REMAPPING DEBATE
Asking "Why" and "Why Not"

# Digging a deep hole: rare earths debacle puts U.S. trade policy under scrutiny

**Original Reporting** | By Mike Alberti | Environment, Trade Policy

January 11, 2011 — While the recent controversy surrounding China's almost complete control over rare earth elements may seem to some like an arcane debate over minerals with hard-to-pronounce names, for many experts and economists it represents a concrete example of a broader long-term failure of United States trade and industrial policy.

Rare earth elements are a set of 17 minerals, some of which are crucial to producing a wide array of high-tech products. They are used in iPads and in flat screen TVs, in wind turbines and in hybrid electric car batteries. These minerals are also needed for the tracking systems of missiles and military drones. Until about 1984, the U.S. mined the majority of the world's rare earth supply; today it produces almost none. Nearly all of the mining now occurs in China.

From the mid-60's to the mid-80's, global rare earth mining was dominated by the Mountain Pass mine in California. The mine closed in 2002, after a series of radioactive wastewater leaks raised environmental concerns, and after increased Chinese production — partially due to state intervention and partially due to a lack of environmental controls — had begun to undercut U.S. prices.

Meanwhile, U.S. manufacturers that relied on rare earths found it easier to be closer to the source, and also relocated. In 2004, a company called Magnequench — a huge producer of permanent magnets that require rare earths and that are crucial components in the guidance systems of cruise missiles — closed its plant in Indiana and moved its facilities to China.

The issue largely escaped the notice of the public, and was not treated as a serious problem by the U.S. government (see sidebar on next page).

Indeed, for many years, China supplied rare earths to U.S. and other manufacturers at a low price. In the middle of last year, however, to fulfill its domestic demand, China cut its export quota of rare earths by 40 percent. The move drove up prices for manufacturers in other countries.

That got some attention. The U.S. Trade Representative's office quickly denounced China's actions and threatened to file a complaint with the World Trade Organization. Last year, two proposals were

introduced in the House and one in the Senate which focus on jump-starting U.S. production of rare earths and funding research and development to search for alternatives. More recently, some petroleum refiners have expressed concern that the rising cost of rare earths will lead to higher gas prices, because the minerals are also used as catalysts in the process of refining crude oil to produce gasoline.

But why was a vulnerability, now seen as requiring quick and decisive action, not addressed for so many years? Some experts argue that the free-market trade policies the U.S. has pursued did exactly what they were meant to do, and the current U.S. predicament shows that those trade policies may have been misguided.

"The failure of the United States to promote a much more aggressive stance on rare earth [elements] is indicative of the degree to which we are willing to stand idle while our manufacturing industries are stolen from us," said Robert E. Scott, senior international economist at the Economic Policy Institute. "There's no doubt that the promotion of free trade agreements has been tremendously destructive to U.S. manufacturing."

**DEFENSE DEPT. 2008 DISMISSAL OF PROBLEM**

According to the Department of Defense's 2008 "Foreign Sources of Supply" report:

> The Department incorporates foreign items and components into many important systems, and in some cases the Department may be dependent upon foreign suppliers for these items. However, this does not mean the Department suffers from a foreign vulnerability. Foreign dependence usually does not equate to foreign vulnerability.
>
> The Department is not vulnerable if it is dependent on reliable foreign suppliers, just as it is not vulnerable when it is dependent on reliable domestic suppliers. The Department of Defense is not aware of any foreign vulnerabilities within its supply chains.

## Abundant, altogether essential, but traditionally messy

The minerals called "rare earths" are not actually rare; in fact they're quite abundant. According to a recent report by the U.S. Geological Survey, there are nearly 100 million metric tons of rare earths in the earth's crust, 13 million of which are in the U.S.

The report also identifies 28 sites in 15 states where rare earths might be mined domestically, including the Mountain Pass Mine in California, though it says that its unclear how much of them can be mined profitably.

Other agencies have recently chimed in to show how important rare earths are for a range of manufacturing industries. The Congressional Research Service issued a report last September outlining a number of commercial applications, and the Department of Energy followed in December, listing a range of green technologies that are dependent on rare earths.

Essential as rare earths are, however, the process of extracting them has often been environmentally damaging. Rare earth mining is usually done in open pits, which can leave a large ecological footprint. Wastewater from the operation of a mine can also contaminate groundwater if not properly treated and disposed of. In addition, because rare earths are often found with the element thorium, which is slightly radioactive, the dust from mining must be prevented from blowing into communities and sensitive areas.

> So, if rare earth mining can be done in a way that minimizes its environmental footprint, and if the government deems it a desirable industry, why hasn't the U.S. promoted the production of rare earths in the past?

The Mountain Pass Mine was notorious among environmentalists for its bad practices, especially its wastewater disposal. In 1998, after several warnings, a wastewater pipeline ruptured, spilling hundreds of thousands of gallons of radioactive waste into the desert surrounding the mine.

Mountain Pass closed down a couple of years later, and still continues the process of cleaning up the spill.

## Limiting the damage

Partly in response to recent government efforts to wean the U.S. off of Chinese supply, the Mountain Pass mine will reopen next year. Molycorp., the mine's owner, says that it has cleaned up its act and will strive to be "environmentally superior."

Brendan Cummings, the public lands director for the Center for Biological Diversity, says he's convinced. The Center for Biological Diversity protested the mine in the past, but Cummings says that they're major concerns have been addressed by Molycorp.

"The main objection in the past, where the problems in the mine spilled out of the mine, was the pipeline," said Cummings. "They're no longer using the pipeline, and their new plan is to deal with the wastewater onsite." The tailing ponds used for evaporation will now be lined, Cummings said, and there are better systems in place to monitor spillage.

Cummings readily acknowledged that rare earth mining was not a "clean" industry, but he also said that the process could easily be much cleaner than it has been in the past. Cummings added that rare earths mining required a "different calculus" than, say, coal mining, since rare earths are ultimately desirable for their uses in  green technology.

## See no evil, hear no evil

So, if rare earth mining can be done in a way that minimizes its environmental footprint, and if the government deems it a desirable industry, why hasn't the U.S. promoted the production of rare earths in the past?

"This really, clearly points to one of the big difficulties of our abandoning trade and industrial policy in favor of open world markets," said Lisa Margonelli, director of the Energy Policy Initiative at the New America Foundation.

Eileen Appelbaum, senior economist at the Center for Economic and Policy Research, agrees, calling the controversy around rare earths "emblematic of the fact that we did not have an industrial policy or an innovation policy.

So does Ed Richardson, vice president of Thomas and Skinner, an Indianapolis producer of permanent magnets.

"This is just one example of how the United States has lost a capability that it used to have," he said. By believing that "global free trade will provide all the answers that we need in terms of an industrial policy," Richardson continued, "we made a big mistake."

Eileen Appelbaum, senior economist at the Center for Economic and Policy Research claimed that, as it stands now, "We are so far behind the eight-ball that we have to re-learn how to produce this stuff."

Jack Lifton, co-founder of the consulting firm Technology Metals Research, says the irony is that China is simply following the model that the U.S. set out for them.

The Chinese "did exactly what we asked them to do," Lifton said. "They started low-cost manufacturing using raw materials they could also produce at the lowest cost."

"The capitalists in New York were popping champagne, saying, 'We have achieved low cost!'" Lifton continued, "And now the Chinese are saying, 'Phase two: we're going to be the supplier, you guys can go out of business, and the capitalists in New York are saying, 'Oh, you evil people.' It's completely ridiculous."

According to Scott, Margonelli and Appelbaum, by focusing on price alone, the U.S. allowed the market to determine the value of crucial components like rare earths.

"We made price the only criteria for where we would buy it, and we did not think about our national interests or our competitiveness going forward," said Appelbaum.

“The way of thinking that came in in the 90’s was that you let the market do the work of apportioning the security of the commodities, and so if the price was cheap, you felt that the supply was secure,” added Margonelli. “So it was hands-off on the part of the government.”

“There’s a real question of whether we allow our whole trade policy and industrial policy in the U.S. to be driven by price, or do we think more in terms of what’s strategic and what do we need to have here,” she went on.

**Other countries' approaches to "critical materials"**

| Nation | Business policy | Research and development policy |
|---|---|---|
| **Japan** | • Funding for international mineral exploration<br>• Loan guarantees for high-risk mineral projects<br>• Stockpiling<br>• Information gathering | • Substitution research funding through METI and MEXT<br>• Exploration, excavation, refining and safety research founded through JOGMEC |
| **European Union** | • Mineral trade policy for open international markets*<br>• Information gathering*<br>• Land permit streamlining*<br>• Increased recycling regulations* | • Increased material efficiency in applications<br>• Identification of material substitutes<br>• Improve end-of-life product collection and recycling processes |
| **Netherlands** | • Government-industry collaboration on material policy through M2i Institute | • Substitutes of abundant for renewable materials<br>• Processes for recycling depleted materials<br>• Study consumption patterns as a result of policy |
| **China** | • Taxes and quotas on REE exports<br>• Prohibition of foreign companies in REE mining<br>• Industry consolidation<br>• Unified pricing mechanisms*<br>• Production quotas<br>• Moratorium on new mining permits until mid-2011 | • Rare earth separation techniques and exploration of new rare earth functional materials<br>• Rare earth metallurgy; optical, electrical, and magnetic properties of rare earths; basic chemical sciences of rare earths |
| **Australia** | • Low tax on the value of extracted resources<br>• High tax on mine profits<br>• Tax rebates for mineral exploration<br>• Fast turnaround for land permit applications | • Promote sustainable development practices in mining |
| **Canada** | • Promote recycling industry and incorporate recycling as part of product design<br>• Require accountability in environmental performance and mineral stewardship<br>• Use life-cycle-based approach to mineral management and use | • Provide comprehensive geosciences information infrastructure<br>• Promote technological innovation in mining processes<br>• Develop value-added mineral and metal products |

* proposed policy

Source: U.S. Department of Engergy, *Critical Materials Strategy*, December 2010

## Free-traders: "Don't worry"

According to free market advocates, though, there is no reason to think that the disruption in the supply of rare earths means that industrial policy should be viewed in any terms other than price.

Derek Scissors, a research fellow at the Heritage Foundation, says that when the rare earths sector began to go overseas, it made perfect sense to allow it to do so because products manufactured in China were available at a lower cost.

"What's the harm in allowing a single country to be your supply?" Scissors asked. "China can't cut everyone off — they can cause a shortage over a certain period."

> "The market would have handled this just fine if it was allowed to, and it will still handle it, it just might take a while," according to Derek Scissors, a research fellow at the Heritage Foundation.

That shortage, according to Scissors, will then be rectified by the market because domestic production will commence, and the intervening lag between foreign and domestic production as U.S. industries race to catch up cannot be blamed on a lack of government intervention. Rather, he says, it is the result of too much intervention in the form of environmental regulations.

"The market would have handled this just fine if it was allowed to, and it will still handle it, it just might take a while," he said. Scissors claims that the value of rare earths has been exaggerated and that they are not important enough to warrant governmental intervention.

American Enterprise Institute resident scholar Kenneth P. Green agrees that it makes sense to buy a product on the world market if a country is unable to produce it economically domestically.

"You can't suggest that companies should have continued to operate at a loss, or that the government take them over and run them at a loss," he said. "That doesn't make any sense."

That's exactly what some critics of the free market are suggesting, however, on the basis that rare earths are a strategic mineral that the U.S. has a vested interest in producing.

Green concedes that if rare earths had been deemed necessary by the military, it would have been justified for the government to intervene because, as he says, "the military has nothing to do with economics."

But what about other reasons why rare earths might be regarded as valuable, such as facilitating the manufacture of green technology or other high-tech products in the U.S.?

Scissors argues that it is the market, not the government, which should set demand for green technologies.

“The Chinese are already providing cheap environmental equipment,” he said. “As an environmentalist, you don’t care where the equipment is coming from.”

But some environmentalists, like Brendan Cummings, do care where the equipment comes from. China has a poor record of environmental controls, so when Americans are buying hybrid cars that use rare earth minerals in their batteries, they might want to think about where those minerals come from, Cummings said.

Green says that intervening in the rare earths sector would be a mistake because the government would then have to intervene again to produce domestic demand, perhaps subsidizing the production of green technology, as well.

“These artificial markets are generally not competitive with private enterprises. The first mistake is creating them,” he said. “The second mistake is then to prop them up with another layer of government subsidy. You’re shifting more and more of the country’s capital into non-productive uses.”

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The case of rare earths has suggested to many experts that China’s policy is working, though, and that the U.S. might want to emulate it. In addition, Scott and other economists are looking toward other countries as illustrations of where industrial policy has been effectively implemented.

“You look at countries like Japan and Germany — these are high-wage developed economies that maintain large trade surpluses and large and viable manufacturing industries,” Scott added. “They do it with a wide variety of active government policies, and I think we should have been doing the same thing and we should do the same thing in the future.”

Green and Scissors were unmoved, maintaining that the market knows best and that the government should not intervene.

“The optimal answer is free trade and free markets,” said Green. “They are demonstrably the path toward human advancement.”

## New Directions

According Eileen Appelbaum of the Center for Economic and Policy Research, if the U.S. had had an industrial or innovation policy at the time when rare earth production and manufacturing were moving offshore, it couldn't have missed the fact that rare earths are a critical input for high-tech products.

As it stands now, she said, "We are so far behind the eight-ball that we have to re-learn how to produce this stuff."

> By believing that "global free trade will provide all the answers that we need in terms of an industrial policy, we made a big mistake," said the vice-president of an Indianapolis manufacturer that relies on rare earths.

"There needed to be a new way of thinking," said Margonelli of the New America Foundation. "The U.S. is a resource rich country, and we should have been thinking about how to put some of those resources to use in an environmentally sound way, both to create jobs and to create security of supply."

According to economists like Economic Policy Institute's Scott, the U.S. should have been imposing import taxes on rare earths to "adjust for the differences in environmental costs associated with U.S. production of those goods relative to the dirty production that occurs in China."

Though Scissors and others say that this approach would have simply raised energy costs, Scott argues that this is desirable.

"If we are vulnerable because of our reliance on rare earths, then we should raise their costs so that people look for alternatives," he said. "Use the market intelligently to send signals to private actors to change behavior and you will get an economy that works better."

Green and Scissors argue that it is unfair to blame policy-makers for not anticipating how valuable rare earths are, but people in industries that rely on them say that they have been warning the Pentagon and the Department of Energy of the value of rare earths ever since the Mountain Pass Mine closed in 2002.

"When the Mountain Pass Mine closed, there certainly was concern that went through the magnet industry," said Ed Richardson of Thomas and Skinner. "It was very difficult to get anyone to pay attention."

Similarly, Jim Kennedy, the president of Wings Enterprises — a company that owns the Pea Ridge Mine in Missouri, which has heavy deposits of rare earths — says that he has been warning officials for years that a policy was needed to address supply shortages of the minerals (see box on next page).

In response to the pressures exerted by the Chinese in recent months, some policy makers have put forth proposals aimed at reviving the rare earths sector.

In the House, Rep. Mike Coffman of Colorado has introduced a bill — the RESTART Act — that would promote the consideration of loan guarantees for rare earths suppliers. Senator Lisa Murkowski has proposed a similar bill in the Senate. In September, the Rare Earths and Critical Materials Revitalization Act, sponsored by Rep. Kathleen Dahlkemper of Pennsylvania, passed the House by a wide margin. The bill, if enacted, would allow the Department of Energy to make loan guarantees to companies in every part of the supply chain and support research and development.

According to Jack Lifton, loan guarantees and research and development are a start but, for the next two years at least, "the Chinese own the game."

"We did ourselves in," Lifton added. "We used to be the world's great industrial power. Now, that title is shifting east. We have no one to blame but ourselves."

## A rare earths cooperative?

As a potential solution, Kennedy has argued for a federally sanctioned domestic "rare earth cooperative," which would function along the lines of agricultural cooperatives, where producers share capital costs, transportation lines and infrastructure, and access to credit from the government. The cooperative would then guarantee supply to the Pentagon and other producers while maintaining environmental standards and technical safeguards not currently present in China.

In an effort to get the focus off of price, Margonelli has proposed changing the way people think about the ownership of rare earths.

"If you're going to start down this path of making electric vehicles, all of which are dependent on rare earth magnets, you need to start thinking about these things as other than commodities," she said.

She suggests that the government require the manufacturer of products like rare earth magnets to retain the title to them after they are sold, to encourage producers to recycle and repurpose the minerals after the consumer is finished with the product.

"Then, they're making more of a capital investment than they are making a commodity investment," she said. "If we change our thinking about the ownership of these strategic components, then it also starts to change the price points and the decisions that are made."

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