Can the Clash of Civilizations Produce Alternate Energy Sources?

BY GERALD E. MARSH

With the war in Iraq and the muddle of the Middle East, the time is ripe for the U.S. to reduce its dependence on oil from the Persian Gulf—but where can the country turn for new sources of energy?

IN THE SUMMER of 1993, Samuel Huntington published an article in *Foreign Affairs* that introduced an apt phrase into the lexicon of futurologists: "The Clash of Civilizations." Huntington maintained that the fundamental source of conflict in this century would be cultural rather than economic or ideological. While the clash that is developing between the Muslim world and the West is indeed cultural, it is driven by the economics of energy and, in particular, oil.

The use of oil is widespread in industry and will be irreplaceable in the transportation sector for decades. It also will be in short supply soon, according to Claude Mandil, executive director of the International Energy Agency, who warns that "the world's energy economy is on a pathway that is plainly not sustainable," and is one that will lead from "crisis to crisis." The IEA predicts that many of the oil fields the U.S. and Europe depend on will peak in the next five to seven years—and this includes those of Russia, the U.S., Mexico, and Norway. It is estimated that world energy demand will increase at least 50% by 2030. To meet this demand, the Organization of the Petroleum Exporting Countries (OPEC), where most of the world's remaining readily accessible oil is found, practically will have to double its production. Most of that increase must come from Saudi Arabia, Iran, and Iraq.

"Peak oil" theorists assert that there will be growing conflict over the remaining oil resources and a high probability of a worldwide economic collapse. Such claims, however, show a misunderstanding of the meaning of "oil reserves." These reserves depend on price and are not a direct measure of the amount of oil physically available in the ground. There is plenty of oil, perhaps as much as the 7.2 trillion barrels estimated by ExxonMobil, but these reserves cannot be brought to market as cheaply as oil from the Persian Gulf, and the economics of oil dictate that cheaper oil will be used first. Moreover, these sources cannot begin production immediately; there is a ramp-up period of years. If the phasing in of such reserves does not match the decline of current oil fields, rising prices and conflict over resources are inevitable.

The members of OPEC recently agreed to cut production to show their determination to defend $60 per barrel as a minimum international price. This is high enough to allow a good profit to be made on oil from shale or tar sands, of which North America has enormous quantities. However, the Saudis know full well that it is unlikely anyone will invest the many billions of dollars needed to produce enough oil from these sources to threaten OPEC dom-

inance. OPEC is a cartel and, if such an investment were to be made, OPEC would pump enough oil to drop world prices to the point where the investment would be threatened.

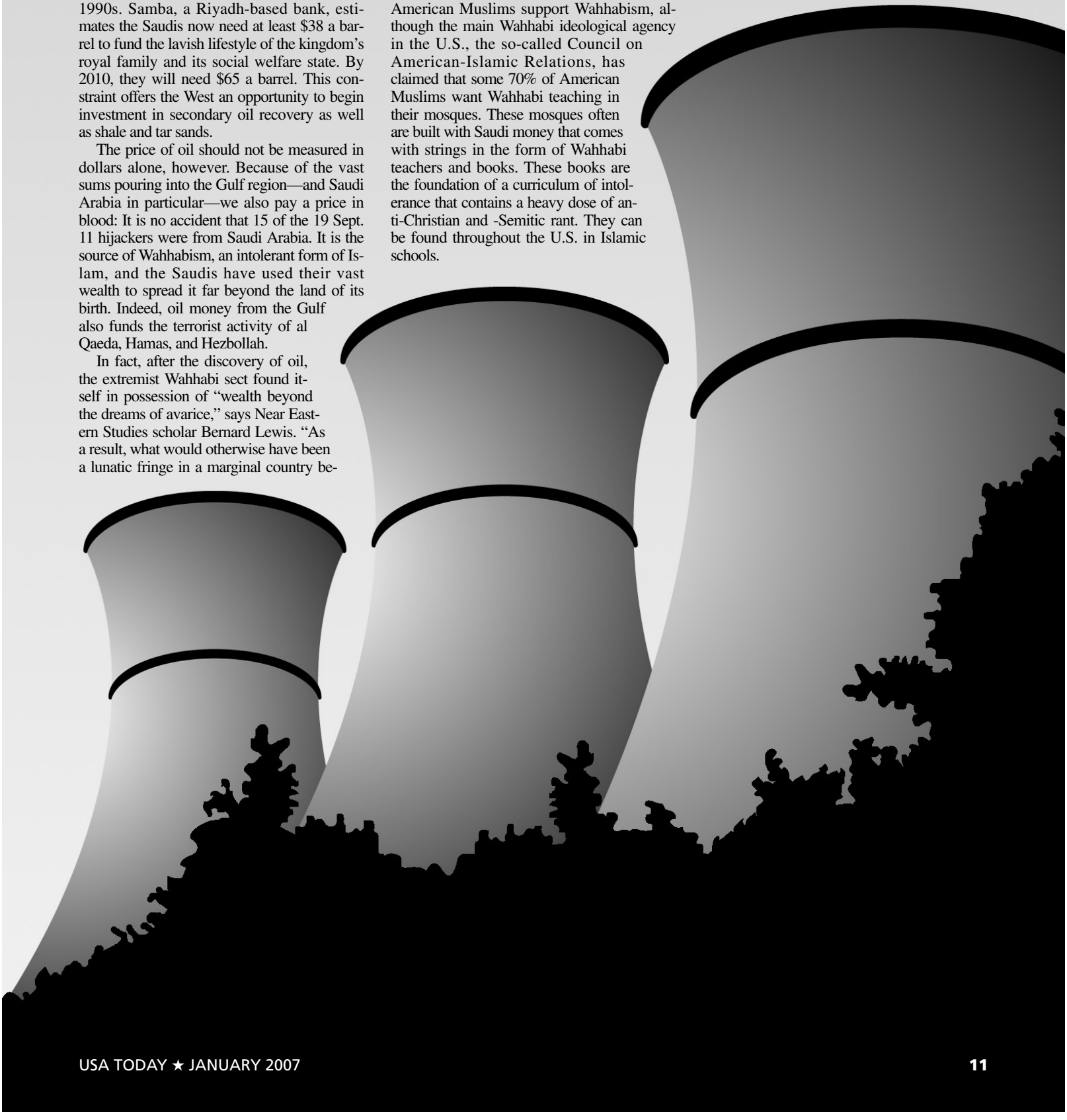
Saudi Arabia's costs of production certainly are below $60 per barrel. Remember, Saudi Arabia even turned a profit when oil was $15 per barrel a decade ago. However, the Saudis no longer have the flexibility they had in the 1990s. Samba, a Riyadh-based bank, estimates the Saudis now need at least $38 a barrel to fund the lavish lifestyle of the kingdom's royal family and its social welfare state. By 2010, they will need $65 a barrel. This constraint offers the West an opportunity to begin investment in secondary oil recovery as well as shale and tar sands.

The price of oil should not be measured in dollars alone, however. Because of the vast sums pouring into the Gulf region—and Saudi Arabia in particular—we also pay a price in blood: It is no accident that 15 of the 19 Sept. 11 hijackers were from Saudi Arabia. It is the source of Wahhabism, an intolerant form of Islam, and the Saudis have used their vast wealth to spread it far beyond the land of its birth. Indeed, oil money from the Gulf also funds the terrorist activity of al Qaeda, Hamas, and Hezbollah.

In fact, after the discovery of oil, the extremist Wahhabi sect found itself in possession of "wealth beyond the dreams of avarice," says Near Eastern Studies scholar Bernard Lewis. "As a result, what would otherwise have been a lunatic fringe in a marginal country became a major force in the world of Islam." Now, that force has reached America's shores.

According to testimony before the Senate Committee on the Judiciary, "non-Wahhabi Muslim community leaders estimate that 80% of American mosques—out of a total ranging between an official estimate of 1,200 and an unofficial figure of 4-6,000—are under Wahhabi control. This does not mean 80% of American Muslims support Wahhabism, although the main Wahhabi ideological agency in the U.S., the so-called Council on American-Islamic Relations, has claimed that some 70% of American Muslims want Wahhabi teaching in their mosques. These mosques often are built with Saudi money that comes with strings in the form of Wahhabi teachers and books. These books are the foundation of a curriculum of intolerance that contains a heavy dose of anti-Christian and -Semitic rant. They can be found throughout the U.S. in Islamic schools.

Immigrants to this country traditionally have made every effort to integrate into mainstream society and, to a large extent, have succeeded. For those who have, ethnicity becomes an important issue when trying to decide which restaurant to choose for dinner. Yet, those who follow Wahhabi teaching do not want to integrate into mainstream America. At best, they want the U.S. to accept a



form of multiculturalism that has failed so abysmally in Europe.

Radical Islamic minorities would like to impose their own customs and, sometimes, even the Sharia (Islamic law), in Muslim areas—as has been done in other countries. However, Western secular societies simply cannot allow Muslims to live under customs or laws with provisions that violate their own laws. In the modern societies of the West, when religious precepts conflict with secular law, secular law rules. This must be understood by all choosing to live in these countries.

The refusal of some Muslims to integrate is being driven by a fundamental division in Islam—between those Muslims who want an Islam compatible with the modern world and its values of secular democracy and basic civil liberties, and radical Islam, which traces the failures of today's Muslim countries to excessive modernization. It sees its primary task as reinstating a purely Islamic way of life.

Remember the Danish cartoon controversy? One of the most offensive cartoons was the one showing Muhammad with a bomb on his head—depicting in a most explicit manner what radical Muslims (with their suicide bombings) have done to the world's perception of Islam. Yet, rather than turning against radical Islam, most Muslims missed the message of the cartoon—or feared to condemn the methods of radical Islam publicly, and instead attacked the West, violently and in words, for its insensitivity. While there is no excuse for actual Western insensitivity when it occurs, the press in Muslim nations routinely characterizes Jews and Christians in the most reprehensible manner.

Oil money funds hatred

Religious sensibilities are central to the conflict with radical Islam. Islamists believe that, wherever Muslims reside, there must be full respect for Islam and Islamic ways. They see no hypocrisy in Muslim countries such as Saudi Arabia making it illegal for Christians or Jews to display a cross or Star of David. After all, infidels simply do not have the same rights. This type of intolerance and the vile manner in which Christians and Jews are depicted has not always pervaded Islamic societies. Such characterizations and the rise of anti-Semitism in the Arab world began with the introduction of Nazi ideology into the region during World War II and were exacerbated by the spread of Wahhabism funded by oil money from Saudi Arabia.

These repressive governments, such as the former dictatorship of Saddam Hussein in Iraq, the Assad family in Syria, and even the more friendly dictatorship of Pres. Hosni Mubarak in Egypt, are due to failed early attempts to modernize these societies, followed by the disastrous introduction of the centralized Nazi and later Soviet models of governance. Traditional Islamic or Arab societies were quite different. The conflict within Islam is unlikely to be resolved anytime soon. There also is little hope that the nations of the world will act in concert to prevent the rise of Iran to power and hegemony over the Gulf—or its probable development of nuclear missiles. If the U.S.'s dependency on Gulf oil is not reduced, the nation must expect to pay the price in blood in addition to dollars.

Many hope that America can avoid the clash of civilizations by finding a new source of energy, one that not only sidesteps the issue of dependence on Gulf oil, but is far more environmentally benign. Perhaps the time is ripe for a heavy investment in windmills or solar power. However, these sources only are capable of providing limited amounts of electric power compared to projected demand. All such sources of energy are unlikely to comprise more than two percent of the total energy mix by 2030.

There is a major government initiative underway to use hydrogen to power the country's vast transportation system. Hydrogen, though, like electricity, is not a source of energy; rather, it is a means of delivering energy from one point to another. In addition, hydrogen use has a built-in inefficiency, since the laws of physics dictate that it takes more energy to produce hydrogen than is given back from its use. Yet, it remains an attractive transfer medium since its sole waste product when burned is water.

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In time, it is quite possible that hydrogen will replace oil, but only after less expensive production and handling methods are developed. One possibility is that future nuclear reactors (development of which has been proposed as part of the 2003 governmental hydrogen initiative) will be able to operate at a temperature high enough to dissociate water directly into its component elements (hydrogen and oxygen). While electricity from any source could be used today to produce hydrogen from water by electrolysis, the process remains inefficient.

Even if economical sources of hydrogen become available, the required widespread distribution facilities do not exist and would have to be implemented; the present natural-gas infrastructure is incompatible with the gas. Also, it is impractical for vehicles to carry large quantities of hydrogen except as a liquid at cryogenic (super-low) temperatures—a very expensive and inefficient process. Certain metals and alloys potentially can store as much hydrogen per unit volume as liquid hydrogen. They are safer than liquid hydrogen and will release the gas in a controlled fashion when heated—again, however, with low efficiency at the current state of the art.

What other fuel options are there for the transportation sector? A number come to mind: natural gas, already used for indoor vehicles because of its clean burning; biofuels, such as ethanol, biodiesel, and methanol; and nuclear fusion, which might be able to produce electricity cheaply enough to offset the inefficiencies of hydrogen production by electrolysis.

Gas that can be stored as a liquid—propane, for instance—would be very attractive for transportation, even if the energy stored per pound is less than gasoline. However, there is not enough to replace oil. Natural gas is very attractive for small-scale electricity production and supplying electricity during peak demand periods, but it is economically unsuitable for producing bulk (base-load) electricity—again, there is not enough available. From a health perspective, natural gas is extremely valuable for heating. Until it was used for this purpose, large cities were not healthful places to live. People are not going to go back to heating their homes with coal (although it is an abundant energy source), nor will they continue to accept skyrocketing heating bills without demanding reforms. The growing use of natural gas for generating electricity already has led to tight supplies and rising prices.

The substitution of biofuels in the transportation sector, while promising, has the handicap of competing with food production. Extensive development without careful planning is likely to raise the cost of food and other agricultural products. It is not clear how such planning could be completed without interfering with the market mechanisms needed for efficient production. The U.S. has some 400,000,000 acres under cultivation. One attractive choice for biodiesel is rapeseed oil but, to produce enough biodiesel from this source to fuel the country would require some 1,400,000,000 acres. Then there is the fresh water—already in short supply—needed for this increased cultivation. Biofuels are unlikely to replace oil, at least not in the short term.

Finally, there is nuclear fusion. Hydrogen has two isotopes—forms that either have one or two neutrons added to the nucleus of each hydrogen atom—deuterium and tritium. If a mixture of the two sufficiently is compressed and heated, the deuterium and tritium atoms will fuse to form atoms of helium, along with the release of a great deal of energy in the form of heat and high-activity neutrons. Yet, keep in mind that there remains only a small possibility that the international effort to build what is

known as a "tokomak" could lead to a design for a fusion reactor to produce electricity. Even if successful, commercialization would be extremely difficult. Most conceptual designs are for plants producing around 10,000 megawatts —the equivalent of five large-size nuclear fission reactors of the kind we use today. Shutting down such megaplants for maintenance would lead to serious electric grid management difficulties.

The tritium fuel used by a fusion reactor must be bred from lithium, with some of the neutrons produced by fusion. This tritium fuel is radioactive and presents the same handling hazards as normal hydrogen. Besides, if the plant were to have optimal efficiency, the excess neutrons left over after breeding tritium would be used to create plutonium in a blanket of uranium, which then would be burned in fast-fission reactors. Fusion power based on current designs only makes sense if integrated into an already existing network of fission-powered reactors coupled with the recycling of spent fuel. Recycling has the added advantage of eliminating the nuclear waste problem by reducing the time the real waste must be isolated to less than 500 years and enabling uranium to supply energy for thousands of years. Too bad this composite technology is unlikely to be available or competitive anytime soon. Western civilization therefore will continue to be dependent on oil—at least for transportation—in the foreseeable future, despite all the talk of electric cars powered by batteries or hydrogen-fed fuel cells. Those technologies already have niche applications, but cannot yet serve general transportation needs.

We can pump more oil

Still, there are various courses of action that can be undertaken immediately. With environmental risks far less than in the past, the Federal government should open areas of the Gulf of Mexico to exploration and drilling. One deep-water well in the area is producing some 6,000 barrels of crude per day from a 300-mile-wide field estimated to contain up to 15,000,000,000 barrels—that represents a 50% increase in current U.S. reserves. The Arctic National Wildlife Refuge is another source of domestic energy with extractable reserves projected to equal as much as 30 years of oil imports from Saudi Arabia. It is oil that can be brought into production quickly using conventional technology.

Incentives should be formulated to increase the secondary recovery of domestic reserves. Much oil remains in existing wells, but it has not made economic sense to recover it. With new techniques, and higher oil prices, this picture is changing. While the amount of oil from these sources is not large in terms of total U.S. consumption, it is enough to provide greater market control of prices during the time the world needs to depend on Middle Eastern oil, especially if the country works hard to increase energy efficiency. This is the role that oil from the North Sea played for many years.

In the longer term, the U.S. has a number of options for liquid fuels, including enormous reserves of coal and shale oil in four western states. However, the production of liquid fuel from coal or the recovery of shale oil in an environmentally sound manner—in the vast quantities needed—will take many years. Most importantly, companies need some guarantee that, if they make the investment to bring these sources of energy to market, they will not lose it to OPEC price manipulation. Since the military would like to see a uniform fuel across its various platforms, it may be possible—through long-term contracts with minimum price guarantees—to form a partnership with industry to secure this investment.

It is a matter of national security that these sources of oil be developed. In the long run, however, we need to ask ourselves whether it makes sense to burn billions of barrels of oil. Even if the slight warming the world is experiencing should prove to be only minimally related to the carbon dioxide produced by human activities, the burning of such vast quantities of fossil fuel is bound to have an environmental impact. The developed world cannot legislate how the developing world will use these fuels, and history has shown that commercialization likely will be at the lowest cost to the producer, with the concomitant release of vast quantities of pollutants. China is a perfect contemporary example. Yet, if the grinding poverty that most people in the developing world are living under is to end through development along the Western model—and no alternative model has been shown to be viable—the required energy has to come from somewhere.

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There is only one practical answer that is known today: nuclear power coupled with the long-term development of a hydrogen economy based on nuclear energy. Despite long-standing public concern, nuclear power is by far the most ecologically sound way to generate large amounts of electricity. The environmental impact of nuclear power since its inception (and this includes the Chernobyl and Three Mile Island disasters) has been far less than that from the burning of fossil fuels for an equivalent amount of energy.

Nuclear power is going to expand globally whether the U.S. plays a role or not. China brought six new reactors on-line between 2002-04, and plans at least another 30 in the next 15 years. India is planning for 30, with seven due to come on-line by 2008. For nuclear power to spread through the developing world beyond these two countries without the threat of additional proliferation of nuclear weapons, we need a new model, hopefully one fashioned by the U.S. with its ability to structure the necessary international framework.

A somewhat promising start has been made with the U.S. Global Nuclear Energy Partnership initiative, under which the world's leading nuclear exporters would guarantee that all countries have access to a reliable source of fuel for civilian reactors at a reasonable cost. The spent fuel would be returned for recycling and waste disposal. In return, the non-nuclear weapons nations would renounce enrichment of uranium and reprocessing of spent fuel. To win acceptance, the supplier nations' fuel and waste-disposal services must be guaranteed by a global entity such as the International Energy Agency or the International Atomic Energy Agency.

The technical part of the new model already exists: Under an arrangement known as "hub-spoke," self-contained reactors, sometimes called "nuclear batteries," would be available in a variety of sizes. Sealed and fail-safe, they would be manufactured at a central location and rented to nations needing more energy. Running them would not require advanced nuclear expertise. At the end of their 15- to 30-year life, the exhausted reactor cores, still sealed, would be traded for rejuvenated ones. In fact, Toshiba has developed a nuclear battery and, to demonstrate it, the company has offered to install one at Galena, Alaska (population 650) for free. The reactor would put out 10 megawatts of electricity—just right for Galena—although much larger modular units can be produced.

The combination of hub-spoke with a secure, internationally guaranteed fuel recycling and waste disposal arrangement for all nations having conventional nuclear reactors would permit the inevitable spread of civilian nuclear power without making the proliferation of nuclear weapons any more likely. If the IEA is correct, the time we have to formulate an appropriate policy and begin investment is a mere five to seven years. We need to act now. ★

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