

Renewable Energy: Foreign Minerals and Metals

Overview

Some renewable energy proponents suggest the only way for the United States to be truly energy independent is to discontinue all fossil fuel production and rely exclusively on wind, solar and other alternative energy resources.

Many of these forms of energy are highly dependent upon the importation of minerals, metals and other critical components whose production and processing are dominated by foreign nations. Many of these countries are not strategic partners of the United States, and do not have comprehensive labor or environmental standards.

Are wind and solar ‘free’ and can they truly provide independence?

While there clearly is no cost for the wind to blow and the sun to shine, there are significant costs associated with harnessing these intermittent resources. The energy provided must be captured, converted to electricity, stored, and then transmitted to consumers. The process to do so requires technology that is not only expensive but necessitates the sourcing of components that are manufactured from minerals, metals and other products, the vast majority of which must be imported from other countries.

If we transition to electric vehicles, won’t we reduce our reliance on foreign countries from whom we import oil?

Matched with the correct energy policies, the United States has sufficient oil and natural gas resources to fuel our vehicle fleets and meet other consumer needs without being dependent on fuel from other countries.

Transitioning the U.S. vehicle fleet to all electric vehicles (EVs) requires significant amounts of materials for their production and operation from foreign sources. Just the batteries alone would *require* our reliance on foreign resources.

What are some critical components that solar panels, wind turbines and electric vehicles depend upon and where are they sourced?

According to the U.S. Geological Survey, below is a sampling of critical components necessary for solar, wind, and EV batteries and the U.S. dependence on each from foreign countries.



Cobalt Mine – Credit Electrek.co June 2020

These critical components have a finite limit of availability as well, and competition for them can often contribute to geopolitical issues.

Critical Component	Foreign Dependence
Aluminum	50%
Arsenic	100%
Cobalt	61%
Gallium	100%
Germanium	50%
Graphite	100%
Indium	100%
Lithium	50%
Manganese	100%
Tellurium	75%

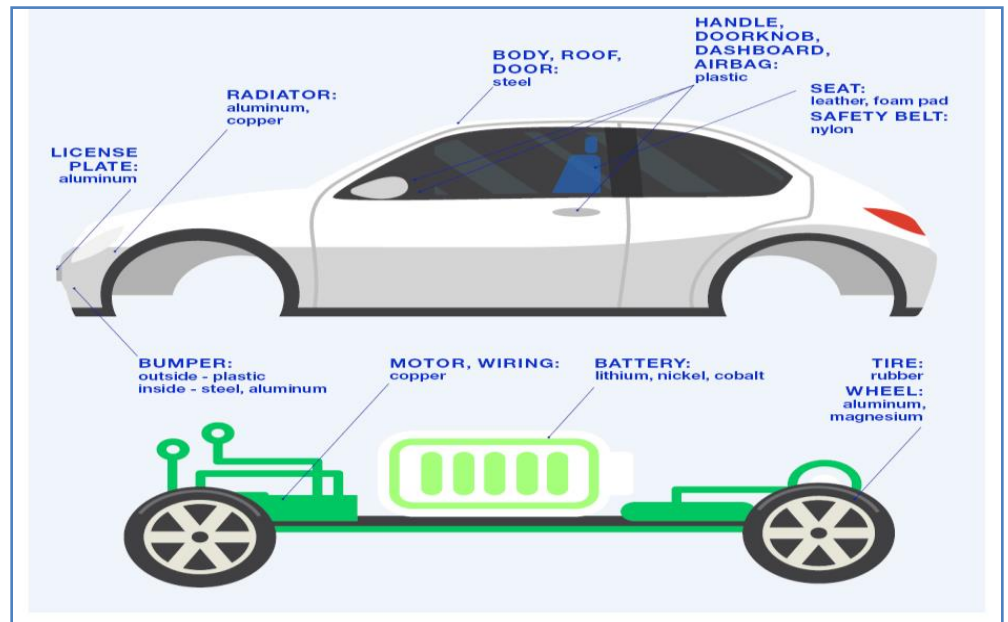
Source: USGS – Critical Mineral Commodities in Renewable Energy June 2019

Don't electric vehicles free us from fossil fuels?

Natural gas liquids are the fundamental building blocks for a host of components found in all vehicles, including EVs. These include vehicle chassis components, bodies, bumpers, interior components, various interfaces with the electronics of a vehicle, as well as the many safety features included, like airbags and seat belts. In addition to the manufacturing components, natural gas generates more than 50% of the electricity in Pennsylvania which is used to power the vehicle.

More EVs equates to more fossil fuels necessary to manufacture and power them.

What are some of the countries relied upon for the critical components to build renewable energy generators and electric vehicles?

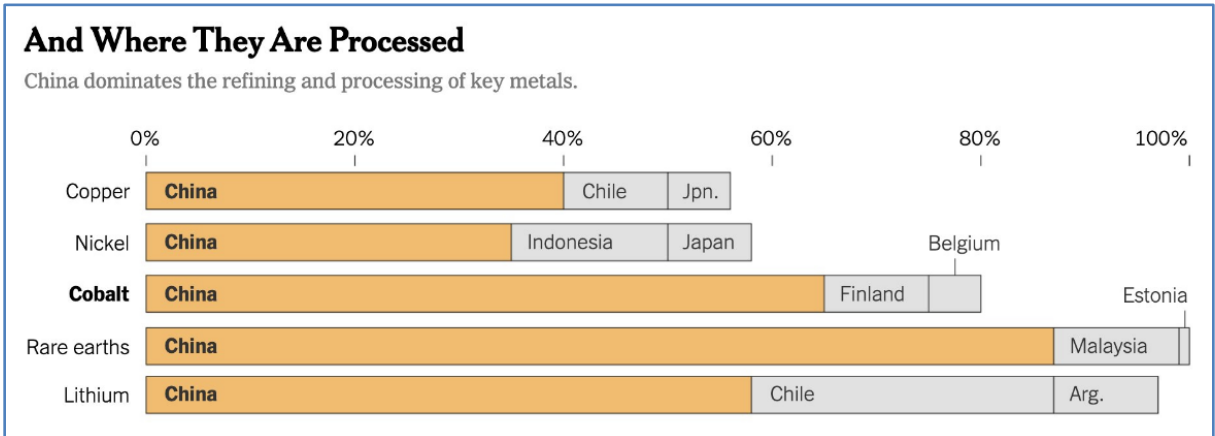


Source: Samsung C&T Trading & Investment

The Democratic Republic of the Congo in Africa produces 70% of the world's cobalt, a key component of the lithium-ion batteries in EVs.

China processes over 90% of the rare earth minerals and elements used to manufacture solar and wind components as well as EVs. Most other countries that produce such minerals and elements must rely upon China to refine them so they can be used in the manufacturing process.

Are there any concerns with sourcing critical components from other countries?



Source: International Energy Agency

Many other countries which currently produce and process critical components do not have the comprehensive environmental and labor standards employed in the United States. The lack of sufficient standards has significant environmental impacts, such as the production of toxic sludge which is often left untreated and held in unlined, open-air sludge lakes. Additionally, significant concerns related to the use of child and other forced labor in some countries has been raised.

Are there rare earth mineral deposits to be mined in the United States?

While the U.S. does have deposits of some rare earth elements, there is currently only one such mine active in the country, located in southern California. It is principally used to retrieve elements critical to military defense.



Toxic rare earth mineral sludge lake, Inner Mongolia. Credit: Liam Young/Unknown Fields www.bbc.com April 2015

Recently, the Biden Administration cancelled federal permits that would have allowed a proposed copper and nickel mine in Minnesota to move forward, while also suspending its review and approval of a project that would open up access to copper, cobalt and zinc in Alaska. However, even if domestic production of these deposits increased, the U.S. would still have to rely primarily on China to refine these elements.