IAI0831

DOCUMENTI IAI

NUCLEAR POWER DEVELOPMENT IN THE MIDDLE EAST AND NORTH AFRICA: ASSESSING THE RISKS OF PROLIFERATION AND TERRORISM

by Joseph F. Pilat

Paper presented at the seminar on "Transatlantic perspectives on the Mediterranean",
organised by the IAI and German Marshall Fund of the United States, with scientific support of Euromesco
Rome, IAI, 28 June 2008

IAI0831

NUCLEAR POWER DEVELOPMENT IN THE MIDDLE EAST AND NORTH AFRICA: ASSESSING THE RISKS OF PROLIFERATION AND TERRORISM

by Joseph F. Pilat[1]

Introduction

Amid great expectations voiced by politicians, pundits and nuclear energy advocates that the world is about to embark on - or has already entered into - a nuclear renaissance, more than two dozen states without nuclear power in the last several years have indicated their interest in developing nuclear power programs. Most of these states are from the developing world and over a dozen are from the Middle East and North Africa.[2]

In many respects, this surge in interest should not be surprising. The promise of nuclear power has enormous appeal today - as it did in the 1950s, when the electricity that would be generated from this new source of power was projected to be too cheap to meter and atomic-powered automobiles and aircraft appeared just around the corner. Today the claims of advocates are more tempered, but it is widely believed that an expansion of nuclear power will have positive energy, economic and environmental benefits. There remain concerns about the economic competitiveness and safety of nuclear power, the waste issue and the proliferation and terrorism risks nuclear power may pose. While these risks have often been exaggerated in the past - every reactor is a "bomb factory"[3] - it is clear that real threats exist, as do a broader set of risks.

Concerns about nuclear power development in the Middle East and North Africa, from within the region and internationally, stem from the belief that nuclear power is not economically justified and that it will inevitably result in greatly increased proliferation and terrorism risks in the region.

Does nuclear power make sense in a region sitting on a large fraction of the world's oil reserves? Iranian rhetoric on the economic rationale for its program has undercut economic arguments for nuclear energy in the region. However, the economic rationale for at least some of the states in the region is quite compelling, now that oil is over $100 a barrel. The arguments for the interest of the Gulf Cooperation Council (GCC) and its member states in nuclear energy are strong.[4] National status and technological prowess, energy security and

[1] The views expressed are the author's own and not those of the Los Alamos National Laboratory, the National Nuclear Security Administration, the Department of Energy or any other agency.

[2] In addition to the Iranian program, the states from the Middle East and North Africa to announce interest in nuclear power include Algeria, Bahrain, Egypt, Jordan, Kuwait, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, UAE and Yemen.

[3] See, e.g., Edward J. Markey, *Nuclear Peril: The politics of Proliferation* (Cambridge, MA: Ballinger, 1982).

[4] See Giacomo Luciani, "Nuclear Energy Developments in the Mediterranean and the Gulf," a presentation at a Seminar on Transatlantic Perspectives on the Mediterranean, IAI, Rome, 28 June 2008.

diversity, environmental protection and other rationales for nuclear power may also be seen to be as applicable in this region as they are around the world, and there is considerable support for regional nuclear energy aspirations.

Is this regional interest really driven by Iran? Do concerns about the region in fact stem from fears that nuclear programs may spread from Iran throughout the unstable, conflict-prone Middle East and North Africa, which have long been a focus of proliferation concerns? It is widely believed that the interest in nuclear power in the region is largely or exclusively based on the desire of regional states - especially Egypt, Saudi Arabia and Turkey - to become weapon-capable as a hedge against the program of Iran. The apparently sudden burst of interest in nuclear power is seen by some observers as a sure sign that the Iranian program is provoking a regional proliferation cascade-creating virtual nuclear - weapon capabilities and possibly a regional arms race.[5] There is also concern about the security of nuclear facilities and materials in the region in light of growing fears of nuclear and radiological terrorism. It should be noted, however, that this issue has not yet received the attention that proliferation has gotten in the debate. While both proliferation and terrorism risks may be overdrawn, it is clear that real risks and threats exist.

These risks and threats have both regional and global dimensions. They might appear particularly worrisome in the Middle East, but they represent a global concern that would appear even in a very different environment in a very different geopolitical setting. Indeed, at the very beginnings of the nuclear age, the dual (military-civil) nature of the atom was recognized. The possible misuse of civilian nuclear power programs for military purposes was on the minds of the authors of the Acheson-Lilienthal Report, the Baruch Plan, the Atoms-for-Peace proposal and the international nuclear nonproliferation regime based on the Atoms-for-Peace bargain.[6]

1. The Debate on the Risks of Nuclear Power

For decades, those who believed we could manage the risks of nuclear power have recognized its inherent dangers, but pointed to the dedicated military programs of most proliferants as the real source of concern. Those who were less sanguine about the prospect of harnessing a promising but dangerous technology in a world rife with conflict often

[5] See, e.g., *Nuclear Programmes in the Middle East: In the Shadow of Iran*, an IISS strategic dossier (London: IISS, 2008).

[6] For details on these programs, see *A Report on the International Control of Atomic Energy, Prepared for the Secretary of State's Committee on Atomic Energy* (Washington, D.C.: U.S. Government Printing Office, March 16, 1946); Statement of United States Policy, presented to the United Nations Atomic Energy Commission by US Representative Bernard Baruch, June 14, 1946; Atomic Power for Peace, an address by Dwight D. Eisenhower, President of the United States, before the General Assembly of the United Nations, December 8, 1953; and Joseph Pilat, editor, *Atoms for Peace: A Future after Fifty Years?* (Baltimore, MD: Johns Hopkins University Press, 2007).

argued against the use of nuclear power altogether, or at least opposed closing the nuclear fuel cycle.

The debate is now over 60 years old. It has waxed and waned, depending upon real-world developments such as the concerns derived from extrapolations of rapid, even exponential, growth in nuclear power and by the actual emergence of proliferation threats, notably the Indian program in the 1970s, the Pakistani program in the 1980s and the Iraqi, Iranian, North Korean and Syrian programs in the 1990s and this decade. The accidents at Three Mile Island and even more so Chernobyl have also greatly affected the debate.

In recent years, the debate is beginning to be reengaged on a level not seen since the 1970s. There are similarities between the debate now and 30 years ago, for example:

- expectations of dramatic growth in nuclear power;
- concerns about reprocessing and plutonium use; and
- perceptions of rising proliferation and terrorism threats.

But there are major differences as well. On the one hand, today proliferation dangers appear more real or concrete, if not necessarily greater than they did thirty years ago when attention focused on plutonium. The risks from highly enriched uranium (HEU) are now seen as greater. The risks are also increasingly seen to be emerging from unanticipated sources, including nonstate actors. The prospect of nuclear terrorism is receiving unprecedented attention (although it was a factor in the debate during the 1970s).[7] After 9/11, some concluded the danger of any use of nuclear power was too great to accept.[8]

On the other hand, the desire for energy independence has led to increased interest in nuclear energy. And global warming concerns have convinced many, including some staunch environmentalists, of the need to pursue nuclear power aggressively.[9] Moreover, to address rising concerns about proliferation and terrorism, strong efforts to reduce nuclear power's risks and vulnerabilities are being proposed and undertaken, including efforts to avoid separation of plutonium in the future. Proposals by President Bush and those of International Atomic Energy Agency (IAEA) Director General Mohammed ElBaradei have been seen in the context of this long-standing debate. The Bush Administration announced a new Global Nuclear Energy Partnership (GNEP) in 2006. GNEP has been, since its announcement, a focus of the debate.

---

[7] See, e.g., Mason Willrich and Ted Taylor, *Nuclear Theft: Risks and Safeguards: A Report to the Energy Policy Project of the Ford Foundation* (Cambridge, MA: Ballinger, 1974).

[8] See, e.g., Ralph Nader, "Nuclear Power is not the Answer," 11 September 2007 at <http://www.commondreams.org/archive/2007/09/11/3761/>

[9] See, e.g., Patrick Moore, "Nuclear power: Massachusetts is facing up to Carbon Choices," *Patriot Ledger*, 12 April 2008 at http://www.patriotledger.com/opinions/x1403477302; and James Lovelock, "Nuclear Power is the only Green Solution," *The Independent*, 24 May 2004 at < http://www.ecolo.org/media/articles/articles.in.english/love-indep-24-05-04.htm>

Clearly, this renewed debate preceded the expressions of interest in nuclear energy from the Middle East and North Africa and would continue even if that regional interest was not forthcoming. The debate may turn our focus from the real dangers we confront.

2. Proliferation and Terrorism Risks Today

The debate is a legacy of the Baruch plan and Eisenhower's Atoms-for-Peace program - early US-led efforts to control nuclear power - which viewed proliferation primarily as a misuse of peaceful nuclear energy activities, which were promoted as an incentive designed to forestall military nuclear programs.[10] From this largely technical-legal perspective on the problem, nuclear proliferation appeared primarily as a fuel cycle problem, and attention focused on the nuclear energy infrastructures of so-called problem countries. The policy debate was between prevention and management in the context of a global treaty and safeguards system.

The threats we confront today looks very different. The nuclear proliferation picture is changing, and covers a wide range of possibilities. The threat is global. Areas of concern include Iran's suspicious and extensive nuclear and missile programs. The discovery of the large enrichment facility at Natanz as well as other clandestine activities revealed two decades of Iranian noncompliance with its international obligations.[11] North Korea's nuclear test and its diplomatic brinkmanship highlight the increasing dangers of its longstanding nuclear and missile programs and the difficulties of efforts to disarm the regime. South Asia, which has been a primary area of concern following the Indian and Pakistani nuclear and missile tests in the late 1990s and the specter of dangerous nuclear arms and missile races on the subcontinent, raises the prospect of battlefield and strategic use. Finally, there are continuing concerns (at very different levels) about the nuclear weapon intentions and capabilities of Syria, an issue highlighted by Israel's bombing of a facility believed to be a production reactor.[12]

---

[10] See *Atoms for Peace: A Future after Fifty Years?*

[11] For the IAEA report on Iran's clandestine activities, see the IAEA Board of Governors Report, *Implementation of the NPT Safeguards Agreement in the Islamic Republic of Iran*, GOV/2004/83, November 29, 2004, <http://www.iaea.org/Publications/Documents/Board/2004/gov2004-83.pdf>.

[12] In January 2004, Pakistani investigators reportedly confirmed an IAEA allegation that the A.Q. Khan nuclear smuggling network offered nuclear technology to Syria. U.S. intelligence agencies are "concerned that expertise or technology could have been transferred." (See the Office of the Director of National Intelligence, *Unclassified Report to Congress on the Acquisition of Technology Relating to Weapons of Mass Destruction and Advanced Conventional Munitions, 1 January-31 December 2004*, <http://www.dni.gov/reports/2004_unclass_report_to_NIC_DO_16Nov04.pdf>, p. 4.). On the bombing and its implications, see, e.g., David E. Sanger and Mark Mazzetti, "Israel Struck Syrian Nuclear Project, Analysts Say," *The New York Times*, October 14, 2007; Background Briefing With Senior U.S. Officials on Syria's Covert Nuclear Reactor and North Korea's Involvement, April 24, 2008, at <dni.gov/interviews.htm>; Leonard S. Spector and Avner Cohen, "Israel's Airstrike on Syria's Reactor: Implications for the Nonproliferation Regime," *Arms Control Today*, vol. 38, no. 6 (July/august 2008), pp. 15-21.

The growing reality of cooperation among so-called "rogue" states is especially troubling. The nuclear and missile cooperation between North Korea, Pakistan and Iran has been examined in the open literature. The question is whether that cooperation was limited to these or a few other states or provides a blueprint for the future.[13]

To these country concerns may be added technology diffusion via the Internet as well as through loose nukes, materials leakage and brain drain in the former Soviet Union, Pakistan and other states and through nonstate actors like the A. Q. Khan network; the security of nuclear and missile technology, materials and expertise in Russia and the other Soviet successor states, as well as in such states as South Africa, Argentina and Brazil; and the possibility of catastrophic nuclear terrorism.

Beyond today's concerns, there is a second tier of states that, it was argued, might consider nuclear or other weapons of mass destruction in the future, including Algeria, Egypt, Saudi Arabia, Turkey, Taiwan, South Korea, Ukraine, Kazakhstan, Nigeria, Japan and Indonesia. A key element in whether these states go nuclear will be the international response to Iran and North Korea, although such factors as globalization, technology diffusion, regional and international security environments (particularly changes in Russia and China) will also be important.

On the basis of this view of current and prospective threats, proliferation and terrorism are global problems that go far beyond the Middle East and North Africa, although they have a strong regional dimension. To the extent that the risks are global, they are best dealt with through the nonproliferation regime.

3. Addressing Global Risks

Efforts to reduce, mitigate or eliminate the risks of proliferation—at least those we anticipated—are decades old and comprise the international nuclear nonproliferation regime, including safeguards and export controls. The global treaty approach has been important for setting norms concerning nuclear weapons, and the treaties have been influential in redefining thinking about the problem. Nonetheless, current concerns may derive from the convergence of projections of dramatic nuclear power growth with the perception that the international nuclear nonproliferation regime and its centerpiece, the Treaty on the Nonproliferation of Nuclear Weapons (NPT), are challenged by Iran, North Korea, the A.Q. Khan network and other proliferation dangers. They may be the product of a belief that if International Atomic Energy Agency safeguards, export controls and other global measures are inadequate today and will not be able to meet the demands of a nuclear rebirth, with increased numbers of reactors and quantities of nuclear materials in commerce, expanding fuel cycle capabilities, and the like.

[13] For a fuller discussion of 2nd tier suppliers, see Chaim Braun and Christopher F. Chyba, "Proliferation Rings: New Challenges to the Nuclear Nonproliferation Regime," *International Security*, vol. 29, no. 2 (Fall 2004), pp. 5-49.

Certainly, the regime is under pressure. The Nuclear Nonproliferation Treaty is challenged today by:

- states overtly acquiring nuclear weapons, including India and Pakistan, that cannot be accommodated within the treaty as nuclear-weapon states or nonnuclear-weapon states and the impact of these states' actions on the views of key states parties to the treaty like Japan and Brazil concerning the Treaty's value;
- North Korea's withdrawal from the treaty, its nuclear brinksmanship and its nuclear test, and despite hopes today for a diplomatic solution, lingering concerns about the limited international response to North Korean actions;
- Serious noncompliance, including North Korea, Iran and Syria, and limited consensus on compliance enforcement;
- growing access of states (and nonstate actors) to sensitive materials and technologies and the rise of virtual or latent weapon programs;
- the issue of the NPT's relevance to activities by nonstate actors, including black marketeers and potential nuclear terrorists; and
- the tensions between reemerging commercial interest in the civil nuclear fuel cycle and nonproliferation aims, which are reflected in the reemerging NPT Article IV debate, along with an increasingly divisive debate over the arms control and disarmament provisions of Article VI of the Treaty.

Other elements of the regime are also under pressure. The IAEA is restricted by the limits of its verification mandate and burdened by noncompliance issues, which raise questions about the value and effectiveness of international safeguards in some quarters. The Additional Protocol (AP), which expanded and strengthened the authority of the Agency to conduct NPT safeguards, is an important new tool.[14] Although most states with significant nuclear activities have now brought the Additional Protocol into force, there remain a large number of states that have not yet ratified the Additional Protocol, including Iran. The Agency and member states are trying to remedy this situation.

Export control efforts are under pressure and Nuclear Suppliers Group (NSG) rules need to be reinforced and strengthened. There is reason to be concerned about Russian and other countries' exports. Technology diffusion, black markets and lateral proliferation also raise questions about the long-term relevance of the NSG as these developments show nuclear supply is no longer the preserve of a few advanced industrial states.

A review of the UN Security Council (UNSC) activity to address proliferation challenges reveals limited consensus on regime enforcement. The UNSC was paralyzed in Iraq. Until

[14] While the AP is a major development, some capabilities are not being utilized and the effectiveness of the new measures in the Additional Protocol remains to be fully demonstrated in the field. For the text and status of the Additional Protocol, see the International Atomic Energy websites: INFCIRC 544 (corrected), at <http://www.iaea.org/Publications/Documents/Infcircs/1998/infcirc540corrected.pdf>; and "Strengthened Safeguards system: Status of Additional Protocols," at <http://www.iaea.org/OurWork/SV/Safeguards/sg_protocol.html>.

recently, it was also unable to act in Iran and in North Korea. Will it be able to implement Iran sanctions and to respond to continuing Iranian defiance of its demands?

The NPT and the international nuclear nonproliferation regime were created in a different time to deal with different threats. If all of the problems with, and stresses on, the regime portended the regime's collapse or increasing irrelevance, the spread of nuclear energy would be very dangerous. Will the regime be able to address the challenges of today, along with those that will emerge with an expansion of nuclear energy around the world and in the Middle East and North Africa? It remains to be seen whether the regime will meet the challenges ahead. However, in the face of these challenges, the regime is being reformed. As it has in the past, the regime is evolving as threats have changed, as is evident in the case of safeguards.

The revelations of the Iraqi nuclear program after the Gulf War, the discoveries of Iranian, Libyan, North Korean and Syrian clandestine programs and the associated revelation of an extensive nonstate nuclear procurement network and the concerns raised by the terrorist attacks of 9/11 have presented new challenges to international safeguards and to the international nuclear nonproliferation regime.

In this environment, the IAEA is developing a new approach to safeguards based on the strengthening measures developed in the 1990s. The new approach is designed to provide an evaluation of the nuclear program of a state as a whole - including the possibility of clandestine facilities and activities - and not just each of its declared nuclear facilities. If they are to meet the demands of global growth in nuclear energy use, it is essential that safeguards be credible and efficient.

In addition to strengthening safeguards and other traditional regime elements such as export controls, initiatives to address new and emerging threats, and unanticipated developments - from the end of the cold war to the rise of terrorism - have been especially prominent in the last 15 years. Among these are critical initiatives involving threat reduction, detection and interdiction, such as programs for Cooperative Threat Reduction, Material Protection, Control and Accounting, Second Line of Defense, including the Megaports Initiative; the Proliferation Security Initiative and the Global Threat Reduction Initiative; the Global Initiative for Proliferation Prevention and the Global Initiative to Combat Nuclear Terrorism; and UNSC Resolution 1540, the Convention on the Suppression of Nuclear Terrorism and the amendments to the Convention on the Physical Protection of Nuclear Material.

Offering an assured supply of fresh nuclear fuel and spent-fuel take back are old ideas that are receiving new attention. They have become central to thinking about addressing emerging challenges. Proposals by President Bush and those of International Atomic Energy Agency Director General Mohammed ElBaradei can be seen in the context of this long-standing desire. The Bush Administration's Global Nuclear Energy Partnership depended on slowing, if not halting, the spread of enrichment and reprocessing (ENR) technologies (and other sensitive nuclear technology); and creating a fully functioning,

secure, effective and nondiscriminatory assured supply/takeback regime that would enable the political acceptance of ENR restrictions. Multinational or multilateral ownership has been proposed by ElBaradei as a means to address this issue.[15]

The difficulties of realizing these or any of the other proposals that have been put forward to minimize proliferation and terrorism risks through reliable supply are significant and have bedeviled past efforts along these lines. Although such approaches have failed before, there are key differences in the situation today from that of the earlier considerations of various proposals, including a more widespread sense of insecurity; the rise of new, illegitimate sources of supply, including black marketers; evidence of NPT noncompliance and the use of the so-called Article IV "loophole;" and the prospect of nuclear terrorism. In any event, the viability of current proposals depends ultimately on common interests (commercial, political, industrial, etc.). They cannot be imposed from the top down, nor should they interfere with market mechanisms.

Finally, new attention to another old idea - proliferation resistance - has grown and can be expected to grow in the years ahead. Although the concept is not well defined and has at times been oversold - it does not mean "proliferation-proof" - there are benefits that can be realized from reactors and other facilities designed to minimize risks coupled with effective safeguards and other nonproliferation measures. The idea of proliferation-resistant small reactors with long-lived cores is among the new ideas for addressing underlying proliferation concerns, while expanding nuclear power to the developing world and increasing the attractiveness and acceptability of nonproliferation efforts. In this as in other cases, if proliferation resistance is to be real, it must be institutionally as well as technically based. There are no simple technological fixes or "silver bullets."

All of these responses to current and emerging threats are important, as efforts to reinforce and reform the global nonproliferation regime to address proliferation and terrorism risks. But not all are agreed or fully developed and implemented. Moreover, they may not be fully adequate (or be seen to fall short) in addressing specific regional problems and issues confronting the Middle East and North Africa. Additional measures may be required in the Middle East and North Africa.

4. Addressing Regional Risks

There are reasons for special concerns based on the history and current security dynamics of the region, as has been recognized by Ambassador Nabil Fahmy and other prominent observers from the region. A key element in the new equation is the role of nonstate actors.

[15] See, Mohamed ElBaradei, "Toward a Safer World," *The Economist*, 18 October 2003. See also the report of experts that followed up the original ElBaradei proposal, *Multilateral approaches to the Fuel Cycle*, Expert Group Report submitted to the Director General of the International Atomic Energy Agency, issued as INFCIRC/640 at <www.iaea.org>

At least some civilian nuclear activities may be vulnerable to theft or diversion if by capable, motivated nonstate actors.[16]

In this context, certain measures can be proposed and discussed, which may be divided into global proposals that are urgently needed in the region and additional, regional specific measures. Those initiatives that are not yet in place globally, but need to be seen as essential for minimizing regional risks include:

- Ratification and entry into force of an Additional Protocol as a condition of supply and as a standard for verification;
- Agreement to forego national or regional enrichment and reprocessing capabilities as a condition of supply;
- Full implementation of UNSC Res. 1540;
- Adherence to the Convention on the Suppression of Nuclear Terrorism; and
- Adherence to the amended Convention on the Physical Protection of Nuclear Material.

In exchange for accepting these measures the states should have access to proliferation-resistant reactors, an assured supply of fuel and spent fuel take back.[17] The possibility of enhanced security guarantees, including strengthened negative security assurances, will need to be considered. Packages to regional states modeled on those offered to Ukraine in the early 1990s to ensure it gave up the Soviet nuclear weapons it inherited and joined the NPT as a nonnuclear-weapon state might be possible. In any event, the threat to the region posed by the Iranian nuclear program must effectively be addressed by the international community.

Because all of these measures are being pursued globally, they may not provoke an overt, negative reaction from the states in the region, especially as support for these global initiatives expands and they are more fully implemented. Already, there has been some movement in this direction within the region. For example, a number of states in the region have signed and ratified the AP[18] and other undertakings, and states such as Bahrain and the United Arab Emirates have agreed to forego ENR. Bahrain, Jordan, Libya, Morocco, Saudi Arabia, Turkey and the UAE have joined the Global Initiative to Combat Nuclear

[16] The greatest terrorism dangers are radiological dispersal devises or "dirty bombs," and the sabotage of or attacks on nuclear reactors and other facilities. If terrorists attempt to build a usable nuclear weapon--an improvised nuclear device--HEU is probably more interesting to than plutonium. The risk posed by nonstate actors using plutonium is currently being debated. On the one side, it is argued that those seeking a symbolic or radiological impact will not care what type of material they obtain. On the other hand, it is argued that the concerns of those who oppose reprocessing and the availability of separated plutonium are misplaced because the prospect of a terrorist group building an implosion device with reactor-grade plutonium is simply not realistic.

[17] The Russian Bushehr deal with Iran involves spent fuel take back. However, a broader deal for the region may be difficult to arrange, especially if Russia is not interested. Nonetheless, spent fuel take back be one of the most powerful nonproliferation tools as well as an incentive to a state that has a small power program and does not wish to deal with spent fuel.

[18] The regional states with an AP in force include Jordan, Kuwait, Libya and Turkey.

Terrorism.[19] However, the Egyptian policy of refusing further nonproliferation obligations until Israel joins the NPT could pose a problem.

For other needed initiatives, the path ahead will be difficult, especially if they do not emerge from within the region. Such additional requirements might include:

- Transparency and confidence - building measures beyond those of the NPT, IAEA safeguards, etc.;
- A regional inspection regime; and
- A nuclear or WMD free zone for the region.

Let us consider each requirement in turn.
With its post-Iraq strengthening measures, the IAEA safeguards system , especially for states under the AP, is evolving to one in which greater transparency is a requirement and emerging norm. In addition, the Iran nuclear crisis has led the IAEA to call for greater transparency on the part of Iran in order to address uncertainties about its program, if not also its noncompliance. To date, Iran has not provided the Agency with the requested openness.

It is becoming increasingly clear that greater transparency will be needed for nuclear energy to flourish around the world, but especially in the Middle East and North Africa. The UAE has recognized the importance of transparency and agreed to demonstrate the complete operational transparency for its program. GCC Secretary-General Abdurrahman declared this commitment to be "an important move agreeing with GCC countries" aimed at developing a peaceful nuclear energy programme, with the commitment to full transparency and the highest standards of non-proliferation and of safety and security."[20] It may be possible to build on these developments.

Regional inspections may be useful in addressing Israeli concerns about IAEA safeguards and to promote transparency and predictability. They could be perhaps modeled on those of the Argentine-Brazilian Agency for Accounting and Control of Nuclear Materials (ABACC). However, unless Israel should decide to allow inspections at Dimona, this is unlikely to be realized in the foreseeable future.

The even more ambitious notion of a nuclear- or WMD- free zone in the Middle East arose within the region and has been unanimously supported throughout the region for decades, although no progress had been reached due to differences over conditions, modalities, etc. At the July 2008 Paris Summit that launched the Union for the Mediterranean, there was a widely reported breakthrough. Over forty states, including Israel, Syria and other states from the Middle East and North Africa, as well as from Europe, pledged in a final declaration to "pursue a mutually and effectively verifiable Middle East Zone free of weapons of mass destruction." These Mediterranean states committed to "consider practical

[19] US Department of State, "Global Initiative Current Partner Nations" at <http://www.state.gov/t/isn/105955.htm >
[20] "UAE calls for ban on weapons of mass destruction," *Business Standard*, 25 August 2008 at <http://www.business-standard.com/india/storypage.php?tp=on&autono=45258>.

steps to prevent the proliferation" of nuclear, chemical and biological weapons and their delivery systems.[21] It is unlikely this agreement will result in a zone, but it may restart the dialogue and spur needed work on conditions and other disputed issues, as well as to lead to the eventual achievement of interim steps, including transparency and confidence-building measures.

One idea mentioned in this context is a regional nuclear fuel cycle center capable of providing enrichment, reprocessing and other services to the states of the region. Ambassador Mohammed Shaker has argued for an international or a regional nuclear fuel cycle to provide assurances about the peaceful pursuit of nuclear energy in the Middle East.[22] It seems an internationalization of the fuel cycle could well be reassuring to the international community but a regional fuel cycle may have the opposite effect. These capabilities would be difficult to site in a manner that ensures stability and security - as memories of similar proposals in the 1970s should remind us - and probably should be done outside the region by France, Russia, a supplier consortium or any international entity that may arise from the many reliable supply proposals that have been presented.

Other proposals could be noted, including a need for deterrence.[23] The measures required for effective nonproliferation and physical security architecture for this complex region depend on understanding and calibrating the risks and threats. Because of the fluid and dynamic security environment stemming from developments in Iran and elsewhere, this task is more difficult today than it ever has been. Moreover, the sensitivities of trying to obtain agreement on measures on the states of the region that are not required of others cannot be overestimated and efforts to strengthen nonproliferation in the Middle East and North Africa in preparation for nuclear energy development there will need to agreed by key supplier states and others and be pursued through deft diplomacy if they are to be successful.

Conclusions

Nuclear energy development in the Middle East and North Africa has been considered before, but never materialized. The interest at present may be different for economic reasons that are particularly compelling for the GCC members but also for other states in the region.

If seriously pursued, the expansion of nuclear power in the Middle East and North Africa, as in the rest of the world, will inevitably raises concerns about proliferation and terrorism

[21] See "Nations agree to work for WMD-free Mediterranean," CNN, 13 July 2008 at <http://www.cnn.com/2008/WORLD/meast/07/13/mediterranean.nuclear.arms.ap/>

[22] Mohamed I. Shaker, "The Internationalization of the Nuclear Fuel Cycle: An Arab Perspective," in *Arms Control in the Middle East*, UNIDIR Disarmament Forum, no.2 (Geneva: United Nations Institute for Disarmament Research, 2008), pp. 33-42.

[23] See, e.g., *Nuclear Programmes in the Middle East: In the Shadow of Iran*, pp. 151-164.

risks. The ability of states in the region to obtain the technologies, material and facilities they need will depend to a significant degree on whether their plans can promote rather than undercut nonproliferation objectives and initiatives. Thus, understanding and addressing the risk/threat environment is critical to any dramatic growth in nuclear power in the in the region and around the world.

If suppliers feel assured, the limited human resources and infrastructure in the Middle East and North Africa is likely to slow the realization of nuclear energy programs in the region, with the possible exceptions of some GCC countries and Turkey. Time may not be on the international community's side with respect to Iran. However, even if the surge of interest in nuclear power in the region is in part a reaction to Iran's program, there may yet be time to ensure that nuclear power development is undertaken in a way that strengthens and does not diminish nonproliferation and other security objectives.

A nuclear cascade in the Middle East and North Africa is not inevitable. If it is to be avoided, the development of ever more robust nonproliferation capabilities, including advanced safeguards and proliferation resistance, is essential. An enhanced, systematic, defense-in-depth approach to nonproliferation that acknowledges the changing threat space and new technological possibilities is also critical. Beyond global solutions, there must be regional efforts as well.

Cooperation in the Mediterranean region, with a strong transatlantic dimension, will be absolutely essential to effectively deal with the Iranian threat, to ensure the security of regional states threatened by Iran's program and to ensure the full realization of dreams for peaceful nuclear energy programs in a manner that strengthens nonproliferation.