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The Return of Energy Insecurity in the Developed Democracies

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Abstract

During the past decade, concerns about energy security have reached levels not witnessed in the developed democracies since the 1970s and early 1980s. In good part because of such concerns, each of the largest of these countries - Britain, France, Germany, Japan, and the United States - has conducted a major review of energy policy, initiated significant policy changes, or both.

Also like the 1970s, recent years have seen a variety of proposals for international cooperation to promote energy security. That is where the similarities with the past largely end, however. In contrast to the earlier period, when the principal sources of concern in these countries were high oil prices and uncertain oil supplies, recent worries about energy security have been much more diverse. This paper describes these differences and explores their implications. It argues that the disparities in today's energy security concerns and policy preferences in the major developed democracies are due in part to the divergent policies pursued in response to the oil shocks of the 1970s. It also argues that the present differences will make meaningful cooperation by these countries to promote energy security, which was never easy in the past, yet more difficult.

The Return of Energy Insecurity in the Developed Democracies

The twin oil shocks of the 1970s propelled energy security to the top of the policy agenda in the developed democracies, but during most of the 1980s and 1990s, the return of low oil prices and seemingly abundant oil supplies allowed policy makers to focus on other issues. During the first decade of the 21st century, however, concerns about energy security in these countries once again reached levels comparable to those fostered by the oil shocks. In good part because of such concerns, moreover, each of the largest developed democracies – Britain, France, Germany, Japan, and the United States -- has undertaken a major review of energy policy, initiated significant policy changes, or both. In addition, as in the 1970s, recent years have seen proposals for additional efforts at international cooperation to promote energy security, especially within the International Energy Agency (IEA), the North Atlantic Treaty Organization (NATO), and the European Union (EU).

That is where the similarities with the past largely end, however. In contrast to the 1970s, when the principal sources of insecurity in virtually all countries were high oil prices and uncertainty about oil supplies, recent energy security concerns in the largest developed democracies have been much more diverse. In the United States, for example, the focus has continued to be on oil. In France, in contrast, the primary concern has been the need to replace the country's aging nuclear power plants. In Germany, worries have centered on the reliability of foreign natural gas supplies. For its part, Britain has faced the challenges associated with shifting from being a net exporter to a net importer of oil and gas. As a result of these differences in energy security concerns, the preferred policy responses of these countries have also been quite varied.

Paradoxically, one cause of these differences in recent energy security concerns and policies was the divergent choices that the major advanced industrialized countries made in response to the oil shocks. Although they then faced similar challenges regarding the price and availability of oil, they responded, for a variety of reasons, in distinct ways. Widely varying efforts were made to increase domestic fossil fuel production, to reduce oil consumption, to develop alternatives to oil, and to secure and diversify foreign oil supplies, among other things. These choices in turn resulted in different energy mixes and vulnerabilities in subsequent years.

The recent differences also have important implications for efforts to promote international cooperation on energy security. In the absence of coercion, international cooperation requires that states (or other actors) enjoy a minimum degree of shared or complementary interests and perceptions of the problems they face. While these five countries have had a common interest in energy security, their specific needs and options have differed considerably. Thus even in the 1970s, they were able to cooperate to only a very limited extent. They agreed to maintain strategic petroleum stockpiles and to establish an emergency oil sharing system within the IEA, but little else of significance. In recent years, the obstacles to meaningful cooperation among these countries have been even greater. Divergent national concerns and policy preferences have made and will continue to make collective responses by them yet more difficult, if not impossible, to orchestrate.

This article focuses on these five developed democracies for three main reasons. First, Since World War II, they have ranked among the largest consumers and importers of energy. In 1973, at the time of the first oil shock, they accounted for nearly half of global primary energy demand, and even as recently as 2000, their combined energy use amounted to some 39 percent of the world total¹. Consequently, the energy policies pursued by these countries have had – and

will continue to have -- a major impact on world energy markets.

Because of their importance as consumers and importers of energy, moreover, the participation of these five states has been and is likely to remain critical to meaningful international cooperation to promote energy security among consumer countries. The first and perhaps still the most important example of this was the creation in 1974 of the IEA, which initially brought together the United States, most of Western European, and Japan as well as Canada and Turkey. Over the years, the members of the European Union, including France, Germany, and Britain after it joined in 1973, have also taken steps toward coordinating and harmonizing their energy policies in ways that promote their energy security. Some more recent international cooperative endeavors, such as the International Renewable Energy Association (IRENA), have included a broader range of countries, but Britain, France, Germany, Japan, and the United States have continued to play critical roles. Finally, as noted above, the principal proposals for promoting international cooperation on energy security concern organizations – the IEA, NATO, and the EU -- in which all or most of them are central actors. The article begins by reviewing the oil-centric energy security concerns of the 1970s and how these five countries responded to them, emphasizing the important differences in their responses and the limits on their principal efforts at international cooperation to promote energy security via the IEA. In the following section, it examines in detail the wider ranging energy security concerns and the even more diverse preferred policy responses that have characterized Britain, France, Germany, Japan, and the United States in the past decade. In the process, the article offers the first comparative analysis of the energy security policies of these countries since energy security was last the focus of much scholarly attention in the 1970s and early 1980s. A third section explores one of the important implications of these differences, the prospects for international cooperation to

promote energy security both among these states and with other import-dependent consumer countries. A conclusion briefly summarizes the principal arguments and findings about the differences between the 1970s and the past decade and the implications of the greater diversity of energy security concerns and policy preferences in recent years for international efforts to promote international cooperation on energy security.

Before proceeding, a note on the meaning of the term energy security as used here may be in order. David Deese has usefully defined energy security as “a condition in which a nation perceives a high probability that it will have adequate energy supplies at affordable prices.”² Likewise, Daniel Yergin has written that “The objective of energy security is to assure adequate, reliable supplies of energy at reasonable prices and in ways that do not jeopardize major national values and objectives.”³ What constitutes energy security for a particular country will depend very much on the types of energy it consumes, where those sources of energy come from, and the principal challenges that exist to their adequacy, reliability, and affordability. A number of developments, both internal and external, can affect a country’s energy security. This article, however, focuses on those concerns that emanate from a state’s dependence on foreign sources of energy and domestic efforts to limit that dependence.

Energy Insecurity in the 1970s

The first great postwar era of energy insecurity in the developed democracies was precipitated by the oil shocks of the 1970s. Correspondingly, the principal concerns of the time revolved around oil, especially its affordability and its availability from foreign sources. In response to the oil shocks, the advanced industrialized countries undertook a number of measures

to reduce their oil consumption, to increase domestic production where possible, to ensure access to foreign oil supplies where necessary, and to reduce their vulnerability to future oil supply disruptions.

The policies adopted by the advanced industrialized countries in the 1970s did result in improvements in their energy security. But their individual responses to the oil shocks were rather varied and, partly as a result, their efforts at cooperation met with only limited success.⁴ A further important consequence of these differences was a growing divergence in the energy situations of these countries, such that their principal energy concerns and preferred policy responses would be marked by increasing diversity in future years.

During the postwar years, the United States, Western Europe, and Japan became increasingly dependent upon oil. In 1950, petroleum passed coal as the most important single source of energy in the United States and by 1973, it accounted for more than 45 percent of U.S. primary energy consumption (PEC).⁵ The shift in Western Europe and Japan, which had relied more heavily on coal after World War II, was even more dramatic. By 1973, West Germany used oil to meet 57 percent of its energy needs, France for more than two-thirds, and Japan for a staggering 78 percent. And while the United States continued to produce a high if declining percentage of the oil it used -- about 60 percent in 1973 -- virtually all of the petroleum consumed in Western Europe and Japan was imported.⁶

Although a few analysts warned about the risks of the West's growing appetite for oil, governments did little or nothing to curb it.⁷ Indeed, some policies, such as price controls in the United States, stimulated consumption. Consequently, all of these countries were hit hard when the Arab members of the Organization of the Petroleum Exporting Countries (OPEC) decided in October 1973 to reduce production and, with the support of the other OPEC members, to raise oil

prices, which nearly quadrupled by the end of the year. Although the simultaneous Arab oil embargo had little effect, the sharp rise in prices was thought to wreak economic havoc, in the form of sharply reduced growth, high inflation, increased unemployment, and payments imbalances.⁸ Then, in the late 1970s, just as the advanced industrialized countries were recovering from the first oil shock, they were hit by a second one. This time, the precipitating event was a strike by Iranian oil workers, though it was largely panic buying by a variety of market actors seeking to build up their stocks that caused the world price to more than double.

The oil shocks raised the issue of energy security to the top of the policy agenda in the developed democracies, and during the 1970s and early 1980s, these countries faced a very similar set of energy security challenges. The principal concern was the possibility of a major disruption of oil supplies that could trigger a sharp increase in oil prices and possibly even fuel shortages. Such a disruption might be intentional, as exemplified by the first oil shock, or it might be the unintended result of an internal upheaval, as represented by the Iranian Revolution, or of a regional conflict, a possibility raised in 1980 by the outbreak of the Iran-Iraq War.

Consequently, the policy responses of the developed democracies to the oil shocks bore important similarities. They all sought to reduce oil consumption through a variety of measures, including efforts at conservation and improving energy efficiency as well as the promotion of substitutes for oil, such as nuclear power, natural gas, and even coal. They also sought to stabilize relations with the oil producing countries through various bilateral arrangements, while making other efforts to diversify foreign oil supplies.⁹ And the period saw major attempts to prepare for future emergencies through the buildup of strategic stockpiles of crude oil and petroleum products, as exemplified by the U.S. Strategic Petroleum Reserve (SPR).¹⁰

At least as important as these similarities, however, were the differences in policy

responses. Most obviously, those who were able, mainly the United States and Great Britain thanks to recent discoveries on Alaska's North Slope and in the North Sea, sought to increase domestic oil and gas production. Indeed, British oil output surpassed domestic demand in the early 1980s, and British natural gas production sustained a steadily rising level of gas consumption, which eventually exceeded oil as a share of Britain's PEC.¹¹

But significant variation also characterized the degree to which governments sought to promote conservation and energy efficiency, especially with regard to the use of oil. West Germany, for example, adopted a large number of conservation measures that, according to one estimate, eventually resulted in savings of about 31 million tons of oil equivalent (MTOE), or about one-quarter of Germany's oil consumption in the late 1980s.¹² Japan, too, placed a high priority on energy efficiency, substantially raising taxes on petroleum products and taking a number of steps to promote conservation in the industrial sector, which accounted for as much as two-thirds of Japanese energy consumption in 1973. Partly as a result of such efforts, Japan's energy intensity (total energy consumption divided by GDP) declined by one-third between 1973 and 1985.¹³

In contrast, efforts to reduce oil consumption in the United States were limited mainly to the introduction of fuel economy standards for passenger cars and light trucks, the so-called CAFE standards. Meanwhile, the U.S. government was slow to lift price controls on domestically-produced oil, which artificially stimulated consumption. And perhaps most significantly, it continued to maintain very low taxes on gasoline and diesel fuel, in contrast to the much higher tax rates found in Japan and the West European states.¹⁴

Important differences also emerged in the development and promotion of alternatives to oil. All the major industrialized countries experienced an upsurge of interest in nuclear power,

but the degree of emphasis varied considerably. France began an all-out effort to generate electricity at nuclear plants.¹⁵ As a result, the percentage of French PEC attributable nuclear power grew from less than two percent in 1973 to 17.6 percent in 1983 and 35.6 percent in 1993. In the United States and Britain, in contrast, nuclear power's share of PEC grew only slowly, remaining below 10 percent for the next two decades. The first oil shock brought about at least a temporary halt in coal's slide as a share of PEC in Western Europe and Japan, but only in the United States did coal see a significant increase, rising from just 18 percent of PEC in 1973 to 25 percent in the mid-1980s. In contrast, natural gas consumption as a share of PEC in the United States continued the decline that had begun in 1970, while it exploded in Britain, doubling from 11 to 22 percent over the next decade, and grew steadily in Japan, thanks to shipments of liquefied natural gas (LNG), and West Germany, which had just begun to import gas from the Soviet Union and approved additional long-term contracts in the early 1980s.¹⁶

Thus, although overall energy consumption in 1985 was roughly the same as it had been at the time of the first oil shock in all five countries, they had reduced their oil consumption by widely varying degrees and had diversified their energy mixes in different ways. The most dramatic change occurred in France, which saw oil use decline by one-third and oil's share of PEC by 25 percentage points. Britain also reduced oil consumption by more than 30 percent, although this meant a much smaller drop as a percentage of PEC (12 points) because of the country's much lower initial level of oil dependence. In both Japan and West Germany, oil use fell by nearly 25 percent, representing declines as a percentage of PEC of 21 and 14 points, respectively. Bringing up the rear was the United States, which reduced oil consumption by just 12 percent, or five percentage points of PEC. Oil's share of PEC was replaced mainly by natural gas in Britain, nuclear power in France, and a combination of nuclear power and natural gas in

West Germany and Japan.¹⁷

These different approaches were also reflected in the modest degree of cooperation to promote energy security that took place among the major advanced industrialized democracies. The biggest achievement was the creation by members of the Organization for Economic Cooperation and Development (OECD) of the IEA as a forum for coordinating their policies for dealing with oil supply disruptions and, in the longer term, reducing oil dependence. Headquartered in Paris near the OECD, the IEA did quickly establish an arrangement for sharing oil supplies in the event of an emergency. But its members were much less successful at developing meaningful measures for limiting oil consumption and imports. They agreed on long-term import targets but not on collective tools to implement them. The IEA also established a floor on oil prices as a means of stimulating domestic oil production and the development of alternative energy sources, but the price was set at too low a level, just \$7 per barrel, to make any difference.¹⁸ Also, France refused to join the organization, in part because it viewed the IEA as excessively confrontational toward the oil producers.¹⁹

Even the IEA's greatest achievement, the emergency oil sharing system, was revealed to have significant limitations when first put to the test during the second oil shock of 1978-1979. The system's mandatory demand restraint and reallocation of oil supplies would only be activated if one or more IEA members suffered a supply reduction of at least seven percent. Yet it soon became clear that smaller reductions could have negative economic consequences, especially if they generated substantial price increases. And when Sweden complained in 1979 of a much larger shortfall, the IEA declined to act, attributing the country's problems to special conditions.²⁰

Energy Insecurity in the 2000s

The worries about energy security precipitated by the oil shocks faded in the early 1980s as the oil market softened due to stagnant global demand and growing production capacity. Oil prices collapsed in 1985 and remained generally low for the next decade and a half. Thus energy security did not re-emerge as a major concern in the developed democracies until the very end of the 1990s or early 2000s, and this time, the issue arose more gradually than it had in the 1970s. There was no single precipitating event comparable to the first oil shock. More significantly, the definition of the problem has taken different forms in different countries in recent years. Energy insecurity could no longer be defined simply as high oil prices and a heightened risk of oil supply disruptions, and these differences in threat perception have in turn contributed to a still more diverse set of national responses. To be sure, U.S. energy security policy has continued to be primarily concerned with reducing oil consumption. But British policy has largely been about managing the transition back to being a significant importer of oil and gas, France has confronted the need to replace its aging stock of nuclear power plants, and Germany has had to address uncertainty about the reliability of its imported natural gas supplies. Paradoxically, these differences in energy security concerns and the resulting preferred policy responses were the result in part of the policy choices made in the 1970s and pursued thereafter.

The United States: Plus Ça Change...

The U.S. energy security concerns of the 2000s have been the most similar to those of the 1970s, in part because United States had reduced its dependence on oil the least. Although

domestic energy supplies have been disrupted on several occasions, the energy security issues that have captured the most attention in the United States during the past decade have been the high price of oil and petroleum products and the country's dependence on oil imports. In late 2000, the cost of a barrel oil reached \$30 for the first time since the Gulf War and only the second time since the price collapse of the mid-1980s. Then after dropping briefly during the following two years, the price of oil began a more or less steady rise that ultimately led to a record high of nearly \$150 per barrel in mid-2008, before dropping sharply.²¹

These price concerns were compounded by the negative consequences associated with the United States' importation of a large and growing share of its oil, which reached 60 percent in the mid-2000s.²² With prices high, oil imports made a substantial contribution to America's towering trade deficit. Especially following September 11, 2001, concerns grew that money sent abroad to pay for oil imports was being used to finance anti-American terrorist activity. And substantial oil revenues helped to empower regimes, such as those in Venezuela and Iran, that were hostile to American interests.²³

The U.S. responses to these renewed concerns about energy security unfolded over a number of years. In 2001, the new Bush administration prepared a "National Energy Policy" that identified the twin problems of high energy prices and growing imports, but it resulted in few concrete actions.²⁴ Rather, it was not until the middle of the decade that the government passed significant pieces of legislation intended to promote energy security, although President Bush did direct his administration to fill the SPR to its full capacity of 727 million barrels following the September 11 attacks. The 2005 Energy Policy Act (EPACT) was the first major energy-related legislation of any kind since the early 1990s, and it was soon followed by the even more far-reaching Energy Independence and Security Act of 2007.

Together, the two acts contained a number of specific measures designed to combat the negative consequences of America's oil dependence in general and its growing reliance on oil imports in particular.²⁵ To mitigate the effects of possible future oil supply disruptions, the 2005 law provided for expanding the capacity of the SPR to one billion barrels. In the area of conservation, the 2005 act contained tax credits for the purchase of hybrid vehicles, while the 2007 act raised fuel economy standards for passenger cars and light trucks from an average of 25 miles per gallon (mpg) to 35 mpg by 2020, the first statutory increase since they had been established in 1975. Since 2009, the Obama administration has accelerated the introduction of tougher fuel economy standards and sought to extend them to heavier vehicles. In the area of alternative transportation fuels, the 2005 act mandated the production of an increasing amount of ethanol, up to 7.5 billion gallons (four to five percent of gasoline demand) in 2012, while the 2007 act established an even more ambitious renewable fuels standard that would require the inclusion of at least 36 billion gallons of ethanol and other biofuels in the fuel supply by 2022. The 2005 act also included several strong incentives for building new nuclear power plants, but these provisions were not intended to reduce U.S. oil dependence.

Just as important as these measures was what the new energy policy legislation did not attempt to do to reduce oil consumption and imports. Perhaps most notably, it provided for no increase in the traditionally low U.S. taxes on motor fuels, even though it is these low taxes that make American consumers uniquely sensitive to oil price spikes. Although economists argue that higher fuel taxes would be the most efficient way to reduce oil consumption, the federal gasoline tax has been frozen at 18.4 cents per gallon since 1993, and it is lower in real terms than it was before the first oil shock.²⁶ In addition, questions could be raised about the sufficiency of the increased fuel economy and renewable fuels requirements. According to one favorable

estimate, the combined effect of the improved gas mileage and the alternative fuels mandate would be to reduce oil consumption by more than four million barrels per day by 2030.²⁷ At the time, however, the government's influential Energy Information Agency (EIA) projected that oil consumption would increase by an even larger amount under business-as-usual assumptions, suggesting that these measures would not likely result in any net reduction.²⁸

In recent years, there has been much debate over reducing federal restrictions on domestic oil production. The Bush administration made lifting these restrictions a high priority, although it was unable to overcome Congressional resistance, and even the Obama administration has proposed opening up substantial offshore areas to exploration and drilling.²⁹ Nevertheless, while the increases in domestic oil production that could be achieved in this way would reduce imports by a roughly equivalent amount, they would not greatly increase U.S. energy security. In particular, output levels would not be sufficient to bring down world oil prices significantly, and increased domestic production would not make the U.S. economy much less vulnerable to the price increases that would inevitably follow a substantial supply disruption elsewhere in the world.³⁰

Since 2009, energy policy legislative efforts have focused on the creation of a cap-and-trade system for carbon emissions. Although such a system might help to limit climate change, its implications for U.S. energy security are unclear and potentially negligible. Indeed, the bill passed by the House of Representatives in 2009 contained no provisions explicitly aimed at reducing oil consumption.³¹

Britain: From Fossil Fuel Exporter to Importer

In Britain, in contrast, renewed concern about energy security has been the result foremost of declining domestic production of oil and natural gas in the North Sea. During most of the 1980s and 1990s, Britain had been a net exporter of oil, and its gas production had met most domestic demand. Around the year 2000, however, production of both oil and gas peaked and then began a rapid decline that appeared irreversible.³²

The situation was particularly acute with regard to natural gas, on which the country had become increasingly dependent; as a share of PEC, it had grown from 11 percent in 1973 to nearly 40 percent. Britain could readily import additional oil from foreign sources. Not so with gas, which requires expensive undersea pipelines or LNG terminals. As a result, Britain has come the closest to experiencing an acute energy crisis comparable to the oil shocks of the 1970s. During the winter of 2005-2006, British consumers faced the real prospect of gas shortages as demand outstripped domestic production, British gas suppliers were unable to make up the difference from stocks or imports, and the government considered imposing mandatory restrictions on consumption.³³ A serious crisis was narrowly averted, but the close call drove home the fact that Britain had made a rapid transition from being a net exporter to a net importer of natural gas and that more would have to be done to ensure that demand could be met increasingly from foreign sources. Indeed, the government estimated that Britain could depend on imports for as much as 90 percent of its gas needs by 2020, and an increasing share of these imports would necessarily come from unstable regions.³⁴

A related but longer-term energy security challenge facing Britain was the aging of its nuclear power plants. Most of the 23 reactors operating in the early 2000s were due to be shut down by 2020. Although they accounted for only about one-fifth of British electricity production, their loss would cause the UK to rely even more heavily on gas-fired power

generation and thus further increase Britain's dependence on gas imports.³⁵

Through the middle of the decade, British energy policy had focused largely on the problem of climate change and had placed primary emphasis on reducing carbon emissions.³⁶ Thus the British policy response to the renewed concerns about energy security only began to emerge in 2006 with the publication of the Energy Review Report and then was fleshed out in the 2007 Energy White Paper, the Energy Bill that was put forward in January 2008, and the 2008 White Paper on Nuclear Power.³⁷ A central thrust of the new policy was to ensure reliable access to supplies of natural gas and oil and to encourage the production of substitutes. The government sought to facilitate the creation of adequate natural gas import and storage facilities by strengthening and simplifying the existing regulatory framework. In addition, it increased the obligations already established for renewable sources of energy in order to reduce the need for oil and natural gas. The government set a goal of quintupling the amount of electricity supplied by renewables from around four percent in 2005 to 20 percent by 2015.³⁸

Perhaps the most striking aspect of the new British energy policy was its embrace of nuclear power. As recently as 2003, the government had minimized the need to replace the country's aging reactors, describing it as an "unattractive option" on economic grounds and because of the unresolved issue of nuclear waste disposal.³⁹ In a sharp turnaround just a few years later, however, the government declared that it would take a number of actions to reduce regulatory and planning risks associated with private investment in new nuclear power stations.⁴⁰

Britain has complemented these domestic initiatives with strong support for EU policies that would help to improve its energy security.⁴¹ Britain has been a leading proponent of completing the internal EU energy market through the adoption of further liberalization measures and the creation of more physical interconnections between national electricity and gas

infrastructures. It has strongly advocated the diversification of EU natural gas supplies through such measures as the construction of a new pipeline connecting Central Europe to the gas resources Caspian region and potentially the Persian Gulf. And it has favored giving central EU bodies greater authority to act on behalf of EU members on energy issues in relations with third parties. Whether these efforts would bear fruit, however, would depend on the policy preferences of its EU partners, especially Germany and France.

Germany: Can It Count on Russian Gas?

In Germany, concerns about energy security also came abruptly to the fore in the mid-2000s. As in Britain, moreover, they revolved primarily around the country's dependence on imports of natural gas, although the specific sources of those concerns were different. Following the oil shocks, Germany had successfully limited oil consumption, but its use of natural gas had grown more or less steadily since the early 1970s and had continued to increase after unification, both in absolute terms – from 54 MTOE in 1990 to more than 77 MTOE in 2005 – and as a share of PEC – from 15.4 percent to 24 percent over the same time period.⁴² Meanwhile, domestic gas production was stagnant, meaning that Germany relied on imports to meet more than 80 percent of demand.⁴³ Of even greater concern was the fact the Germany received about 37 percent of its natural gas from Russia, thanks to pipelines built in the 1970s and 1980s, and that based on existing trends, this figure was expected to rise to as high as 70 percent by 2020. Because almost all of Germany's natural gas arrived via fixed pipelines, moreover, it could not be very easily replaced in the event of a supply disruption.⁴⁴

Initially, however, German leaders evinced little concern. At the beginning of the 2000s,

the left-of-center Red-Green coalition had agreed to phase-out within two decades nuclear power, one of the principal means on which West Germany had relied to reduce its oil dependence. The nuclear phase-out was likely to result in even greater demand for natural gas in order to replace the approximately 30 percent of electricity production then accounted for by nuclear power.⁴⁵ And in 2005, the German government backed an agreement by German and Russian companies to build a new gas pipeline that would directly link the two countries via the Baltic Sea.⁴⁶

Thus it required the January 2006 gas conflict between Russia and Ukraine to propel energy security to the top of the political agenda. The decision by the Russian natural gas concern Gazprom to cut off supplies to Ukraine over an unresolved commercial dispute called into question Russia's reliability as an energy supplier. Although the recently elected Black-Red coalition government had already decided to conduct a comprehensive review of energy policy, the gas crisis gave considerable impetus to the process.⁴⁷

The energy policy review culminated in the adoption of an Integrated Energy and Climate Program (IECP) in the second half of 2007. The IECP included 29 separate measures primarily aimed at increasing energy efficiency and the use of renewable forms of energy that could reduce Germany's dependence on natural gas imports. When fully implemented in 2020, these measures were expected to increase the contributions of renewable energy to electricity production from 13 percent to 25-30 percent, to increase the share of electricity produced from efficient combined heat and power (CHP) from 12 to 25 percent, and to reduce energy use in new buildings by 30 percent, among other things.⁴⁸

As ambitious as the program may have been, however, it appeared to place much more emphasis on fighting climate change than on enhancing Germany's energy security. Although greater energy efficiency and the use of renewables could reduce energy imports, the program

contained few if any measures primarily intended to address Germany's dependence on imported natural gas per se. For example, it contained no measures to diversify the sources of Germany's natural gas imports, nor was there any discussion of the possible contribution of nuclear power to energy security. By late 2007, the concerns about energy security that had initially animated the review process had largely subsided.⁴⁹

A further boost was provided by an even more serious Russia-Ukraine gas crisis in early 2009, which resulted in gas delivery shortfalls of as much as 60 percent in southern Germany and of 10-15 percent in the country as a whole.⁵⁰ That, plus continuing concerns about climate change and the election of a new center-right coalition government in September 2009, set the stage for a further review of energy policy the following year. The resulting 2010 Energy Concept established an even more ambitious goal for renewable electricity – 35 percent by 2020 – and called for reducing PEC by 20 percent over the same period. In sharp contrast to the IECP, moreover, it called for slowing the long-planned nuclear phase-out, extending the operating lives of Germany's nuclear power plants by an average of 12 years.⁵¹

Nevertheless, the new concept, like the IECP before it, played down Germany's dependence on imported gas and the energy security risks it posed, emphasizing instead the potential contributions to reducing greenhouse gas emissions and fighting climate change. More seriously, there were grounds for questioning how realistic the targets for reductions in energy consumption and increases renewable energy were and thus what contribution the relevant measures could make to German energy security. In the run up to the IECP, for example, government officials were deeply divided over whether Germany could generate even 30 percent of its electricity from renewables by 2020.⁵² And the scenarios on which the 2010 concept was based depended on a series of ambitious assumptions about technological innovation and

international cooperation in the fight against climate change.⁵³ If Germany fell short of its targets in any of these areas, the demand for natural gas and natural gas imports would almost certainly be much higher than projected. To make matters worse, the government abruptly reversed its position on nuclear power in mid-2011 following the disaster at Fukushima Daichi in Japan, quickly shutting down Germany's eight oldest reactors and restoring the goal of phasing out the rest by 2022. Thus it appeared that Germany would continue to place considerable faith in the reliability and adequacy of its existing sources of natural gas imports, especially Russia.

France: Nuclear Power and Its Discontents

In Western Europe, France has been most consistently attentive to the issue of energy security since the oil shocks, given its even more limited fossil fuel resources. Nevertheless, concerns about energy security have been least acute in France in recent years, thanks in large part to its heavy investment in nuclear power following the oil shocks. By the early 2000s, domestically produced nuclear energy and hydroelectric power accounted for nearly 45 percent of France's PEC. In contrast, it boasted the lowest level of oil dependence (just over 35 percent of PEC) and the second lowest share of PEC from natural gas (approximately 15 percent) of the five major developed democracies.⁵⁴ In addition, France's foreign sources of natural gas were among the most diverse, making it less vulnerable to a major supply disruption.⁵⁵

Energy security worries have not been entirely absent, however. By the middle of the decade, French officials had begun to voice concern about the high and rapidly rising cost of energy imports, which roughly doubled between 2003 and 2006. Indeed, in May 2006, then Prime Minister Dominique de Villepin spoke of a "petroleum crisis."⁵⁶ That year, the net cost of

energy imports reached 46 billion euros, just short of the all-time high of just over 50 billion euros in 1981, and the bill would have been higher but for France's export of nuclear electricity.⁵⁷

Of even greater concern was the aging of France's nuclear power plants. Of the 59 plants in operation in the mid-2000s, all but four had commenced commercial operation between the late 1970s and the early 1990s. Assuming a 40-year lifetime, replacements would have to begin to come on line between 2015 and 2020.⁵⁸ Although the lifetimes could potentially be extended to as much as 55 years, there was little time to lose in determining how France's future electricity needs would be met, given the long lead times for power plant construction.

A major review of energy policy began in 2002, even before the Iraq war and the subsequent run up in world oil prices. This timing reflected the longer view of French concerns about energy security. The process culminated with the publication of a White Paper (*Livre blanc*) in late 2003 and the adoption of a major energy policy act (*Loi d'orientation*) in July 2005.⁵⁹

The new French energy policy established a number of ambitious goals aimed at addressing the renewed concerns about energy security. By 2010, France would seek to reduce its energy imports (two-third of which were oil) by 10 MTOE, or more than 10 percent, and to increase the use of biofuels from almost nothing to seven percent of fuel consumption. Over the longer term, France would seek to slow the growth of electricity consumption, by improving energy efficiency, by two percent per year until 2015 and then by 2.5 percent per year thereafter, and to more than double the amount of electricity generated from renewable sources by 2020.⁶⁰ To achieve these goals, the government introduced a system of energy saving (white) certificates, which obligated energy suppliers to achieve savings by their customers, and it increased

significantly the feed-in tariffs that power companies were required to pay for electricity from renewable sources.⁶¹

Most significantly, the government renewed its commitment to maintaining heavy reliance on nuclear power. In 2006, the state-controlled *Électricité de France* (EDF) approved, for the first time in more than a decade, the construction of a new reactor, which was expected to be completed in 2012, and three years later, the government confirmed that EDF would build a second one. These reactors would be of a new design, the so-called European Pressurized Water Reactor (EPR), with the goal being to decide by 2015 whether to build as many of 40 of them. Also in 2006, the French Atomic Energy Committee began the process of designing the prototype for a fourth generation reactor, which was expected to become operational as early as 2020.⁶² Finally, the government initiated discussions about extending the lifetimes of the existing power plants beyond 40 years, a move that would require approval by the independent Nuclear Safety Authority.⁶³

Japan: Multidimensional Insecurity

Traditionally, concerns about energy security have been most acute in Japan, given the country's very limited indigenous energy resources and its isolated geographical position. And in the 2000s, the issue "returned to the top of the political agenda in Japan."⁶⁴ Despite considerable efforts in the 1970s, Japan had been able to do little to reduce its fundamental vulnerability. Although the country's oil dependence had declined substantially, oil still accounted for half of all PEC. Moreover, nearly 90 percent of Japan's oil still came from a single region, the Middle East, with much of that having to pass through the narrow Straits of Hormuz.⁶⁵ As the decade

wore on, these long-standing oil security concerns were heightened by the rising price of oil and the seemingly increased potential for supply disruptions due to instability in the Persian Gulf and other oil-producing regions.⁶⁶ Concerns about the supply of natural gas were somewhat less acute, but still significant. Japan is almost entirely dependent on gas imports, and although the sources of these imports are diverse, with less than one-quarter coming from the Persian Gulf, they have not been immune to disruptions.

These long-standing worries about the security of energy supplies have been heightened by two other recent trends. One is intensified competition and conflict over regional energy sources, such as those located in Russia and the East China Sea, as a result of rapidly growing demand for oil and natural gas in China, India, and elsewhere.⁶⁷ And because the countries of East Asia obtain their imports from many of the same sources, a future supply disruption could trigger an intense scramble for access to whatever supplies remain. Further compounding the problem has been a resurgence of resource nationalism among energy suppliers.⁶⁸ This trend posed a direct challenge to Japan's traditional policy of attempting to secure resources through direct investments in overseas energy development projects.⁶⁹

Perhaps because of the intensity with which concerns about energy security are felt, Japan's policy responses have been potentially the most wide-ranging and far-reaching. The basic long-term goals of Japanese energy security policy were first set forth in a "New National Energy Strategy" made public by the Ministry of Economy, Trade, and Industry (METI) in May 2006. Most importantly, the strategy called for further reducing oil's share of PEC to less than 40 percent by 2030. To do so, Japan would seek to increase its already high level of energy efficiency by another 30 percent over the 2003 level. It would stimulate the introduction of solar power, wind power, and biomass energy through various subsidies, tax incentives, and

production requirements. And it would reduce the near total oil dependence of the transportation sector to 80 percent by promoting greater fuel efficiency and encouraging the use of electric vehicles, fuel cells, and biofuels.⁷⁰ A related measure would be to maintain nuclear power's share of electricity generation at the existing 30 percent and possibly to increase it to 40 percent or more by 2030. To this end, the government would seek to raise the capacity utilization of existing nuclear power plants and promote the construction of new ones.

In the international sphere, the government would play a much more prominent role.⁷¹ According to the new strategy, the share of imported oil produced by Japanese companies should rise from 15 percent to 40 percent by 2030. To this end, the government would provide more "risk money" to encourage oil and gas exploration overseas by Japanese companies, and it would reinforce its diplomatic activities in the area of energy resources with the strategic use of overseas development assistance.⁷² At the same time, Japan would make efforts to dampen regional competition for energy resources by working with other Asian countries to promote energy conservation and efficiency, to increase domestic energy production and develop alternative energy sources, and to improve emergency preparedness through the establishment of adequate petroleum stockpiles and emergency response systems.⁷³

A 2010 revision of Japan's Basic Energy Plan by the new government headed by the Democratic Party of Japan (DPJ) established even more ambitious and more detailed goals. It called for reducing oil's share of the primary energy supply to just 28 percent by 2030 and cutting oil consumption by more than 40 percent. Imports of natural gas would be reduced by lesser but still significant amounts. Meanwhile, the amount of energy provided by nuclear power would more than double, partly through the construction of 14 new nuclear plants. And total renewable energy generating capacity would increase by more than 130 percent.⁷⁴

Given the ambitious nature of these plans, there were solid grounds for doubting their feasibility.⁷⁵ But by 2011, the government had taken a number of concrete steps to implement the new strategy. It extended the Energy Conservation Law to cover a much broader range of businesses and raised the already high fuel economy standards for passenger cars to nearly 44 mpg by 2015. It established a feed-in tariff for power generated by photovoltaics and was considering extending the tariff to other small renewable sources of electricity. And it increased the amount of financing available for Japanese energy companies engaged in exploration and development projects overseas.

A principal limitation of these efforts was the difficulty the government continued to face in overcoming local resistance to the construction of new nuclear facilities and to reopening existing plants that had been temporarily shutdown out of safety considerations. Then, the 2011 crisis at the Fukushima Daichi power plant required the government not only to scrap its plans for increasing nuclear energy's share of electricity production but to contemplate a future in which electricity generated by nuclear power would be sharply curtailed.⁷⁶ During the following months, the government sought to craft programs for further encouraging the development of renewable sources of electricity, even as the country had to rely more heavily on fossil fuel-fired generating capacity in the short to medium term.⁷⁷

Implications for International Cooperation

These national concerns and the resulting policies have a number of implications. Most obviously, they will affect the degree of energy security achieved by each of these countries. In some cases, they will also affect relations between these states and energy exporting countries.

This final section, however, will focus on how these cross-national differences in threat perception and preferred policy responses will affect the prospects for international cooperation to promote energy security both among these countries and with other import-dependent consumer countries. Just as in the 1970s, the recent re-emergence of concerns about energy security has spawned a number of proposals for collective action. Most of these have concerned existing international organizations, chiefly the IEA, NATO, and the EU. While some international agreements may be reached to promote energy security, this analysis suggests that progress will be slow and extremely limited. The differences in national concerns, policy preferences, and constraints will place sharp limits on what can be accomplished.

Global Cooperation in the International Energy Agency

The IEA remains the principal international organization devoted exclusively to energy issues. Indeed, both its membership and its functions have expanded over the years. The organization now includes Britain, France, Germany, Japan, and the United States as well as 23 other advanced industrialized countries, and increasingly, IEA has played an important role in conducting research and analysis and publishing information on energy policies, markets, technologies, and other issues. Perhaps most importantly, however, the IEA continues to promote the energy security of its members through a variety of provisions intended to minimize the impact of oil supply disruptions and to facilitate a collective response to them. In particular, it requires members to maintain oil stocks equivalent to at least 90 days of imports and as well as plans for releasing those stocks, restraining demand, fuel switching, increasing domestic production, and, if necessary, sharing oil supplies in the event of a major oil supply disruption. Over the years, the organization has sought to increase the flexibility of these emergency

response arrangements, and they have been used on several occasions to alleviate actual shortages and to reassure market actors that significant shortages would not develop. Thus one might expect the IEA to be a logical and perhaps the most useful forum for the development of common approaches to the problem of energy insecurity. Yet the organization has seen little new activity in this regard.

In fact, the IEA's potential to address the current energy security concerns of its members is quite limited. One reason is the organization's traditional focus on the problems associated with dependence on oil, reflecting the circumstances of its birth. The IEA still maintains an emergency oil sharing system as well as an information system on the international oil market that can help to provide prompt warning of supply problems. But as the energy security concerns of its members have shifted from oil to other energy sources, such as natural gas and nuclear power, where the IEA has had much less of a formal role to play, the organization has become less relevant. As Jeffrey Colgan notes, "the organization's basic structure and procedures have remained frozen in time since its creation even as geopolitical circumstances have changed..."⁷⁸

At the same time, the capacity of the IEA to blunt the negative consequences of even an oil supply disruption has declined due to the growth of demand in developing countries such as China and India. Although the number of IEA members has increased over the years – even France joined in 1992 – they now account for just over half of global oil consumption, as compared to more than 60 percent when the organization was created.⁷⁹ To remedy this situation, some, including the IEA's Executive Director, have proposed bringing China, India, and perhaps other developing countries into the organization so that they can participate in the emergency oil sharing system.⁸⁰ At least three obstacles must be overcome before the IEA could be usefully expanded, however. First, membership in the IEA remains restricted to members of

the OECD, and it is likely to be some time before China, India, and others are able or willing to join the latter organization, given its expectation that members exhibit open market economies, democratic pluralism, and respect for human rights.

Second, China and India may have little interest in joining the IEA itself. They and other developing countries are already able to benefit from the efforts of the current IEA members without having to bear any of the financial costs of membership. In addition, they may be unwilling to pay the sovereignty costs associated with meeting the IEA's information sharing and disclosure requirements. Thus unless the agreement establishing the IEA is amended to allow non-OECD members and new members are willing to release sensitive data regarding their stockpiles, meaningful participation in the emergency sharing system will be precluded.⁸¹

Third, China, India, and other developing countries have relatively little to contribute to the system, at least in the near term. India's strategic petroleum reserve amounts to at most 37.4 million barrels, or less than three weeks of imports. China established a strategic oil reserve of 100 million barrels in 2008, is in the process of completing a second phase that will add another 170 million barrels of capacity, and has plans for 200 million more barrels by 2020. But the roughly 200 million barrels accumulated so far amount to just 40 days of Chinese oil imports, still well below the IEA requirement that members maintain emergency reserves equal to 90 days of imports.⁸² In contrast, nearby Japan, which now imports less oil than does China, directly controls about 320 million barrels of reserves and requires private companies to maintain an additional 70 days of supply.⁸³

Energy Security and the North Atlantic Treaty Organization

Thus more prominent than anything that has occurred within the IEA have been recent proposals to assign NATO new responsibilities in the field of energy security. In early 2006, shortly after the first Russia-Ukraine gas conflict, Poland reportedly proposed that member countries be obliged to help each other during an energy crisis, and former NATO Secretary General Jaap de Hoop Scheffer called for putting the issue of energy security on the alliance's agenda.⁸⁴ Later that year, U.S. Senator Richard Lugar, the foremost congressional authority on energy issues, argued that NATO should formally adopt energy security as one of its central missions and that the alliance must prepare for and respond to attempts to use the energy weapon against its members under Article Five of the North Atlantic Treaty.⁸⁵ Lugar also sponsored a Senate resolution that called upon the President to raise the issue of establishing a NATO energy security strategy.⁸⁶ And at its Riga Summit in November 2006, the North Atlantic Council agreed to work toward defining "those areas where NATO may add value to safeguard the [energy] security interests of the Allies and, upon request, assist national and international efforts."⁸⁷

Beyond resupplying a member threatened with or suffering from a cutoff of energy supplies, a number of other specific roles for NATO have been suggested. Lugar, for example, has proposed holding high level consultations between NATO and Russia on energy security, developing strategic partnerships with other energy exporters, and providing diplomatic and economic support for alternative energy routes from Central Asia and the Caucasus. Likewise, a high level NATO official has identified four possible areas of NATO involvement: monitoring and assessment of the energy security situation, the provision of security assistance to allies, maritime surveillance to deter attacks against important energy assets, and military operations to secure the supply of oil or gas in an actual crisis or conflict situation.⁸⁸ And in addition to the

adoption of an explicit NATO solidarity clause in the event of threats to energy security, Poland reportedly proposed the creation of common oil and natural gas reserves.⁸⁹

Thus far, however, most of the ideas for using NATO to promote energy security have originated either in the United States or at the alliance's headquarters. In contrast, other than Poland, the European members of the alliance, including Britain, France, and Germany, have exhibited little or no enthusiasm for the concept. France has traditionally been cool toward any proposals to expand the responsibilities of NATO. But even the more Atlanticist German government has preferred to address energy security in the context of EU-US relations or in the broader framework of the Organization for Cooperation and Security in Europe (OSCE) rather than through NATO.⁹⁰ And the British government, traditionally the most pro-NATO of the three, made no reference to the alliance in the series of major statements on energy policy that it has issued in recent years.⁹¹

There are several overlapping reasons for the tepid European response. First, many of the proposals do not address the principal European energy security concerns, or at least do not offer much of a solution to them. NATO's comparative advantage lies in the area of ensuring the reliable delivery of oil and natural gas by sea from distant sources. In contrast, many European concerns revolve around the adequacy and reliability of regional energy infrastructure (natural gas pipelines, import terminals, and storage facilities; nuclear power plants, etc.). Second, many Europeans would prefer to emphasize political and economic measures for enhancing energy security, whereas many of the proposals for using NATO seek to exploit the alliance's military capabilities.⁹² By the same token, Europeans fear that an increased role for NATO could be counterproductive, especially in dealing with Russia, given the alliance's strong association with the cold war and military approaches to security.⁹³ Finally, some of the proposed functions, such

as those involving intelligence and diplomacy, are already handled or, in the view of many Europeans, might be better handled by other bodies. As even de Hoop Scheffer noted, “I am not suggesting that NATO should be the place where decisions are taken on where the next pipelines should be constructed, nor that NATO would be the first responder in an energy crisis situation – I acknowledge that other international organisations are better suited for those tasks.”⁹⁴

Perhaps not surprisingly, in view of these European reactions, there have no significant developments within NATO since the initial proposals were made. At an April 2008 summit in Bucharest, NATO leaders noted a report on “NATO’s Role in Energy Security” that identified principles that would govern NATO’s approach in this field and outlined options and recommendations for further activities. Based on these principles, the members agreed on five specific areas where further NATO engagement was deemed desirable: information and intelligence fusion and sharing; projecting stability; advancing international and regional cooperation; supporting consequence management; and supporting the protection of critical energy infrastructure. The alliance would also continue to consult on the most immediate risks in the field of energy security.⁹⁵ Since then, work on implementing this decision has gone on quietly behind the scenes, as noted in semi-annual declarations and communiques issued by the North Atlantic Council. But prominent public discussion of the issue within the alliance has died down, and there is no evidence that NATO has yet taken any important practical steps to enhance the energy security of its members. The subject received just two paragraphs and one very general recommendation in the 47-page report issued by the Group of Experts in May 2010,⁹⁶ and the new strategic concept adopted in November 2010 simply states that NATO will “develop the capacity to contribute to energy security, including protection of critical energy infrastructure and transit areas and lines, cooperation with partners, and consultations among Allies on the

basis of strategic assessments and contingency planning.”⁹⁷

Cooperation for Energy Security in the European Union⁹⁸

Instead, for the major European states, at least, the most promising forum for multilateral cooperation to promote energy security has been the European Union. Energy policy per se was not a formal area of EU competence until the entry into force of the Lisbon Treaty in late 2009. Nevertheless, the organization has in recent years proposed or adopted a number of measures that, directly or indirectly, would enhance the energy security of its member states.

As early as 2000, the European Commission published a “Green Paper” that raised concerns about the security of the EU’s energy supplies and suggested a general strategy for addressing the problems it identified.⁹⁹ Although this initiative yielded no concrete results, the goal of energy security was a central element of subsequent efforts to fashion a more comprehensive energy policy. In early 2006, at the invitation of the national leaders, the Commission prepared another Green Paper that laid out a general “European Strategy for Sustainable, Competitive and Secure Energy.”¹⁰⁰ The following year, the Commission presented a more detailed action plan titled “Energy Policy for Europe” that was adopted by the heads of government that March.¹⁰¹ The action plan, like the Green Paper, placed equal emphasis on the goals of economic competitiveness, environmental sustainability, and security of energy supplies, but went beyond it to establish ambitious targets for reducing greenhouse gas emissions, increasing the share of renewable energy in the EU’s overall energy mix, and raising overall energy efficiency in the EU all by 20 percent by 2020. Then based on the action plan, the Commission developed an “energy and climate package” of more specific measures designed to

achieve those goals.

Some proposed measures have been specifically intended to increase the energy security of the EU. One set of measures would establish a coherent external energy policy whereby the EU could “speak with one voice” on international energy issues and integrate energy into other policies with an external dimension. Of particular interest here, of course, are relations with Russia and other key energy producers and transit countries as well as support for the creation of new infrastructure for bringing energy to Europe. Another set of steps, which have seemed especially urgent in the wake of the two conflicts over natural gas between Russia and Ukraine, would create a more effective system for dealing with disruptions in natural gas supplies, including more gas storage, strategic stockpiles, and adequate pipeline capacity for moving gas wherever it might be needed in a crisis.

Other energy policy measures that have been proposed or adopted by the EU so far, even though intended primarily to promote low energy prices or fight climate change, would also contribute to greater energy security. For example, full liberalization and integration of the members’ gas and electricity markets would add flexibility and increase the resilience of the EU energy system as a whole. Raising the share of renewable sources in the energy mix and increasing energy efficiency would reduce demand for imports of oil and gas.

Despite all this activity, progress toward the goal of increasing the energy security of the EU has been slow, and the prospects for significant advances in this area remain uncertain. One problem is that some important energy policy initiatives will do little to promote energy security or could even exacerbate the situation. For example, the much touted Emissions Trading System, by raising the cost of carbon emissions, could make natural gas relatively more attractive

than coal and thus aggravate the region's import dependence.¹⁰²

More fundamentally, even within the highly integrated EU, energy policy continues to be an area where national prerogatives are carefully guarded. The new article on energy contained in the Lisbon Treaty concludes that measures to achieve common objectives “shall not affect a Member State's right to determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply...”¹⁰³ This constraint might not be so problematic if the members states had similar policy preferences. But on many particular issues, the positions of Britain, France, and Germany, not to mention some other member states, have often been far apart.¹⁰⁴

One area of disagreement has been the completion of the internal electricity and gas markets. Britain has been a leading proponent, while France and Germany have resisted critical proposals, such as “unbundling” the ownership of energy supplies and transmission networks.¹⁰⁵ Another point of contention has been the future role of nuclear power, which could greatly reduce the EU's dependence on imports of natural gas. Yet here the EU lacks a common policy, with each country instead insisting on its unrestricted right to expand, reduce, or simply maintain its nuclear program at its current level regardless of the overall implications for the union. In this case, France and increasingly Britain have been strong proponents of building new power plants, while Germany has planned to phase out nuclear power.¹⁰⁶

Issues dealing more directly with energy security have been marked by no more comity. Britain has strongly endorsed the idea of establishing a common external energy policy. Although the advantages of a collective approach to such endeavors as negotiating access to energy markets and facilitating the construction of expensive infrastructure like pipelines may seem compelling, Germany and France have continued to back bilateral agreements between

their energy companies and Russian counterparts.¹⁰⁷ Disagreement has also persisted over what common measures are needed to ensure security of gas supply. For example, Germany, which maintains substantial gas storage facilities, has been concerned lest countries that do not already stockpile gas seek to free ride on its emergency preparations.¹⁰⁸

Thus even within the highly integrated EU, substantial obstacles stand in the way of collective efforts to increase energy security. Divergent policy preferences have made it difficult to create a united front. And even if the EU is able to make significant progress, its success will do little to enhance the energy security of many other developed democracies, led by the United States and Japan.

Conclusion

After years of absence, energy security returned as a prominent policy issue in the first years of the 21st century. Indeed, during the past decade, concerns about energy security in the largest developed democracies – Britain, France, Germany, Japan, and the United States -- have reached levels not seen since the 1970s and early 1980s. In several important respects, however, the recent era of heightened energy insecurity is quite different from the previous one.

In the first place, the recent concerns about energy security are much more diverse than they were in 1970s. Then, it was largely a matter of high oil prices and uncertain oil supplies for all the developed democracies. Now, in addition to oil, important sources of insecurity are dependence on imports of other fuels, notably natural gas, and the viability of nuclear power programs. For example, Britain has faced the challenge of transitioning from being a net importer of petroleum and especially natural gas to being a net importer. In France, attention has

focused on the country's aging nuclear infrastructure, which was built largely to reduce France's dependence on foreign oil. In Germany, meanwhile, concerns have revolved around the dependence on foreign sources of natural gas, especially from Russia, exacerbated by sharp domestic constraints on continued reliance on nuclear power. Japan's energy security worries have been most diverse, given that country's extreme lack of energy resources. Only in the United States have the recent concerns mainly revolved around oil.

This diversity of energy security concerns owes in no small part to the different policies pursued by these countries in response to the oil shocks of the 1970s. Britain encouraged the rapid exploitation of the recently discovered reserves of oil and gas in the North Sea. France undertook the world's most ambitious nuclear power program, which would eventually provide some 40 percent of its PEC. The German government promoted the diversification of the country's energy mix and the sources of its fossil fuel imports, including the construction of natural gas pipelines connecting Western Europe to the Soviet Union. Arguably, the United States made the most limited efforts to reduce its dependence on oil.

Not surprisingly, these more recent differences in national definitions of the problem have contributed in turn to rather varied policy responses. In Britain, government policy has sought to promote the construction of natural gas import facilities and new nuclear power plants that would reduce the need for gas in electricity production. France has renewed its commitment to nuclear power, while German policy has emphasized achieving ever greater levels of energy efficiency and renewable sources of electric power. Japanese policy has called for progress on numerous fronts, including energy efficiency, renewable energy, nuclear power, and gaining greater access to overseas oil supplies by Japanese companies. Only in the United States has the principal emphasis once again been on reducing oil consumption through greater fuel economy and

developing substitutes for petroleum products.

Finally, these differences have significant implications for cooperative efforts to improve energy security. One important response to the oil shocks was the creation of the International Energy Agency. But even the IEA has played only a relatively minor role compared with national efforts in enhancing the energy security of its members. Today, the prospects for significant multilateral approaches to promote energy security seem even more limited. With the possible exception of the European Union, divergent national concerns and policy preferences will make meaningful collective responses difficult, if not impossible, to orchestrate. The usefulness of the IEA is likely to remain limited to addressing concerns about oil supply disruptions, and even there its capacity to respond effectively is increasingly constrained by rising oil consumption in non-member developing countries. NATO's role in promoting energy security is likely to remain even more marginal because of differing member views about its relevance to addressing today's energy security concerns. And even within the EU, substantial obstacles remain before that body can respond in a unified way to the recent energy security challenges faced by its members. Overall, international cooperation to promote energy security is likely to be even more limited than it was in the 1970s.

Notes

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