinc with 4.2 million tons mined in 2020 or 35% of world production. **China** was followed by **Australia** with 1.4 million tons and **Peru** with 1.2 million tons. Australia and China have the largest known reserves. Zinc prices have ranged from \$1,800 to \$3,500 per ton in the last five years, with an average around \$2,500. At the time of writing in 2021, the price was approaching \$2,900.

MINING IN USAID-PRESENCE COUNTRIES

Peru is third largest producer with significant reserves. Other important producers include: **India, Mexico, Bolivia** (limited presence), and **Kazakhstan**. There are numerous smaller zinc producing countries with USAID presence such as: **Armenia, Bosnia-Herzegovina, Burkina Faso, Burma, Chile** (limited presence), **Cuba, DRC, Dominican Republic, Honduras, Indonesia, Kosovo, Mongolia, Montenegro, Morocco, Namibia, Nigeria, North Macedonia, Pakistan, Serbia, South Africa, Tajikistan, Uzbekistan, Vietnam, and Zambia**. Namibia has a unique deposit that produces special high-grade zinc that commands a premium.

MAJOR INDUSTRIAL COMPANIES

Major zinc producing mining companies are **Glencore** (Switzerland-based), **Hindustan Zinc** (India), **Teck Resources** (Canada), **Boliden AB** (Sweden), **Zijin Mining Group** (China) and **MMG** (owned by China Minmetals Corporation).

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. Another report from over a decade ago notes ASM zinc in Bolivia (IIED, 2002).

ISSUES IN USAID-PRESENCE COUNTRIES

The same environmental concerns noted in the section on lead apply to zinc miners as they are generally the same mines. Most public reporting and academic literature focuses on the environmental impacts of zinc mining and smelting in China. Heavy metal contamination of soils and water are the top issues. USAID-presence countries are susceptible to the same problems. While most smelting is in China, there is a smelter in Namibia at its major zinc mine Skorpion which produces high grade zinc that fetches a market premium (Wadlow, 2002). The public participation process used in establishing the mine and refinery was highlighted as a positive case study by the US Environmental Protection Agency (EPA, n.d.).

MINE DEVELOPMENT AND SUPPLY CHAIN DYNAMICS

Zinc mines generally produce a concentrate which is then processed and refined by a smelter. Many smelters are located in China, though the larger multinational mining companies like Glencore run both mines and smelters/refineries (Glencore, n.d.). Many analysts have a mixed outlook on zinc due to potential oversupply of both zinc concentrate and zinc metal, but so far prices have remained relatively stable and are foreseen to stay that way (Wood Mackenzie, n.d.). Zinc and lead prices are often tracked together, though they can diverge significantly (Home, 2020).

ORGANIZATIONS AND INDUSTRY GROUPS

The **International Zinc Association** is the main global industry group. The **International Lead and Zinc Study Group** is an intergovernmental organization dedicated to zinc and lead research and communication.