



ENSURING JAPAN'S CRITICAL RESOURCE SECURITY

CASE STUDIES IN RARE EARTH ELEMENT
AND NATURAL GAS SUPPLIES

Michael Mazza, Dan Blumenthal, and Gary J. Schmitt



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Introduction

Japan continues to grapple with a challenge that has befuddled it since the early days of its rise as an industrial power: it suffers from a scarcity of the natural resources most critical to its economic well-being and national security. This is especially troubling now compared to recent decades as power dynamics across the Eurasian landmass are in flux, with China, Russia, Iran, and others flexing their muscles or otherwise acting in ways not conducive to a stable international environment. The confluence of these economic and security concerns could prove troublesome for Asia and the United States.

Asia's Evolving Security Environment. China's growing assertiveness is largely responsible for Asia's deteriorating security environment—for Japan's in particular. Beijing has seemingly abandoned its decade-long policy of "smile diplomacy," aimed at projecting a nonthreatening countenance to its neighbors. An accounting of just a few of China's provocative actions in recent years illustrates why those neighbors now feel increasingly threatened. Since 2009, the Chinese government or its maritime forces have:

- Harassed an unarmed US naval survey ship in international waters;
- Refused to condemn North Korea's unprovoked sinking of a South Korean naval vessel or the shelling of a South Korean island;
- Embargoed the export of rare earth elements (REEs) to Japan;
- Threatened the Philippine government and civilian vessels in contested waters;
- Unilaterally announced a fishing ban in the northern half of the South China Sea;
- Cut the towed survey cable of one PetroVietnam vessel and rammed another;
- Engaged in a maritime contretemps with the Philippines over the disputed Scarborough Shoal and instituted an apparently permanent "occupation" of the nearby waters;
- Stoked, or at least allowed, instances of mass anti-Japanese violence in China in response to the Japanese government's purchase of three disputed islands;
- Launched an ongoing effort to shift the status quo around the disputed Senkaku (called "Diaoyu" in Chinese) islands, relying on paramilitary and naval vessels and aircraft to do so.

Much of Asia continues to feel increasingly unsettled about China's rise, but perhaps no one state more so than Japan. Japan certainly has a better capacity for self-defense than do most Asia-Pacific states, but Japan has also been a longstanding target of Communist Party vitriol in a way that the Philippines, for example, has not. Tokyo's various attempts to apologize for its behavior during Japan's imperial period, not to mention Japan's longstanding status as China's top foreign aid donor, have done little to arrest anti-Japanese sentiments in China. Beijing's need—whether actual or contrived—to right "historical wrongs" ensures continuing distrust between East Asia's two most important capitals. Japanese leaders' occasional revisionist comments regarding Japan's wartime behavior, of course, do not help matters.

China's military investments likewise have Japan concerned. The People's Liberation Army's (PLA) developing anti-access/area denial (A2/AD) capabilities is designed to keep US forces distant from Chinese shores and deter or prevent those forces from intervening in a

conflict on China's periphery. By wearing away at the credibility of Washington's security commitment, Chinese A2/AD puts pressure on the US-Japan alliance, heightening Japanese insecurity. PLA modernization of its naval, air, and missile forces threatens Japanese forces as well. Overall, the military balance in East Asia is shifting in a direction less and less favorable to the United States and its key Asian ally, Japan.

At the same time, China has used nonmilitary means to pressure its neighbors and pursue strategic ends in the region. As we will discuss in the next section, Beijing cut off exports of REEs to Japan in fall 2010. During its standoff with Manila over the Scarborough Shoal, China halted the import of bananas from the Philippines. To China, economic coercion appears to be a legitimate foreign policy tool, especially in the early stages of a bilateral dispute.

China has also made use of its nonnaval maritime forces—essentially coast guard equivalents—to enhance its agenda. In recent years, these vessels have regularly entered disputed waters, harassed other states' research and fishing vessels, and even harried unarmed American naval ships. Beijing seems unconcerned about the potentially escalatory nature of its patrol ships' activities, evident in its activities in the East China Sea, where Chinese maritime ships are now facing off against Japan's highly capable coast guard vessels on a regular basis.

Japan and China have thus been engaged in a contretemps at sea since September 2012, after the Japanese government purchased three of the Senkaku islands from a private owner. Japan, China, and Taiwan all claim sovereignty over the islands, though Tokyo has administered them since the 1971 US-Japan Okinawa Reversion Agreement. Chinese vessels have regularly entered what Japan considers to be its territorial waters, previously a relatively uncommon occurrence. Chinese and Japanese ships are tracking and shadowing each other, and Japan's Self-Defense Forces have even scrambled fighter jets on a number of occasions in response to incursions by Chinese surveillance planes into Japan-claimed air space.

When Tokyo assesses this immediate dispute with Beijing as well as Chinese behavior across the arc stretching from Korea in the north to Asia's littorals in the south to India in the west, it sees a China that

is challenging the existing, US-led security order—an order that has kept the region generally at peace, stable, and increasingly prosperous. Japan and other states in the region are increasingly and rightly concerned with what the region will look like if that order is challenged by an ever more powerful and aggressive China.

In addition to its narrow disputes with China, Japan must also take note of the North Korean leadership's erratic, crisis-inducing behavior; a Middle East and North Africa awash in uncertainty; a Southeast Asia divided in how to deal with China's growing assertiveness and power; and a United States focused on domestic problems and willing to accept significant cuts to its defense budget at a time of global insecurity. Naturally enough, this evolution of the security environment is generating concerns within Japan about the country's potential vulnerabilities and, in particular, concerns over the security of the foreign natural resources required to fuel Japan's economy. China's willingness to put pressure on adversaries' economies, the instability in the oil- and gas-producing world, and the relative decline in America's ability to guarantee open access to the world's key sea lanes have brought concerns about Japan's critical resources supply security to a head.

The Critical Resource Security Conundrum. The critical resource security conundrum raises a number of converging problems. Most obvious is the economic future of already resource-poor nations such as Japan. Insecure supplies of needed resources could imperil the future development of Japan's commercial and defense industries (as well as those of the United States). Fortunately, Japan is already looking for alternative sources of supply. But alternative sources require new supply chains with accompanying infrastructure.

The acquisition of new sources and the building of new supply chains will also introduce new vulnerabilities. Overwater routes, especially those across the Asian littorals, are susceptible to maritime disruptions and the problems brought about by ongoing maritime territorial disputes. Indeed, the alleviation of high prices by increased supply could be negated if insufficient mechanisms for safe transport of these materials are in place.

Already sensitive disputes in the South China Sea, East China Sea, and Sea of Japan could be exacerbated if the transport of commodities enters into the

security equation. If China perceives efforts to develop new infrastructure as threatening to China's own supply chains or in violation of its maritime rights, Beijing may take steps that will increase tensions in the region. These issues are serious and need to be addressed in a manner that enhances cooperation between America and its Asian allies and partners.

In this paper, we will consider two critical resource security case studies: REEs and natural gas. Together, they demonstrate how Japan's resource security concerns are informing Japanese foreign policy in important ways. They likewise provide new opportunities for increased US-Japanese cooperation and new avenues for enhancing US-Japanese security ties.

Rare Earth Elements

In September 2010, China engaged in an act of economic intimidation by drastically reducing its export of REEs to Japan. Carried out in the wake of an ongoing dispute with Tokyo over the Japanese Coast Guard's arrest of a Chinese fishing boat captain who had rammed one of Japan's coast guard vessels, Chinese monthly rare-earth exports to Japan dropped from approximately 2300 metric tons in September 2010 to less than 400 in October and November before returning to normal levels in December of that year.¹

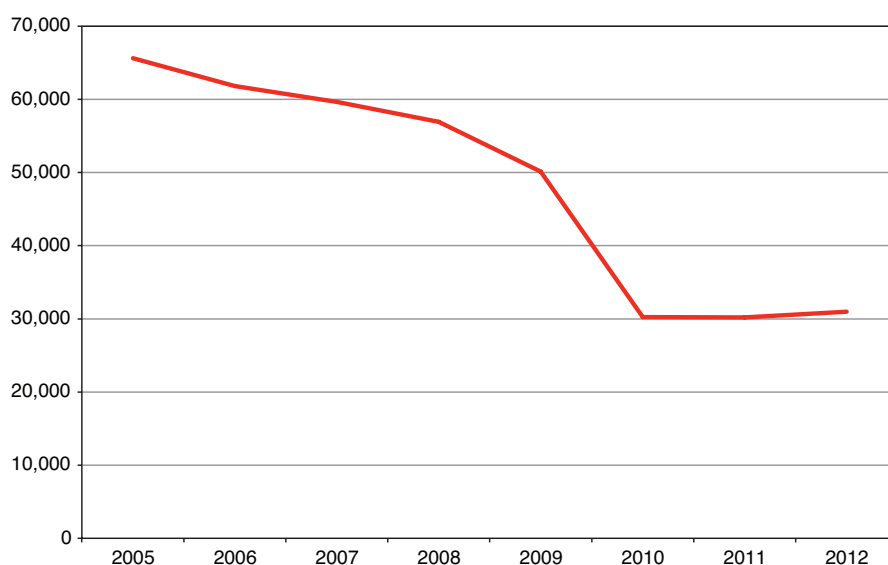
Most concerns about China's rise have been related to its rapid and expansive program to modernize its military. Yet Beijing's decision to use its role in the Japanese high-tech industry's supply chain to punish Tokyo has widened concerns as to the tools China is willing to employ. In particular, the decision to cut REE exports

called into question the assumption that Beijing could be counted on to be a responsible economic actor and to abide by its obligations as a member of the World Trade Organization. Japan and other countries are now increasingly wary of accepting a state of affairs in which China dominates supply of REEs and other strategic resources. Even before its ban on exports to Japan in 2010, Beijing's increasingly stringent export quotas (see figure 1)—imposed, Beijing argued, for environmental reasons—were doing little to calm these fears.

China's near-monopoly on REEs poses three main challenges for Japan, the United States, and other allies and partners. Briefly put, they are as follows:

- **Commerce.** Limited supply leads to higher prices for consumer goods;

FIGURE 1
CHINA'S RARE EARTH ELEMENT EXPORT QUOTAS (TONNES RARE-EARTH OXIDES)



Sources: US Department of Energy, "Critical Materials Strategy," December 2010; and James T. Areddy and Chuin-Wei Yap, "China Raises Rare-Earth Export Quota," *Wall Street Journal*, August 22, 2012.

TABLE 1
JAPANESE COMPANIES THAT USE RARE EARTH ELEMENTS

Company	Product(s)
Canon	Digital cameras
Hitachi	Motors
Honda	Hybrid vehicles
Mitsubishi Heavy Industries	Guided weapon systems
Nissan	Hybrid vehicles
Panasonic	Flat-panel televisions
Sony	Flat-panel televisions; laptop computers
Toyota	Hybrid vehicles

Source: The authors.

- **Defense-Industrial Base.** Limited supply threatens Japanese and US military recapitalization and weapons development needs;
- **Foreign Policy and National Security.** Control of supply potentially provides China with a coercive economic weapon.

Washington and Tokyo as well as corporations in both countries are taking steps to address these challenges. Doing so effectively will help ensure continued economic and national security.

Rare Earth Elements: An Overview. “Rare earth elements,” which refers to a group of 17 metals, is perhaps a misnomer. REEs, in fact, are not rare at all—indeed, they are found the world over; their production, however, is both expensive and potentially damaging to the environment, making them scarce. Still, production was once more widespread. For many years, the United States was self-reliant; it was the world’s primary producer of REEs into the 1980s. But that changed completely by the late 1990s.²

China’s lower labor costs; willingness to use cheaper, environmentally damaging production methods; and willful efforts to price others out of the market have led to a Chinese near-monopoly of REEs. In 2010, China accounted for almost 98 percent of world production, while accounting for only 50 percent of the world’s

reserves. US reliance on imports for REEs has been at 100 percent since 2003, with China providing 92 percent of that total from 2006 to 2009 and well over 70 percent since.³

The 17 REE metals are divided into two smaller groupings. Major end-uses of light REEs include petroleum refining and manufacturing of laptop hard drives, headphones, and ultraviolet filters in glass. Heavy REEs, on the other hand, are used in the production of permanent magnets, lasers, and medical x-ray machines; in many cases, heavy REEs can more reasonably be called “rare,” especially outside of China.⁴ In speaking about heavy REE dysprosium, for example, Peter Kelemen of Columbia University explained that “Ninety-nine percent of the current supply comes from clay deposits that can be easily mined with a shovel in Jiangxi, China. . . . Other known deposits of dysprosium in Canada and Greenland will be much harder to mine.”⁵

Why is China’s dominance in REE supply so concerning to Japan? Similar to the United States, Japan is dependent on foreign suppliers for REEs, and as of mid-2012, Japan received 82 percent of its imports from China.⁶ REEs are crucial for the production of a variety of electronics and electronic components, from digital cameras to flat-panel displays to hybrid vehicles. To say that Japan’s economy is reliant on a stable and sufficient supply of these materials is an understatement. See table 1 for a sampling of major Japanese companies that rely on REEs for their products.

Japan and the United States also use REEs in the production of a number of defense articles, including precision-guided munitions (PGMs), electronic warfare capabilities, laser-targeting systems, electric drive motors (components in the F-35 Joint Strike Fighter and the Zumwalt DDG 1000), radar, and sonar.⁷ Of course, the US defense-industrial base serves not only domestic military needs but also those of key allies and partner states. For example, Japan is dependent on the American laser-component supply chain, as Japan lacks an indigenous laser-component industry. These American-made components are crucial for PGMs made in Japan.

As large-scale REE recycling becomes a reality and as new alternatives to REEs are developed, demand should decrease substantially.

Addressing the Challenge. The primary commercial concern vis-à-vis REEs is that China's control over supply—and thus, to some extent, over price—leads to higher production costs, thus high prices for consumers and, potentially, decreased sales and revenues for companies. But according to many economists, the commercial challenge is solving itself: the market is working. As Derek Scissors explains:

Higher prices encourage the entry of new suppliers and encourage existing suppliers to expand. Both of these results have occurred in rare earths in the U.S. and elsewhere. Existing firms have mushroomed in size along with REE prices, new firms have been created, and new deposits have been discovered, as to be expected with the greater incentive to explore.⁸

Higher REE prices not only lead to new market entrants and the expansion of operations, which drive down prices, but they also spur innovation. Indeed, the growth in REE prices in recent years has encouraged corporations and governments to invest in research and development (R&D) efforts aimed at developing REE recycling technologies and REE alternatives. For example, the American company Baldor Electric is developing an

REE-free motor for use in electric vehicles—at present, REEs are critical components in such vehicles' motors.⁹

In Japan, some recycling technologies are already in place. For example, Hitachi has developed machinery for opening used air conditioner compressors and separating out the rare-earth metals, which are then used to manufacture batteries for Toyota's hybrid Prius.¹⁰ But the challenge for Japan is to establish a society-wide system for garnering materials to be recycled (for instance, encouraging people to dispose of their phones in a certain manner and instituting a process for efficient and large-scale scrap collecting). As large-scale REE recycling becomes a reality and as new alternatives to REEs are developed, demand should decrease substantially.¹¹

Indeed, these efforts have already helped decrease demand for REEs, which puts downward pressure on their prices while reducing reliance on these resources. High-tech industries have started to transition away from their heavy reliance on REEs. Toyota, for example, is developing a new, REE-free electric motor for its hybrid Prius. American company General Electric has found ways to lessen REE use by as much as 80 percent by simply reducing waste in the manufacturing process for products like jet engines and wind turbines.¹²

Unlike private industry, however, American and Japanese defense ministries cannot depend solely on the market to ameliorate the dilemma caused by China's near-monopoly on REEs. Why? As marvelous as the market may be over the long run in solving such supply dilemmas, sound defense planning requires assured access to such resources in the near- and medium-term future as well. As such, countries will inevitably be concerned about foreign control over critical inputs to weapons systems, especially if the source country could not be counted on to be a reliable supplier or is a potential adversary. Furthermore, in a time of conflict, such foreign control could make it difficult to expand production of needed arms, either because the source country willfully withholds resources or because the state of conflict slows or halts international shipping.

A review of Japan's 2011 Mid-Term Defense Program indicates numerous weapons capabilities on which Japan will rely in the coming years and that are dependent on REE components. These include PATRIOT surface-to-air missiles (SAM) and new medium-range SAMs; F-35 Joint Strike Fighters; electronic warfare

upgrades for F-15 fighter aircraft; enhanced intelligence, surveillance, and reconnaissance capabilities, likely to include unmanned aerial vehicles; new and extant warning radars; new submarines; and advanced interceptor missiles for ballistic missile defense.¹³ Companies like Mitsubishi Heavy Industries and Kawasaki Heavy Industries will play major roles in meeting these needs, though their ability to do so could be impeded if their access to REEs is limited.

Of course, whether through joint development, licensing agreements, or US foreign military sales, Japan is quite reliant on American defense companies as well. It is thus important for Japan's security that the United States gets its own REE house in order. If the US government does not want to rely on the market, it could instead stockpile REEs or support domestic industrial capacity (either by direct funding or by requiring suppliers to source REEs domestically). But both of these options are problematic. Neither is economically efficient or, perhaps, feasible in a time of fiscal constraint; while they might reduce US reliance on China in the longer term, they would also drive up REE prices, making defense acquisitions more costly.

Japan has begun to address this issue by investing in defense R&D to reduce REE use. In particular, Tokyo has launched a program to replace rare-earth magnet use in critical manufacturing with non-rare-earth magnets.

To date, the United States has not taken similar steps, though the US Department of Defense (DoD) has begun to address the general issue. DoD's recent *Strategic and Critical Materials 2013 Report on Stockpile Requirements* considers the potential for shortfalls in a conflict that lasts one year and takes another three years to fully recover. In that scenario, DoD found that it would experience shortfalls of six REEs and proposed the following "mitigation strategies": (1) "Import somewhat larger-than-normal" amounts from "reliable foreign suppliers" that can increase production; (2) use easily substituted materials "to mitigate some or all of any remaining shortfalls"; and (3) "During the conflict . . . if needed, place . . . restrictions on U.S. guarantees of material to produce exports of shortfall-material-intensive products."¹⁴

Finally, if those three steps are insufficient to mitigate the shortfall, then shortfall-prone materials should be stockpiled before the conflict.¹⁵ Options one and

two seem to rely on private sector producers having excess capacity and substitutes ready to go; the DoD report does not suggest that it should invest in such capabilities ahead of time. In any case, to do so—or to stockpile—is problematic, as we noted earlier.

While the mitigation strategies offered by the report may not be adequate, DoD has at least admitted that a potential problem does exist. It is also reassuring to see that the department has walked back its position in an earlier, unpublished report, which denied that REE shortages are a concern and asserted that domestic production will meet demand by 2013—with the production of yttrium being the sole exception.¹⁶

Given known trends in REE production, the Pentagon's optimism was always questionable. As noted earlier, less than two years ago, the United States was entirely dependent on REE imports, the majority of which came from China. Molycorp, which owns the largest REE mine in the United States, only reopened its mine last year.¹⁷ And Molycorp will not process in the United States all that it mines:

Recent supply chain developments by Molycorp include the announcement of plans to acquire Neo Materials Technology, Inc.—a Toronto-based firm with rare earth processing and permanent magnet powder facilities in China. According to Molycorp CEO Mark Smith, 18% of Neo Materials production volume goes to domestic Chinese companies and 33% is directly exported to Japan plus an additional 11% goes to Japanese companies operating within China. One concern voiced by critics of this deal is that some of these highly valued materials could potentially become subject to Chinese export restrictions. When the deal is finalized, Molycorp plans to ship 7%-12% of its total 2013 production capacity (known as Phase 2 capacity) of 40,000 mt to its Neo Materials facility in China. Molycorp also entered a joint venture with Daido Steel and Mitsubishi Corporation of Japan with plans to produce sintered permanent rare earth (NdFeB) magnets by 2013 in Japan.¹⁸

Lack of transparency from DoD on the question of potential REE shortfalls prevents Congress from assessing what sort of corrective actions should be taken if, in fact, legislation is needed. To that end, Congress should

require DoD to provide an annual report on current and projected defense-related REE requirements.

The US Department of Energy (DOE) has been more concerned about this issue than DoD. In its 2011 report *Critical Materials Strategy*, DOE found that there are “supply challenges for five rare-earth metals (dysprosium, neodymium, terbium, europium, and yttrium) [that] may affect clean energy technology deployment.”¹⁹ More recently, DOE announced the creation of the Critical Materials Institute, which will “develop solutions to the domestic shortages of rare earth metals and other materials critical for U.S. energy security.”²⁰

According to METI estimates, over 50 percent of Japan's REE imports will come from outside of China by mid-2013.

In general, however, the US government has been slow to address the issue of America's strategic mineral needs and the security of America's supplies. More public discussion—and, in particular, more congressional oversight—would promote a more thorough airing of what steps should be taken to mitigate uncertainty in the acquisition of crucial components for defense and energy security. More specifically, it could help illuminate the extent to which the government should be actively involved (or not) in the market, the ways in which the public and private sectors could collaborate, and the potential for cooperation with allied and partner states with similar security concerns.

DoD and DOE's Japanese counterparts, of course, should take similar steps. Tokyo should provide Washington with its own assessment of how current rare-earth supply chains will affect Japan's ability to defend itself adequately. Such an assessment should consider both vulnerabilities in Japan's own defense-industrial base as well as vulnerabilities inherent in Japan's reliance on the United States for defense technology. Just as cooperation in the area of missile defenses has risen to new importance in US-Japan defense relations, so too should the issue of strategic mineral supply security.

This is crucial not only because the commercial and defense-industrial challenges that China's command of

the REE market pose are cause for concern, but also because of China's potential to use that command as an economic weapon. As with the commercial challenge described earlier, the natural functioning of the market will help ease this problem as mining operations open in other countries.

With the Japanese Ministry of Economy, Trade and Industry (METI) in the lead, Japan is also taking direct steps to accelerate the diversification of its import sources. Through the Japan Oil, Gas and Metals National Corporation (JOGMEC), an independent administration agency that reports to METI, Tokyo is investing in and launching partnerships with Lynas Corporation (Australia), Lavreco (Vietnam), and Indian Rare Earths (India). According to METI estimates, over 50 percent of Japan's REE imports will come from outside of China by mid-2013.²¹ The Japanese government is also investing in R&D efforts targeted at substitution and REE recycling.

Ironically, however, Japan's investment in diversified import sources creates new vulnerabilities. In particular, imports from Australia, Vietnam, and India will rely on shipment through the South China Sea and other Southeast Asian waters. Such shipment is susceptible both to shipping stoppages and diversions because of territorial disputes and a possible Chinese interruption of commercial traffic.

But these are more acceptable risks than those inherent in dependence on China. China is less likely to interdict trade than to institute a ban on its own exports and, at least for the time being, US naval forces still rule the seas. Japan can further mitigate these risks by effectively taking advantage of the opportunities that its investment in diversified REE sources will afford Japan. Those opportunities can be divided into two broad categories, which are related to one another: foreign relations and national defense. Consider the following investments in infrastructure and REE mining and production that Japan is making throughout littoral Asia.

Australia. Japanese trading house Sojitz Corporation is providing a \$325 million loan to Australia's Lynas Corp—half of that amount provided by Japan's government—and purchasing \$25 million in shares of the company. Lynas is expected, in return, to supply approximately 8,500 tons of rare-earth metals annually

for 10 years.²² That is approximately 28 percent of Japan's annual REE consumption.²³

India. Five months after the October 2011 India-Japan announcement of an agreement to promote joint development of REEs, it was reported that Toyotsu Rare Earths India Private Limited (TREI), a wholly owned subsidiary of Toyota Tsusho Corporation, was set to start REE production in India the following month. TREI would use monzonite sand provided by India's Indian Rare Earths Limited in its production of REEs. Last November, Japan and India signed a trade pact on Indian exports to Japan, and Tokyo and Delhi are considering forming joint ventures operating in third-party countries.²⁴

Vietnam. In November 2011, it was reported that Toyota Tsusho Corporation was establishing a venture with Sojitz Corporation and Lavreco, a Vietnamese state-run mining company, to supply more than 20 percent of Japan's REE needs. The deal was announced at the same time as a Japan-Vietnam nuclear accord.²⁵

Malaysia. Australia's Lynas Corporation has built an REE refinery in Malaysia to refine REEs mined at Mount Weld in Western Australia. The plant began operating in late winter 2013.²⁶

Burma. Japanese trading group ITOCHU Corporation is investigating Burma's REE potential.²⁷

Infrastructure. Japan is considering investing in connectivity and enhancements to India's port of Ennore as well as in developing Burma's Dawei port, located directly across the Bay of Bengal from Ennore. The Japan Bank for International Cooperation (JBIC) is investing in the Challenger Emerging Market Infrastructure Fund LP, which invests in infrastructure primarily in Asian emerging economies. JBIC has likewise invested in the similar CapAsia ASEAN Infrastructure III LP.

Japan has also provided a grant of \$131 million to Cambodia to build the Mekong Bridge, connecting Cambodia to Vietnam. Enhanced infrastructure in Southeast and South Asia will attract more Japanese multinational investment, potentially deflecting it from China and making Japan, on the whole, less dependent on China. Together, these projects will—by

sea, rail, and road—connect India to the South China Sea and may over time reduce reliance on the Malacca, Lombok, and Sunda Straits. At the very least, these new links will support an alternative transit route in the event of disruptions in Asia's strategic waterways.

These investments can have two effects. First, they can enhance both government-to-government and business-to-business ties between Japan and other Asian countries and make Tokyo a more important partner than it otherwise might have been—an important goal for Tokyo as it looks to balance China's rise by enhancing bilateral partnerships in the region. Second, such investments make recipients more dependent on the Japanese market—which provides demand for REEs and transit services in Southeast Asia—and thus on the security of sea lines of communication (SLOCs).

Shared concerns over SLOC security should provide additional opportunities for Japan to further develop defense relationships in Asia and for the Japan Coast Guard (JCG) or Maritime Self-Defense Force (MSDF) to pursue joint exercises and conduct training for less capable maritime services. Although the JCG is already conducting some low-level training in Southeast Asia, shared and growing fears for SLOC security could help accelerate these efforts. This would enhance Japan's influence in South and Southeast Asia and strengthen SLOC security—thereby reducing the vulnerability of Japan's REE supply chains by improving the naval and coast guard capacities of littoral states and improving deterrence.

From the perspective of Japan's own national defense, diversified REE import sources and their attendant vulnerabilities—and, thus, vulnerabilities in the supply chains of Japanese national champions like Toyota, Mitsubishi, and Toshiba—will provide Japanese leaders with a viable, less controversial rationale for increasing defense spending and extending the area of operations of Japan's Coast Guard and MSDF. Strengthening these services and expanding the breadth of operations they perform (and thus their experience) would improve Japan's overall defense capability and contribute to regional stability; Japan could be seen as providing a public good for the region. It would likewise enhance Tokyo's capacity for self-defense, while also allowing for even higher-level US-Japan military cooperation.

Interestingly, Japan's efforts to diversify its REE supply lines have not been limited to littoral Asia and Australia, but have extended to Central Asia as well. These efforts are not as extensive or as well developed as those in littoral Asia and Australia, but they are promising—both from the perspective of securing additional REE sources and of extending Japanese influence in continental Asia.

Although China's dominance of the global supply of REEs poses a national security challenge for Japan, that dominance is spurring Tokyo to take steps that will make it more secure than it otherwise would have been.

Kazakhstan. In March 2010, Kazakhstan's national nuclear company Kazatomprom and Japan's Sumitomo Corporation—with 51 percent and 49 percent stakes, respectively, in the joint venture—established Summit Atom Rare Earth Company (SARECO). SARECO opened its plant in November 2012. In September 2011, Kazatomprom and Toshiba Corporation established a joint venture called KT Rare Metals Company LLP. Toshiba, with JOGMEC support, was also investigating the establishment of processes for the effective recovery of REEs from uranium-pregnant solutions and uranium extraction operations in Kazakhstan.²⁸

Mongolia. In October 2010, in the immediate aftermath of China's embargo on REE shipments to Japan, Mongolia and Japan decided to drill for REEs “in a bid to make the country [Mongolia] a major sourcing destination for rare earths for Japan.” In March 2012, Tokyo and Ulan Bator announced the start of negotiations for an economic partnership agreement:

Taking into account the complementary structures of the two economies, the two leaders shared the view that the conclusion of the Economic Partnership Agreement between Mongolia and Japan, which will be the first

free trade agreement for Mongolia, will not only contribute to strengthening the existing political and economic ties between the two countries, but also become one of the significant steps in building Mongolia-Japan ‘Strategic Partnership.’

Earlier preliminary talks about the potential for a deal included discussions about Mongolia's capacity to be a stable supplier of REEs and about possible joint development of REEs and other natural resources.²⁹

From Japan's commercial perspective, of course, the more REE suppliers, the better. But the greater payoff in these deals will also be strategic in nature. Indeed, Japan's REE-specific efforts in continental Asia are matched by investments in infrastructure and other sectors of the economy and by efforts to develop broad-based bilateral relationships. These efforts will give Japan greater influence in China's “backyard”—perhaps mitigating China's influence there and complicating China's assumptions about its adjoining southern and western security environments. Japan-Mongolia relations have particular promise given each country's proximity to and concerns about China. Although Japan's growing reach into continental Asia will not afford it the same sorts of opportunities for enhanced defense relationships as its efforts in littoral Asia will, there may be opportunities for low-level military cooperation—for example, airborne search-and-rescue training for Kazakh forces over the Caspian Sea or army engineer or medical training for the Mongolians.

In short, although China's dominance of the global supply of REEs poses a national security challenge for Japan, that dominance is spurring Tokyo to take steps that will make it more secure than it otherwise would have been. Those steps are beginning to bear fruit: according to the *Wall Street Journal*, in 2012 Japan “sharply reduced” its dependence on Chinese REEs.³⁰ By deepening its economic, political, and security ties with countries throughout Asia, Japan can ensure itself a reliable supply of REEs while expanding its influence and enhancing the capacity of its own and partner militaries to respond to growing Chinese assertiveness. This will not only enhance Japan's security but will also contribute to regional stability.

Natural Gas

On March 11, 2011, a triple disaster struck Japan: earthquake, tsunami, and nuclear meltdown. In some respects, the meltdown will have the most long-term effects, as it called into question the underpinning of Japan's economy: power production. Given the ever-present memories of Hiroshima and Nagasaki and the Japanese people's long-held suspicion of all things nuclear, it is no surprise that the 2011 Fukushima Daiichi nuclear disaster has sparked a vigorous debate about the merits of moving away from versus sticking with nuclear power generation.

In September 2012, then-prime minister Yoshihiko Noda approved a new national energy policy that aimed to phase out all nuclear power by the late 2030s, although the cabinet later walked back the commitment to doing so by that date. Recently elected Prime Minister Shinzō Abe, however, announced in a February 2013 speech to the Diet (Japanese parliament) that Japan would restart idled nuclear plants that are able to pass new safety standards to be set later this year. His government has also kept open the possibility of permitting the construction of new plants in the future.³¹

Before the earthquake, Japan was one of the world's three largest nuclear energy consumers. In 2010, nuclear energy counted for about 13 percent of Japan's total energy consumption.³² That same year, nuclear energy was responsible for about a quarter of all electricity production in Japan.³³ Regardless of how the pronuclear versus antinuclear debate turns out, it seems all but certain that nuclear energy production will not return to pre-Fukushima levels in the foreseeable future as some damaged plants could take years to resume generating power, older plants are likely to be decommissioned, and plans for new reactors will likely proceed with greater deliberation. Only 2 of Japan's 50 reactors have been brought back online thus far, and the rate at which others will follow is still uncertain. In 2012, the Economist Intelligence Unit (EIU) forecasted that

in 2020, Japan would have 30.6 gigawatts of nuclear capacity, a 35 percent drop from actual 2010 capacity and a 50 percent downward revision of the EIU's pre-Fukushima 2020 forecast.³⁴

Japan, then, will have to rely more heavily on other means of energy production. The goal to significantly reduce greenhouse gas emissions, as also laid out in former prime minister Yoshihiko Noda's energy policy—a goal that Abe, who called for reduced emissions during his first term as prime minister, may support—will limit Japan's ability to burn more coal, which accounted for some 15 percent of Japan's total installed electricity-generating capacity in 2011.³⁵ And while Tokyo would like to see renewables one day account for 30 percent of the country's energy mix, ramping up will be a long process considering that hydroelectric and other renewable energy accounted for only 4 percent of Japan's total energy consumption and 2 percent of electricity generation in 2010.³⁶

In its 2012 report on Japan's energy future, the EIU forecasted no growth in renewable energy's share of total energy consumption by 2020, but the Japanese government is supporting an expansion of capacity.³⁷ In summer 2012, for example, Tokyo instituted a feed-in tariff to encourage investment in renewables. In April 2013, METI announced that 21 new geothermal energy projects were under consideration, which could potentially double the total number of the country's geothermal plants.³⁸

But in both the short and medium term, Japan will instead rely on greater use of natural gas for its energy needs. This was evident in the immediate aftermath of Fukushima. In 2011, Japan saw its year-on-year liquefied natural gas (LNG) imports increase by 12 percent. Japan's power sector increased LNG consumption by 20 percent that year, even as "Japan's total power demand fell by 4.7% due to post-Fukushima energy conservation and restricted power supplies."³⁹ Notably, before the nuclear

disaster, Japan was already the world's largest importer of natural gas. These trends are likely to continue unless Japan alters tack and decides to double down on nuclear power or coal, both of which are unlikely eventualities.

Over the longer term, Japan's energy security concerns may wane, as the growth in Japan's energy demand has actually slowed since 2000. In a 2009 study funded by DOE and the Institute of Energy Economics, Japan (IEEJ), a group of Japanese and American scholars concluded that "in a long run to fiscal [year] 2050, final energy consumption will decrease on a population decline, enhanced energy conservation measures and the services sector's growing presence in the economy."⁴⁰ The researchers found that between 2005 and 2050, final energy consumption could drop by between 15 and 27 percent.⁴¹

In 2011, Japan imported about 27 percent of its liquefied natural gas from the Middle East (primarily Oman, Qatar, and the United Arab Emirates), 39 percent from Southeast Asia (Malaysia, Indonesia, and Brunei), and 9 percent from Russia.

Still, Japan will continue to rely on some foreign energy imports. The IEEJ study found that LNG-fired plants would continue to provide a significant share of power generation in most scenarios that the researchers considered. Notably, this pre-Fukushima study assumed a larger and larger role for nuclear power in Japan. Even with growing nuclear power generation, the study did not anticipate gas usage declining until some time after 2030.

So even as total energy consumption diminishes, natural gas may become more important as it becomes responsible for a growing share of Japan's energy mix. Much like Japan's reliance on foreign rare earths, stepping up reliance on foreign LNG presents overlapping commercial and national security challenges.

Japanese Liquefied Natural Gas Imports: Insecure and Unaffordable? Japan's current LNG imports

challenge Tokyo in two interrelated ways. In 2011, Japan imported about 27 percent of its LNG from the Middle East (primarily Oman, Qatar, and the United Arab Emirates), 39 percent from Southeast Asia (Malaysia, Indonesia, and Brunei), and 9 percent from Russia.⁴² In general, Japanese importers purchase these natural gas supplies on long-term contracts. These contracts use a pricing mechanism that ties the price of LNG to that of crude oil.

In the nearly two years before the March 2011 triple disaster, the import price Japan paid had been steadily rising, but it has since jumped to new highs. Since July 2011, Japan's LNG price has been consistently between \$16 and \$19 per million British thermal units (MMBtu), the typical unit for measuring LNG.⁴³ By comparison, in February 2011, just before the Fukushima meltdown, the average Japanese price for imported LNG was \$12.02 per MMBtu.⁴⁴

Will Japan's shift to LNG for power generation be economical? At these prices, it will certainly be more expensive. One estimate found that in 2010, the cost per kilowatt hour of burning LNG was about 20 percent greater than the nuclear power-generated cost per kilowatt hour.⁴⁵

Not surprisingly, the heightened post-Fukushima demand for LNG put a drag on the Japanese economy. Japan's trade balance has been in deficit nearly every month since the earthquake, and Japan posted an annual trade deficit in 2011 for the first time in 30 years.⁴⁶ (The trade deficit cannot be blamed on gas imports alone; the still-weak global economy, the growing competitiveness of other high-tech economies, and the strong yen in 2011 all hurt Japanese exports.)

"Abenomics," Prime Minister Abe's economic policy, may exacerbate Japan's concerns over LNG prices. The depreciation of the yen has made imports more expensive across the board, only heightening Japan's need to secure sources of low-dollar-price LNG.

In agreeing to purchase LNG at prices based on the price of oil and in relying so heavily on LNG from the Middle East, Japan has put itself in a difficult position. As Japan increases the use of LNG in its energy mix, it will further open its economy to the risks of natural fluctuations in oil prices and of "unnatural" supply disruptions. Renewed conflict in the Persian Gulf, for example, would likely negatively impact both oil

and gas production in the region while complicating shipping, thus driving up prices for both oil and gas. Even oil production disruptions internal to a country like Saudi Arabia, from which Japan purchases no gas, would drive up Japan's LNG price.

As noted, Japan does not rely solely on gas imports from the Middle East. But although Japan maintains stable relations with Indonesia, Malaysia, and Brunei, and although those countries are themselves relatively stable, the environment is not as benign as it once was. The South China Sea is becoming an arena for great power competition between China and the United States and between some Southeast Asian states and China as territorial disputes in the sea heat up.

At the same time, Beijing-Tokyo ties have entered a downward spiral; even if those relations begin to warm, Japan will not forget China's willingness to target the Japanese economy. China's embargo on REE exports is not the only example of this. More recently, in response to the Japanese government's purchase of three of the disputed Senkaku islands in September 2012, Beijing permitted—and local officials may have encouraged—mob violence toward Japanese businesses. Toyota, Honda, and Nissan, for example, were all forced to halt production at Chinese factories. Sales of Japanese automobiles in China plummeted in September 2012, with Toyota, Honda, and Nissan posting year-on-year sales drops for that month of 48.9 percent, 40.5 percent, and 34.6 percent, respectively.⁴⁷

Given China's increasing assertiveness in the South China Sea and its apparent proclivity for tightening the screws on Japan's economy, Beijing's playbook may very well include the interdiction of Japan-bound shipping through the South China Sea. This step is not one that Beijing would take lightly, but it is a vulnerability that should concern Tokyo.

Japan should also be wary as it steps up LNG imports from Russia to improve supply diversification. Russia and Japan have an ongoing territorial dispute over islands in the chain connecting Hokkaido to the Kamchatka Peninsula, making Moscow all too eager to secure leverage with Tokyo over that issue. In Europe, Russia has not shied away from using its control of LNG supplies to pressure others into making concessions. In 2006, Moscow cut off gas supplies to Ukraine—and, as a result, to most of Europe—in an

effort to force Kiev to grant Gazprom a stake in the Ukrainian pipeline network. The gamble paid off.⁴⁸

A Secure Energy Future. Unless public attitudes toward nuclear power in Japan change dramatically, and until renewables become economically feasible, LNG is the natural choice for Japan's energy future. But if Japan continues to source gas as it has in the past, it will not be able to count on either a stable supply or a stable, and ideally low, price. Fortunately, in the case of LNG—unlike in that of REEs—Japan can diversify its supply without opening itself up to new vulnerabilities.

As noted, since the Fukushima meltdown, Japan has been paying a price for LNG that at times approaches \$19 per MMBtu. By comparison, the Henry Hub Natural Gas spot price for LNG in the United States has not even reached \$5 during that period, and has generally been considerably lower.

This is largely because of the shale gas revolution in the United States. Over the last decade or so, new technologies that allow for the affordable extraction of natural gas from shale formations have become operational. These formations are large and spread across the continental United States. American gas reserves have always been plentiful, but tapping them was, until recently, simply not economically viable. Now, American gas *supplies* are plentiful as well. So plentiful, in fact, that supply has overwhelmed demand, leading energy companies to curb production. The explosion of natural gas production in the continental United States has created new opportunities for Japan.

Exports from the Continental United States. US natural gas producers are increasingly eager to export their product, as low domestic prices and large surpluses threaten to undercut their bottom lines. There are nearly 20 proposed LNG export facility projects in the United States, two of which have received approval from DOE to proceed.⁴⁹ In 2011, DOE provided an export license to Cheniere Energy Inc. and, in May 2013, approved Freeport LNG's export of gas from its Quintana Island, Texas, terminal.

Although DOE froze the approval of export licenses over the past two years following appeals from environmental and industrial groups, the recent Freeport approval has signaled that the Obama administration

will no longer stand in the way of LNG exports. Exports from Sabine Pass, which borders Louisiana and Texas, could start as soon as 2015, with those from Freeport beginning in 2017.⁵⁰

Korea Gas Corps (KOGAS), South Korea's state-run gas buyer (the world's largest), became the first foreign entity to secure a contract to purchase US LNG at the Henry Hub price. Since its deal with KOGAS, Cheniere has lined up supply agreements with BG Group (United Kingdom), GAIL (India), and Gas Natural Fenosa (Spain).⁵¹

The explosion of natural gas production in the continental United States has created new opportunities for Japan.

Although the Bank of Tokyo-Mitsubishi UFJ Limited is one of eight financial institutions providing financing for the Cheniere project, Japan has until recently been somewhat wary of committing resources to importing natural gas from the United States. DOE must provide export licenses to companies wishing to export LNG to countries with which the United States has no free trade agreements. Domestic political opposition from groups in the United States—generally on environmental grounds or on the basis of wanting to keep domestic LNG prices depressed—has made Japanese buyers worry that their investments would not pay off.

Early in 2012, for example, US Representative Ed Markey (D-MA) sponsored two bills designed to keep American natural gas in the United States.⁵² While there is some limited support for these pieces of legislation on Capitol Hill, they are unlikely to become law. First, the economic and geostrategic benefits of US LNG exports are becoming increasingly clear. A study commissioned by DOE and conducted by NERA Economic Consulting, for example, found that in a range of scenarios, "U.S. economic welfare consistently increases as the volume of natural gas exports increased." The report concluded that natural gas exports would lead to increases in both US gross domestic product and US households' real income.⁵³ (We discuss the geostrategic benefits later.)

Second, expanding foreign direct investment in the US natural gas industry and increasing numbers of

supply deals, such as those Cheniere has already negotiated, will make it politically difficult for Washington to restrict exports. Indeed, Japanese participation in America's LNG market will make the approval of exports more rather than less likely.

But Japan should move quickly. Other governments are signing supply agreements with energy companies and financing new export facilities. Cheniere, for example, has already reached agreements to supply gas to a number of foreign buyers, as noted earlier.⁵⁴ If Japan gets involved now, it will be able to secure more favorable export agreements than it would at a later date. It will also be able to help affect where new export terminals are located, which will play into the overall cost Japan pays for importing LNG from the United States.

Japanese utility company Tokyo Electric Power Company's recent agreement to purchase gas from Cameron LNG, "a proposed export project in Louisiana backed by Semptra Energy of the U.S., Mitsui and Mitsubishi of Japan, and GDF Suez of France," is a positive step.⁵⁵ Sumitomo Corp's recent agreements (subject to DOE approval) to export LNG from Dominion Cove Point LNG (in Lusby, Maryland) and sell to Tokyo Gas Company Limited and Kansai Electric Power Company may likewise signal that Japanese companies are putting their concerns about relying on US gas behind them.⁵⁶ DOE's approval of the abovementioned Freeport project, from which Osaka Gas Company Limited and Chubu Electric Power Company have already agreed to buy gas, may foretell a much more aggressive Japanese push for access to American natural gas.⁵⁷

Abe's February 2013 visit to Washington may have marked an inflection point. In directly raising with President Obama the issue of LNG exports to Japan, Abe signaled that securing American gas is of immense importance to Tokyo. A major expansion of Japanese investment in the US shale gas revolution may be in the offing.

Exports from Alaska. While the forthcoming reopening of an enlarged Panama Canal makes potential Japanese LNG imports from the Gulf of Mexico more economical, Japan can also look to American locales closer to home to fill its gas needs. Japan has long been importing small amounts of Alaskan LNG, but Alaska's potential to become Japan's primary gas supplier is increasing.

Alaska's North Slope is awash in conventional natural gas. Although the release of natural gas is a byproduct of oil drilling on the North Slope, energy companies have no way of moving the gas from the North Slope to the market, and simply inject it back into the earth's crust. Much of the North Slope's reserves, moreover, are entirely untapped. Plans had long been in development to build a pipeline network that would deliver that gas to the lower 48 states. The shale gas revolution and resulting low Henry Hub price, however, have made that all but impossible—on price, Alaskan gas simply cannot compete in the continental United States with gas produced in the lower 48 states.

Alaskan gas could, however, compete on the global natural gas market. A recent Brookings Institution study found that Alaskan LNG could be delivered to Japan at a cost of \$11 per MMBtu or less in 2020—or, at most, two-thirds of what Japan is currently paying.⁵⁸

Still, as with the continental United States, Japan has been hesitant to consider Alaska as a future significant gas supplier. In part this is because of those problems in Washington that we discussed previously. But local politics in Juneau have hampered efforts to develop Alaskan gas as well, as state legislators cannot agree on royalties that companies will have to pay the state for extracting natural gas. Legislators fear setting royalties at rates lower than they should be and paying for this mistake at the polls. But the delay in doing so prevents energy companies from investing in the necessary infrastructure for exporting gas: without knowledge of what the royalty payments will be, these companies cannot determine whether the billions of dollars of required investment will pay off in the long run.⁵⁹

Those oil companies do share blame for the lack of progress as well, as their intentions have not always been entirely clear. ExxonMobil, ConocoPhillips, and BP hold rights to the North Slope fields—working together, as will be necessary to get gas from the well to market, does not often come naturally for these energy majors. Nor has their desire to make the required massive investments always been certain.

But that is changing. In October 2012, the three energy producers agreed on a plan to build a LNG pipeline from the North Slope to Alaska's southern coast to facilitate export to Asia, as well as to supply the local Alaskan market. In February 2013, ExxonMobil, ConocoPhillips, BP,

and TransCanada provided Alaskan Governor Sean Parnell with their completed project concept. The project is in the early stages and still needs to clear a number of hurdles, but it is gaining momentum.⁶⁰ Any indications that Japan is ready to contribute financing and sign supply agreements will add to that momentum.

The Geostrategic Logic of US Liquefied Natural Gas Exports. As we noted, foreign financing, its potential impacts on job creation, and the balance of trade make outlawing LNG exports a difficult sell. Nor is there extensive evidence to support assertions that “fracking” is damaging to the environment. Beyond economic and environmental issues, however, the geostrategic logic for allowing natural gas exports is compelling. Indeed, the security benefits for Japan of diversifying its supply extend to the United States as well.

A Japan that is less dependent on Middle Eastern and Russian gas, and that is no longer dependent on a gas price tied to that of oil, is a Japan whose foreign policy priorities are more likely to align with those of the United States. Robust US-Japan energy trade, moreover, will serve to reinforce broader ties, particularly the security relationship. In particular, such trade will allow Japan to rely more heavily on transpacific shipping lanes and less so on those relatively insecure SLOCs running west to the Persian Gulf and Red Sea.

Furthermore, more affordable gas could assist renewed economic growth in Japan, which had been further retarded by high energy prices after Fukushima and which is necessary for Tokyo to assume the greater regional role it appears intent on playing. Healthier government revenues would allow Tokyo to finally match its defense spending with its requirements, making Japan a more capable security partner for the United States and others in the Asia-Pacific region.

Other Options for Japan. As Japan rebalances its supply arrangements away from the Middle East and Russia over time, it need not—in fact, should not—rely solely on the United States. Although the United States is certain to be a reliable supplier, diversified import sources will enhance Japan's energy security.

Other promising opportunities abound in the Western Hemisphere. The shale gas revolution has hit Canada as well and the Japanese government is providing

financing to Japanese companies engaged in the gas sector there. For example, in March 2013, JOGMEC announced an agreement to “provide equity financing to JAPEX Montney Ltd., established by Japan Petroleum Exploration Co., Ltd. (JAPEX), which will acquire a 10% interest of the natural gas blocks in North Montney, British Columbia.”⁶¹ There are currently seven proposed LNG export terminals to be opened on Canada’s west coast, with the first coming online as soon as 2014. These will serve Asian markets.⁶²

Elsewhere along the Pacific’s eastern rim, Mexico and Argentina are promising suppliers. In a 2011 study, the US Energy Information Agency found that Mexico has the world’s fourth largest technically recoverable shale gas reserves, though water resource limitations may make it difficult for Mexico to take full advantage of its gas fields.⁶³ The same study found that Argentina has the world’s third largest reserves.⁶⁴ In late 2012, Chevron signed an agreement with an Argentinian counterpart to begin developing that country’s shale gas.⁶⁵

In the meantime, Japan should continue to import LNG from Southeast Asia. Malaysia and Indonesia

have been and should continue to be reliable suppliers in the near term, though projections see them becoming net importers of natural gas in the coming years. With concerns over China’s growing assertiveness driving Kuala Lumpur, Jakarta, and others to pursue tighter links to Tokyo, energy trade can help cement growing ties. Japan should likewise continue to source LNG from Australia, from which it imports 18 percent of its foreign gas.⁶⁶ The need on both ends to secure such trade can likewise facilitate enhanced maritime security cooperation between the Japanese Coast Guard (and, potentially, the MSDF) and its Southeast Asian and Australian counterparts.

As with REEs, Central Asia is home to ample reserves of natural gas. Tokyo recently committed to providing the region’s five countries with \$700 million in aid, part of which will support the energy industry.⁶⁷ While there are logistical and security challenges to importing LNG from the Central Asian states—consider through which countries pipelines would need to pass—Japanese assistance in developing the region’s resources is a relatively low-risk, high-reward gambit.

Policy Recommendations

Japan stands at a crucial juncture. The critical resource supply chains it has maintained in recent decades look increasingly problematic. In the case of REEs, Tokyo can no longer afford the economic and security ramifications of potential Chinese anti-Japanese outbursts in the future. A large share of Japan's energy supplies, meanwhile, comes from a region of the world in which stability is a scarce commodity. If Japan works hand-in-hand with the United States, however, it is well within Japan's capability to address these vulnerabilities.

To boost its supply-chain security, Japan should first and foremost continue doing what it has been doing: providing wide-range investment in and aid to countries in which Japan has strategic resource interests. Doing so not only facilitates a stable supply of REEs, LNG, and other critical resources but also insures bilateral relations against potential future drops in resource demand. Although the REE investments Japan has made to date are all sensible, Tokyo should consider increasing its emphasis on less traditional areas of interest, including Bangladesh and Central Asia. Wherever Japan decides to pursue strategic resource investments, METI (and JOGMEC) can lead the way, but the foreign and defense ministries should be at their heels and prepared to pursue full-spectrum ties to new and old partners alike.

To that end, Japan should grow its coast guard and, if resources permit, expand its responsibilities to include SLOC protection in international waters in the Bay of Bengal and eastern Indian Ocean (the MSDF's prior Indian Ocean mission to refuel US naval vessels supporting operations in Afghanistan suggests that such an expansion of responsibilities would not be beyond the pale). This would be less provocative than sending the MSDF to do so, and Asian states still wary of Japanese military activity are likely to be more amenable to cooperating with Japan's coast guard than with its navy. The coast guard (and the MSDF, if deemed feasible) should

engage in expanded capacity building—to include training, exercising, and aid—for friends and allies in the region. Japan can be particularly helpful in assisting those partners in enhancing their ability to monitor and patrol their own territorial and nearby waters.

A Japan that is less dependent on Middle Eastern and Russian gas, and that is no longer dependent on a gas price tied to that of oil, is a Japan whose foreign policy priorities are more likely to align with those of the United States.

For its part, the United States must remain engaged—diplomatically, economically, and militarily—in Asia not only to further its own narrowly defined interests but also to dispel international concerns about expanding Japanese maritime activities. To do so, the United States could make access and infrastructure security in Southeast Asia a central aspect of its Asia policy. Washington should pursue trilateral exercises with Japan and individual Southeast Asian countries to facilitate Japan's growing influence in the region and should encourage Japanese bilateral military exercises with developing partners. But the US Navy's main effort should continue to be the provision of general SLOC security in the Asia-Pacific, while Japan and its new partners should provide security for their own REE supply chains.

Tokyo and Washington might consider establishing a joint infrastructure investment fund, which would support infrastructure development in South, Southeast, and Central Asia. By pooling their resources in this way, Japan and the United States could expand the alliance's influence in countries along strategic waterways

and in countries otherwise more likely to fall under China's sway.

While Washington should explore the feasibility and potential value of conducting dialogues with Japan and Central Asian states regarding resource security, it should make the US-Japan-India relationship a focus of US strategy in Asia. Though a formal alliance is unlikely (and probably unnecessary), their geography, overlapping security concerns, shared security partners, and highly capable maritime forces position the three countries to cooperate effectively in providing security and stability in Asia. The United States should similarly relaunch efforts to develop a formal or informal US-Japan-India-Australia arrangement.

Domestically, Washington should remove barriers to energy exports. Such barriers hinder rather than boost economic growth and prevent the United States from employing a valuable geopolitical tool. LNG exports to Asia will enhance not only Japan's energy security, but

also that of US partners such as South Korea and Taiwan. Binding US allies' energy security more tightly to the US market will moreover mediate occasionally divergent national security interests, thus reinforcing transpacific security ties. Japan's participation in the shale gas revolution should be placed atop the bilateral alliance agenda.

Market forces and concerted Japanese investments are loosening China's dominance of the world's rare-earth supply, yet that very diversification of supply sources creates new and different vulnerabilities for Washington and Tokyo to worry about. Meanwhile, opportunities abound for Japan to diversify its energy supply and to rely for energy imports on relatively secure transpacific SLOCs rather than trans-Asian waterways. Addressing these critical resource supply-chain vulnerabilities affords both countries—Japan in particular—opportunities to expand their influence and develop new security relationships throughout Asia. Stability in the region will improve as a result.

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