CHART OF THE MONTH

Vol.15

Energy Transition in Greece: Material Demand Forecast for Strategic Technologies

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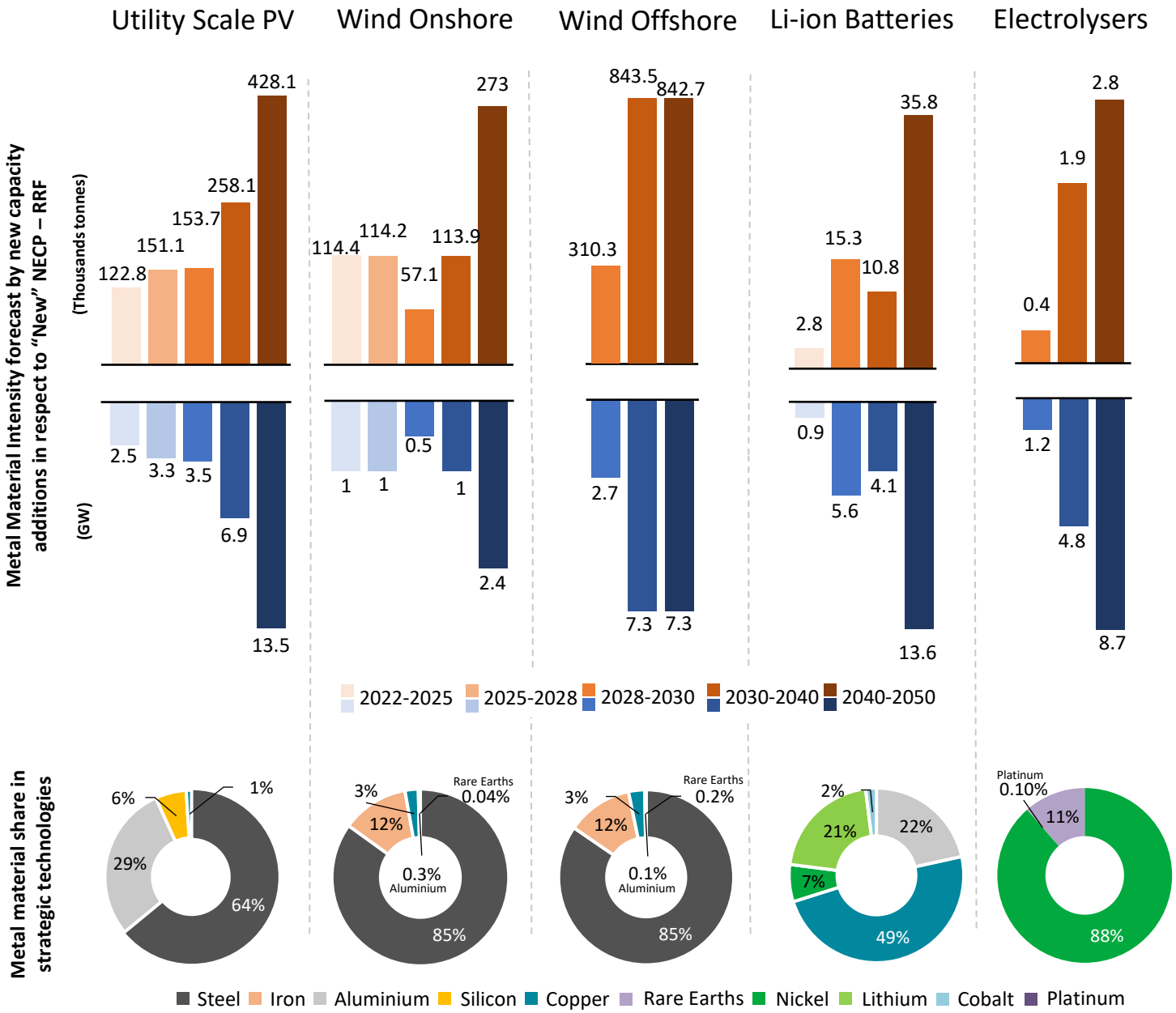
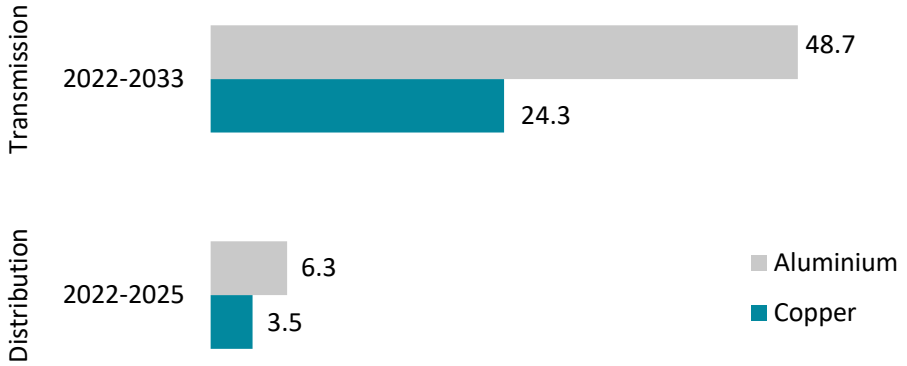
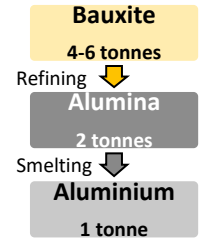


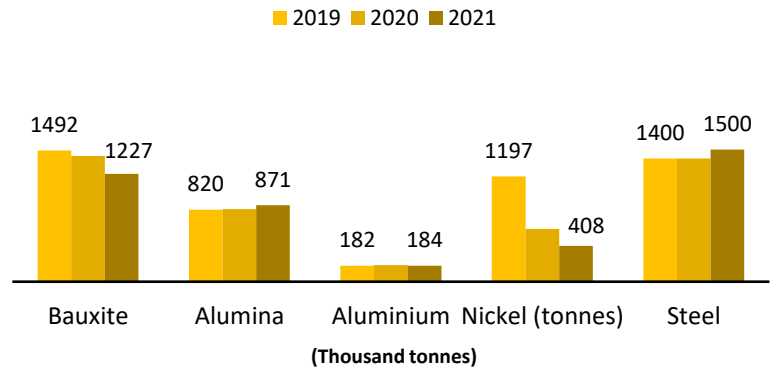
Demand for Copper and Aluminium for electricity grid expansion and replacement needs
(Thousands tonnes)



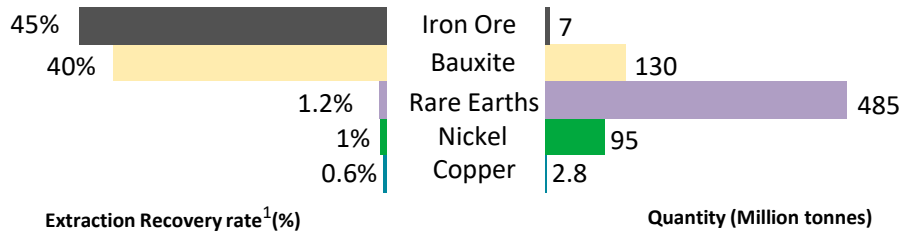
Greece's annual production of strategic products

Aluminium Production Process





Estimated Resources of Greece by Strategic Commodity



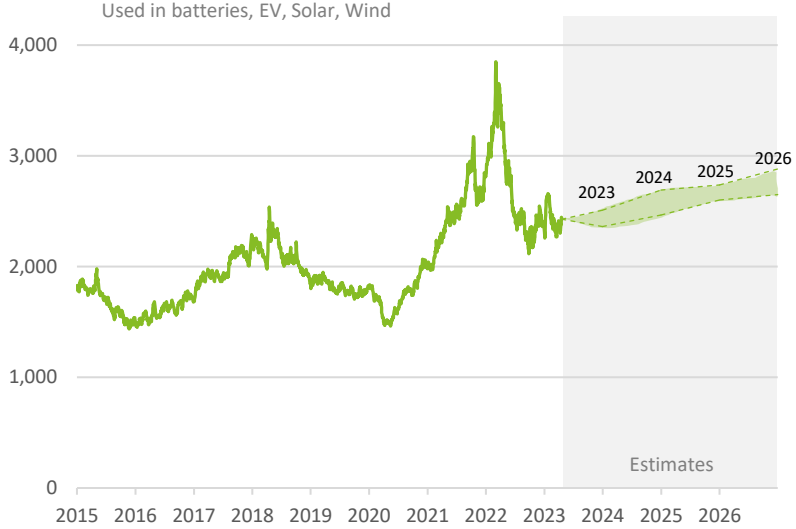
1 Weighted Average Grade, Lower value indicates proportion of the valuable material needs higher processing to be extracted.

Source: BNEF, IEA, JRC, IPTO, HEDNO ,USGS, NREL, World Steel, SME, HAEE Analysis

Critical Material prices evolution & forecasts

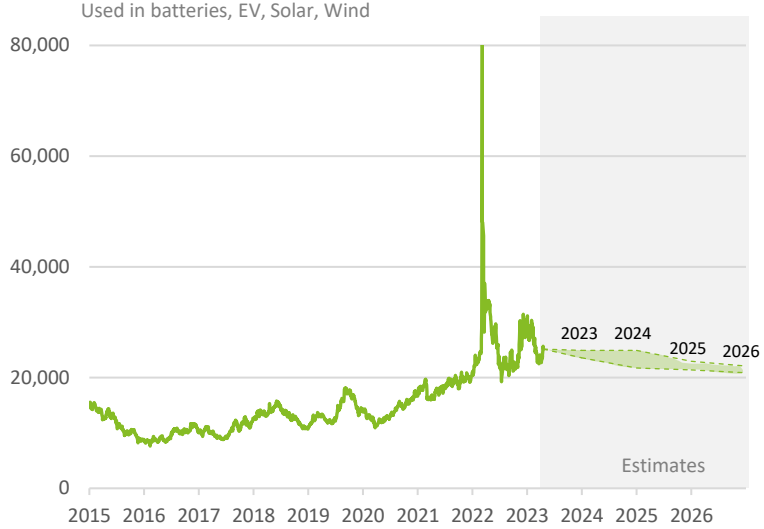
Aluminum ($/tn)

Used in batteries, EV, Solar, Wind



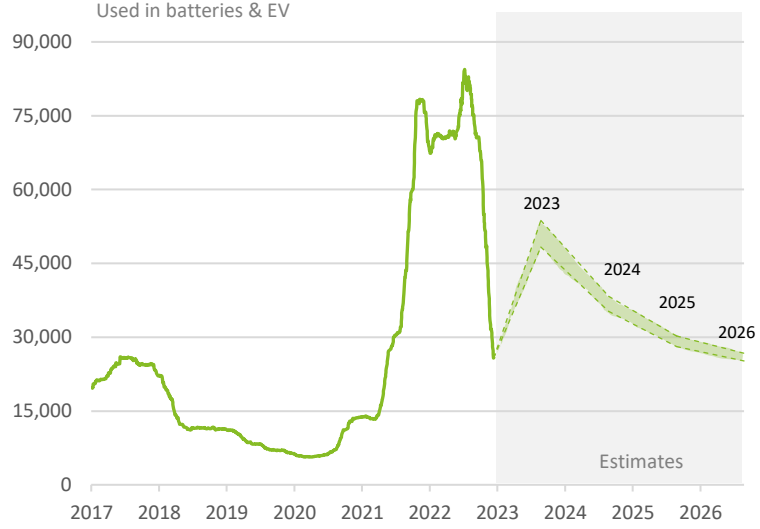
Nickel ($/tn)

Used in batteries, EV, Solar, Wind



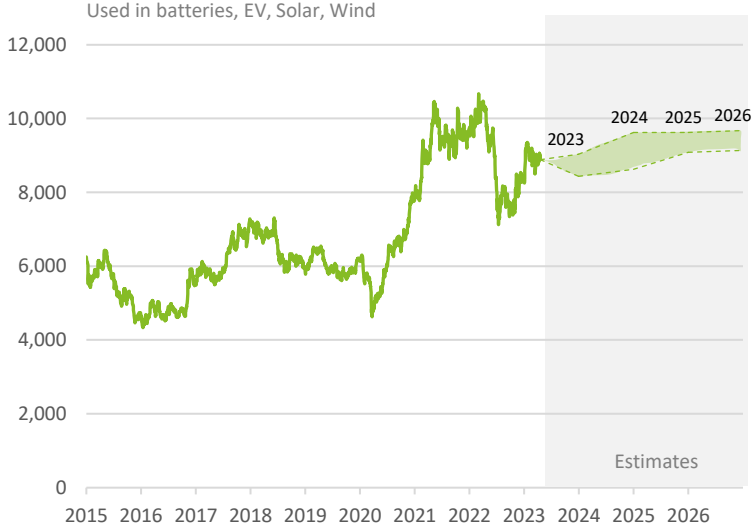
Lithium Carbonate ($/tn)

Used in batteries & EV



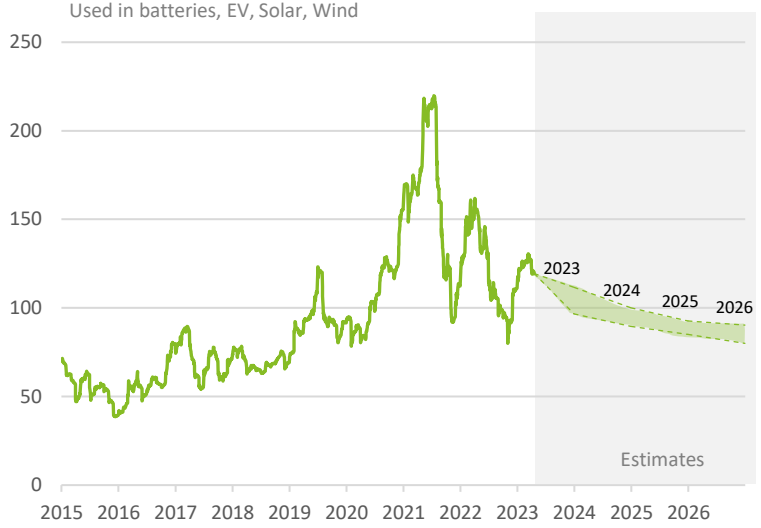
Copper ($/tn)

Used in batteries, EV, Solar, Wind



Iron Ore ($/tn)

Used in batteries, EV, Solar, Wind



*Prices as of 20/4/2023

Sources: Deloitte Analysis,Economist Intelligence Unit, Investing.com

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The new additional capacity of Solar parks is expected to increase by 1.16 GW per year till 2030 reaching a total of 14.1 GW. This corresponds to 427 ktonnes of metal intensity till 2030.

Greece targets to have additional 2.5 GW and 2.7 GW of Onshore and Offshore Wind by 2030, respectively. This designates to 596 ktonnes of metals by 2030.

For Hydrogen, the electrolysis capacity target set is 1.2 GW by 2030 while for Li-ion batteries the installation of the first storage systems, with 900 MW capacity, must be completed by the end of 2025.

The most important metals by their share values are Steel, Aluminium, Copper, Lithium and Nickel. Steel comprises of 68% of the PV metal share. For Wind turbines the share of Steel and Iron covers around 97%. Nickel is the most important critical metal for electrolysis with 88% share.

The development of electricity infrastructure is a key strategic pillar for Greece. By IPTO's and HEDNO's development plan the total demand for copper and aluminium will be in the order of 83 ktonnes. Aluminium material share stands for 66% of the total metal needed for each km of grid.

Greece has significant quantities of strategic resources. The highest extracted and utilized are Bauxite, Iron ore and Nickel. Bauxite and Iron ore have the highest recovery rate of 35-40% and 45%, respectively.

In the case of Rare Earths, the inferred quantity according to USGS is 485 million tonnes but the low extraction recovery rate (1.17%) imply that a considerable amount of processing is required to extract a certain amount of the valuable material.

Greece has a favourable geological environment, and mines already five critical mineral raw materials to produce bauxite, nickel, cobalt, magnesite, and high-quality quartz to produce silicon metal. The estimated plan is to mine one critical raw material for copper production.

In 2021, Steel had the highest annual production in Greece, followed by bauxite, alumina, Nickel and Aluminium. Nickel annual production has reduced by 65.9% in respect to 2019.

In the last couple of years, critical material prices have reached all time highs. Prices have deescalated and stabilized to higher levels than before their peak. Forecasts for the upcoming years are indicating a pricier environment which could potentially damage the investment plans for RES development, thus resulting in delays in meeting decarbonization goals.

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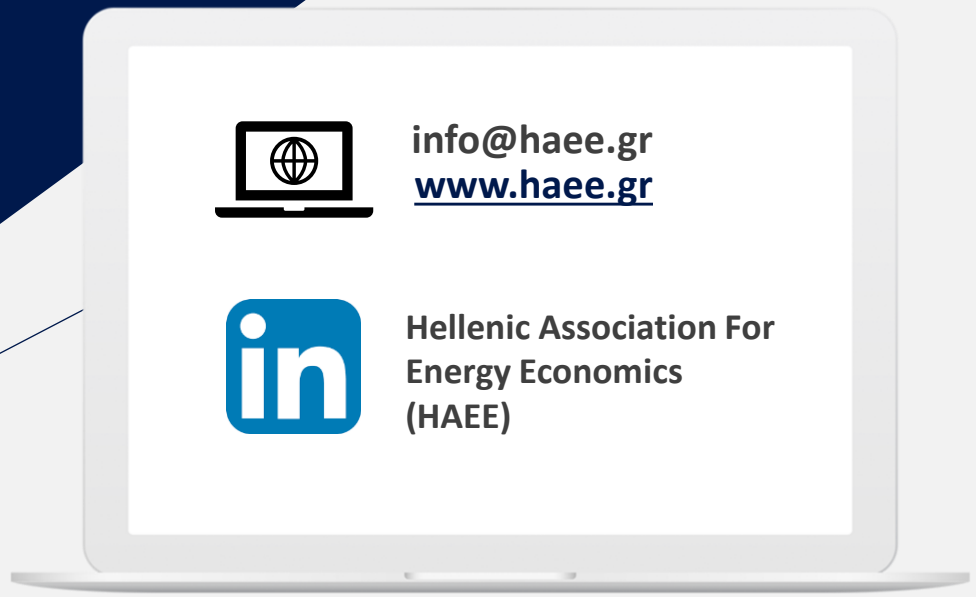

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