



## COBALT IS INDISPENSABLE FOR THE GREEN ENERGY TRANSITION, ENABLING TECHNOLOGIES AND ENSURING NATIONAL SECURITY

It is a critical component of lithium-ion batteries that give electric vehicles the range and durability needed by consumers. It is also used in electronic devices, renewable energy storage, jet engines, power plants, and pigments. Cobalt is infinitely recyclable, making it a strategic source that is essential to achieving the net-zero 2050 targets.

### COBALT RESERVES

Total world reserves are estimated to be around 11 million tonnes. Additionally, more than 120 million tonnes of cobalt resources have been identified in polymetallic nodules and crusts on the floor of the Atlantic, Indian, and Pacific Oceans.



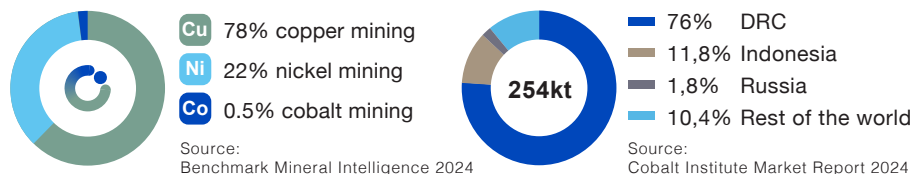
Source: US Geological Survey 2024

### COBALT VALUE CHAIN



### COBALT MINING

**99%** of cobalt is mined as a by product of copper or nickel



**Cobalt is mined in several countries, mostly produced as a by-product from copper and nickel industrial mines.**

The Democratic Republic of the Congo (DRC) is by far the largest cobalt producer where the vast majority is mined industrially in the Haut-Katanga and Lualaba provinces in the Copperbelt.

Industrial mining is capital-intensive and highly-mechanised with high rates of production, typically performed by multi-national or multi-site companies. They can make a significant contribution to the socio-economic development of host countries.

A minor portion of cobalt production in the DRC takes place via artisanal and small-scale mining (ASM). ASM is typically formal or informal mining operations that is highly labour-intensive.

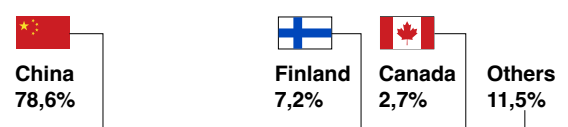
Due to market surplus, ASM production has reached a record low, with ASM accounting for an estimated 2% of total cobalt supply from the DRC in 2024 (Cobalt Market Review, Darton Commodities; Cobalt Market Report 2024, Benchmark Mineral Intelligence).

The number of people involved in ASM, and the volumes produced, swing considerably from year to year depending on the cobalt price itself and the cobalt price relative to the prices of other raw materials, principally copper.

**RESPONSIBLE MINING PRACTICES ARE A PRIORITY FOR THE COBALT INDUSTRY. COLLECTIVE ACTION WILL SUPPORT THE FORMALISATION OF ASM AND ADDRESS THE ROOT CAUSES THAT STEM FROM POVERTY.**

### COBALT REFINING

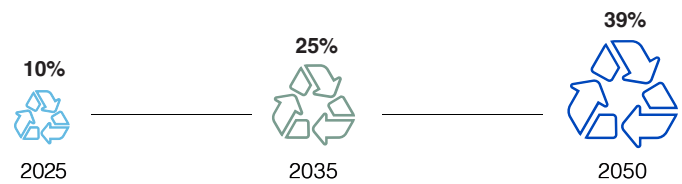
After cobalt is sourced and processed, refining is needed for most applications, including electric vehicle (EV) batteries. Primary refined supply, including both metal and chemical products, reached 222kt in 2024.



Source: Cobalt Institute Market Report 2024

## COBALT RECYCLING

**Cobalt is highly recyclable, contributing to a smart and circular world.** The recovery of cobalt is one of the main drivers that makes recycling of lithium-ion batteries attractive for recyclers. Recycling is expected to continue to rise, especially as the volume of EV batteries reaching end of life is expected to grow 30% per annum until 2035, significantly increasing flows of cobalt supply from scrap.



Source: A Just Cobalt Decarbonisation Pathway Report, November 2024

## COBALT MARKET



**Cobalt demand exceeded 200kt for the first time in 2024, growing by 14% y-o-y and marking the strongest annual growth since 2021.** Demand rose by 27kt annually, more than double the 12kt of annual growth in 2023. The largest end use market, electric vehicle (EV) batteries, gained further demand share in 2024 – reaching 43% of cobalt demand (+3% y-o-y) – and accounted for 61% of total annual demand growth. Cobalt demand from EVs totalled close to 95kt, up by 21% y-o-y.



**Mined cobalt supply exceeded 250kt in 2024, with total output up +22% y-o-y to 254kt (equivalent to +46kt).** The Democratic Republic of the Congo (DRC) was the biggest producer, accounting for 76% of mined output, with its contribution growing by +34kt compared with 2023. Indonesia was the second-largest producer, accounting for 30kt (+82% y-o-y), with growth in the country driven by several HPAL operations.



**Key sectors – EV batteries, aerospace, defence and consumer electronics – will increase cobalt demand three-fold by 2050,** driven by the global commitment to achieve the energy transition.



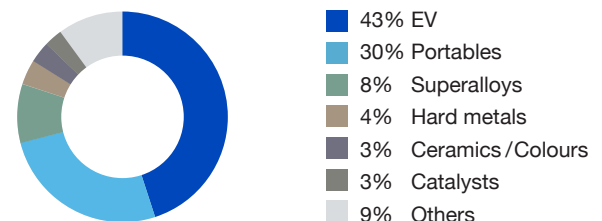
**Cobalt is a key part of several major battery chemistries, providing important stability and safety benefits.** Demand for Ni-Co chemistries (variants of NCM and NCA) rose by 10% y-o-y. Demand for cobalt-containing chemistries is expected to continue to see strong growth and maintain market share in the medium to long term.



**After 2023, the EV sector is solidifying itself as the biggest cobalt consumer.** By 2030 that is expected to even rise to 68% of the total cobalt demand. In comparison the portable electronics in 2030 will be expected to drop down to just 14% consumption.



**All the top 10 EV models in the US and Europe relied on cobalt-containing chemistries.**



Source: Cobalt Institute Market Report 2024

## 2050: INVESTMENT AND POLICIES NEEDED TO UNLOCK COBALT'S POTENTIAL

**Investment of over \$1.7 billion is required by 2050 to build the cobalt mines needed to meet global battery demand for net zero.**

**\$1,7 billion by 2050**

Source: Cobalt 2050: Unlocking Potential for a Net-Zero Future, BNEF

Good policies that incentivize demand, competitively grow supply and prioritize recycling will ensure cobalt can play its full role in delivering the energy transition.

**Cobalt Institute is a global industry association composed of producers, users, recyclers, and traders of cobalt. We promote the safe, sustainable and responsible production and use of cobalt in all its forms and uses.**



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