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China's "Strategic" Rare Earths Industry: China's reforms and the U.S. response

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In a series of recent documents, several ministries of the State Council have outlined their 2009-2015 strategy for reforming China's rare earths industry, an industry which currently dominates the global market. The new strategy has both domestic and international components, all of which conform to the policies China has been following since rare earths became a "strategic industry" in the late 1980s. The new domestic reforms target the twin problems of overcapacity and environmental exploitation through an overhaul of the rare earths regulatory structure. Within this national movement, provincial and sub-provincial governments have ramped up efforts to enforce regulations. China's new policies directed towards the international market include export quotas and import taxes. In addition, China is aggressively acquiring stakes in foreign rare earths enterprises.

China's rare earths policy reflects China's long term strategy to dominate global supply of *processed* rare earths products as well as its current sense of confidence on the international stage. Nevertheless, deep problems in this industry will be hard to overcome, and international actors including the US are responding to China's new policies with their own plans. With all the promise it has, the rare earths market will not remain static within the international market, but will change depending on the success of China's domestic reforms, the decisions of other international actors, and perhaps most importantly, the force of the market. This paper will first summarize the properties and uses of rare earths, then discuss China's rare earths industry and how the new reform plans address deep problems in this industry, and finally define the choices facing the U.S. as it responds to China's policy.

PROPERTIES AND APPLICATIONS OF RARE EARTHS

Rare earths are a group of 17 elements, atomic numbers 57 through 71[1]. Despite their name, rare earths are fairly abundant in the earth's crust. Even lutetium, the least abundant of them, is approximately 200 times more abundant than gold, and the more commonly used cerium is more abundant than copper[2]. However, unlike gold, rare earths do not often appear in concentrations high enough for mining.[3] Perhaps another reason they are misnamed rare is that they always appear mixed together and require comparatively more processing than other minerals.[4]

Rare earths elements share many geochemical properties, but important differences do exist. Rare earths are categorized according to ionic radius into two groups: light rare earth elements

[1] Some sources, particularly earlier ones, group only the 15 lanthanides as rare earths. The category has expanded to include scandium and yttrium, which are in the same part of the periodic table and share many similar qualities.
[2] Haxel, Gordon, Hedrick, James, Orris, Greta, "Rare earth elements—critical resources for high technology: U.S. Geological Survey Fact Sheet 087-02," USGS, 2002: 5.
[3] Hedrick, James B., "Rare Earths in Selected U.S. Defense Applications," *U.S. Geological Survey*: 40th Forum on the Geology of Industrial Minerals: 2004: 2.
[4] Hurst, Cindy, "China's Rare Earth Elements Industry: What Can the West Learn?" *Institute for the Analysis of Global Security*, www.iags.org, 2010: 2.

(LREE) and heavy rare earth elements (HREE). HREE are less abundant than LREE. Perhaps because of this, there are more commercial applications for LREE.[5] However, in some advanced technologies, only particular HREE can be used,[6] or using HREE in place of LREE produces better functioning or more efficient products.[7]

The five primary sources of ore mined for rare earths contain varying proportions of LREE and HREE, and are unevenly distributed in the world. The most common type of ore, called Bastnasite, is composed primarily of LREE. Mines in both California and Inner Mongolia have rich Bastnasite deposits, and together account for the largest amount of rare earth resources.[8] The second most common ore, Monazite, is also mostly LREE, but contains more HREE than Bastnasite. Russia has a large deposit of this type of ore.[9] The ore loparite, though it also contains more HREE, has a large amount of thorium, which is radioactive and thus dangerous to mine; this ore is currently only mined in Southeast Asia and India.[10] Similarly, xenotime, an HREE ore, is hard to mine. Because of these defects, the primary ore mined for HREE is a type called rare-earth ion absorption clay. Large sites with this ore in Jiangxi produce significant amounts of the world's supply of yttrium, an important HREE.[11] At the same time, China's supply of rare earths will not necessarily remain dominant. According to the US Geological Survey, prospects for discovering new sources of rare earth ores are thought to be high.[12]

Rare earths have many electro-magnetic, optical, and catalytic properties that have triggered technological innovation over the past 60 years. One of the earliest uses for rare earths was the color television; it is the optical properties of the HREE, europium (Eu), that allow for color. Currently, there is no other substance, rare earth or not, that can replace Eu.[13] The huge commercial success of color televisions in the US created the space for more research into the various practical applications of rare earths.[14] Other properties and elements then came into focus. For example, rare earths have "high specificity" and "high unit value" properties which allow electronic devices like computers to shrink to laptop size, and iPods to fit into your pocket.[15]

Rare earths are also fundamental building blocks in many types of cutting-edge green technology. Because rare earths have "greater energy density," motors built with rare earth

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[5] Kaiser, John, "Overview of the Rare Earth Sector," 2010 Phoenix Investment Conference, www.KaiserBottomFish.com, 2010: 35.
[6] Haxel et al, 2002.
[7] Economist, *Abundant in Inner Mongolia*, October 10, 2009.
[8] Hurst, 4.
[9] Hedrick, 2004: 3.
[10] Hedrick, 2004: 10.
[11] Ibid, 4.
[12] Hedrick, James B., US Geological Survey, Mineral Commodity Summaries, January 2010.
[13] Haxel et al, 2002: 2
[14] Ibid, 7.
[15] Ibid, 2.

magnets are superior and produce less pollution. The rare earths needed to make these new catalytic converters include both HREE and LREE.[16] Also, new batteries using a compound with Lanthanum (LREE) are important in the development of hybrid car technology, in part because of the greater degree of efficiency they allow and also because disposing of them carries with it less harmful.[17] (HREE are also needed to produce hybrid cars.[18]) In addition, windmills, energy-efficient fluorescent lamps, and magnetic refrigeration among other things all require rare earths.[19]

In addition to their domestic uses, rare earths are a key component of many military technologies. For example, all precision guided munitions (missiles and smart bombs) and aircraft depend upon rare earth magnets for their functionality.[20] Many of these magnets require the LREE neodymium and the HREE yttrium. Also, lasers used to light up a target or to detect the enemy rely on rare earths for their optical properties.[21] Another HREE, gadolinium, is used as a protective coating on military planes to protect against neutron radiation.[22]

The history of commercial rare earth mining begins in the 20th century. During the Cold War Years, the US with its large deposit of Bastnasite ore led the world in rare earth mining, processing, and research. However, by the turn of the 21st century, China had surpassed the US.[23] Vast rare earth resources in China were discovered during the Mao years. Deng Xiaoping, realizing their importance, famously said, "The Middle East has oil; China has rare earths."[24] Rare earths became a designated "Strategic Industry" in China and central authorities vigorously promoted and invested in it.

Currently 97% of the world's rare earths are mined in China. Reports show that China produced 139,000 tons of rare earths in 2008.[25] Also, China's rare earths resources are estimated to make up 57% of the world's reserves.[26] To take the US as an example, between 2005 and 2008, the US imported 91% of its rare earths from China, 3% from France, 3% from Japan, 1% from Russia, and 1% from other sources.[27] According to the US Geological Survey, "net import reliance" on rare earths imports as a percentage of apparent consumption is 100%.[28]

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[16] Ibid, 4.
[17] Haxel et al, 2002: 5.
[18] Smith, Mark A., "American Rare Earth Minerals: The Indispensable Resource for Clean Energy Technology; Prepared for Congressional Leaders presentation," April 15, 2009, www.molycorp.com, 4.
[19] Ibid, 5
[20] Hedrick, 2004.
[21] Ibid, 6-7
[22] Ibid, 10.
[23] Haxel et al, 2002: 7.
[24] Hurst, 11.
[25] Hurst, 27.
[26] Hurst, 15.
[27] Hedrick, James B., US Geological Survey, Mineral Commodity Summaries, January 2010.
[28] Ibid

PROBLEMS AND REFORMS IN CHINA'S RARE EARTH INDUSTRY

China's rare earths industry, though dominant internationally, is fraught with problems. Many of these problems stem from the industry's fundamental structure, which is state directed and non-market. In fact, all of China's strategic industries are macro-managed by central authorities, and the largest industries within it are state-owned. In a draft of the "2009-2015 Rare Earth Industry Development Plan," the Ministry of Industry and Information Technology discusses how the government plans to "strengthen the control of strategic resources and strictly control production capacity, by both administrative and market means."[29] However, because industries of strategic resources do not own the land, they have no long term interest in protecting that land, leaving them with no incentive to conserve resources or satisfy environmental codes. At another level, the state, which is the major shareholder in most of these industries, has no claim on the profits, and thus profit maximization is not at the core of decision-making. In this situation, firms overproduce goods that are then sold inexpensively, distorting both domestic and international markets.[30] Overcapacity also results in the depletion of natural resources at an unsustainable rate. One prominent non-government Chinese spokesperson, the rare earths chemist Xu Guangxian, has been loud in his warnings that China will deplete its rare earths supplies in 35 years if efforts are not made to slow production.[31]

While maintaining its developmental economic approach, China has introduced new domestic and international reforms of its rare earth industry to address the problem of overcapacity and the pattern of environmental exploitation. Domestically, central authorities plan to restrict mining permits, restructure the rare earths regulatory system, and crack down on both illegal mining and smuggling. Internationally, central authorities have imposed export controls and taxes, and are also vigorously buying stakes in foreign rare earth industries.[32] Through these measures, China hopes that it can strengthen its position as a leader in rare earths production, and moreover start to move up the value chain, exporting primarily processed rare earths products rather than raw material.

The domestic policies in the 2009-2015 plans address systemic problems in the rare earths regulatory system. The bureaucracy has trouble regulating the rare earths industry in part because China's rare earths resources span many provinces. Although two main rare earth production powerhouses are Inner Mongolia and Jiangxi Province, other mines can be found in Shandong,

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[29] Stewart, Terence P., "Hearing on 'Rare Earth Minerals and 21st Century Industry'" Testimony, March 16, 2010: 4.
[30] *Overcapacity in China: Causes, Impacts and Recommendations*, European Chamber and Roland Berger Strategy Consultants, www.europeanchamber.com.cn.
[31] Hurst, 20.
[32] Hurst.

Sichuan, Guangdong, and others.[33] In its recent announcement concerning 2010 exports and new rare earth mining regulations, the Ministry of Commerce delegated responsibility to notify relevant industries and enforce new regulations to the provincial governments.[34] While the success of regulatory standardization requires cross-province cooperation, mechanisms for this kind of cooperation are often weak because bureaucratic links within regions are stronger than bureaucratic links by function.[35] As a result, the provincial governments are often stymied in their efforts to enforce new standards. Border territories, such as the one spanning Jiangxi and northern Guangdong, provide an obvious example of these challenges faced by provincial governments. While Jiangxi is more famous as the HREE rare earths producer, northern Guangdong province also has abundant resources. Recent reports indicate that it is often businessmen from Jiangxi that set up illegal mines in Guangdong.[36] According to industry executives, mines operating without licenses make up about half the number of total mines in the country.[37] It seems clear that efforts by either the Jiangxi or Guangdong provincial government to singularly implement its own new set of stricter legislation on rare earth mining, however extensive, will be hard to implement on a unilateral basis.

Provincial governments are also hampered in their ability to enforce regulation because the mining companies themselves are often at the same rank within the bureaucracy. In this kind of situation, the provincial government would not have the authority to mandate the company to conform to standards.[38] For example, Sinosteel, one of 22 Chinese State Owned Enterprise that was allotted export quotas, is registered at the central level, and it owns stakes in metallurgical industries across the country.[39] The local branches of the industry would then have two lines of authority: government via Sinosteel and government via local government. Another problem that emerges is that many illegal mines actually set up within the bounds of a larger mining site;[40] the source of regulatory control might vary by situation. Within this matrix of bureaucratic overlap, local authorities are strapped and small-scale unregistered mines are rampant.

Regulatory problems sink all the way down to the village committee level. Chinese setting up illegal mining sites make deals with the village committees, and also hire local laborers. When these mining sites are discovered and taken over by higher level governments, the money made

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[33] Inner Mongolia's mine provides much of the world's LREE and Jiangxi Province's mine providing much of the world's HREE.

[34] 商务部关于下达2010年第一批一般贸易稀土出口配额的通知，Ministry of Commerce Special Commissioner's Office in Dalian, dltb.mofcom.gov.cn, January 4, 2010.

[35] Ma Xiaoying and Leonard Ortolano, *Environmental Regulation in China: Institutions, Enforcement, and Compliance*, (Boulder: Roman and Littlefield, Inc., 2000): 39.

[36] 非法稀土矿场污染 村庄环境 记者采访遭警告， *Yellow River News*, www.sxgov.cn, March 9, 2010.

[37] Bradsher, Keith "China: Earth-Friendly Elements, Mined Destructively," *New York Times* December 26, 2009.

[38] Ma and Ortolano, 36.

[39] Sinosteel Corporation, en.sinosteel.com/zggk/fzlc/index.shtml.

[40] Yang Liqun, "环境成本由谁支付？" *China Environment Journal*, March 25, 2010.

off the land and the leftover equipment is split between the provincial government and sub provincial governments, while none is left to the village committee to clean up the environmental damage. In this situation, village committees have no reason to cooperate with regulations issued from above.[41] It is thus often hard for provincial or sub-provincial levels to follow through on its task of clearing out illegal mines.

THE ENVIRONMENTAL IMPACT OF RARE EARTH MINING

The problems that make it hard for the central government to curb overproduction are the same problems that make it hard to improve environmental protection standards. Currently, environmental standards in China are far below Western standards.[42] One of the biggest environmental challenges in the production of rare earths is how to dispose of the waste products, called tailings. According to an official at the Ministry of Industry and Information Technology, as cited by Hurst, producing one ton of rare earths will generate 2,000 tons of mine tailings, and these tailings often contain the radio-active element thorium.[43] Managing waste water is also a big problem. The largest LREE mine in China, located in Inner Mongolia, produces about ten million tons of waste water per year.[44] These statistics correspond to registered industries operating on a large scale. The situation is often worse at small-scale companies, and worse still at illegal mines.[45]

In 2009, Central authorities made plans to restructure the industry into larger districts in order to address these environmental problems and strengthen regulation. In the new system, the rare earth industry will be divided into three regional sectors: the northern, including Inner Mongolia and Shandong, the Southern, including Jiangxi, Guangdong and Fujian, and finally the Western region including only Sichuan.[46] Clearly, by creating this new grid, the government is trying to fill in cross-provincial regulatory lapses.

Provincial and sub-provincial governments are also trying to strengthen enforcement of rare earths regulations. For example, in 2007 Jiangxi Province issued new regulations, stating its goal of cutting the number of mines in operation by 20% and increasing rate of utilization of resources by 10%.[47] The Jiangxi government also has an anti-illegal rare earths miners propaganda campaign, which includes putting up big banners and passing out propaganda

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[41]非法稀土矿场污染 村庄环境 记者采访遭警告， *Yellow River News*, www.sxgov.cn, March 9, 2010.
[42] It is worth noting, however, that the processing rare earths (including mining and purification processes) is a multilayered process that is as yet inefficient, not just in China but everywhere. Hurst, 18.
[43] Hurst, 17
[44] According to the Chinese Society of Rare Earth as reported by Hurst, 16.
[45] Yang Liqun, "环境成本由谁支付？" *China Environment Journal*, March 25, 2010.
[46] Hurst, 22.
[47] 江西省出台矿产资源开发整合总体方案, July 20, 2007, www.ytbxw.com/Info/14949.html.

pamphlets, posting announcements in public squares which ask people to tell authorities the names of the bosses of local illegal mining industries, and finally setting up and publicized a telephone number particularly for reporting these rare earth illegal industry-related information.[48] In addition, a variety of newspapers are issuing reports exposing these rare earths mines as well as describing how government leaders successfully cooperated with local cadres to discover and shut down illegal rare earth mines.[49]

Central authorities are using rare earths export controls and foreign purchases to strengthen China's position in the international rare earths market. Since 2005, China has implemented a series of rare earths export controls. The size of the quotas has decreased each year, the 2009 figures down by 8.33%.[50] The 2010 export control announcement marked 22 rare earth mining industries, allocating export quotas based on their size (the bigger the better) and their market success.[51] In addition to export quotas, export duties have also been imposed.[52] As for taxes, Wall Street Journal reports that they will be increased to 15-20%.[53]

Chinese officials hope that the export controls and taxes will not only help slow production domestically, thus reinforcing domestic policy, but also create ideal incentives for attracting foreign firms. These export restrictions cause the price of rare earths to rise for foreign firms relying on exports, giving Chinese firms and foreign firms manufacturing in China a comparative advantage. This situation creates an incentive for foreign companies to move operations to China and bring their technology with them. Moreover, Chinese government officials at central and provincial levels have explicitly offered foreign firms an uninterrupted and less expensive supply of rare earths.[54] The hope is that foreign, downstream firms will move to China and bring about a technology transfer, thus giving an extra boost to the industry. The ideal outcome for China, then, would be for all exported rare earths to be at the post-raw stage of processing. Thus, in the rare earths industry, China hopes to move up the value chain in the rare earths industry all the while maintaining a near monopoly over supply.

China is also introducing measures to combat the smuggling problem. In 2008, 20,000 tons were smuggled while 39,500 tons of rare earths were exported legally. That is one third of total export volume.[55] The quantity smuggled is increased with the reduction of exports, indicating that some foreign companies are finding ways of getting around these export quotas.[56]

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[48] 信丰所有非法稀土矿产被取缔 下一步将回复生态环境, Genan Post, April 7, 2010.
[49]信丰所有非法稀土矿产被取缔 下一步将回复生态环境, Genan Post, April 7, 2010.
[50] Stewart Testimony, 5.
[51] Stewart reports and translates in Exhibit 2, Ministry of Commerce Trade Letter [2009], December 29, 2009.
[52] Stewart, 2.
[53] Talley, Ian, "U.S. Warned on China's Role in Rare Metals Market" *Wall Street Journal,* April 15, 2010
[54] Ibid, 3.
[55] Hurst, 15.
[56] Stewart, 4.

Finally, China has aggressively pursued foreign rare earth industries in the international market. One recent successful purchase was by the Jiangsu Eastern China Non-Ferrous Metals investment Holding Co., which bought more than 25% of an Australian rare earth developing company called Arafura Resources Ltd.[57] China does not restrict these purchases to rare earths, but has been actively trying to acquire high stakes in foreign firms producing many resources deemed strategic. For example, on May 4, 2010, Sichuan's Hanlong company bought 55% of another Australian mine (Moly Mines) for US$200 million.[58]

Not all of China's offers have been welcome. In 2009, China tried to purchase more than 50% of Australia's Lynas Corporation. However, in the end, the Chinese pulled out of the deal when they were asked to reduce their purchase to below 50%.[59] Similarly, in 2005, another Chinese firm tried to buy the rare earths mine in California – the one that had dominated the market during the Cold War years. However, Congress blocked the deal.[60]

The trade of rare earths also colors trade relations via the WTO. In the last WTO meeting, the U.S. and other countries submitted a formal, multi-lateral objection to China's export policies on a number of natural resources.[61] Rare earths were not included on this list, but in a recent Congressional hearing, Stewart & Stewart advised the U.S. to use the same multi-lateral mechanism to confront China on its rare earths export policy. The Ministry of Commerce of the PRC denies that these export controls violate the WTO agreement.[62] Clearly, the rare earths trade is headed to become yet another thorny issue in the complex U.S.-China trade relationship.

THE DEBATE ON AMERICA'S ROLE IN THE INTERNATIONAL RARE EARTH MARKET

China's rare earths export control policy has stimulated debate in the U.S. among politicians, businesses, and academics. Reports from several government agencies on the rare earths industry have either been released recently, or will be released shortly. In one report, the Government Accountability Office summarized current U.S. dependence on China's rare earths. In particular, the GAO report discusses the gaps in the U.S. rare earth production line, showing that the U.S. no longer has the capability to produce items like the much needed neodymium iron boron magnet from start to finish. Moreover, GAO notes that currently the Department of Defense does not stockpile rare earth reserves along with other key resources required for national defense.

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[57] Hurst, 14.
[58] Winn, Howard, "Sichuan firm buying deposits of key metals," *South China Morning Post* May 04, 2010.
[59] Hurst, 14
[60] Bradsher, Keith, "Challenging China in Rare Earth Mining," *New York Times*, April 21, 2010.
[61] Stewart, 2.
[62] There does seem to be some confusion as to whether or not rare earths have been included in a complaint or not; U.S. sources say that they have not yet been included (Stewart, 2), while this source and other Chinese sources say that they have been included. 中国缺乏稀土定价话语权 酝酿全行业整合, *Caijing*, May 5, 2009.

While not alarmist, the GAO report does hint that U.S. security is at risk because of our dependence on China for rare earths productions. The final word on the rare earths trade dynamics on U.S. security will come with the DOD report in September 2010.[63]

The business community is also actively discussing prospects for the U.S. rare earths industry. Molycorps, the company owning the Mountain Pass Mine in California, is trying to raise $350 million to reopen the mine, hoping that some amount of government-backed loans will be available.[64] In its presentation pitch, Molycorps highlights the fact that it will create 900 jobs while strengthening U.S. security and competitiveness.[65] Molycorps also argues that, after replacing rusty equipment with a new recycling system and a natural gas power plant, reducing costs while satisfying regulations.[66] The complete production line would be completed by 2015.[67]

Nevertheless, the investment in Molycorps is a risky one. After dominating the world's industry for decades, the mine closed in 2002 because of an environmental standards violation, and also due to price competition from Chinese rare earths firms. The high environmental standards and the difficulties that come along with mining rare earths (particularly disposing of the radioactive tailings) make investment risky. Some also fear that China could lower costs of rare earths at a point when the firm was still not firmly established, forcing the industry to foreclosure.[68]

U.S. Representative Mike Coffman of Colorado has been a prominent voice in promoting a more active role for the U.S. government in supporting growth in the rare earths industry. On March 16th, 2010, Mr. Coffman submitted a bill in which he argued that a budget for supporting research, innovation, training, and workforce development. In this bill, Coffman also argues that funds should be pooled from Secretaries of Commerce, Defense, Energy, and Interior and directed towards academic institutions, government laboratories and "industry associations" among others.[69] In a recent opinion-editorial, Coffman specifically stated that the U.S. should provide loans to emerging rare earths industries.[70]

Voices from U.S. think-tanks disagree. Freeman argues that the rare earths industry is similar to other industries in the globalized economy, and that rare earths products are far from the only component of military technology that the U.S. cannot produce from start to finish. Moreover,

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[63] Government Accountability Office, "Rare Earth Materials in the Defense Supply Chain: Briefing for Congressional Committees," April 1, 2010.
[64] Bradsher, "Challenging China in Rare Earth Mining," *New York Times*, April 21, 2010.
[65] Smith, 14.
[66] Bradsher, "Challenging China in Rare Earth Mining," *New York Times*, April 21, 2010.
[67] Smith, 14.
[68] Hurst, 26.
[69] "Rare Earth Supply-Chain Technology and Resource Transformation (RESTART) Act of 2010," introduced at the 111th Congress 2nd Session, H.R. 4866, p. 10-11.
[70] Ibid.

Freeman argues that products like the much-hyped Neodymium iron boron magnets do not actually count as "high-tech" anymore, (or certainly will not count as high tech by the time the U.S. has the capacity again to manufacture these products from start to finish). Instead of instituting a system of strategic resources like the Chinese, the U.S. should continue to trust market forces and the power of innovation.[71]

From this debate, several key points become clear. First, there are many roles the U.S. government could take in stimulating research and innovation and in safeguarding national security. Investing in new research institutes and building up a DOD stockpile of rare earths are definitely worthwhile and important investments. However, our security risks within a globalized community can easily become exaggerated. Instead of turning back towards manufacturing, the U.S. should look forward to innovation – not just in rare earths but in substitutes for rare earths. Investing millions into rebuilding a production line for a product important today will leave us a step behind, not a step ahead.

In its assessments, the U.S. should also be aware of the limitations China will have in controlling its domestic industry. While China is trying to address weaknesses in the regulatory system by restructuring the industry, the success of these reforms is by no means assured. In fact, China has overlooked some critical points in this reform, as village committees are still disconnected and have nothing to gain from cooperating with higher authorities. Without a strong regulatory system, China's ability to solve overcapacity and environmental problems might be limited.

In the long term, the U.S. will benefit from a stronger regulatory system in China. Currently, the cost of rare earths does not account for environmental costs –that is, rare earths are too cheap. If China's regulatory system is stronger, the price of China's rare earths will rise and U.S. companies will become more competitive. As such, in addition to following through on multi-lateral complaints against China's export policy in the WTO and investing in research institutes to promote innovation, the U.S. should also be looking for opportunities to cooperate with China. Prospects for U.S.-China cooperation in the rare earths industry are high given the newly established "US-China Clean Energy Research Center."

Overall, debate on what actions the U.S. should take in developing the domestic rare earths industry is still young and as yet inconclusive. As the debate moves forward, hopefully media accounts as well as government assessments will be looking forward to a more integrated world.

[71] Freeman III, Charles W, (2009), "Remember the Magnequench: An Object Lesson in Globalization," *The Washington Quarterly*, 32: 1, 61-76

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