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New Strategies and New Players: Creating a Nuclear Revival for the Long Term

The case for nuclear power has never been as compelling as it is today. The challenge for the industry is how to harness the current interest in nuclear energy to trigger a nuclear revival with staying power. Unless there is a favorable climate for development and investment, a nuclear comeback will remain vulnerable. National governments must take the lead in addressing this critical issue.

There is no need in this group to detail why nuclear power is currently the object of so much attention. The three primary drivers are well known - high oil and natural gas prices, global warming, and the desire for energy security. Together, these factors have created a "perfect storm" in which the importance of nuclear power as part of the energy mix cannot seriously be questioned. The key issues for the industry today are more pragmatic - how to develop an effective long-term nuclear energy policy - in contrast to the stop and go approach that has characterized the industry's recent history.

The challenge presented by investment in new nuclear facilities has recently become a popular focus of discussion. Analysts debate and bankers calculate. Is nuclear power economic on its own terms? What return on investment should be required? What does the projected price of natural gas have to be in order for nuclear investments to be attractive? These are important issues, and they deserve study. But right now, they are beside the point. There will be - there must be - new investments in nuclear generation. Therefore, the focus should be on how to develop national policies to make that investment as attractive as possible, to create favorable conditions for the deployment of the new nuclear generation that is now recognized as essential. Once that environment has been created, the investments will follow.

Now is the Time for Decisive Action.

The logic behind such an outcome is straightforward. Each of the primary drivers of the nuclear energy revival - high oil and gas prices, global warming, and energy security - will remain key concerns for the foreseeable future. Any one of the three is enough to justify - on both policy and economic grounds - a significant investment in new nuclear facilities. The question is not whether, but when and how those facilities will be constructed. The discussion about financing a nuclear revival needs to become proactive and focused on identifying the key elements of an enduring nuclear renaissance. Then, industry and government need to adopt a pragmatic strategy designed to accomplish that goal as rapidly as possible. The appropriate governmental policies will make affirmative investment decisions all but inevitable.

Other participants in the Symposium have offered views from different national perspectives. The policies required to create a stable environment to foster the growth of nuclear energy must be adopted at the national level. Recent developments in the United States are instructive and offer some insight into how governments can play the key role in creating a favorable environment for constructing advanced nuclear power plants.

The U. S. Approach Is Succeeding

The U.S. experience has multiple dimensions. The U.S. nuclear industry has played a critical role through its continuing emphasis on increased efficiency and safety. Absent the hard work of the industry over the last two decades, circumstances today would be different and no amount of governmental support could jump-start a nuclear revival. But, as important as they have been, those industry efforts alone have not been enough. It is the nuclear energy policy and economic incentives the United States has adopted that have created today's favorable environment for U.S. utilities to order nuclear plants for the first time in a quarter century.

The U.S. approach has been multidimensional, a joint effort of regulators, the Bush Administration, and the Congress. On the regulatory front, the Nuclear Regulatory Commission has simplified its procedures and rebalanced the process of public comment that has often worked to hamper the industry in the past. The most recent manifestation of the NRC's new approach is the agency's June 23 decision to issue a construction and operating license for LES to construct a centrifuge enrichment plant in New Mexico. This decision has been closely watched as evidence of how the NRC might approach the licensing of new nuclear power plants, and, on that score, the agency passed the test by meeting the 30-month licensing schedule commissioners had proposed at the outset.

Likewise, the Bush Administration has been consistent in its vigorous support of nuclear energy, beginning with the 2001 Report of the National Energy Policy Development Group headed by Vice President Cheney. A key element of the Administration's approach has been the Nuclear Power 2010 Program, under which industry and the federal government have joined together to finance an effort to complete design work on the advanced reactor designs of Westinghouse and General Electric and move those designs closer to deployment by the submission of applications for a Construction and Operating License (COL). Under the auspices of Nuclear Power 2010, the NuStart Energy consortium was formed by the leading U.S. nuclear utilities,

the industry members most likely to deploy advanced nuclear reactors.

The U.S. Congress did its part last summer when it passed the Energy Policy Act of 2005 (EPACT), the first major energy legislation in a decade. EPACT is particularly significant for the U.S. nuclear industry because it includes a series of measures designed not only to support the construction of advanced reactors but also to create incentives for their rapid deployment.

EPACT contains numerous provisions beneficial to the nuclear industry, but several deserve emphasis as the key elements of the Congressional effort to encourage utilities to build advanced nuclear power plants: (1) standby support, (2) loan guarantees, and (3) production tax credits. Without delving into all the details, a brief overview of each program illustrates the Congressional intent to reduce risks and create incentives for new build.

Standby support addresses one of the primary difficulties the nuclear industry encountered in the last wave of new plants and which has haunted the financial community ever since - the cost of regulatory and litigation delays. Under EPACT, standby support is available for the first six new advanced nuclear facilities,¹ but its benefits are most significant for the first two new plants. For those initial facilities, which involve the greatest risk, EPACT provides coverage for 100 percent of the cost of regulatory and litigation delays, up to a ceiling of US\$500 million per plant. Standby support for plants three through six is roughly half of that offered for the initial plants, reflecting the lower risk profile for those facilities. Support is available for delays caused by the NRC's failure to meet the established regulatory schedule and for operational delays arising from litigation.

Likewise, loan guarantees of up to 80 percent of estimated project costs are available for innovative energy technologies that reduce greenhouse gas emissions and represent new or improved technologies. Here again, a balance has been struck. The guarantees are not limited to nuclear energy facilities (coal gasification, fuel cells, and carbon capture and sequestration are among other eligible technologies), but the importance of nuclear power in a diverse national energy mix is recognized by creating a level playing field in which nuclear power is eligible for guarantees on the same basis as other advanced technologies that could help reduce global warming.

The final member of the incentive triad is a production tax credit offered for the first eight years of operation of

advanced nuclear facilities. Specifically, EPACT authorizes production tax credits of 1.8 cents per kilowatt-hour of electricity generated by qualifying facilities.

The point here is that, led by Senator Pete Domenici, the Chairman of the Senate Committee on Energy and Natural Resources, the Congress has provided the U.S. industry with incentives to deploy advanced nuclear technologies by responding to the financial needs of the industry. EPACT addresses major impediments to the deployment of nuclear facilities by creating a constructive framework calibrated to jump start new build while preserving commercial discipline for the long term. Both national energy policy goals and free market principles are served by the form of the assistance authorized by EPACT. Utilities still must assume the risks and reward of deployment, but they are offered substantial protection from the vagaries of process and financial uncertainty that have plagued commercial nuclear projects in the past.

Time will tell whether the United States has gotten it right. In any event, it clearly has a long way to go to address the critical issue of nuclear waste disposal. But the contrast with just a few years ago is striking. A country in which nuclear plant construction has remained moribund for decades has now openly embraced the reality that nuclear energy must be a key element of the country's energy strategy for the future. There is a lesson here for other nations, particularly European countries that rely on nuclear energy to supply a substantial portion of their energy needs and yet shrink from a commitment to support new build. It is time that those nations admitted the nuclear imperative and took bold action to ensure that new nuclear facilities are built to satisfy their future energy requirements. The alternatives - such as buying more natural gas from Russia - seem less attractive with each passing month.

Russia's Role Remains Unclear.

This brings us to the question of Russia. It clearly is a player with enormous potential, but Russia has yet to compete effectively outside of its traditional territory. Russia presents both a challenge and a conundrum for the nuclear industry, particularly for the growth of nuclear power in the United States.

Russia has made no secret of its desire to create a nuclear enterprise comparable to Gazprom - Atomprom - and, to that end, has reorganized its nuclear industry to make it a more effective player on the world stage.

¹ An "advanced nuclear facility" is defined to be a reactor design approved by the NRC after December 31, 1993. This requirement is in keeping with other elements of EPACT that encourage innovation by providing incentives for nuclear energy research. For example, EPACT authorizes funding for the Nuclear Power 2010 Program and directs the Secretary of Energy to pursue a Generation IV Nuclear Energy System Initiative to support work on new commercial reactor designs.

Russia's role in key nuclear markets - specifically Europe and the United States - has historically been limited by commercial and legal limitations that may not long survive. Russia is chafing at old restrictions and ways of doing business. In Europe, it is impatient with import limitations imposed by the Euratom Supply Agency, limitations the EU justifies as an effort to preserve diversity of supply in nuclear materials. In the United States, the 1992 uranium suspension agreement effectively prohibits Russia from supplying more of the U.S. commercial nuclear needs. At the same time, the HEU Agreement, a major nonproliferation effort of the last decade, allows Russia to sell low enriched uranium ("LEU") in the United States but only through the U.S. Executive Agent, the United States Enrichment Corporation ("USEC"), which is a competitor as well as a partner of the Russians.

Russian discontent has resulted in strong talk by Sergei Kiriyenko, the chief of the Russian nuclear agency, Rosatom. He advocates elimination of the suspension agreement that limits Russia's ability to ship more LEU to the United States. Yet, at the same time, nearly half of U.S. enrichment needs are already met by Russian shipments under the HEU Agreement, and the United States will be reluctant to allow that percentage to increase.

Earlier this year, Russian representatives argued for the elimination of the uranium suspension agreement on the grounds that it imposes unfair restrictions on Russian trade. However, Russia nevertheless declined to participate in the sunset review of the suspension agreement, a procedure designed specifically to provide a mechanism to terminate such agreements if they are no longer justified. Predictably, with no participation by Russia, the U.S. trade agencies declined to terminate the suspension agreement. This leaves the next move up to the Russians, who could attempt to negotiate a different approach with the Bush Administration or, alternatively, could exercise their right to terminate the suspension agreement. The latter course of action would, at least in the short run, prove highly disruptive because it would require the United States to restart the suspended antidumping investigation of Russian nuclear products and, depending on the approach adopted by U.S. trade officials, could even threaten the flow of Russian LEU to U.S. reactors.

The existing HEU Agreement expires in 2013, and at least one Russian representative has recently declared that the Agreement will not be extended. This leaves the United States with the prospect of finding a new source for approximately one-half of its enrichment needs. Although LES is scheduled to be operating well before 2013, LES alone will not have the capacity to take up the slack if the HEU Agreement is no longer in place. Given the uncertainty surrounding the efforts of USEC to develop its own centrifuge enrichment capability, and the high cost and other difficulties associated with USEC's one remaining gaseous

diffusion plant, meeting the U.S. demand for enrichment services will be subject to uncertainty, particularly because of the lack of clarity about Russia's future role.

Russia has also made it clear that it intends to build new nuclear power plants to supply its own electricity needs. The Russian resolve on this issue contrasts sharply with the attitude of some other European nations, who are reluctant to make the commitment to build new plants as a matter of government policy. The new Russian approach is sure to have an impact elsewhere, as Russia will be required to keep enough of its own nuclear material to support its ambitious domestic plans and therefore will have less available for export to other European nations and the United States.

Simply put, Russia is the wild card in the nuclear deck. It plans to expand its domestic nuclear operations while hoping to play a more significant and profitable commercial role in the United States market even though Russia is already a major force in the U.S. nuclear fuel cycle through the HEU Agreement. Those who view nuclear energy as a path to energy security have yet to come to grips with the fact that Russian warhead material powers one in ten U.S. light bulbs, yet the U.S. has no clear strategy for replacing Russian enrichment within the next seven years. For the United States, balancing the potential enrichment shortfall with the drive for new plants is another challenge the industry needs to address promptly.

The Westinghouse Sale Has Reshaped the Industry.

A key factor affecting the future course of the industry is the restructuring triggered by Toshiba's purchase of Westinghouse. On the positive side of the ledger, the Toshiba purchase illustrates the substantial increase in the value of nuclear assets. The hefty price that Westinghouse commanded confirms the favorable trend for nuclear power. However, this development has been accompanied by significant uncertainty resulting from the effects of the Westinghouse sale on traditional industry alliances. In reaching out to acquire a PWR capability, Toshiba has broadened its perspective and acquired the ability to move away from its traditional focus on BWR technology and its relationship with its long-time partners, General Electric and Hitachi. Likewise, Westinghouse will no longer be linked with its traditional PWR partner, Mitsubishi Heavy Industries. Some of the key questions are obvious. Will Mitsubishi seek a new comrade in arms? Will it enter the United States market for new reactors by itself?

Whatever the ultimate answer, the new structure of the nuclear industry has created uncertainty at a delicate time. Governments can help the industry cope with this added risk by adopting proactive measures to ensure a firm foundation

in support of nuclear energy. Make no mistake; governments cannot - should not - do this alone. They can, however, and must, create a structure in which the private sector can readily accomplish the task at hand. The manner and effectiveness of a nuclear revival will be profoundly affected by whether national governments effectively prime the pump, particularly as new alliances form and Russia emerges as a commercial force on the world stage.

The sooner new advanced plants are built the better, for it is only through the process of construction and start up that the full extent of the challenge will become known. With deployment success, the financing issues will be resolved. Then the industry and its customers can move forward and help shape a coherent energy policy that most effectively utilizes nuclear energy's commercial and environmental advantages.