

Testimony of

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President**

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**before the
Committee on Foreign Affairs
Subcommittee on Asia and the Pacific**

United States House of Representatives

**China's Monopoly on Rare Earths:
Implications for U.S. Foreign and Security Policy**

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Chairman Manzullo, and Members of the Subcommittee, I thank you for the opportunity to testify on critical issues surrounding rare earth elements and how they are undermining American competitiveness in our area of business.

Danfoss is a leading global manufacturer of compressors, controls and variable frequency drives for high efficiency air-conditioning, refrigeration, heating and motion systems. The US is the largest market for our company. We have 12 factories in the United States that employ over 3000 professional, managerial and hourly employees, and a large network of US suppliers of parts and services with several hundred additional employees.

We design, develop and manufacture products to enhance the energy performance of our customers' products. So, innovation and energy efficiency are critical for us and to our competitiveness in the marketplace.

Rare earths are a group of 17 elements whose unique properties make them indispensable for a wide variety of current and emerging technologies. They are used in applications such as catalysts, glass, electronics, lighting, ceramics, metal alloys, and magnets.

To take one example, the global demand just for magnets containing rare earth elements is expected to increase 10-16% by 2012¹. Worldwide demand for rare earth elements is expected to exceed supply by 40,000 tons annually unless major new sources are developed². For the magnetics industry the critical elements are Dysprosium (Dy) and Neodymium (Nd). Rare earth elements, as this illustrates, play a decisive and growing role in our nation's economic performance. And as the recent national focus on America's debt has made clear, our economic performance is the most important key to our future as a nation.

After several years of aggressive pricing and rapid growth, China is currently the source of 97% of the world's supply of rare earth elements but holds only 35% of the world's known reserves. China produces 76% of rare earth magnets with Japan supplying 22% and Western Europe the remaining 2%. Today, no nation on earth is more important to the worldwide availability of rare earth elements than China -- no other nation is even close. That position in the global economy is clearly one of special responsibility.

Since July 2010 China has cut export quotas by 40% compared to 2009³. Their reported purpose to do so was to protect the environment and licensors. It is evident that in doing so they preserve the resource for their future internal use--to preserve it for the Chinese economy. Unlike much in the international trade arena, rare earth elements managed irresponsibly is a zero-sum game. Managed by China for the short term security, the

resulting worldwide shortage would hamper innovation, sustainability, and growth all around the world.

Our Danfoss-Turbocor facility, located in Tallahassee, Florida, produces advanced centrifugal compressors for high efficiency chiller systems, and supplies the global market. These patented compressors contain a unique magnetic bearing system combined with high performance permanent magnet motors that provide energy savings of up to 40% in cooling large buildings compared to conventional chiller compressors. Our business has been growing an average of 20% per year (2007-2010), even during the economic slowdown and creating jobs in R&D and manufacturing.

These sophisticated magnetic bearings eliminate the reliability problems associated with traditional oil-based lubrication systems and enable the compressors to operate extremely efficiently. Powerful magnetic bearings suspend the shaft in a magnetic field without physical contact with other parts, and the highly efficient permanent magnet motor rotates the shaft very efficiently at very high speeds. Rare earth elements dysprosium and neodymium are vital to these unique combined capabilities.

The permanent magnetic motor itself improves energy efficiency in a range of 3% to 4% compared to traditional induction motors.

The elements dysprosium and neodymium, once produced in several countries, are now produced almost exclusively by China, since they have dominated the market by aggressive pricing. Mines in the U.S., Australia, Canada and Brazil ceased or limited production because artificially low pricing in China created a market imbalance that prevented global producers from being competitive. Since February 2011 China has implemented quotas, pricing spikes and lead-time constraints on shipments to countries like the U. S. and Japan.

Mines in the U.S. and Australia have been re-opened to increase supply outside China, and Canada and Brazil are looking to increase production, but these production increases cannot happen overnight.

Chinese control over the mining, processing and exporting of these materials has now driven up the cost of our bearings almost ten-fold. We've experienced an 800% increase in the cost of magnets used in a bearings/shaft/motor kit this year. This dramatic cost increase threatens the viability of the technology and profitability of our factory in Tallahassee. Magnet lead-times have stretched out from 8 weeks to 6 months, and advance payment has been requested to secure supply, making production scheduling and cash flow very problematic.

Our business in Tallahassee is not the only one affected by this crisis. We are currently developing a new line of variable-speed scroll compressors for very high efficiency residential and light commercial air-conditioning systems. These designs include high-efficiency permanent magnet motors, which utilize rare earth element magnets in their rotors. This technology will result in huge energy savings, as it has already done for countries with high electric rates such as Japan (100% of residential applications), Europe (~33% of residential applications), and China (~35% of residential applications). The U.S. has started this transformation but is still in the beginning stages of applying this technology.

Rare earth elements enable compressor manufacturers to develop products such as the variable speed scroll compressor, with higher energy efficiency and performance potential. The severe cost increases we have seen this year could make these highly efficient technologies uneconomical, thereby, jeopardizing a substantial energy-saving opportunity for our customers, as well as our nation, resulting in a regression to old, inefficient traditional technologies.

Rare Earth Elements Impact American Industry

Rare earth elements, especially in magnets, are used in an increasing array of products in American industry including highly efficient motors, wind turbines, hybrid cars, and even lighting products.

In addition, this advanced technology could possibly be critical to our defense industry as well. Defense is not our area of specialization, but we hope Congress will make every effort to understand the implications of rare earth elements in that critical sector.

My overarching point is this: China's rare earth elements strategy is an issue affecting the US and friendly-country industries broadly, threatening our leadership in such innovative technologies and the ability of our country to meet energy saving goals. That China conducts a national industrial policy is well known. It is also known that China's national industrial policy sometimes distorts market dynamics deeply. Rare earth element pricing and availability are a particularly troubling example of such distortions. Its impact cuts near the heart of our ability to innovate in critical technologies.

Unless the US is willing to pay a steep price in lost opportunities to innovate in energy, defense, and other important areas, the US Government must develop an effective means of countering China's emerging approach to rare earth elements. Fundamentally, it is that simple. And I would add that we do not see such a recommendation as at all "anti-

China." In a global economy, lost opportunities for progress and innovation hurt everyone. Whatever China may gain from a restrictive approach, it loses in forgone access to the innovations that would result from more free-flowing trade.

Industry's Actions

We have reacted to mitigate the impact of price shock and supply constraints. We are working with magnet producers to find alternative materials and sources or to use lower concentration of these resources. But the elements in magnetic bearings were chosen for their unique properties and performance, so alternatives are not readily available. Our materials procurement managers are seeking other sources of supply including new mines, new fabricators and new processes. Our research and development teams are evaluating technology alternatives. But finding, testing and qualifying such alternatives will require years, not months, to bear fruit.

We are aware of several bills that have been introduced during the 112th Congress, including HR618, HR952, HR1229, HR1314, HR1388, and HR2011 in the House and S.1113 in the Senate. But those are long-term in nature and focus on assessing the American and friendly country reserves of the elements and prospects of bringing them to market. In the interim, we need to ensure access to Chinese sources at reasonable prices while US manufacturers develop alternative solutions.

I would like to conclude my testimony today by outlining short-term, medium-term, and long-term actions that we hope you will consider to minimize the destructive impact on the cost and availability of these elements, elements that are critical to US manufacturing and trade.

Short Term:

- Reduce the import duties of magnets from 2.1 % to 0. While this is a small step, it signals actions to alleviate additional price burdens for manufacturers.
- Enact temporary subsidies until new mining/processing starts (18-36 months)

Medium Term:

- Establish a collaborative approach to encourage China to increase the export/production quota until other sources can be brought on line.

Long Term:

- U.S. should file a claim in the WTO to pressure China to increase quotas.
- Federally fund research of alternative materials (ex: National High Magnetic Field Laboratories, based in Tallahassee and Los Alamos.)

We ask Congress and the administration act on this decisively to protect American industry, our national balance of trade, and our economic and technological future.

Thank you for the opportunity to testify on this important issue.

End Notes:

¹ “REE - Rare Earth Elements and their Uses,” www.geology.com,
<http://geology.com/articles/rare-earth-elements/>

² “The Rise in Global Demand for Rare Earth,” International Business Times, September 19, 2011. <http://www.ibtimes.com/articles/126245/20110324/the-rise-in-global-demand-for-rare-earth.htm>

³ “Beijing crackdown hits rare earths mining,” Financial Times, Leslie Hooks, August 23, 2011.

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Clause 2(g) of rule XI of the Rules of the House of Representatives and the Rules of the Committee require the disclosure of the following information. A copy of this form should be attached to your written testimony and will be made publicly available in electronic format, per House Rules.

1. Name: John Galyen	2. Organization or organizations you are representing: Danfoss, North America
3. Date of Committee hearing: September 21, 2011	
4. Have <u>you</u> received any Federal grants or contracts (including any subgrants and subcontracts) since October 1, 2008 related to the subject on which you have been invited to testify?	5. Have any of the organizations you are representing received any Federal grants or contracts (including any subgrants and subcontracts) since October 1, 2008 related to the subject on which you have been invited to testify?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
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