

Critical Raw Materials for EVs

ADDRESSING THE AVAILABILITY OF NICKEL

NICKEL

Nickel is a natural metallic element. It occurs extensively in the earth's crust and core and is the fifth-most common element. Nickel possesses physical and chemical properties which make it a valuable alloying material particularly with chromium and other metals to produce stainless steel and heat-resisting steels. It is used in many battery technologies because of its energy density and storage capabilities.

GLOBAL ELECTRIC CAR SALES ARE EXPECTED TO REACH ABOVE 40 MILLION BY 2030, WHICH ACCOUNTS FOR MORE THAN 30% OF ALL PASSENGER CAR SALES IN 2030*.

This increase in electric vehicle penetration, the growing use of nickel in batteries and the upsurge in energy storage systems are expected to drive and intensify nickel demand.

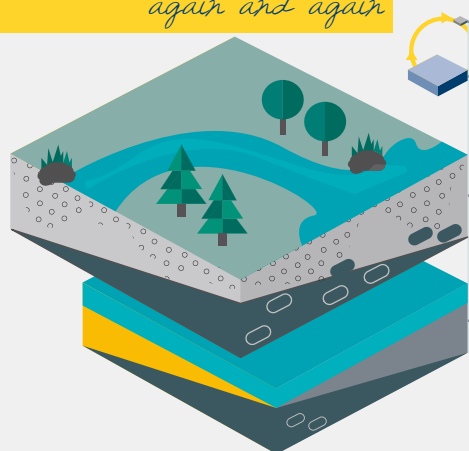
11% of nickel produced is currently used for batteries



69% of nickel produced is used for stainless steel

IS THERE ENOUGH NICKEL TO SATISFY FUTURE DEMAND ?

After reaching its end of life, nickel is recycled and used again and again



2,7mt
yearly production

+40 mt nickel
in use in society

350 mt nickel
available onshore

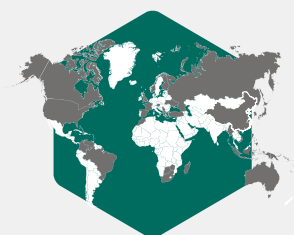
300 mt nickel
available offshore

NICKEL IS AVAILABLE TO MEET THE NEEDS OF FUTURE GENERATIONS

Nickel mine production is currently 2.7 mt with 4% annual growth in the past decade. Latest data show 350 mt of nickel in the ground available to satisfy demand, and another 300 mt in the deep sea.

The discovery of new nickel deposits, as well as technical advances in mining, extraction and recycling will increase the amount of available nickel, and secure a sufficient supply to meet the increase in demand.

THE GEOGRAPHIC WIDE SPREAD, LOW MARKET CONCENTRATION AND RESPONSIVENESS OF INDUSTRY ENSURES A SAFE AND CONTINUOUS SUPPLY OF NICKEL



GEOGRAPHIC WIDE SPREAD

Nickel is mined and produced in >25 countries, by a wide range of producers.



LOW MARKET CONCENTRATION

More than 100 companies are active in the nickel business. Top 10 producers hold less than 60% of the market share.

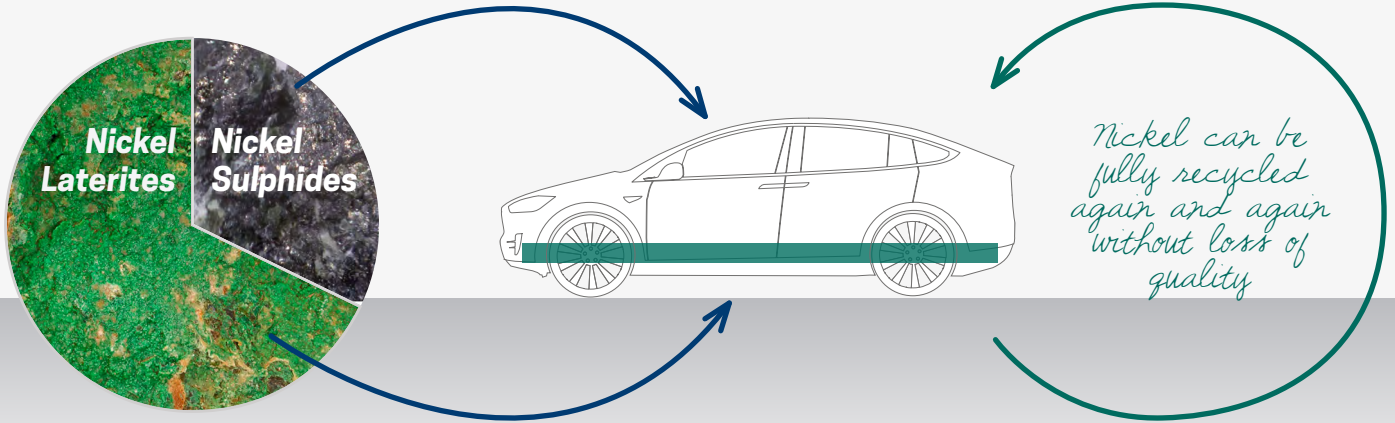


RESPONSIVE INDUSTRY

The nickel industry has been responsive to demand in the past by increasing production.

ARE ALL NICKEL ORES SUITABLE FOR BATTERIES?

Nickel is mined from two ore types: laterites, often found near the equator; and sulphides, found particularly in Canada, Russia and Australia. Both are used to produce nickel sulphate needed for cathode materials in nickel-containing batteries, such as Li-Ion batteries.



NICKEL FOR BATTERIES IS MADE FROM ALL NICKEL ORE TYPES AND FROM RECYCLING

**NICKEL FOR BATTERIES IS AVAILABLE FROM MULTIPLE SUPPLIERS ACROSS THE GLOBE
NICKEL IS AN ABUNDANT RESOURCE AND HIGH RECYCLING RATES MEAN THAT IT REMAINS AVAILABLE FOR
USE BY FUTURE GENERATIONS**



NICKEL IN BATTERIES

Energy density

Power density

Cycle life

Sources :