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The Nuclear Renaissance: Ten Principles to Guide U.S. Policy

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Nuclear power has many advantages over other power sources, but a global expansion of peaceful nuclear technology could present risks if not managed properly. While acting to mitigate these risks, U.S. policy should, as in other sectors, include pro-market regulatory reforms, foster competition, and avoid unnecessary intervention. The government will, however, have a more direct role in the nuclear sector than in most industries due to its history and the nature of the technology. Following the government-induced stagnation of the industry in the 1970s and 1980s, the private sector remains leery of making large investments without a clear sign that the government will not regulate the industry out of business again. To reap the benefits of nuclear power, while minimizing the risks, the United States must commit to reestablishing itself as a technology leader in commercial nuclear power, avoid unwanted foreign dependencies, modernize its approach to waste disposal, promote marketplace freedom, and modify its approach to nonproliferation. The 10 straightforward principles laid out in this paper should guide Congress and the Administration's actions.

1. Avoid creating dependency-based vulnerabilities.

To the casual observer, nuclear energy is domestically produced. The plants exist in America, are generally operated by Americans, and generate electricity distributed to Americans. This is a narrow view, however; it does not respect the significance of the industrial and intellectual base that produces the people, components, and fuel necessary to build and operate nuclear plants. After three decades of decline, the domestic industrial base does not have the capacity to produce the components for a single reactor.

This lack of capacity goes beyond items that are easily found on the international market. Essential components, such as heavy forgings (the enormous pieces of metal out of which components are manufactured) and specialized piping, are not available domestically and are in limited supply internationally. These industrial bottlenecks could be difficult to overcome as nuclear plant construction ramps up. Ultimately, there is little difference between relying on foreign oil or foreign manufacturing if both allow America's ability to produce energy to be disrupted by foreign interests. This reliance creates opportunities for others to exercise power over the U.S. Minimizing these leverage points is central to advancing national interests. The Administration and Congress must avoid the potential vulnerabilities and risks associated with foreign energy dependence.

2. Establish technological leadership across the spectrum of military, civilian, and commercial nuclear activities.

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The international influx of investment to the commercial nuclear sector (public and private) almost guarantees that more advanced nuclear technologies, some of which could threaten the United States, will become available to unfriendly actors. Preventing this requires that the U.S. and its allies establish technological superiority across the spectrum of nuclear activities. Close links among civil, commercial, and military nuclear technologies will assure that those nations with the most advanced commercial and industrial capabilities are able to develop the most advanced military technologies. Therefore, it is vitally important that America's nuclear industrial base, along with that of its close allies, both commercial and military, remain globally preeminent.

3. Assure access to the components, capabilities, and materials necessary to build, operate, and maintain America's nuclear power plants.

Several critical sectors of the nuclear industry will have to be strengthened to support a near-term, sustained effort to expand America's commercial nuclear industry. For example, the very large forgings needed to build reactors are available only in Japan, which can provide parts for only seven or eight reactors annually. This is not adequate to sustain a broad nuclear renaissance. Only one U.S. company today can take those forgings and manufacture them into the components used to build reactors. Other choke points may include the capacity to manufacture steam generators and specialized piping. Even if there were additional manufacturers, there are too few skilled technicians, boilermakers, pipe fitters, electricians, and ironworkers to support the effort. Supplies of raw materials must also be secured. Global capacity could be enough to support the near-term expansion of America's nuclear power industry, but problems will arise as other nations expand their nuclear industries simultaneously. This will seriously stress the current infrastructure and challenge America's ability to meet its energy needs.

4. Promote free trade as a central tenet of the global nuclear industry.

The nuclear marketplace is often understood to be global, but this is not exactly true. Though the U.S. market is certainly international, with companies from around the world—many state owned and subsidized—doing business in the United States, most states control foreign access to their markets. American companies are effectively barred from most countries' markets through a combination of tariff and non-tariff barriers, bureaucracy, protectionism, and onerous liability regimes. This is becoming a significant issue as major manufacturing countries like China and India and parts of Europe are developing plans to expand their commercial nuclear capabilities. Gaining access to these markets will be crucial to the long-term health of America's domestic nuclear industrial base.

5. Limit subsidies to the commercial nuclear industry.

The federal government has a critical role to play in the initial phases of the American nuclear rebirth, but this role must be finite. Many countries are choosing to consolidate control over their nuclear industries to protect their strategic and economic interests. This approach may seem attractive in the near-term—it allows these industrial titans to underbid competition, minimize risk calculations, and enjoy market preferences—but it will undoubtedly leave those industries worse off in the long-term.

Congress and the Administration must resist efforts to rebuild America's commercial nuclear industry through long-term federal support. While some near-term incentives may be appropriate, given the government's part in inducing the current atrophy of the nuclear industrial base, industry must not become dependent on subsidies. An American industry that grows out of the free market will be stronger over the long term. Furthermore, a competitive, market-driven U.S. industry will provide critical competition to the state-owned and state-supported companies that currently lead the commercial sector. Strong competition will force these nationalized and quasi-nationalized industries to maintain high quality standards. Quality assurance is critical to the success of nuclear energy, because an accident at one facility could negatively impact the entire industry.

6. Recognize nuclear power as a clean and abundant energy source.

It is not good that the federal government is working to pick winners and losers in the energy market. The results will surely be increased costs and limited choices for U.S. consumers. Instead, once a set of goals and priorities are set following adequate public debate, the government should remain technology-neutral. In the current political climate, however, this may be unrealistic. If the government is not able to be neutral, it should at least do as little harm as possible. Federal laws, programs, and regulations should recognize nuclear power as an emissions-free, domestic energy source just like wind, solar, and other favorites of the environmental community. Furthermore, nuclear energy is abundant. Whether or not it fits the strict definition of "renewable," the fact is that known uranium stocks will last for a very long time—perhaps centuries or even millennia, with certain fuel recycling technologies.

7. Move beyond a Yucca-only approach to spent nuclear fuel.

When the nuclear industry was in decline, there was little incentive to resolve the Yucca impasse or develop alternatives, but renewed interest in expanding America's nuclear fleet demands a change in policy. The expansion of nuclear power in the United States should not be held hostage to political differences over the use of Yucca Mountain as a nuclear by-product repository.

Although Yucca is critical to the overall future of nuclear power in the United States, other disposition options do exist. The recycling (capturing the unused energy from spent nuclear fuel) component of the President's Global Nuclear Energy Partnership is an important part of moving beyond Yucca. Depending on how technology evolves, recycling spent nuclear fuel could reduce the amount of highly radioactive waste that will require permanent storage. In addition, utilities have demonstrated the potential of interim storage over the past four decades, as they safely kept spent nuclear fuel while waiting for the government to take title of the material. The most appropriate policy will likely combine on-site, interim, and permanent storage with recycling.

8. Recognize that nuclear weapons are not the result of peaceful nuclear energy programs.

Nuclear energy critics often argue that the threat of nuclear weapons proliferation outweighs any potential benefits of nuclear power. While civilian nuclear power has been used to clandestinely pursue nuclear weapons programs in the past, there is no causal link between the two. As has been demonstrated consistently throughout history, states act in their interests and generally behave according to agreed norms only to the extent that doing so advances their national objectives. Therefore, limiting the technology development of peaceful nations will not serve to limit the threatening behavior of other nations. With very few exceptions, law-abiding countries do not divert their energy programs for weaponry.

9. Modify international nuclear regimes to better manage a global nuclear renaissance.

The prevailing thrust of global nonproliferation policy has been to keep weapons out of the hands of non-weapons states. The grand bargain of the Nuclear Nonproliferation Treaty was that its parties would have access to all nuclear technology so long as it was not weaponized. This allowed countries like Iran and North Korea to operate within the letter of the treaty while amassing technology to begin a weapons program. With the growth of nuclear power, the focus should be on the fuel cycle. Rather than be based on five nuclear weapons states, the nonproliferation regime should be based on a limited number of nuclear diverse fuel states. Some countries could still pursue nuclear weapons, but by focusing on fuel cycle activities, this nonproliferation regime would make such nations much easier to identify, because they will have moved beyond the bounds of international norms much earlier in the process.

10. Pursue nuclear power programs that make the U.S. government work better.

Because of the integrated nature of the nuclear industry, government programs work symbiotically with the private sector. The United States should not fund programs simply to support the nuclear industry; legitimate programs, however, will assure that the United States maintains critical capabilities

that nuclear technology uniquely provides and serve as vital investment in essential intellectual capital. For example, growing the Navy's fleet of nuclear submarines and surface ships will help meet critical national security requirements and strengthen the domestic commercial industrial base. Rationalizing, streamlining, and modernizing the nation's nuclear weapons complex and the Department of Energy laboratory system would not only save taxpayers money but would also strengthen domestic nuclear capability.

These programs not only make financial sense and provide significant operational upgrades but also demonstrate U.S. commitment to nuclear energy. These are the most important activities that the government can undertake to stimulate the nuclear industry, and undertaking them bolsters private-sector investor confidence. Ultimately, these steps would lead to a robust nuclear industrial base and the development of the skilled personnel base required to support an expansion of nuclear power in the United States.

Conclusion. The United States risks cementing its status in the second tier of commercial nuclear power states unless it takes action. While European and Asian companies aggressively work to meet the emerging demands of a growing commercial nuclear market, America's industry has lost its capacity, intellectual expertise, and competitive edge. For economic and national security reasons, U.S. policy must change to better promote and manage the growth of nuclear power.

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