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# U.S. Mineral Dependence—Statistical Compilation of U.S. and World Mineral Production, Consumption, and Trade, 1990–2010

Open-File Report 2013–1184

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U.S. Geological Survey, Reston, Virginia: 2013



Suggested citation:
Barry, J.J., Matos, G.R., and Menzie, W.D., 2013, U.S. mineral dependence—Statistical compilation of U.S. and world mineral production, consumption, and trade, 1990–2010: U.S. Geological Survey Open-File Report 2013–1184, 6 p., http://pubs.usgs.gov/of/2013/1184.

# U.S. Mineral Dependence—Statistical Compilation of U.S. and World Mineral Production, Consumption, and Trade, 1990–2010

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The tables that accompany this report were prepared to provide insight into the dependence of the United States on foreign supply to meet the country's mineral needs. When determining vulnerabilities to the U.S. supply, it is not enough to look solely at the mining source for each mineral to determine the potential impact that a supply disruption might have on the Nation's economy. The tables help to illustrate the importance not only of the mining and processing of minerals but also the exporting countries and end uses. Understanding the total risks and costs of supply disruptions along the supply chain are beyond the scope of this report. However, this overview of mineral production, consumption, and trade highlights the importance of understanding what is happening at each point along the supply chain.

The data in the tables come from U.S. Geological Survey Minerals Yearbook publications, 1994–2010 (U.S. Geological Survey, 1996–2012a,b). The most current numbers available are provided for each mineral commodity. Note that production numbers are sometimes revised, and as such, the data in the more recent years are subject to revision.

Tables 1 and 2 show the global concentration of the top three producing countries for mined and processed minerals, respectively. The calculation for each commodity is the sum of the three countries' production divided by the total world production. Thus, a larger number indicates less diversity in the production of a given mineral commodity. The first column is a 6-year average concentration ratio, and the second column is a snapshot of the year 2007. The year 2007 was chosen because of the favorable economic conditions, highlighted by high levels of consumption of mineral commodities. The next two columns are the 20-year and 5-year growth rate percentages for production of the given mineral commodity. For most of the mineral commodities, growth in production over 20 years has been positive. However, the global economic downturn in 2008 (Economist, The, 2010) had a negative impact on the production of many mineral commodities. The final group of columns shows the top three producing countries for the given mineral commodity and their share of total world production for 2007. In some cases, mineral commodity production is concentrated in just one or two countries, with a very small amount being produced by other countries.

Tables 3–79 are similar to tables 1 and 2, except these tables present 21 years of time-series data by mineral commodity. These tables show world production of mined minerals. When there is also processing of minerals, there is a corresponding table for world production of processed minerals. There are also separate tables for secondary production of minerals, as well as separate tables for minerals with more than one processing technology. If the United States is a significant producer of the mineral, U.S. data are included in a separate column. The top three producing countries are the top producers excluding the United States, where applicable. Rather than listing a top producing country's share of production, these tables show the actual production for each country. Finally, the concentration ratio is not an average, but is on a year-by-year basis. The tables provide context to the changes in production during the last two decades.

Tables 80 and 81 provide 5 years of data (2005–2009) pertinent to the use of selected mineral commodities in the United States. For each mineral, data are shown for U.S. consumption, production, exports, and imports. The top three exporting countries are also provided, along with each country's share (as a percentage) of total U.S. imports.

Tables 82 and 83 show, for 2007, the number of mineral commodities for which a country is a top producer of mined or processed minerals. The concentration of countries producing processed mineral commodities is larger when compared to the concentration of countries producing mined mineral commodities. One finding that emphasizes this concentration of processed mineral commodities is that only 6 countries occupy the leading position in production for the 33 processed mineral commodities reviewed here. This suggests that vulnerability of U.S. supply may be greater at the processed mineral production stage of the supply chain than at the mined mineral production stage.

Vulnerability to disruption in the supply chain can change, however, when the import sources are taken into account. The leading exporting countries (to the United States) are more diverse when compared with leading world producers of mined and processed mineral commodities. Tables 84 and 85 give the count for import rankings of mineral commodities by country. The leading importer to the United States

is not necessarily one of the leading producers; this is most pronounced with imports of processed minerals.

End uses are the final link in the supply chain for consideration. End use is the most micro-level measurement, provided to show the potential impact of a supply disruption of a mineral commodity on the economy. At this level, a number of markets may be adversely affected by a supply disruption. Depending on the substitutability of a mineral commodity, as well as how quickly that substitute can be brought into the production line, large segments of the economy could stall because of a large-scale shortage of a single mineral commodity.

The end uses of mineral commodities are one of the factors that determine the importance of minerals to the U.S. economy. By knowing these end uses, the amount of risk exposure to segments of the economy due to a disruption of mineral supply can be determined. These risks may be mitigated if the mineral input in question has a good substitute in the production of the final good. In some cases, this can be an almost seamless substitute, such as aluminum wire for copper wire. While copper wire has some superior features to aluminum, substitution can still take place with minimal effect on the economy. However, some disruption may still occur before the substitute can be incorporated into the production process. For example, machines may need to be retooled. Finally, when considering longer term solutions, substituting materials based on advancements in technology may be possible. Technological changes are slow to take place and may not occur fast enough to be sufficient to offset the adverse effects on the economy if they are the only answer to a sudden supply chain disruption.

This overview of U.S. mineral dependence highlights the importance of understanding what is happening at each point along the supply chain. Understanding the total risks and costs of supply disruptions along the supply chain is beyond the scope of this report. However, it is important to note that world events, both natural and political, can have substantial implications for one or more mineral commodities. Recent examples of such supply disruptions include the Japanese tsunami of June 2011 and the labor strikes in South Africa (Menzie and others, 2011; Yager and others, 2012).

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The tables are in an Excel workbook. The link for the tables is OFR_2013-1184_Workbook. Country abbreviations used in the tables are listed here:

| | |
|---|---|
| Congo-K | Congo (Kinshasa) |
| Lux. | Luxembourg |
| N. Korea | North Korea |
| S. Africa | South Africa |
| S. Korea | South Korea |
| UK | United Kingdom |
| U.S. | United States |
| USSR | Union of Soviet Socialist Republics |
| W. Germany | West Germany |

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Prepared by:
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Raleigh Publishing Service Center
3916 Sunset Ridge Road
Raleigh, NC 27607