

The Globalization of Energy Markets

Martha Caldwell Harris

Energy market globalization is deepening and broadening, not only through international trade but also through cross-investments, deregulation of domestic markets, and industrial restructuring that links the older energy industries to the new global political economy. This transformation of energy industries and markets is apparent around the world, and it offers great promise in terms of economic efficiency, technology development, and consumer choice.

The process of energy globalization is uneven, however, and some of its impacts will present new challenges for strategic planners. What new relationships are developing between producers and consumers, and between buyers and sellers? Who are the winners and losers? In a context of opening energy markets, why is there renewed concern about energy security around the world today? What types of security challenges will energy globalization present during the next two decades?

There are varying approaches to energy security in a context of market globalization. The United States supports market-oriented energy policies at home and abroad that open traditionally closed markets to new forms of competition and restructuring. Asia, a region where the United States has vast security stakes and where the most rapid increases in oil and gas imports are projected in the next two decades, deserves special attention. Policymakers in Asia and other countries worry that the market alone will not ensure energy security. The United States has generally pursued energy security on a different track, making Persian Gulf security a high priority.

To promote the cooperation and mutual interdependence that open energy markets require, it will be necessary to explore different approaches to energy security, analyze some of the unintended security risks that globalization of energy markets entails, and draw conclusions about the implications for U.S. security. Although the United States has already made large investments in Asian security, new multilateral approaches will be needed to pre-empt and mitigate the energy-related disruptions that may lie ahead. Defending the sea-lanes, to take an example, will be more important than ever in the future, but ensuring freedom of transit will require new multilateral efforts that cannot be simply subsumed under traditional alliances. Although the

Martha Caldwell Harris is a senior fellow at the Atlantic Council of the United States. She has served as Deputy Assistant Secretary of State in the Bureau of Political Military Affairs. Dr. Harris has also held positions at the Asia Foundation, National Research Council, and Office of Technology Assessment.

United States will have adequate access to energy supplies, it may be drawn into energy-related disputes, as weak states fragment, and producers and others seek to exert political leverage via energy supplies and infrastructure. Despite the uncertainties and difficulties of multilateral initiatives, it will be necessary to use them to address myriad energy-related security problems that are likely to arise as unintended consequences of energy market globalization. Failure to move proactively will result in requirements for more costly and demanding responses further down the road.

Asymmetrical Interdependence

Globalization of energy markets is not a new phenomenon. The major oil producers have for years been quintessential “multinational corporations,” and fossil fuels have been internationally traded for centuries. Today, however, energy market globalization is unprecedented in its pace, range, and depth.

Networks of interconnection in energy development, supply, and use among actors in different countries on different continents render obsolete the traditional energy policy approaches directed toward national autonomy and control. National markets are increasingly integrated with global markets through more open access to resources, international agreements such as the Energy Charter, electronic international exchanges, corporate linkages and industry restructuring, cross-border pipelines, and electric power grids. Global energy trade grew much faster than did energy consumption between 1990 and 1997. Deregulation of electric power, one of the bastions of regulated monopoly operated for “public good” purposes, is a global trend. Consumers around the world are buying electricity from non-national firms operating in expanding regional markets.

The unevenness of the globalization process and the asymmetrical nature of relationships among key actors present new challenges for energy policymakers and security planners. In the developing world, there are 700 million more people today who do not have access to electricity than there were 25 years ago. Although 1.3 billion people have been added to central power grids, the population has grown by 2 billion.¹ The traditional model of centralized grids and state control has left many literally in the dark. Fuel subsidies have favored larger users, while lower income populations and smaller businesses have been squeezed when fossil fuel prices soared, in some cases as an industrial restructuring precondition for access to international capital. Developing nations, moreover, have suffered disproportionately from high oil prices in the past year.

In the midst of energy market globalization, regions are faring differently. Whether one argues that the outlook is for an oil glut or for continuing high prices and constrained supplies, differences among regions will be clear in the next 20 years. Forecasters agree that Asia will become much more dependent on Middle East oil in the two decades ahead,² as demand surges and local production levels off. Although oil trading has certainly become more transparent and global, Asian nations are at a critical juncture in deciding how much to rely on market forces. They have traditionally paid more for oil than have buyers in Europe and the West, and they continue to rely on long-term contracts and special relationships. One nation’s

choices will affect the calculus of neighbors. As China courted Saudi Arabia with promises of assured imports in recent months, Japan was rocked with the loss of the Arabian oil concession. Whether Asian nations will rely on global energy markets or old-style resource diplomacy is an open question. Growing dependence on Middle East oil imports will distinguish the Asian region for decades to come and create new imperatives to strengthen relationships with suppliers.

International cross-investment, another indicator of globalization in energy markets,³ has grown rapidly in recent years. Decisions to privatize energy industries stimulated global transactions valued at more than \$65 billion in the period 1991–1997 alone.⁴ Foreign-based firms have taken advantage of these opportunities in the United Kingdom, Latin America, Northern Europe, and around the world—including the United States. (It's not your father's electric company any more.) Privatization and deregulation have brought significant benefits in electricity price decreases, but large industrial users have benefited more than have residential consumers. Furthermore, industry consolidation involves wrenching changes for workers as well as for managers. Deregulation has opened energy markets to new players who are selling new services and developing joint ventures that leverage resources of energy companies in new areas such as telecommunications and the Internet. Corporate linkages among firms based on different continents have in some cases streamlined operations and produced new resources for innovation. Market liberalization, nevertheless, is progressing at different rates around the world, and new problems are emerging that require new forms of government action, such as setting rules of the road that enhance market competition in electricity transmission.

Many argue that technological change provides the solution to global energy problems by lowering the costs of exploration and development and by promoting more efficient production and use of energy. New technologies can also help address environmental problems likely to grow even more serious as the world population increases to 9 billion people in the next 50 years. Fossil-fuel use is the major cause of environmental problems, particularly in developing nations where local and regional pollution is growing. Despite the promise of hybrid cars and distributed energy generation (for example, small turbines and decentralized power generation), market signals have been inadequate to support early commercialization. Political will (rather than government noninvolvement) is necessary to promote sustainable solutions that require joint governance. The uneven application of new technologies to address global energy and environmental problems is another dimension of the asymmetrical impacts of globalization of markets.

Renewed Concerns about Energy Security

Although energy security has been dismissed as old-think in a world of integrated energy markets, public concern heightened in the United States as gasoline prices rose in the past year. In Europe and Japan, where energy security never disappeared as an issue, perceptions of the problem nevertheless differ. A recent survey found that 60 percent of Japan's energy policy experts have big concerns about energy security—a percentage that only slightly exceeds similar concerns of all others surveyed.⁵

The biggest danger was growing demand for energy in Asia, followed by concerns about possible conflict in the Middle East and constraints in nuclear power. Japanese energy experts see global warming as a major threat, and they believe that as the phenomenon becomes more apparent, there will be negative impacts on energy security. Japanese perceptions of energy security today reflect a broader definition of risk—and a greater focus on the Asian region—than did the preoccupation with security of oil supplies in the 1970s’ “oil shock” period.

In Europe, there is renewed concern about energy security today. A recent forecast projects that the overall import dependence of the European Union (EU) will rise to almost 70 percent for natural gas, 80 percent for coal, and 90 percent for oil by 2020. Imports of Russian gas could reach 45 percent of the union’s total.⁶ As demand for energy in the developing world rises to surpass the demand of the Organization for Economic Cooperation and Development during this time frame, the EU share of global energy demand will shrink to slightly more than 10 percent. The European Union has begun an effort to sort out the strategic implications by the end of 2000 and, in the meantime, to work on a transit protocol to implement the Energy Charter, an international agreement that includes EU nations as well as others. As Europe grapples with rising dependence on imported energy, the European Union places strong emphasis on environmental concerns and (more so than Asia) on continuing market liberalization. While the European Union stresses the benefits of competitive markets in terms of flexibility and avoidance of market control, however, it is clear that different countries have different perspectives. In 1999, the union brought legal action against France, for example, for missing the deadline on the introduction of national legislation to implement the electricity market-opening directive.

In the United States, rising gasoline prices in mid-2000 brought energy security back to the center of public attention. Over the past decade, a consensus around market-oriented policies has developed. In this context, public debate about energy security has focused on negative impacts of price hikes—increases that seem minuscule compared with those in other nations where taxes are high—on consumers. With a large U.S. strategic petroleum reserve and the increasing interconnection of North American energy markets, politicians worry about the uneven impacts of oil price increases—for example, on heating oil consumers in the Northeast compared with truckers—and about the reliability of the electricity transmission in a deregulated market. With inventories tight, planners were surprised by the jump in prices, and American officials turned their attention back to jawboning with the Organization of Petroleum Exporting Countries. Although the quest for Caspian oil has been a major pursuit of U.S. energy diplomacy, the tangible results have been limited. Meanwhile, the international coalition that supported military action against Iraq in the Persian Gulf crisis has lost its traction as major European countries push for loosening of sanctions.

In Asia, Europe, and the United States, these different approaches to energy security reflect different resource endowments, traditions, and institutions. Asian countries, understandably concerned about oil supply disruptions, are moving toward new forms of regional cooperation as pollution and environmental problems increase. European approaches resemble those of Asian countries, but with an important distinction. The European Union has made market competition a high priority and has

the legal and institutional resources to push laggards forward. The United States has also in the past decade placed great priority on energy market liberalization, but the 50 states are moving at different paces and experimenting with different approaches. In addition, investments in Persian Gulf security, freedom of the sea-lanes, and maintenance of the strategic petroleum reserve provide a security underpinning. In the United States, however, the security and market opening dimensions are pursued on parallel (some would say unintegrated) tracks by different agencies.

Energy Market Globalization in Asia: Challenges Ahead

Does it matter that globalization is unfolding unevenly and that policy priorities for enhancing energy security are defined differently in the United States, Europe, and Asia? Traditionally, analysts have focused on the potential for military conflict over energy resources as the primary threat. Extrapolating 20 years ahead, based on consensus supply-and-demand projections that show sharp increases in Asia's energy requirements, a number of energy-related issues are likely to generate new types of problems and unintended consequences associated with deepening globalization. To the extent that globalized energy markets more deeply integrate economies in the region, of course, investment resources, entrepreneurial skills, and experience in governance will be available to mitigate the downsides. At the same time, U.S. officials responsible for security as well as for economic policy need to anticipate problems—many of them unintended consequences of globalization—that they may be required to address. Focusing on Asia, where there is no overarching, institutionalized security framework and where energy market globalization offers perhaps the biggest uncertainties as well as great promise, brings potential problems into sharper view.

Among the countries of the Asia-Pacific Economic Cooperation (APEC) group, electricity demand is projected to increase 60 percent by 2010, with China's electricity demand likely increasing by almost 6.4 percent annually.⁷ In India, the International Energy Agency (IEA) forecasts that electricity consumption will more than double between 1995 and 2010. These forecasts (revised after the Asian economic downturn) imply major additions to generating capacity and to grids. Coal will likely continue to play the major role in electric power generation, but substantial increases in gas-fired generation are expected. Asia now has only limited intercountry electricity trade and pipeline systems. A number of countries, China in particular, have substantial energy resources located far from industrial and population centers.

Most of developing Asia is part of the global energy system, but because of inadequate investment in infrastructure as well as weak political leadership, the connections are in some cases tenuous. Rapid population growth and pressures for economic restructuring and deregulation have already produced some wrenching changes. Twenty thousand miners rioted in Northeast China in early 2000 after an announcement that a large mine had gone bankrupt, and workers were offered a one-time severance package equal to \$68 per working year. The army was brought in to restore order, but the incident was not reported in the press for weeks.⁸ Industrial unrest is rising in China's resources sector, where inefficient plants must be closed in line with government restructuring plans and ambitions to enter the World Trade Organization.

Russia exemplifies another type of political complication associated with market integration. In Russia, the country with the world's largest natural gas reserves, a good portion of which are located in the Far East, there are frequent blackouts. Gazprom cut gas supplies to RAO Unified Energy Systems (UES) recently in response to nonpayment. Gazprom is not investing enough to keep its gas flowing, and UES has warned that its old network of power stations and lines needs \$75 billion in investment if Russia is to avoid blackouts.⁹ Europeans and Asians hoping to import more Russian gas are rightly concerned about supply security in light of Russia's status as a nonsignatory of the energy charter, which includes transit provisions.

These examples illustrate the potential political fallout when energy market globalization occurs in developing and transitional economies that lack experience with market competition. As markets and infrastructure are connected across national borders, fuel substitution and economic benefits accrue. At the same time, new vulnerabilities are created. Energy infrastructure such as power grids can be the target of terrorists and opposition groups.¹⁰ These concerns are not unique to developing countries, of course. The President's Critical Infrastructure Commission has outlined serious threats to the U.S. energy system from a number of sources—including hostile governments, terrorist groups, and disgruntled employees—as well as accidents.

For some groups in developing economies, the sharp changes in fortune that accompany restructuring and global energy market integration can create a political backlash that threatens the security of neighbors who buy energy from them or import it through their territories. Intense discussions are now under way in Northeast Asia about cooperation in pipelines and high-voltage transmission lines extending from Russia into China. According to some estimates, Eastern Russia could supply half of Northeast Asia's natural gas needs by 2020. These projects offer great promise in meeting energy demand and in hands-on cooperation among countries that have been historical competitors and enemies. The United States and countries in the region need to discuss the security implications of growing and asymmetrical interdependence, however, at an early stage. Joint planning and scenario analysis involving government as well as private sector organizations will be needed to anticipate and mitigate risks. The United States could lend support for discussions involving public officials and private sector representatives from Japan and South Korea, but Russia and China also need to be involved. In addition to high-level discussions on rules of the road for cooperative energy development, there is a need for joint efforts among environmental experts to assess potential effects, among regulatory authorities to discuss harmonization of equipment and industrial standards, and among legal experts to clarify issues such as transit rights and reciprocal tax treatment.

In developing Asia, where energy market integration is uneven, energy demand will grow sharply; because the infrastructure is inadequate and vulnerable, security-related problems are likely to grow. Attacks on energy infrastructure in friendly nations could lead to requests for U.S. assistance—both official and private. U.S. cooperation in the APEC and other regional initiatives to promote common standards and shared infrastructure are, in this light, a good investment. Although U.S. support for APEC energy market liberalization initiatives has been strong, energy security con-

cerns have been treated with less urgency. U.S. industry and government could make this a higher priority and share expertise for assessing and mitigating risks.

A second dimension of uneven globalization—Asia's growing dependence on Middle East oil—also will present new challenges. The United States has made great investments in Persian Gulf security and has gone to war to ensure the stability of the region and its oil production. In the future, the narrow, shallow Straits of Malacca and the sea-lanes between the Middle East and Asia will be more congested with tankers and other ships carrying fuel and commodities. Today, 90 percent of Japan's oil imports and most of South Korea's and Taiwan's oil imports flow through these waters. More than 200 vessels pass through the Malacca, Sundra, and Lombok Straits and the South China Sea daily. In 1994, more than \$1 trillion in international trade passed through these waters, which have seen an increase in serious accidents since the early 1990s. Piracy, kidnapping, and other acts of violence by nonstate actors, such as left-wing rebels in the Philippines, are also on the rise. China has fortified small islets in the South China Sea with fort-like structures, and the number of incidents involving fishing and naval vessels from Southeast Asian countries has increased.

Although some argue that territorial chokepoints such as these narrow water passageways are no longer security concerns in an age of globally integrated electronic markets that permit rerouting of cargo and fuel switching, securing freedom of the sea-lanes may well be more of a security challenge in the future. Competing claims among six claimants to the Spratly Islands, differing interpretations of the United Nations Law of the Sea, and the inability of the International Maritime Organization to establish safety and environmental standards of sufficiently high quality all contribute to a sort of maritime anarchy.¹¹ At the urging of the Philippines and other Southeast Asian states, the Association of Southeast Asian Nations (ASEAN) Regional Forum has agreed to take up the question of a code of conduct for the South China Sea; however, China opposes legally binding agreements and prefers to deal separately with each country. Other countries favor demilitarization and joint development, with the geographically closest claimant country taking stewardship over disputed areas. In this context, the potential for military conflict remains significant. By supporting efforts of regional states to address these issues, the United States can add momentum and expertise.

In the future, accidents and acts of terrorism and piracy will be even more likely throughout the region. Some have called for a change in the transit passage law enshrined by the Law of the Sea separating commercial and military traffic.¹² The objective would be increased regulation of commercial vessels in the Straits of Malacca to ensure navigation safety without affecting military or government vessels. Such a regime would involve not only the key states but also shipping concerns and user states such as Japan, China, and the United States. Another approach has been led by a working group on maritime security cooperation of the Council for Security Cooperation in the Asia Pacific, a nonofficial organization that provides input to the ASEAN Regional Forum. The working group has developed guidelines for maritime cooperation and plans to examine the Law of the Sea to identify areas that need clarification in order to ensure maritime security in South Asia.¹³ These efforts suggest that addressing maritime security problems in Asia will be a challenging task, but

arguably a good investment in preventive diplomacy. Cleaning up after a major oil spill and relief efforts to deal with terrorism or piracy could be much more costly after the fact.

Another way to address vulnerabilities in energy transportation through the searoutes is to develop regional emergency response mechanisms. Japan, Australia, and New Zealand are the only Asian members of the IEA, although South Korea is following IEA activities closely, and programs for nonmember states such as China have recently expanded. Asia lacks a viable regionwide program of emergency response or oil stockpiles. Although the impulse is strong for many of the Asian countries to pursue old-style resource diplomacy to secure supplies of Middle East oil, a more effective approach would be to build cooperative emergency response measures.

Market-oriented approaches can also contribute to solutions. Asian countries could permit cross-investment in downstream facilities so that refinery operations could be streamlined and efficiencies improved, encouraging Middle East countries to consider establishing storage facilities in the region. In addition, government involvement in emergency response and stockpile development is needed. American political support, technical expertise, and approvals to use international development assistance funding would help significantly in addressing energy security concerns in Asia and in bolstering the confidence and mutual trust required to sustain energy market liberalization policies over the long haul.

International corporate linkages in Asian energy markets are most extensive in the upstream resource exploration and development areas. Japanese firms have for years been mining coal in Australia, developing natural gas resources in Indonesia, and purchasing oil from China. With greater openness come new possibilities. Tokyo Electric Power has stakes in new power-generating ventures in Malaysia and Vietnam. Enron has teamed up with ORIX Leasing to compete in Japan's energy services and electric power markets. Marubeni, a Japanese trading company, and Sithe Energies, an independent U.S. power producer, plan to buy power plants and market electricity in Japan. Gas and electric power are the focus of networks of growing international joint ventures that include firms from many Asian countries, as well as from the United States.

These corporate linkages today extend further and deeper into the domestic economies and, in some cases, can stimulate market-oriented corporate restructuring and advanced technology development. They can also lead to new security challenges. In 1996, Japan imported almost one-fifth of its natural gas from Indonesia, a country where violent independence movements have threatened central authority in some regions. Electric power, gas, and steel companies have long-term contracts for liquefied natural gas (LNG) imports from Indonesia that stretch more than a decade ahead in some cases. Two-fifths of Indonesia's LNG exports come from Aceh, at the western end of Sumatra. Aceh is overwhelmingly Islamic; its rural people resent the wealth of the Javanese who run the industrial enclave. Disputes and violence have erupted. The potential fragmentation of energy- and resource-rich regions poses problems not only for central government but also for the importers whose investments become vulnerabilities.¹⁴ The United States, Japan, and others have an interest in developing multilat-

eral approaches toward assistance that leverage the resources of the international community and address the basic grievances that have led to strife and tension.

Advanced technology is diffusing through energy development, presenting another double-edged sword from a security perspective. Japan, South Korea, Russia, China, Taiwan, India, and Pakistan have commercial nuclear power programs, and four of these states have tested and/or developed nuclear weapons. For Japan, nuclear power has been the central pillar of its energy policy—seen as Japan's only hope for gaining a degree of autonomous control (through technology indigenization) and for meeting environmental commitments. However, the serious criticality accident that took place recently at a fuel fabrication plant shook Japan's energy policy leadership enough for the government to announce a comprehensive review. Japan's ambitious plan to develop the complete fuel cycle has proved to be expensive and technically difficult. Such problems aside, Asia has become the new center of gravity for the global nuclear industry, as additions to capacity in this region are projected to make up three-quarters or more of the world's total over the next two decades.

For safety, environmental, and nonproliferation reasons, advanced technology cooperation in energy among Asian nations is essential. Working with other nations around the world, the industrial operators and research institutions of Asia need to develop a stronger safety culture. In addition, governments will need to work to strengthen nonproliferation norms (a very difficult task in South Asia) and to build cooperation in material protection, accounting, and export controls. Weapons of mass destruction proliferation is clearly a major threat to the stability of a region where the security framework is weak. Two of the benefits of addressing the North Korea problem have been an expansion of security cooperation between Japan and South Korea and a broadening of dialogue involving China.

Other forms of cooperation are also needed to make the most of new technologies that are coming on stream. They include microturbines and fuel-efficient vehicles that offer promise not only for industrialized countries but also for many developing nations. Regulatory barriers, as well as established business practices, may present obstacles to the application of new equipment and systems. Government leadership in eliminating regulatory obstacles and in supporting international partnerships could speed up penetration and assimilation of technologies—with environmental gains for all concerned.

As energy market globalization proceeds in Asia, the likelihood that the United States will be forced to deal with threats that stem from unintended consequences will increase. Multiple actors will be involved, and solutions will in most cases need to be constructed—at least in the near term—in the absence of established frameworks and institutions.

Conclusion

Energy market globalization brings significant benefits for producers and consumers, if the political will can be mustered to implement thoroughgoing, market-oriented reforms. In many countries, this process is still in its early stages and re-

mains vulnerable to reversals. The United States has much to gain from more open energy markets, and deeper cooperation and sustained leadership are needed.

The potential security risks stem in large part from the unintended consequences of uneven globalization in a context of partial market liberalization. In the current transitional phase, critical choices are being made about financial investments, partnerships, technology development, and fuels that will affect evolving and multidimensional interdependent relations among actors. Addressing energy security concerns, rather than dismissing them, is a requirement for promoting market-oriented policies.

In this fluid context, the United States should take pre-emptive action, investing resources in preventive diplomacy and building security communities on specific issues in order to avoid the need for military force deployment down the road. Despite the uncertainties and inadequacies of multilateral approaches, there is really no alternative. The investments will be costly (not so much in terms of hardware, but in terms of time) and will challenge the skills of strategists trained to deal with more traditional security threats. Security specialists will need to work more closely with economic policymakers and the private sector, bridging the traditional separation between security and economic policy domains.

Asia offers the most striking example of both the potential risks of neglecting these issues and the tremendous gains that can come from devising new ways to address the concrete problem of energy security. China and India, the emerging new energy giants, will need assistance in meeting energy requirements and addressing concerns about energy security—if they are to contribute to, rather than detract from, Asian security. The United States will need to work proactively with them and with other countries in the region, forming new communities to deal with specific energy security concerns. In many cases, doing so will require focused dialogue not only with close allies and friends but also with other countries. Issues that require attention include disputes over energy-rich areas such as the South China Sea, the absence of an emergency response program in Asia to deal with oil supply interruptions, and the need for cooperation in resource development and efficient and environmentally sound energy use in the Russian Far East and China, as well as the potential for expanded energy cooperation involving South and North Korea, if progress continues in building trust and reducing threats on the Korean Peninsula.

Efforts to address specific problems such as piracy as a threat to shipping in South and Southeast Asia provide a platform for building lines of communication, experience with working together, and synergies with energy-related challenges, such as ensuring free and safe transit for energy resources. Cooperation with the Regional Piracy Center in Kuala Lumpur, a minimally manned but potentially important effort, is a case in point. There are signs that countries in Asia are beginning to take positive steps to deal with the piracy problem. China reportedly has improved the capabilities of the People's Armed Police for dealing with piracy and has shown new commitment to prosecute criminals. In addition, the Philippine Navy has expanded its coastal patrol effort, and merchant vessels have applied new technology, such as automatic tracking systems that make it possible to locate hijacked vessels quickly and allow ship owners to track vessels by using the Internet.¹⁵ Meanwhile, Japan's Defense

Agency has talked with Vietnamese counterparts about cooperation in search-and-rescue operations for civilian ships and has reached agreement for use of Singapore bases in the event of a peacekeeping operation. Japan also has been talking to India about cooperation in antipiracy efforts. These and other efforts illustrate the potential benefits, as well as limitations, of myriad approaches.

The challenge for U.S. policymakers, security specialists, and economic affairs officials, as well as private sector leaders, is to determine how and when to work with existing organizations, where new approaches are necessary, and how to work most effectively with a diverse range of stakeholders. In some cases, U.S. leadership may be necessary; in others, thoughtful U.S. “followership” and support may best serve to build security coalitions on specific issues. Economic organizations may provide the needed framework for cooperation in some instances, but military cooperation and leadership will be essential in others. Determining the appropriate approach, finding needed resources (funding, expertise, and technology), and ensuring implementation and follow-up will require new modes of cooperation among U.S. Government agencies. Building multilateral security communities on energy security issues will not be easy, but the globalization of energy markets makes it a necessity. 🌐

Notes

¹ James Bond, Director and Chair of World Bank Sector Board of Energy, Mining and Telecommunications Department of the World Bank, “Global Energy Policies Must Be Updated for the 21st Century,” *European Affairs* 1, no. 1 (Winter 2000), 74.

² The Department of Energy forecasts that by 2010, developing countries in Asia will consume 24.3 million barrels a day of oil, about the same amount as the United States at that time. See *International Energy Outlook*, 1999.

³ Daniel Yergin has pointed to cross-investments as the key indicator of “globality” in energy markets, a term that he uses to stress that in the future traditional boundaries will be increasingly irrelevant.

⁴ See Enron Energy Outlook 1999–2020, 9.

⁵ *Shakai Keizai Seisansei Honbu* [Japan Productivity Center], *Enerugi Sekurite no Kakuritsu to 21 Seiki no Enerugi Seisaku no Arikata* [Approaches to Ensuring Energy Security and 21st Century Energy Policy], (March 2000).

⁶ European Commission, Directorate-General for Energy, *Energy in Europe: Economic Foundations for Energy Policy*, Special Issue (December 1999).

⁷ Asia Pacific Energy Research Center, *APEC Energy Demand and Supply Outlook* (Tokyo: Updated September 1998).

⁸ James Kynge, “Chinese Miners Riot over Severance Pay,” *The Financial Times*, London, April 3, 2000.

⁹ Jeanne Whalen, “Russian Energy Dispute Reflects Threat to Country’s Gas, Electricity Supplies,” *The Wall Street Journal*, April 12, 2000.

¹⁰ Leftwing guerrillas bombed hundreds of electricity pylons in Colombia, causing severe problems for the government, which is attempting to privatize the industry. The grid has been split in two. See James Wilson, “Security Fears Dog Colombia’s Privatization Plans,” *The Financial Times*, London, April 5, 2000.

¹¹ Mark J. Valencia, “Maritime Management in the Malacca/Singapore Straits: Lessons Learned,” report for the GEF/UNDP/IMO Regional Programme, draft (August 1999).

¹² Mark J. Valencia, "Time for a New Regime in the Straits of Malacca?" *The Business Times*, April 25, 1998.

¹³ The Pacific Forum Center for Strategic and International Studies has also conducted workshops on maritime security issues. See Ralph A. Cossa, *Security Implications of Conflict in the South China Sea: Exploring Potential Triggers of Conflict* (Honolulu: Pacific Forum, March 1998).

¹⁴ A cease-fire agreement was signed on May 12, 2000, but unrest continues. See Jay Solomon, "Mobil Sees Gas Plant Become Rallying Point for Indonesian Rebels," *The Wall Street Journal*, September 7, 2000.

¹⁵ "Repelling the Pirates," *Jane's Security*, June 14, 2000; homepage <www.janes.com>.