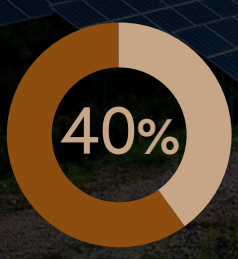
OUR ENERGY FUTURE DEPENDS ON MINING

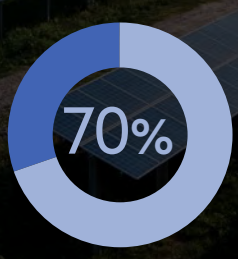
Global investments in advanced energy will increase 3x by 2030 reaching $4 trillion annually.[1] To be a world leader in energy technologies, the U.S. must increase domestic mining and secure its supply chains for the estimated **3 billion tons** of minerals and metals needed to deploy wind, solar and other advanced energy technologies.[2]

6x The energy sector's demand for minerals could grow **6x** by 2040

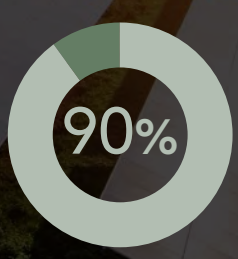
Advanced energy technologies are set to become the fastest-growing segment of demand for most minerals.[1]



Over **40%** of total copper and rare earth demand



70% of total nickel and cobalt demand



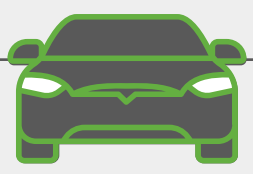
Nearly **90%** of total lithium demand

MINERALS OF OUR ENERGY FUTURE

Minerals are at the forefront of every major manufacturing supply chain and key to our energy transition.

TRANSPORTATION

2020 3M → **2040** 70M



By 2040, EV sales could exceed **70 million** cars compared to only **3 million** in 2020, causing mineral demands to increase **40x** current levels.[1]

4x EVs require **4x** as much copper as gas-powered vehicles.[3]

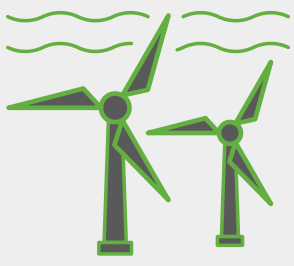
Depending on climate action and available technologies, growth in demand for EV battery minerals like **lithium**, **cobalt**, **graphite** and **nickel** could skyrocket by 2040 compared to 2020 levels:[1]

3 Li Lithium 6.94	28 Co Cobalt 58.933	Graphite	27 Ni Nickel 58.6934
Up to **51x** lithium	Up to **31x** cobalt	Up to **25x** graphite	Up to **20x** nickel

WIND AND SOLAR ENERGY

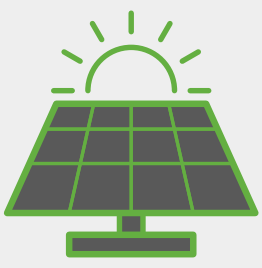
The World Bank expects global wind capacity to increase **3x** and solar capacity to increase **5x** by 2050.[2]

In the past decade alone, wind power capacity has already increased **4x**.[1]



A single 3 megawatt turbine requires:[4]

- **335 tons** of steel
- **4.7 tons** of copper
  - *Offshore wind could account for nearly **40%** of copper demand*[1]
- **3 tons** of aluminum
- **2 tons** of rare earths
- **1,200 tons** of concrete



Solar capacity has increased by almost **20x** over the past decade.[1]

A single solar panel requires:[4]

- **70%** glass
- **10%** polymer
- **7%** aluminum
- **4%** silicon
- **1%** copper
- <**0.1%** silver, tin, lead
  - *Solar accounts for **7%** of global silver demand*[1]

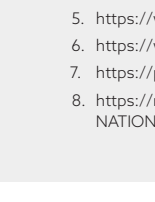
By 2040, growth in demand for solar technology could require:[1]

25 Mn Manganese 54.938	27 Ni Nickel 58.6934	24 Cr Chromium 51.9961	29 Cu Copper 63.546
92x manganese	**89x** nickel	**75x** chromium	**68x** copper

SMART CITIES

From energy-efficient buildings and homes to power grids and digital technology, smart cities are made possible by minerals.

Future energy transitions require a significant expansion of electricity grids or refurbishing existing grids to strengthen their resiliency and to improve digitalization, for smart and flexible grids:



- **2x** the copper and aluminum by 2040 for wires and cables.[1]

5G technology is the fastest growing mobile technology and is expected to unleash a massive ecosystem that would allow networks to serve billions of connected devices:[5]

- 5G requires **gallium** for semiconductors, **silver** to enable its networks, and **copper** to build base stations and data centers.[6]

Intelligent and sustainable buildings will define the future:[4]

- **Nickel** combined with **stainless steel** to provide cost-effective architecture
- **Limestone** to make insulated concrete for efficient temperature control
- **Copper** to improve conductivity and reduce energy consumption
- **Quartz** in windows to improve energy-efficiency
- **Gold** in solar panels to increase photovoltaic efficiency

ADVANCED ENERGY TECHNOLOGY DEPENDS ON STRONG DOMESTIC SUPPLY CHAINS

To deliver the future of advanced energy, the U.S. needs a strong and stable supply of domestic minerals. U.S. mineral import reliance has doubled over the past decade despite an estimated **$6.2 trillion worth of untapped mineral reserves** available on American soil. With commonsense reforms, domestic mining can support the growing need for minerals while providing high-paying jobs and maintaining strong environmental protections.

In 2020, the U.S. was **100%** import-reliant for **17** key minerals and more than **50%** import-reliant for **29** additional key minerals.[7]

87% of voters believe our material supply chains should use minerals sourced from U.S. mines.[8]

Policymakers need to support smart policies to ensure U.S. minerals mining is ready to supply these essential inputs. Here's how:

Embrace **efficient permitting** processes

Ensure fiscal policies **encourage investment**

Recognize the role of federal lands in **reducing import reliance**

Acknowledge **made in America** includes **mined in America**

Sources

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