Policy Forum 11-20: A Second Nuclear Era? It’s Not Worth the Risk


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A Second Nuclear Era? It’s Not Worth the Risk

By Nikhil Desai

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This article was originally published by Global Asia and is available here.

Nautilus invites your contributions to this forum, including any responses to this article.

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I. Introduction

Nikhil Desai's article examines how, with the building of nuclear plants in decline for years in developed nations, the nuclear industry has pinned its hopes on developing nations' energy thirst. However, so many improvements are still needed in safety, regulatory and compliance criteria that the prospects for a 'nuclear renaissance' look bleak. Nikhil Desai is an economist, and divides his time between India and the US.

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II. Report by Nikhil Desai

- A Second Nuclear Era? It's Not Worth the Risk

By Nikhil Desai

Is nuclear power necessary, and if so, at what cost? The images of the disaster at the Fukushima Daiichi nuclear plant in the aftermath of the March tsunami — coming just ahead of the 25th anniversary of the 1986 Chernobyl accident — revived these questions at a time when governments around the world are preparing to bet trillions of dollars on a technology whose signature contribution to the world has been, well, weapons of mass destruction.

Nearly 30 years ago, Alvin Weinberg — the father of the light water reactor used in more than half of all nuclear power reactors — predicted in the wake of the 1979 Three Mile Island accident in the US that environmentalists would re-discover nuclear power as they learned the risks of climate change. He speculated that a Second Nuclear Era would emerge.

Nuclear electricity has been losing market share for 20 years or more, with China the sole significant exception. Some 80 percent of the units are more than 20 years old. For a while, it did seem that the 21st century might ring in that Second Nuclear Era, with advocates talking about a "nuclear renaissance" that could save humanity from climate change. The World Nuclear Association (WNA) even prepared a visionary forecast of worldwide nuclear capacity expanding by as much as 30 times by the end of the century.

But in the countries that were the original nuclear energy pioneers — the US, France, and the UK — reactor-building essentially ended by 2000, with only one reactor under construction in France. Reactor vendors face bleak prospects elsewhere: Japan added three units in 2004 and 2005, and has only three others under construction that are now at risk of being abandoned. Germany has said it will abandon nuclear power completely. Since 2004, an average of fewer than two units a year have been put into service, compared to one per week of equivalent fossil fuel-based capacity, and about half have been in China. Construction starts have picked up somewhat, to about five units a year; but again, more than a half are from China.

Emerging Market Reincarnation?

Despite worries about carbon emissions, the upper-income OECD market that accounted for 86 percent of world nuclear generation in 1980 has been weak for quite some time, and the Fukushima accident has put new nuclear power on life support.

The industry has pinned its hopes on developing countries, reflecting in part the dramatic transformation of the world energy economy over the past two decades. From 1990 to 2010, electricity generation in China and India grew more than five-fold. The rest of developing Asia and the Middle East also had spectacular growth in electricity generation over the period — more than 240 percent. The demand has outpaced supply, though, and shortages continue.

As in the 1960s, nuclear vendors have drawn on their governments for help in making deals. The commercial nuclear co-operation agreement between the United States and India was hailed as a way for India to build more nuclear capacity — more than 450 GW — in the next 40 years than the whole world has built in the last 50 years. China also announced a 2050 target of 400 GW. Many other countries, too, have expressed concrete interest in new nuclear power plants, including Turkey, Nigeria and practically all countries in the Middle East. Even Afghanistan wants in. Unfortunately, a long history of delays, escalation in costs and pitiful performance has previously plagued many developing countries; Argentina, Brazil, and Iran are yet to commission plants on which they started construction more than 30 years ago.

Except for Taiwan and South Korea, nuclear power has not established itself as a significant, reliable electricity source in any other developing country — with its share of power generation ranging around 2-4 percent in China, India, Brazil, Mexico and Pakistan. Even dismissing the irrational exuberance of nuclear advocates, it is worthwhile asking whether the rosy nuclear future has any chance of success given inherent risks and the threat of the illegal trade in technology and materials.

Tough Times Coming Back?

The next decade is critical for Western nuclear vendors to survive in their home markets as well as establish a firm foothold in developing countries. To that extent, the Fukushima accident is not just a Japanese but a European disaster, in particular a French one. The US vendors are not as much at risk; General Electric (the supplier of the Fukushima Daiichi reactors) can sell other types of generating equipment. France, with the state holding the lion’s share of AREVA, will suffer the most if it does not make rapid gains in developing countries.

This is precisely where civic protests against new nuclear plant sites in India have sharpened since the Fukushima Daiichi accident. India, after all, is a developing country pioneer in both civilian and military nuclear technology; it installed a dual-purpose reactor in 1954, ordered a power reactor in 1963 and tested a nuclear bomb in 1974, the first to do so outside of the UN Security Council permanent members.

In the midst of rapid economic growth, the Indian debate has taken on the shades of similar debates in years gone by about safety, comparative economics and environmental impact — and about sheer “necessity,” as if accident risks and questionable economics do not really matter.

In fact, major nuclear accidents have occurred, nuclear economics have never proven decisively favorable, and “necessity” is now argued in terms of avoiding fossil fuel use, not because fossil fuels are in danger of exhaustion, but because of climate change. Of course, energy efficiency and renewable energy have also made significant strides; however, these are easily dismissed by nuclear advocates who ignore the fact that after nearly 60 years, the nuclear contribution to world electricity supply has yet to reach even 5 percent.

Unfortunately, in India or elsewhere, vested interests in government, scientists in nuclear bureaucracies and even some environmental activists possessed of the need to reduce CO2 emissions at any cost and by any means have “tamper-proof” convictions. More importantly, that portion of the establishment does not even have to bother with the mundane realities of planning, running and regulating electrical systems; their convictions are even “evidence-proof.”

The reality that often gets ignored in the ideological debates and fanciful advocacy is that nuclear power poses formidable demands on institutional capacity. Technologies can be imported much more easily than institutions, which need to grow organically. While the risks of major accidents are real and staggering, the last 40-odd years of experience with nuclear power has confirmed three concerns that are beyond technological fixes: 1) the potential for diversion of materials to weapons of mass destruction; 2) the unpredictability and uncontrollability of costs and performance; and 3) the difficulty of planning and executing an emergency response, as was just seen in Japan.

Institutional capacities are generally weak in developing countries, even in India with its long nuclear experience. Nuclear safety agencies are not free of conflicts of interest, and power sector regulatory agencies often simply do not have the authority to mandate or enforce criteria concerning cost or performance.

Institutional challenges rapidly multiply with the scale of the nuclear enterprise. It is one thing to manage one or two reactors, quite another to deal with 20 or more sites distributed over a wide area. As for the capacity to cope with a major accident or terrorist event, especially with a massive expansion in nuclear sites, one only has to keep in mind that “an accident anywhere is an accident everywhere.”

Don’t Give In to Temptation

Unfortunately, nuclear dreams come in pairs: electric power and military power. And even where governments have no interest in the military option, potential diversion by non-state actors will remain a possibility, no matter how improbable. Major accidents will also remain a potential nightmare. True, governments have to plan for all manner of calamity, but what is different with the nuclear option is the sheer hubris of nuclear advocates. Their immodest assurances of safety and superiority make it more likely that even avoidable risks will not be avoided, and manageable risks will not be managed.

Therein lies the paradox of the nuclear choice — the alternatives carry minor excess cost or damage

risk, whereas ambitious nuclear plans carry huge, unmanageable incremental risks that are simply avoidable.

Is the world prepared for an Asia-Pacific reincarnation of nuclear power in the 21st century? One option will be to establish and strengthen safety and regulatory institutions, build adequate and expensive emergency response systems, adopt stringent compliance criteria and put all new licensing under public scrutiny. These are huge undertakings with no assurance of success.

There is another option: resist the temptation. For now, fossil fuels are reliable enough to help in the transition to a post-carbon world. Renewable energy and energy efficiency will help enough in due course.

III. Nautilus invites your responses

The Northeast Asia Peace and Security Network invites your responses to this essay. Please send responses to: bscott@nautilus.org. Responses will be considered for redistribution to the network only if they include the author's name, affiliation, and explicit consent.

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