

## *Energy and Security*

Energy and Security  
*Toward a New Foreign Policy Strategy*

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## The International Energy Agency

*William F. Martin and Evan M. Harrje*

Energy underpins national security, economic prosperity, and global stability. But a number of factors point to an increasingly unstable energy future: rapidly rising energy demand in Asia, growing dependence on oil from regions with less stable governments, increasing global competition for resources, and the environmental impact of rising fossil fuel consumption. Just looking at the “reference cases” for global energy supply and demand projections to 2025 from the U.S. Department of Energy’s Energy Information Administration<sup>1</sup> and the International Energy Agency (IEA)<sup>2</sup> is enough to raise serious questions about the sustainability of the world’s current energy policy course. In those projections, we see rising demand for oil and natural gas in particular, with growth in non–Organization for Economic Cooperation and Development (OECD) energy demand increasing dramatically over the coming decades, far surpassing demand growth in industrial countries. Pressing energy, environmental, and economic challenges await on the horizon.

These challenges cannot be addressed by national governments alone. International institutions will be called on to coordinate strategies in response to a variety of future global energy and environmental problems. The security of the natural gas supply, providing electricity to the 1.6 billion people worldwide who do not have regular access to it, the development and deployment of environmentally friendly power and transportation technologies, and the extension of strategic oil stocks are key challenges for the IEA to confront in the next century.<sup>3</sup> The IEA’s history of flexibility can help it address these issues. The institution has had a positive influence on potential and actual energy crises, whether by avoiding their occurrence or by lessening their effects on the market. But IEA members must not rest on

their past achievements. Today, energy markets are evolving far faster than the IEA's mandate. The time has come for IEA member states to muster the necessary political will and financial resources to modernize the agency and its mission.

To keep up with this evolution and anticipate new disruptions, the IEA must adopt a comprehensive and ambitious work program. The IEA should enlarge its range of actions to help ensure the security of oil and natural gas supplies, address appropriate strategies for dealing with climate change, promote efforts to "wire the world," facilitate effective consumer-producer country dialogue, examine the impact of deregulation and investment patterns on energy security goals, further develop research and development (R&D) collaboration programs, and promote closer relationships between its members and the rest of the energy world. The United States played the pivotal role in creating the IEA in response to an energy challenge that arose thirty years ago. Now the United States has an opportunity to shape the IEA's future by pledging to increase its funding and by putting significant political capital behind global energy security initiatives.

In this chapter, we describe the evolution of the IEA since its creation in 1974 and show how the institution's flexible system and adaptability have allowed it to deal with threats to its members' energy security over the past thirty years. Next, we set forth the energy security challenges the world will face in the coming decades and the role the IEA can play in addressing them. Finally, we offer specific recommendations for how the IEA can build on its historic flexibility to enhance global energy security.

### Historical Perspectives on the IEA

The IEA was formed in response to the damaging economic effects of the Arab oil embargo of 1973 on OECD countries. Although the United States and the Netherlands were the stated targets of the embargo, all oil-consuming countries suffered as a result of the oil supply disturbances. The embargo served as a stark wakeup call to the United States and its allies of a looming national security threat. Under the leadership of U.S. secretary of state Henry Kissinger, the OECD countries created the now-twenty-six-member country IEA as the oil-consuming countries' collective mechanism for responding to the energy crisis. In November 1974, the founding members produced the "Agreement on the International Energy Program" (IEP), which spelled out its responsibilities and scope of work.<sup>4</sup> The heart of the

IEP was a plan to share the member countries' oil supplies in the event of an embargo or other serious supply disruption that could adversely affect individual IEA countries or the group as a whole.

During the ensuing decades, the IEA's approach has shifted away from oil sharing to the coordination of collective measures emphasizing stock draw, with elements of demand restraint, surge production, and fuel switching. Such measures actually were taken at the time of the Allied attack during the Gulf War, and the IEA had plans ready to activate them for the year 2000 computer glitch popularly known as "Y2K," if needed. Since its formation, the IEA has also served as an institutional forum for sharing energy information, discussing and coordinating energy policies, and cooperating in the research and development of new technologies that can enhance national and international energy security.

*The Period 1973–74:  
Embargo, Oil Shock, and the Formation of the IEA*

Any review of the effectiveness of the IEA begins with the Arab oil embargo of the United States and the Netherlands in 1973. The boycotters failed in their attempt to selectively starve two oil-consuming countries while supplying "friendly" nations and inadvertently showed that the world oil market is essentially one big pool with a variety of vulnerabilities. When supplies are withheld anywhere, the entire market is affected. The shortfall in global oil supplies during the 1973–74 shock reached about 9 percent of the global oil market and led to the worst recession among OECD countries in decades, causing significant political turmoil. For the United States, the embargo came at a time when the country was becoming more dependent on oil imports because domestic production had peaked. The U.S. gross domestic product fell by 6 percent between 1973 and 1975, while unemployment doubled to 9 percent.<sup>5</sup> The 1973 Arab oil embargo was the first oil supply disruption to cause major price spikes and have global repercussions. At the time of the embargo, almost all spare production capacity resided in the Middle East. When the crisis hit, there was no established mechanism to enable the OECD countries to effectively respond and limit the economic impact of the supply disruption.

On the basis of a recognition that oil supply disruptions posed a considerable national security threat, U.S. secretary of state Henry Kissinger called upon the industrial countries to meet in Washington in February 1974 to craft the beginnings of international energy cooperation. All major nations

of the Western alliance participated in the conference, although French foreign minister Michel Jobert attended only with great reluctance.<sup>6</sup> After almost a year of intense negotiations, the IEA was born on November 15, 1974, through a decision by the Council of the OECD. The IEP was signed three days after the OECD Council's decision. The IEA was linked—for administrative purposes—to the OECD in Paris, but with France conspicuously absent from the membership.<sup>7</sup> The OECD had an international oil committee before the IEA's creation, and under the able direction of Hans Schneider of Germany, it had prepared a two-volume assessment of the world energy outlook to 1985, published in 1974. The report warned of rising OECD dependence on oil from the Middle East—enhancing the desirability of creating a multilateral “emergency sharing system.”

Kissinger was impressed by the director general of energy of the German Ministry of Economics, Ulf Lantzke, and a consensus grew that Lantzke would become the first IEA executive director and that an American, Wallace Hopkins Jr., would serve as deputy director. A small Secretariat was formed and housed on the third floor of the OECD's new building, at 19 rue de Franqueville in Paris. The Washington conference had produced a remarkable “oil-sharing” plan, which was the centerpiece of the IEA in its formative years. The basic principle was simple: Oil sharing would occur among member nations if any country or group of countries lost more than 7 percent of its supplies. The aim was to make it impossible for the Organization of Petroleum Exporting Countries (OPEC) to embargo any country or group of countries. The system was complicated and came under close antitrust scrutiny, but its purpose was primarily to deter producing countries from withholding supplies, and to date the oil-sharing system itself has never been triggered.

In addition to the oil-sharing system, the IEA established a Statistics Office and helped formulate a system of energy supply and demand balances—a matrix-style report that remains in use today as the standard international energy reporting system. Though the IEA's main focus in its early days was the oil-sharing scheme, a division for long-term cooperation was formed. This division was responsible for conducting periodic assessments of member-country energy policies as they sought to reduce their dependence on imported oil. Policies related to resource development, conservation, fuel substitution, efficiency, and R&D were all examined country-by-country, and an overall evaluation was determined by the Secretariat. Finally, an R&D division was established to encourage cost and expertise sharing in innovative energy research and development projects.

*The Formative Years:  
The Iranian Revolution and the Iran–Iraq War*

As is often the case in international relations, in developing the oil-sharing system, the IEA laid a framework for “fighting the last war.” When the outbreak of the Iranian Revolution led to a tripling of oil prices in just a few months from late 1978 to early 1979, the IEA soon discovered that its emergency system was not adequate for dealing with the new crisis. Though no IEA country was the target of an embargo, the Iranian Revolution set off a worldwide scramble for oil supplies when Iran’s production plummeted by about 4.5 million barrels a day over a short period of time.<sup>8</sup> The shortfall did not reach the IEA’s 7 percent trigger, but the sudden loss created significant oil market turmoil. Instead of sharing limited supplies and drawing down stocks, concern about ongoing physical shortages of oil led to increased stock building, further exacerbating upward price pressure.

Smaller economies were driven out of the market by the purchases of the wealthier OECD economies. But ultimately all oil-consuming countries suffered. Meeting in desperation, the heads of state at the Group of Seven conference in Tokyo agreed to specific oil import targets—but the targets were inflated by the negotiators and their potential impact was weakened. The IEA agreed to reduce demand by 4 to 5 percent below normal levels, but there was little agreement on how to implement the import targets.<sup>9</sup> The Europeans called for conservation. The Americans tried to pump up the global oil supply—especially by urging Saudi Arabia to increase its output. The result of this beggar-thy-neighbor policy was an increase in oil prices to more than \$40—plunging the world economy into recession.

Although cooperation failed to produce a notable impact on the oil price, it did strengthen the role of the IEA as a consultative body. Important lessons were learned from the Iranian Revolution—lessons that have provided valuable protection up to the present. The key lesson was that oil stocks matter. In the event of a disruption, member countries must coordinate their actions. In the end, the Iranian shortfall amounted to about 2 million barrels a day for a period of less than a year, but it was the scramble for oil and the excessive building of stocks that exacerbated the problem and kept prices high. Countries did what motorists do in the face of emergency—they panicked and rushed to fill up their tanks all at the same time, making the crisis worse.

When the Iran–Iraq War broke out in September 1980, the IEA learned from its previous experiences and was able to react more effectively. Once

again, the IEA countries faced a major disruption in oil supplies from the Middle East. Within the first week of fighting, the IEA had scheduled a routine meeting of its Standing Group on Emergency Questions. An emergency Governing Board session was called the next day under the able leadership of the Japanese ambassador to the OECD, Hiromichi Miyazaki. The board agreed to coordinate a drawdown of stocks, avoid abnormal purchases on the spot market, and take such actions in a fair and equitable way. The subsequent approval of a communiqué marked a pivotal moment for the IEA, because the organization had moved away from oil import targets and demand restraint and toward the coordination of oil stock release as the central element of its cooperation—a policy that endures more than two decades later.

The IEA ministers met within a couple of weeks to confirm their decision under the chairmanship of German economic minister, Otto Lambsdorf. Prices held steady, but there was a threat of action by Japanese trading companies with Kuwait that could have spun out of control if it had not been dealt with decisively. During a late-night meeting in Lantzke's office, the Belgian director general of economics, Steve Davignon, pressured the Japanese negotiator by saying that if Japan could not stop its traders, then it could forget about selling its cars and television sets in Europe. This tactic was a bit dramatic and overstated, but it turned out to be effective in helping the parties resolve the problem. The Japanese government halted the actions of the traders, and the oil price held steady. The IEA lowered stocks, did not bid up the price, and as far as it was possible to tell did this in a fair and equitable manner.

The Iran-Iraq War erupted in the midst of the U.S. presidential election season. At the time, European countries wondered if the IEA could uphold its agreement if the challenger, Ronald Reagan, won the election. Ulf Lantzke communicated with George Shultz to find out whether a Reagan administration would back such a coordinated stock policy approach if elected. Shultz was somewhat surprised to be contacted on the issue, and he modestly replied that he did not know if he would have any role in the not-yet-elected U.S. administration, but he said the IEA's stock policy sounded reasonable to him. Lantzke had earlier befriended Shultz and invited him to participate in the IEA's Coal Industry Advisory Board. Shultz's participation in this minor board helped secure his later support (as secretary of state) of the IEA's activities during pivotal moments such as the Siberian natural gas pipeline controversy and the intensification of the Iran-Iraq War.

The period from 1974 to 1981 was a critical time for the IEA. The insti-

tution was tested by multiple oil market disruptions during its formative years, and there were often significant differences of opinion between IEA members on how best to respond. Despite these difficulties, the IEA was able to adapt to changing conditions and learn from past mistakes. It is appropriate to say that the first seven years of the IEA benefited from the exceptional contributions of State Department officials Steven Bosworth, Edward Morse, Harry Bergold, Lester Goldman, and Dean Hinton—not to mention the important appearance of James Schlesinger at the IEA Ministerial in 1979.

### *The 1980s:*

#### *The Reagan Administration, the IEA, and the Siberian Pipeline*

Despite Shultz's tacit approval of oil stock policy, the Reagan administration was initially hostile to the IEA because of its oil-allocation system. This setup was at odds with the new administration's strong belief in free markets. But Cold War realities helped lessen these concerns. When controversy developed over the Soviet Union's natural gas pipelines to Europe, the IEA (along with the Coordinating Committee for Multilateral Export Controls and NATO) became an essential forum for discussing this issue. In early 1981, after the Soviets had imposed martial law on Poland, the United States insisted that Europeans not buy pipeline equipment for the long natural gas pipeline connecting the Siberian fields to Western Europe. The Americans were concerned that the Soviets could monopolize the Western European natural gas market and wanted to constrain Soviet hard currency earnings, which were being boosted significantly by natural gas export revenues.

Lantzke, once again in the center of controversy, insisted that the situation was neither "black nor white." He conceded that the Americans had some legitimate points, especially over dependence on Soviet natural gas supplies, but he also saw that natural gas offered an important energy supply alternative to Europe. With nuclear power stalling and Europe already heavily dependent on Middle Eastern oil, natural gas offered promise for European energy security and environmental quality.

Negotiations began and failed among the Group of Seven countries. Sanctions were expanded in June 1982 to cover licensees of GE turbines in Europe. British prime minister Margaret Thatcher called Ronald Reagan and voiced her concerns, saying in effect that the United States was not going to stop the Soviets, but it was going to bankrupt the British firm John Brown (a GE licensee). In the fall of 1982, Shultz had an idea. He said that

the issue over the pipeline was not about gas—it was about underlying differences of view between the United States and its European Allies over East-West trade. He urged President Reagan to lift the sanctions and “study” the problem of credits, technology theft, economic security, and energy security. The president agreed, and major studies were undertaken, with the IEA becoming one of the central forums for this effort.

A critical moment came in the negotiations just before the IEA Ministerial in April 1983, when the United States insisted on limiting the share of Soviet natural gas in European markets to 30 percent and the Europeans, led by the Germans, refused. Late-night calculations revealed to the U.S. delegation that the development of Norway’s huge Troll field would have a de facto effect of reducing the Soviet share of the European natural gas market below the limitation. The United States floated the idea of inserting into the communiqué the importance of developing Troll and dropped its insistence on a 30 percent numerical target. The Germans accepted the compromise. The Troll field was indeed developed and continues to produce significant levels of natural gas for the European market. Thanks in part to the discussions and decisions made within the IEA; Europe now enjoys a stable and diverse supply of natural gas from Norway, Russia, North Africa, and other producing regions.

The IEA oil stock policy agreements in 1981 at the time of the Iran-Iraq War were ad hoc in nature. In 1985, the Iran-Iraq War began to spin out of control with the targeting of oil tankers, leading to serious concerns about oil supplies and the worrisome question of “What if Saudi Arabia’s oil fields are attacked?” In the White House, there was a feeling that greater preparations were necessary to formalize IEA emergency stock agreements and also to build up the defensive capability of the Arab Gulf states near Iran and Iraq. Interestingly, the Reagan administration now viewed military and political issues as very closely associated with energy and economics—a bit of a departure from its initial adherence to free market orthodoxy. There was a fundamental understanding in 1985 that oil stocks could buy time for diplomacy. They had become an essential tool of foreign policy, and there was an understanding that the tool must be implemented internationally in a coordinated manner. Recognizing this, the United States endorsed the development of a more formal system of stock usage and the need for the United States and its allies to expand their strategic oil stockpiles. As a result, the IEA undertook a major effort to formalize coordinated stock policy and to urge all member countries to build stocks. The effort successfully concluded with the 1985 agreement, which stated that “Ministers agree to

a common approach whereby imported refined oil products can go to markets of different IEA countries on the basis of supply and demand as determined by market forces without distortions.”

By 1985, the IEA had a new executive director, Helga Steeg, a very capable economist from the German Economics Ministry. She was insistent on the importance of market forces in the energy sector. During her tenure, the IEA made significant progress in decontrolling oil and natural gas prices and urging greater deregulation in all energy markets, including electricity. The IEA helped encourage Japan to open its previously closed products market. The Europeans made progress in developing a more competitive natural gas market and in cutting subsidies to the coal industry. However, despite the progress there were areas of considerable disagreement. Debates occurred within the IEA over the future of nuclear power, making it almost impossible to forge a common nuclear energy policy. Toward the end of the 1980s, the issue of global climate change hit the international radar screen. It appeared that a new age was dawning in which environmental concerns might overshadow oil security issues. But Iraq’s August 1990 invasion of Kuwait brought oil security back to center stage at the IEA.

### *The 1990s: From the Gulf War to Y2K*

Eric Melby, a former assistant to Lantzke and Steeg, was opportunely serving on President George H. W. Bush’s National Security Council when Iraq invaded Kuwait. He helped acquaint the president’s national security adviser, Brent Scowcroft, with the workings of the IEA and its important role in protecting the world economy during times of oil market turmoil. In August 1990, it was essential to reassure the world market when Kuwaiti exports were halted by the Iraqi invasion and there were concerns that Saudi oil fields would be targeted next. After almost two decades of practical experience, the IEA was poised to address the impact of the supply disruption with strategic stocks, demand restraint, and opportunities to quickly draw upon spare capacity (particularly through cooperation with Saudi Arabia). Working closely with the Bush administration, the IEA developed an operation called “Black Gold,” which assisted in providing clear information to the market and encouraging production increases in order to lower the upward pressure on prices. But there was no immediate need for a drawdown of the strategic reserves once the threat to Saudi oil fields subsided as U.S. and allied forces moved in to secure the area.

As the preparations for military action took place during the fall of 1990,

the United States expected that the IEA, directed at that time by Steeg, would activate the automatic oil-sharing plan. But it was not until January 1991 that the IEA decided to go ahead with the use of strategic stocks. The emergency-sharing plan was composed of stock drawdown and demand restraint. The three countries that implemented measures to draw down their stocks were Germany, Japan, and the United States. The price of oil spiked for a very short period of time when the air war started in late January, but it dropped quickly thanks in part to the IEA's decision to release stocks. The markets stabilized quickly when it became apparent that Iraq was no military match for the United States and its allies. The IEA's efforts to reassure the markets by drawing down stocks, sharing information, and encouraging transparency helped to restore oil market stability more quickly than in the pre-IEA days of 1973 when there was no coordination. Once order was restored in the Gulf, global oil markets enjoyed a period of relative calm. Iraqi oil exports returned to the market in the mid-1990s under the auspices of the UN Oil-for-Food program, and then oil prices dropped dramatically in the aftermath of the Asian Financial Crisis, which destroyed significant oil demand in what had been one of the world's fastest growing economies.

The next big oil market concern for the IEA was brought on not by instability in the Middle East but by a computer programming glitch that threatened to create worldwide confusion when 1999 ended and 2000 began (i.e., the year 2000 computer glitch, known as the Y2K problem). The IEA took a strong lead in encouraging both oil-producing and -consuming countries to audit their systems and repair any Y2K bugs that could affect the performance of energy-related systems. From December 1999 to January 2000, based on the Governing Board's adoption of "IEA Y2K Response Plans," the IEA Secretariat maintained an emergency response team for the critical rollover period when computer problems might have led to oil supply disruptions.<sup>10</sup>

### *Post–September 11, 2001, and the Iraq War*

The terrorist attacks of September 11, 2001, reawakened many Americans to concerns about energy security. As President George W. Bush responded to the post-9/11 security reality with attacks on Afghanistan and began pressuring Iraq and Iran to moderate their behavior, it became clear that it was time to revisit the issue of oil security. Once President Bush delivered his ultimatum to Saddam Hussein to "come clean" on Iraqi weapons programs

and the UN Security Council gave him a sixty-day window of opportunity to cooperate with UN weapons inspectors, the IEA was working hard to prepare for a possible oil market disruption.

In the run-up to the war, a series of unusual events conspired to raise oil prices. A strike in Venezuela crippled its oil industry and dramatically reduced export levels for several months. Iraq continued to export oil in early 2003, but the market had built a “war premium” of \$4 to \$6 into the average price of crude on the knowledge that Iraqi exports would end once the war started. Nigeria experienced civil unrest in key oil-producing regions, which lowered its exports. In Japan, seventeen nuclear units were shut down following a safety-data falsification scandal (requiring the use of mothballed oil generators to meet electricity demand). All these factors conspired to create a very tight oil market balance just before the war.

Amid these tense oil market conditions, the IEA made clear that it was ready and willing to use the tools at its disposal to ensure stable supplies, that is, spare capacity and strategic stocks. In close coordination with the Bush administration, the IEA plainly expressed its will to draw down stocks if conditions warranted. By announcing this possible course of action, the IEA helped to encourage OPEC countries to increase output from spare capacity and avoid the need for an IEA strategic stock drawdown. As Claude Mandil, the executive director of the IEA, has noted, strategic stocks are a very important tool of deterrence for OECD countries.<sup>11</sup> Mandil led efforts in the months preceding the war to increase the level of dialogue with OPEC countries, and particularly Saudi Arabia, which retains significant spare capacity.

The dialogue between the IEA and producing countries had never been better during such a time of crisis, and it helped ensure the timely cooperation of key oil producers in getting spare capacity flowing in the months before the war started. As a result of this deepening dialogue and cooperation between the IEA and oil-producing countries, there was no need to draw down IEA strategic stocks. Additionally, prices were less volatile than during previous periods of crisis in the Middle East. The IEA’s response to the war in Iraq clearly showed that the OECD countries have made substantial progress during the past three decades in developing workable responses to oil market disruptions. However, though the IEA has learned from past mistakes and made some policy corrections, it remains focused on “fighting the last crisis.” The institution is overdue for a twenty-first-century mandate. The following section highlights a variety of challenges that the institution must confront in the future and offers a number of recommendations.

## Current Challenges and Recommendations

Although it is clear that the IEA as an institution has had a positive impact on global energy security, there are a variety of challenges on the horizon. Unless policies and consumer habits change substantially, energy demand will continue to grow steadily, with fossil fuels continuing to dominate the global energy mix. Most of the growth in energy demand will come from developing countries. The explosive rise in Chinese energy demand during the past year and its impact on energy market dynamics dramatically illustrate this trend. Global resources are adequate to meet growing demand, but it is not clear that “business as usual” is sustainable in terms of security of supply, environmental quality, and economic sustainability.

The IEA’s members currently agree on the following as their core objectives: maintaining and improving systems for coping with oil supply disruptions; promoting rational energy policies in a global context through cooperative relations with nonmember countries, industry, and international organizations; operating a permanent information system on the international oil market; improving the world’s energy supply and demand structure by developing alternative energy sources and increasing the efficiency of energy use; and assisting in the integration of environmental and energy policies.<sup>12</sup> These objectives are highly relevant to addressing current and future challenges, but to advance global energy security, the IEA will need to go further. This section recommends ten steps for a new IEA work plan.

### *Ensuring Oil Security in a Dynamic and Evolving Global Market*

In the coming decades, most of the world’s oil supplies will come from non-OECD countries that are typically beset by political risk and social instability. The IEA member countries are currently capable of overcoming an oil import disruption for approximately 110 days.<sup>13</sup> In 1986, emergency stocks held 160 days worth of supply. These numbers are important, given that the IEP agreement stipulates emergency reserves equivalent to at least ninety days of net oil imports. IEA stockpiles must be expanded to keep up with rising demand levels; otherwise, the protection they offer will erode over time. It is also important to consider the status of private stocks. Just-in-time inventory practices have meant that private stocks have steadily shrunk in recent years. At the same time, as the world oil market becomes increasingly integrated, it becomes essential that major non-IEA countries, with rapidly rising oil demand, build their own strategic stockpiles. As de-

mand grows in non-OECD countries, the IEA system protects a declining share of oil consumers.

We recommend that the IEA (1) intensify its efforts to encourage non-IEA members to build and expand strategic stockpiles that can be utilized in concert with IEA stocks in the event of a supply emergency, (2) expand IEA member strategic oil stockpiles to meet future oil market contingencies, and (3) review and update strategic stockpile policies to account for the changing dynamics of the international oil market.<sup>14</sup>

### *Facilitating the International Development of Secure Natural Gas Markets*

With global demand for natural gas expected to grow exponentially in the coming decades, the security of natural gas supplies will become increasingly important for the IEA. The United States is now moving toward greater importation of natural gas via liquefied natural gas (LNG) as U.S. domestic gas fields mature and the growth in Canadian output slows. Europe may once again need to revisit the diversity of its natural gas supplies as North Sea production may begin to decline in the coming decade and its dependence on a potentially unstable Russia increases. The IEA needs to begin considering a strategic stockpile system for natural gas. As regional gas markets evolve toward an eventual emergence of a global natural gas market, the security of supply will become an issue of growing concern. Storage plays an important role in competitive natural gas markets, in part because seasonal swings in consumption tend to be larger than the variability in production levels. Adequate levels of storage capacity are crucial to managing price volatility and supply disruptions. As the global dependence on natural gas rises in the coming decades, it will be essential to develop an emergency response system both within the IEA and regionally.

We recommend that the IEA undertake three tasks. First, it should engage in an intensified effort of study focused on natural gas security of supply within the context of growing regional and global usage of natural gas. The study should also consider whether policies are needed to encourage more efficient consumption of natural gas (e.g., emphasizing distributed generation over central station generation). Second, it should encourage greater diversification of natural gas supply, including investments in LNG terminals to ensure competitive markets and security of supply. Third, it should encourage greater private investment in natural gas storage facilities and consider national storage facilities for the development of strategic natural gas stockpiles.

*Making a Strong Commitment to  
Improving Global Access to Electricity*

Ensuring long-term global energy security requires recognition by IEA countries that more must be done to close the gap between the “haves” and “have-nots.” Even in our high-technology age, close to 2.4 billion people are still relying on traditional biomass to meet basic cooking and heating needs. According to the IEA’s *World Energy Outlook 2002*, roughly 1.6 billion people lack access to electricity.<sup>15</sup> *World Energy Outlook 2002* further notes that with a “business as usual” policy approach, 1.4 billion people (mainly in rural areas) will still lack access to electricity in 2030. Ensuring that all people have access to adequate and affordable energy supplies is beyond the scope of the IEA’s mission, but IEA members must address the energy needs of the developing world to lessen global energy insecurity. The 9/11 terrorist attacks certainly showed that no country is immune to the impact of problems that emerge from a lack of economic and political development. All countries will need to work cooperatively to ensure a sustainable energy future. Though the IEA has contributed significantly to international efforts examining the linkages between energy and poverty and the transition from traditional biomass to modern energy, more help will be needed to give the entire global population access to electricity. The challenge appears greatest in Sub-Saharan Africa and South Asia, where governments are strapped and private investment is hard to come by. Greater cooperation among the IEA, World Bank, the United Nations, and other multilateral organizations could have a tangible impact on the prospects for achieving energy access for all.

We recommend that the IEA (1) intensify analytical efforts related to the electrification of developing countries through greater collaboration with international development agencies such as the World Bank and the United Nations, and (2) focus R&D efforts on identifying and deploying low-cost distributed-energy-technology solutions that can meet electricity needs in rural areas.

*Increasing IEA Action in Response  
to the Climate Change Challenge*

As the implementation of the Kyoto Protocol moves forward without the participation of the United States—the world’s largest emitter of greenhouse gases—a growing schism in climate change policy will lead to considerable

international tension. In the midst of this policy “gap,” the IEA can play an important role in harmonizing international responses to the challenge of global warming. As IEA executive director Mandil mentioned recently, its members share fundamental goals relating to the “three Es”—energy security, economic growth, and environmental quality.<sup>16</sup> All three are essential to assuring a stable future, but achieving balance among these three Es is not easy. The IEA has been active in examining the intersection of the three Es and finding effective balancing strategies, particularly with regard to climate change. It has been looking at the role of market-based mechanisms for efficiently reducing and managing carbon dioxide emissions. It is working to share knowledge and operational experience related to a variety of promising carbon-reduction or -avoidance technologies. It is also focusing on demand-side measures (e.g., advanced appliances) that can improve energy efficiency and reduce overall emissions. Enabling technological improvements and facilitating the transfer of knowledge and experience are core competencies of the IEA. The IEA can play an effective role in helping to “spread” key climate change policy and technology solutions.

We recommend that the IEA (1) enlarge its scope of action on climate change issues and help its members and the rest of the world move beyond the Kyoto Protocol and define a new technology and market-based approach; and (2) conduct a major study, utilizing IEA models, that soberly analyzes the strengths and weaknesses of the various technology and policy pathways.

### *Finding Strategies to Deal with Deregulation and Its Impact on Energy Security*

The ongoing deregulation of electricity markets worldwide has created a number of opportunities and challenges. For much of the twentieth century, the three major components of the electricity market (generation, transmission, and distribution) were highly regulated, with vertical utilities typically holding monopolies over all three market segments within a given service area. The traditional assumption was that electricity is not a typical commodity and does not fit neatly into a pure market economy framework. Satisfying electricity demand requires processing a complicated slate of fuels and then delivering power to every household and business. Electricity is produced in response to real-time demand and has no full-fledged substitute. It cannot be stored and can only be transported through dedicated transmission lines. Lead times for building power generation and transmission

infrastructure can typically measure five years or longer. But, during the past two decades, liberalization has led to greater competition primarily in the generation sector and to a lesser degree at the distribution level. Deregulation has largely been “sold” to voters in IEA countries on the promise of lower prices; but as consumers have discovered, there is no guarantee that prices will remain low. Opening markets to increasing competition generally leads to greater efficiency and lower costs. Yet if reforms are not properly designed, market opening can also lead to greater price volatility, over-reliance on certain fuels, and reliability problems.

When implemented properly, liberalization has allowed market forces to push efficiency and cost improvements, created more choices for consumers, and put overall downward pressure on prices. However, as long as there are externalities, market forces alone cannot achieve various energy security and environmental goals. In a competitive electricity market, participants become ever more focused on the short term and look for low-risk investments with a high return. Without oversight, market participants will not ensure that adequate peak generation capacities are maintained. The market does not provide incentives for supply diversity, because short-term cost decisions trump energy security considerations.

The IEA has a significant role to play in sharing information on experiences with energy deregulation and studying the consequences of liberalization on energy security and environmental goals. The IEA’s *World Energy Investment Outlook 2003* highlights the challenging investment environment for electricity and other energy projects.<sup>17</sup> A key challenge will be to ensure that regulatory, policy, and market barriers do not prevent timely investments that promote global energy security.

We recommend that the IEA (1) expand efforts to share information between members and nonmembers alike on experiences with electricity market deregulation and its impact on reliability and energy security; and (2) focus analytical resources on examining the intersection between deregulation, investment patterns, and energy security, with the goal of finding a balance between the short-term focus of the market and long-term energy security and environmental goals.

### *Examining R&D Priorities in the Context of Improving Global Energy Security*

Future energy R&D investments must focus on a range of energy resources, including advanced nuclear systems and small-scale renewable technologies.

Solar, wind, and biomass are likely to become cost-effective solutions for off-grid power in developing countries. A variety of innovative renewable technologies are now emerging, but they will need further R&D to improve their efficiency and ability to compete effectively in the marketplace. Though it will be imperative to develop small-scale renewable technologies, it is time to confront the wishful thinkers who believe that the rising demand for clean and affordable energy supplies in the coming decades can be met primarily through the deployment of renewable energy resources. Renewable energy holds a significant but marginal role in meeting future global energy demand.

As an energy resource that has been proven to be free of greenhouse gas emissions, nuclear power has the potential to play a major role. That said, nuclear power faces a variety of economic, technological, and political challenges that must be overcome if it is to serve as a key energy technology solution. Public concerns about safety, waste storage and disposition, and proliferation are critical areas that must be addressed. Progress is occurring in the United States with the development of the long-term waste disposition site at Yucca Mountain in Nevada and a renewed commitment to nuclear R&D. The French and Japanese have led efforts to close the nuclear fuel cycle with technologies to reprocess waste and reuse it in reactors, thereby reducing the volumes of waste for long-term disposition. These leading nuclear energy countries should be at the forefront of an IEA focus on nuclear energy development.

A cooperative international framework will inevitably be a part of this nuclear energy debate. In developing countries, modular proliferation-resistant nuclear power reactors could meet global energy, environment, and sustainable development goals. Though collaboration is occurring through international frameworks such as the United States–led GEN-IV initiative and the International Atomic Energy Agency, the IEA must help make the case that nuclear expansion will be critical to addressing future global energy needs. The IEA can also encourage advanced fusion energy research. The collaborative ITER (Latin for “the way”) project was originally agreed to by Reagan and Gorbachev at the Geneva Summit in 1985, in large part thanks to the efforts of Al Trivelpiece, the former director of the Oak Ridge National Laboratory, and Yevgeny Velikhov of Russia’s Kurchatov Institute. Today, the project is supported by the European Union, Japan, Canada, China, Russia, South Korea, and the United States. In the future, the IEA can play a role in demonstrating the market applications of fusion energy and encouraging other “ITER-style” long-term energy R&D efforts.

We recommend that the IEA engage in an open and productive dialogue regarding the role of advanced nuclear energy technologies (fission and fusion) in addressing global energy needs and that it support the future deployment of nuclear power.

### *Improving Energy Market Transparency and the Consumer-Producer Dialogue*

The IEA is the leading global consolidator and provider of energy market data and information. Nevertheless, there is a strong need for more transparency and cooperation to improve the accuracy of energy data and statistics. Deficiencies in the overall accuracy, timeliness, and transparency of global energy statistics present a significant economic cost in market efficiency. For example, data deficiencies led to a significant underestimation of second-quarter 2004 global oil demand growth, which in turn encouraged OPEC to announce a production cut.

Efforts to improve market transparency will inevitably be linked to efforts to improve dialogue between producer and consumer countries. In recent years, the IEA has attempted to cultivate closer communication with OPEC. However, fundamental areas of disagreement remain. The best opportunity for deepening this dialogue may be through the International Energy Forum (IEF), which was originally created to help facilitate periodic summits between consumer and producer nations. The aim of consumer-producer dialogue should be to improve transparency and enhance the understanding of the economic decisions made on both sides.

We recommend that the IEA (1) strengthen its existing methods of dialogue and relationship building with producers, and (2) fully develop a cooperative relationship with the IEF secretariat in Riyadh—working closely together on such multilateral transparency initiatives as the Joint Oil Data Initiative.<sup>18</sup>

### *Reaching Out to Non-IEA Countries While Maintaining a Nimble Organization*

The IEA should remain a nimble organization that can respond effectively to energy crises. In the decision-making process, the IEA Governing Board—which consists of senior energy officials from member countries—has recognized the importance of maintaining a rapid response capability. Through its Industry Advisory Board, as well as through its day-to-day activities, the IEA maintains an effective network of contacts at international organiza-

tions, universities, nongovernmental organizations, private companies, and industry associations to call upon for assistance. This network was successfully tapped during past crises and will be called upon in the future.

Yet as rapid energy demand growth shifts to the developing world, the IEA needs to reach out to nonmember countries. It is time to consider a framework for the integration of large countries, such as Brazil, China, India, and Russia, into a cooperative arrangement with the IEA. Relationships with these countries are important and cannot rely only on intermittent dialogue. The two major options are to create another parallel energy institution dedicated to developing countries in collaboration with the IEA or to define criteria that would allow these countries to enter the organization on a “partnership” basis. We recommend that the IEA move quickly to expand its framework for working effectively with non-IEA countries.

### *Committing IEA Members to Addressing Global Energy Security Challenges*

The challenges described on the preceding pages will require a sustained commitment from IEA members. The United States can and must lead this effort to reinvigorate the IEA’s core mission and expand its vision to address global energy security. Since its rejection of the Kyoto Protocol in 2001, the United States has faced considerable criticism internationally with regard to its energy and environmental policies. America can show its commitment by significantly increasing its financial contribution to the IEA and by calling on other members to do the same. We recommend that the United States lead by example and significantly increase its financial commitment to the IEA and that it demonstrate its support for an expanded IEA role in addressing the major issues affecting global energy security.

### Conclusion

We believe the IEA has the skill and agility to take on new missions to address the threats that global poverty, political instability, terrorism, and energy price volatility may present. The United States should lead this effort to modernize the IEA’s mission because improving global energy security will dramatically enhance America’s own national security. Energy can be a path to bring Russia and China closer to the United States, enabling America to avoid destructive competition and better manage issues of weapons proliferation and regional security. Bringing Brazil and India into the IEA’s fold

will help advance free trade in energy and improve regional stability in Latin America and South Asia. Enhancing the consumer–producer dialogue will enable the United States and other IEA members to constructively engage with the energy-exporting countries of the Middle East as they undertake potentially destabilizing but essential political and economic reforms. The IEA has served its mission well for the past thirty years; the time is ripe to prepare it for the new century.

## Notes

1. U.S. Energy Information Administration, *International Energy Outlook 2003* (Washington: U.S. Department of Energy, 2004).
2. International Energy Agency (IEA), *World Energy Outlook 2004* (Paris: IEA, 2004), 25–33.
3. Strategic oil stocks under the IEA system can include “commercial stocks” held by the oil industry, “government stocks” held exclusively for emergency purposes and financed by the central government (e.g. the U.S. Strategic Petroleum Reserve), and “agency stocks” maintained for emergencies cooperatively by both public and private bodies on cost-sharing basis.
4. The full text of the “Agreement on the International Energy Program” may be found at <http://www.iea.org/Textbase/about/IEP.PDF>.
5. William F. Martin, Ryukichi Imai, and Helga Steeg, *Maintaining Energy Security in a Global Context: A Report to the Trilateral Commission* (New York: Trilateral Commission, 1996), 13–14.
6. Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon & Schuster, 1991), 630.
7. France later joined the IEA in 1992.
8. Martin, Imai, and Steeg, *Maintaining Energy Security in a Global Context*, 15.
9. Richard Scott, *The History of the International Energy Agency, 1974–1994: IEA the First 20 Years* (Paris: International Energy Agency, 1995).
10. See IEA, <http://www.iea.org/about/files/factsheet1.pdf>.
11. Claude Mandil, “The IEA in 2003,” International Energy and Environment Program seminar, Nitze School of Advanced International Studies, Johns Hopkins University, Washington, November 12, 2003.
12. IEA, <http://www.iea.org/about/index.htm>.
13. IEA, *Oil Supply Security: The Emergency Response Potential of IEA Countries in 2000* (Paris: IEA, 2001).
14. See a detailed discussion of this concept by David Goldwyn and Michelle Billig in chapter 21 of this volume.
15. IEA, *World Energy Outlook 2002*, 365.
16. Mandil, “IEA in 2003.”
17. IEA, *World Energy Investment Outlook 2003* (Paris: IEA, 2003).
18. Participants in the Joint Oil Data Initiative, which aims to standardize and improve the accuracy of oil data collection worldwide, include such organizations as the United Nations, OPEC, IEA, the Asia-Pacific Economic Cooperation forum, and the European Union.