

COBALT IS A TECHNOLOGY-ENABLING METAL THAT IS PART OF THE SOLUTION TO THE GREEN ENERGY TRANSITION.

It is a key part of the lithium-ion batteries that give electric vehicles the range and durability needed by consumers. It is also used in electronic devices, jet engines and renewable energy storage, to name a few. Additional cobalt chemical properties allow for hard wearing and abrasion resistance, advanced pigment solutions and various other uses. Cobalt can be recycled and reused over and over, playing an essential role in the green energy transition.

COBALT RESERVES

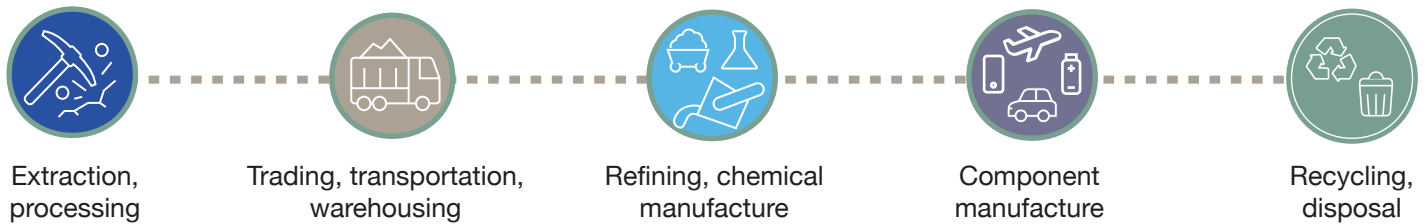
Total world reserves are estimated to be around 8.3 million tons of contained cobalt. Additionally, more than 120 million tons of cobalt resources have been identified in polymetallic nodules and crusts on the floor of the Atlantic, Indian, and Pacific Oceans.



Source: US Geological Survey.

COBALT SUPPLY CHAIN

KEY STAGES:



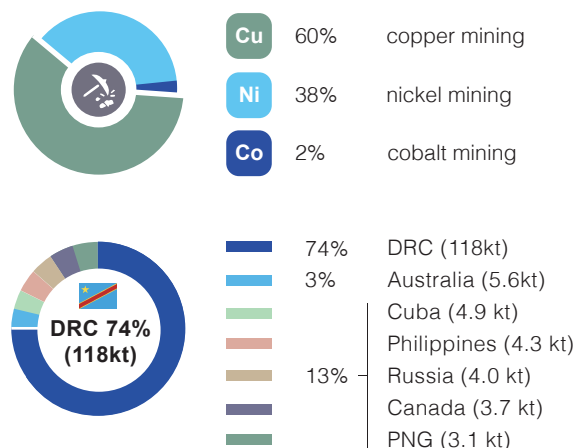
COBALT MINING

98% of cobalt is mined as a by product of copper or nickel.

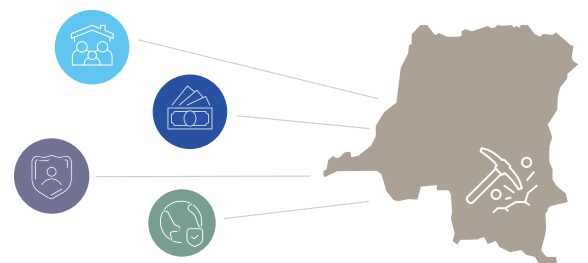
Cobalt is mined in several countries, with the Democratic Republic of the Congo (DRC) being by far the largest producer. Mineral extraction accounts for 90% of the country's exports and constitutes a core element of the Congolese economy. The majority of all cobalt mined in the DRC comes from large scale mines that are mostly operated by large-scale mining companies. They make a significant contribution to the social and economic development of the country.

100,000 to 200,000 people work in ASM, and many more depend on their income. Around 12% (14,5 kt) of cobalt mined in the DRC comes from the artisanal and small-scale mining sector (ASM), where independent miners use their own resources to extract the mineral. ASM is often associated with human rights issues and low levels of safety measures.

RESPONSIBLE MINING PRACTICES ARE A PRIORITY FOR THE COBALT INDUSTRY. IT IS IMPORTANT TO FORMALISE ARTISANAL MINING TO END POOR PRACTICES WHILE ALLOWING PEOPLE A SOURCE OF LIVING.



Source: Cobalt Institute Market Report 2021.

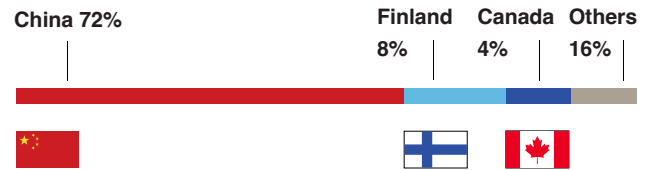


COBALT REFINING

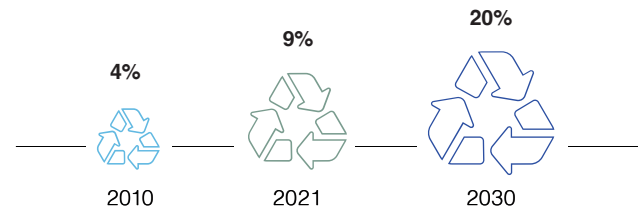
After cobalt is sourced and processed, refining is needed for most applications, including electric vehicle (EV) batteries. Primary refined supply, including both metal and chemical products, reached 144 kt in 2021.

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 due to new technological innovations that will come onstream.



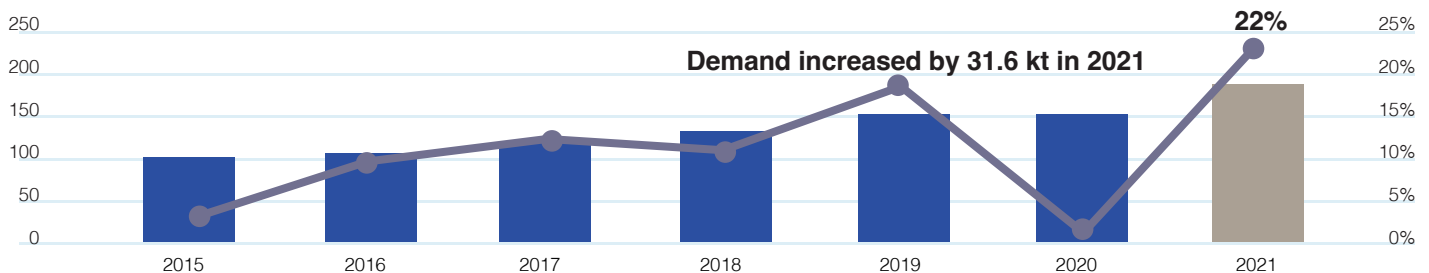
Source: Wood Mackenzie.



Source: Cobalt Value Chain Report.

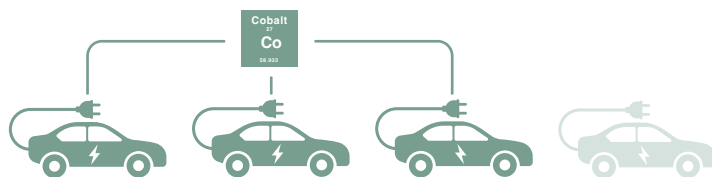
COBALT MARKET

In 2021, the cobalt market showed unprecedented demand growth of 22%. This upward trend is expected to continue, rising by about 13% per year for the next five years.



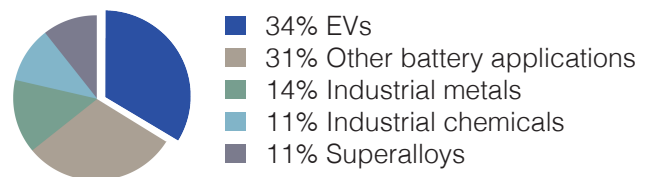
Source: Cobalt Institute Market Report 2021 (LHS: cobalt demand, kt Co; RHS: y/y growth, %).

Cobalt-containing battery chemistries account for three quarters (74%) of the global electric vehicles battery market – this is largely due to their superior energy density, with safety and performance ensured by cobalt.



Source: Cobalt Institute Market Report 2021.

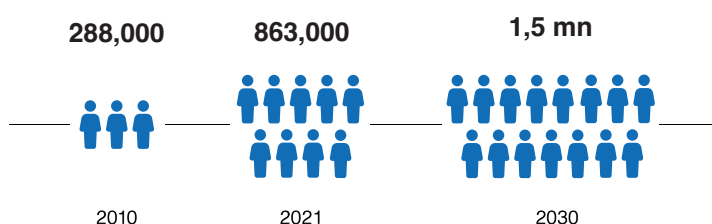
For the first time, EVs became cobalt's largest end use sector in 2021. It is expected to accounting for half of cobalt demand by 2026.



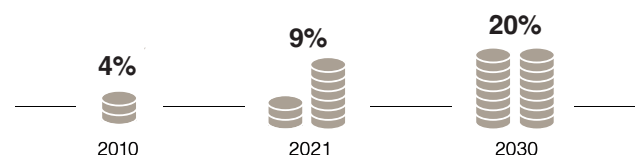
Source: Cobalt Institute Market Report 2021.

SOCIO-ECONOMIC CONTRIBUTION

The cobalt industry provided just under one million jobs globally in 2021, growing threefold since 2010. Three out of four jobs in the industry are indirect (subcontracting services to mining, refining, battery production), which shows multifaceted ecosystem of cobalt.



Globally the cobalt supply chain contributed 11bn \$ in taxes in 2021. This upward trend is expected to continue, reaching 19bn \$ in 2030. Refined production will account for the largest share on average measured over the 2010-2030 period representing 34% of the total tax contributions.



Source: The Global Cobalt Socio-Economic Analysis (SEA), Cobalt Institute, 2021.

About: The Cobalt Institute is a trade association composed of producers, users, recyclers, and traders of cobalt. We promote the sustainable and responsible production and use of cobalt in all its forms.