

Risk and Reliance: The U.S. Economy and Mineral Resources

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The USGS National Minerals Information Center tracks how much the United States relies on other countries for minerals critical to the economy and national security.

It's 1954. Elvis Presley has released his first single; Ellis Island has closed; the first nuclear powered-submarine, the *USS Nautilus*, has launched; the first transistor radio has debuted; and the United States is fully reliant on foreign sources for only 8 mineral commodities.

Now, in 2016, the United States is fully reliant on foreign sources for 20 mineral commodities, including rare earth elements, manganese, and niobium. That is a 250 percent increase in 60 years, according to the 2017 USGS Mineral Commodity Summaries (<https://minerals.usgs.gov/minerals/pubs/mcs/>).

Contacts

Department of the Interior,
U.S. Geological Survey

Office of Communications and Publishing
12201 Sunrise Valley Drive
Reston, VA 20192
United States
Phone: 703-648-4460

Alex Demas (/staff-profiles/alex-demas)

Public Affairs Specialist
Office of Communications and Publishing
Email: apdemas@usgs.gov
(mailto:apdemas@usgs.gov)
Phone: 703-648-4421

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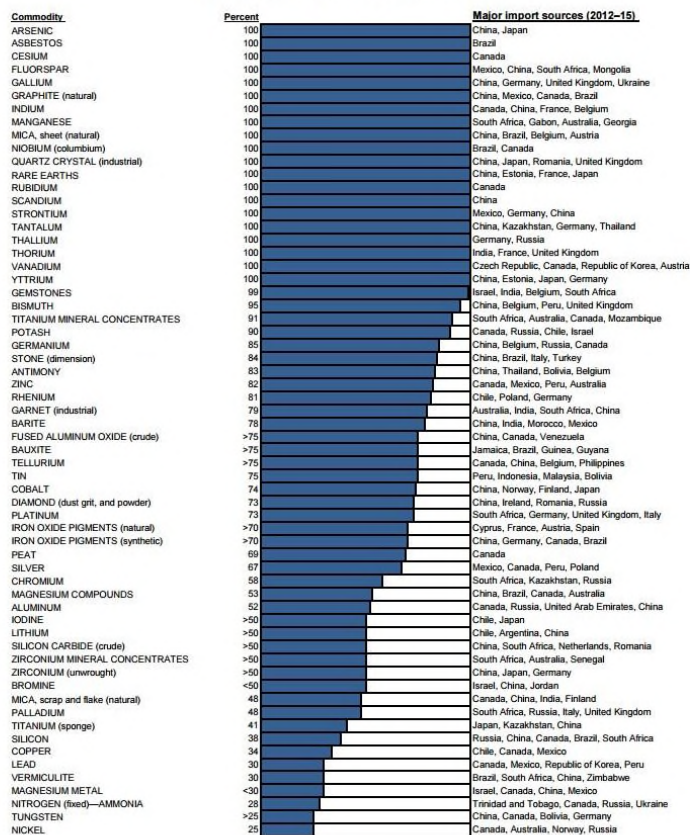
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2016 U.S. NET IMPORT RELIANCE



(/media/images/2016-us-net-import-reliance)

This chart shows several mineral commodities used by the United States, the percentage of each commodity that comes from foreign sources, and the major countries that supply that mineral to the United States. (Public domain.)

What is Net Import Reliance

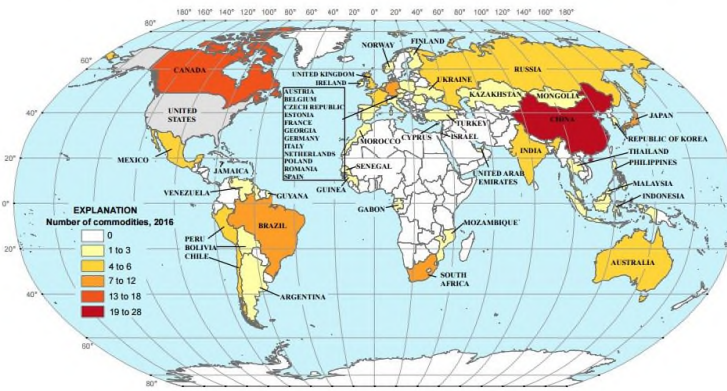
Net import reliance (<https://pubs.usgs.gov/fs/2015/3082/fs20153082.pdf>) refers to the percentage of a mineral commodity used by the United States that must be imported from another country. In 2016, the United States was 100 percent dependent on foreign sources for 20 of the 90 mineral commodities that USGS tracks.

Typically, the United States imports its mineral commodities from a wide variety of countries, and in no case is the United States fully reliant on a single country for a mineral resource. That being said, there are a few countries that the United States relies on for mineral commodities more than most.

China is the single largest source of mineral commodities for the United States, particularly for resources like rare earth elements (https://minerals.usgs.gov/minerals/pubs/commodity/rare_earths/), germanium (<https://minerals.usgs.gov/minerals/pubs/commodity/germanium/>), and industrial diamonds (<https://minerals.usgs.gov/minerals/pubs/commodity/diamond/>). In fact, of the 47 mineral commodities that the United States is more than 50 percent reliant on foreign sources, 24 came in part from China.

After China, the next largest source (<https://pubs.usgs.gov/fs/2015/3082/fs20153082.pdf>) of mineral commodities to the United States is Canada, which provides the United States with 16 different mineral commodities, with Mexico, Russia, and South Africa the next leading sources, each providing U.S. imports of 8 different nonfuel mineral commodities.

**MAJOR IMPORT SOURCES OF NONFUEL MINERAL COMMODITIES
FOR WHICH THE UNITED STATES WAS GREATER THAN 50% NET IMPORT RELIANT IN 2016**



Source: U.S. Geological Survey

(/media/images/major-import-sources-nonfuel-mineral-commodities-us)

This map shows the countries that supply mineral commodities for which the United States was more than 50 percent reliant on imports for its consumption in 2016. (Public domain.)

How Import Reliance Happens

One of the primary reasons the United States has become more reliant on foreign sources for mineral commodities is the large increase in mineral commodities used by the United States, both in type and quantity. For instance, a National Research Council report (<https://www.nap.edu/catalog/12034/minerals-critical-minerals-and-the-us-economy>) showed that computers went from using just 12 elements in the 1980s to as many as 60 by 2006.

Many of these minerals are not distributed evenly across the globe, and some countries have larger reserves than others. Chile, for instance, has more than twice the copper reserves (<https://minerals.usgs.gov/minerals/pubs/commodity/copper/>) of the country with the next largest (Australia), and provided the United States with 50 percent of its copper imports in 2016.

Another primary reason the United States has become more reliant on foreign sources for mineral commodities is the relative cost of production for the minerals. Policy decisions in the United States and other countries, as well as relative concentrations of mineral resources, affect the comparative cost of mineral production.



(/media/images/bastnaesite-reddish-parts-carbonatite)

This mineral is Bastnaesite (the reddish parts) in Carbonatite, a primary source of rare-earth elements (REE). REEs are used to make strong magnets for smartphone speakers, microphones, vibration motors, smartphone screens, as well as many other high-tech applications. The United States is currently 100% reliant on foreign sources of REEs and demand is satisfied by imports, primarily from China. In recent years, Chinese production has accounted for about 95 percent of the REE global market. (Credit: Scott Horvath, USGS. Public domain.)

Why Net Import Reliance Matters

The overall net import reliance of the United States for mineral commodities is important, because it affects the risk of the supply of these minerals for the U.S. economy and national security. The path by which these minerals reach the United States ranges from production and extraction, through refining, to shipping and transport. An interruption at any of those points can affect the supply.

Some minerals that the United States depends on are produced in, or must pass through, areas that have political stability issues. In addition, some minerals that the United States relies on are produced in areas that have historically opposed the United States in other political arenas.

In addition, some minerals are not produced or used in large supplies, so an interruption in the flow of that mineral, no matter how small, can have an immediate effect. Natural disasters can also affect the global supply of minerals. The 2011 Northern Honshu, Japan, earthquake (<https://archive.usgs.gov/archive/sites/www.usgs.gov/newsroom/article.asp-ID=2738.html>), for instance, briefly affected one quarter of the world's iodine supply, which is used, among other things, to create LCD screens.



(/media/images/stibnite)

Stibnite is the predominant ore mineral of antimony. Antimony compounds are used in many ways, like helping prevent skin burns, increasing battery life, and refining glass used for cellphones. A surprising 83% of antimony consumed stateside is imported—mostly from China—leaving the US susceptible to supply disruption.(Credit: Scott Horvath, USGS. Public domain.)

How USGS Helps

The USGS collects, analyzes, and disseminates information on a monthly, quarterly, or annual basis for more than 90 nonfuel mineral commodities (<https://minerals.usgs.gov/minerals/pubs/commodity/>) from more than 180 countries (<https://minerals.usgs.gov/minerals/pubs/country/>). The USGS then calculates the net import reliance for these commodities using prior-year data and publishes this information annually in the USGS Mineral Commodity Summaries (<https://minerals.usgs.gov/minerals/pubs/mcs/>).

In addition, the USGS tracks domestic supply and production of these mineral commodities, monitoring the industry that produces them as well as researching the genesis and possible locations of these minerals.

The USGS provides this information to the Department of Defense, Congress, and other decision-makers so that they can make informed decisions about the inputs of critical minerals to the U.S. economy.

Also, the USGS conducts research on mineral resource formation and provides mineral resource inventories and assessments to decision makers to inform their mineral policies here in the United States.