PART 2

Science and Technology Policy in the New Administration

On June 25, 2001, President George W. Bush announced his intention to nominate John H. Marburger, III, director of Brookhaven National Laboratory to be director of the Office of Science and Technology Policy. This decision put an end to nearly seven months of concern and speculation in the S&T policy community over who would be providing scientific advice to the new Administration. Part 2 contains four chapters that look at the process of selecting Presidential science advisors, provide some recommendations on streamlining the appointment process, offer suggestions on improving S&T policymaking, and give some hints as to the direction of U.S. science policy for the next four to eight years.

In Chapter 2, President Bush's economic advisor, Lawrence B. Lindsey, outlines the economic, energy, and environmental challenges that the new Administration faces, and the role for science and technology in providing answers. Lindsay says, "We all know that scientific research lies behind our nation's long-term economic success. Good science is also the key to both defining and addressing many of the great policy challenges facing the country." Since many of these issues are interdisciplinary in nature, the appropriate public policy must also be interdisciplinary. According to Lindsey, not only are economics and engineering involved, "But so too are physics, biology, chemistry, and environmental science, and since we are talking about public policy, both law and political science...."

Lindsey also addresses the reasons for the Administration's opposition to the Kyoto Protocol. He states that the Protocol could not only "damage our collective prosperity and, in so doing, actually put our long-term environmental health at risk," but impede the nation's ability to meet energy needs and economic growth. He states that public policy should encourage efficiency, "not dictate austerity." Instead, Lindsey lobbies for the Administration's plan that would focus on reducing energy waste without impinging on the country's economic growth.

Former Secretary of Energy and president emeritus of the Consortium for Oceanographic Research and Education (CORE), Admiral James D. Watkins USN (Ret.) is the author of Chapter 3. Watkins somberly begins by outlining some of the S&T policy failures he has witnessed throughout his career; from the mismanagement and cancellation of the Superconducting Super Collider, to the government's inadequate preparation for the UN Conference on Environment and Development in Rio de Janeiro. He finds the nation's S&T policy-making process "antiquated, ineffective, and inefficient," and in need of radical restructuring. In order to repair these problems, he offers a number of suggestions directly to the new President. Among these are: appoint a presidential science advisor to whom you will actually listen; direct the Office of Management and Budget to track S&T separately from R&D; and help bring the Department of State and its congressional authorizing and appropriations committees into the S&T arena. He writes: "Mr. President, the timing seems to be right to do all of this. Fortunately our information also says that Congress would be receptive to such a broad S&T restructuring process, one which cries out for top-level attention."

David H. Guston of Rutgers, The State University of New Jersey, E.J. Woodhouse of Rensselaer Polytechnic Institute, and Daniel Sarewitz of Columbia University's Center for Science, Policy, and Outcomes give additional S&T policy advice to the new Administration in Chapter 4. In their paper, the authors advocate social outcomes based science policies for R&D management and public accountability. They write: "Publicly funded science is not an end in itself, but one tool among many for pursuing a variety of societal goals." They find that the executive branch lacks the structure needed to achieve integrated policymaking, and suggest increasing the interaction and integration between science policy and other policy areas. Guston, et al. advise the President to "appoint people with substantial knowledge and experience in R&D policy to high positions in relevant nonscience agencies." In order to increase public accountability, they recommend creating public fora for discussing R&D policy and integrating evaluation and social impacts research into all major federal research programs.

Part 2 concludes with the National Academies' Committee on Science, Engineering, and Public Policy (COSEPUP) report, "Science and Technology in the National Interest: The Presidential Appointment Process." The report addresses the importance of selecting qualified people to fill the 50 most sensitive and influential S&T policy posts, and the need to lower the obstacles inherent to the process that create barriers to public service. COSEPUP recommends that the transition team have expertise in S&T; that the candidate pool for presidential appointments be "broad and deep;" and that the President and Senate should "adopt the goal of completing 80 to 90 percent of appointments within four months, which was the norm from 1964 to 1984."

2 Science and Technology in the Bush Administration

Lawrence B. Lindsey

The Bush Administration is committed to changing the way things are done in Washington. Fundamental to this effort is our commitment to be candid with the American people about our national challenges. We have major national challenges in dealing with our economy and our national energy situation, and in protecting our environment. They are interrelated, and success will require creativity as well as a willingness to confront facts and avoid ideologies and preconceptions.

We all know that scientific research lies behind our nation's long-term economic success. Good science is also the key to both defining and addressing many of the great policy challenges facing our country. Ultimately it will belong to the scientists to lay the foundation for new technologies and increase our understanding of the world around us. Their work will enable our nation to address these important policy challenges.

During the campaign, then-Governor Bush spoke of energy as a storm cloud forming over the economy. America's reliance on energy had continued to grow, but its supply had not kept pace. We now know the consequences. A few years ago, many people had never heard the term "rolling blackout." Now everybody in California, and across the country, knows the term all too well. The rest of America is starting to wonder when these rolling blackouts might roll over them.

It is only reasonable for Americans to ask if California is once again foretelling a national trend. Throughout the country, we have seen sharp

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increases in fuel prices, from home heating oil to gasoline. In parts of the Northeast, communities face the possibility of electricity shortages this summer. Energy costs as a share of household expenses have been rising, and families are feeling the pinch.

Similarly, we confront a potentially major challenge in human effects on the global climate. We also face the need to improve the quality of the air we breathe and the water we drink. But without a clear, coherent energy strategy for the nation based on hard data and sound science, all Americans could one day go through what Californians are experiencing now, or even worse.

As the situation in California now makes clear, the absence of such a strategy means we will neither have energy nor a clean environment. We know, for example, that less efficient and more polluting generators will be used to provide needed electricity this summer than would have been the case had adequate planning taken place. We know that fish and wildlife, which depend upon adequate water sources, will have less water because of the California energy crunch.

It is inaction that forces us to choose between energy and the environment. It is careful planning and maximum use of science and technology innovations that allow us both the energy we need and the clean environment we have a responsibility to protect.

Most decisions in government are interdisciplinary in nature, and bringing them together can be a source of enormous frustration for the scientist, the economist, or the businessperson when he or she enters the public sector. I have been privileged to have enjoyed a variety of career paths, having continuously rotated among jobs in academia, the private sector, and government. What is always striking to me when I shift jobs is the change in vocabulary that goes along with it. For example, the meaning of the term "cost-benefit analysis" varies as one shifts from teaching economics to working in business, and changes again when one enters government. The same is true of the term "sound science."

This confusion only begins with language. The fundamental objectives of academic, business, and public sector decision making are different. This means that different questions are asked and different issues are considered important. Someone steeped in one paradigm would naturally be puzzled by the decision-making processes used in a different paradigm. Worse, these differences are magnified when those in positions of influence—the press and public officials for example—fail to understand any of these paradigms, and instead operate under their own paradigm that exploits every possible appearance of controversy.

The result is widespread public confusion and misinformation, which ultimately makes sound decision making in the public sector more difficult.

This situation has been years in the making; it will take years to overcome. In January 2001, President Bush directed the Vice President to form a Cabinet-level task force to recommend a new national energy strategy. In March, he ordered the creation of a Cabinet-level group to work on global climate change. The meetings of both groups are "principals only." This means that the decisions of the group are not going to be part of a bureaucratic process of give-and-take, where the language of the least common denominator prevails. The members of both groups are senior decision-makers of this Administration. They are the ones who are accountable to the President, the Congress, and the public for rendering their best judgment. These issues are not being relegated to some nameless and faceless bureaucrat or to some ill-defined "process." Far from putting difficult decisions on some back burner, the President has put these issues at the top of the menu. To my knowledge, there has never been such a commitment of so many of the top decision-makers in the executive branch to any policy working group.

One of the best attributes of these high-level groups is the diversity of backgrounds in their membership. As a result, these groups are a natural for discussing the interdisciplinary nature of the challenges of formulating a national energy strategy and studying the issue of global climate change. The first step in our process has been to go back to school. We have been meeting with some of the leading experts in the country on these subjects, listening to their analyses, reading what they have written, and questioning them. This is a process that speaks of seriousness and concern about the need to craft the right long-term solution.

One cannot stress enough the interdisciplinary nature of determining appropriate public policy regarding energy and the environment. Obviously, economics and engineering are involved in the process. But so too are physics, biology, chemistry, and environmental science, and since we are talking about public policy, both law and political science are invaluable.

To some the task of providing energy and economic growth is incompatible with preserving a clean environment. But the data suggest that science, technology, and sound economic and public policy do make both possible. Since 1973, the U.S. economy has grown four times faster than our energy use. If we had continued to use energy as intensively as we did in 1970, last year we would have consumed over 168 quadrillion BTUs (British thermal units), compared to the 94 quadrillion actually consumed. That 74 quadrillion BTUs difference is the equivalent of 1,350 (1,000 megawatts) power plants.

Historically, U.S. carbon dioxide emissions have grown at less than half the rate of the Gross Domestic Product (GDP). In recent years, however, very robust growth in the nation's GDP has been accompanied by a slowdown in the growth of greenhouse gas emissions. In both 1998 and 1999, U.S. GDP grew by more than four percent each year while carbon dioxide emissions grew by less than 0.15 percent per year and was 1.3 percent in 1999. In addition, the overall carbon dioxide intensity of the U.S. economy (that is, the amount of carbon dioxide emitted per unit of GDP) declined by 15 percent over the course of the 1990s.

Our success in reducing other, more immediately health-threatening emissions has been even greater. Since 1970, for example, the economy has grown nearly 125 percent. But our emission of sulfur oxides is down 36 percent, and we have 98 percent less lead in our air. We have cut nitrous oxide emissions almost in half per unit of GDP.

These successes are due to major improvements in technology. For example, technology has already led to significant reductions in pollution from coal-fired plants. Today, emission scrubbers can reduce the amount of sulfur dioxide emitted by over 90 percent. Coal currently provides half of all the fuel for electricity generation in this country and will, of necessity, play an important role for decades to come.

But, further progress is still possible. Two-thirds of the energy used in a conventional coal-fired power plant is wasted in the production of electricity. These losses can be minimized through a number of innovations, including installing high-efficiency steam turbines, reducing steam leaks, and using software to optimize combustion efficiency. New coal-burning power plants can achieve efficiencies of over 40 percent using existing technology. And companies are investing in the search for even more efficient technologies. In addition, wasted energy can be recycled for use in industrial processes or for heating buildings. A family of technologies known as "combined heat and power" can achieve efficiencies of 80 percent or more.

Technology also allows us to make efficient improvements in our use of energy on the demand side. For example, advanced sensors and controls enable buildings and factories to be operated more efficiently, allowing equipment and lights to be turned off or dimmed when not in use. These technologies are already being offered in the marketplace. Energy management companies now offer their services to reduce demand for energy by final users, and tie their profits to the energy fees being charged.

New technologies are allowing the market to work even better. One clear example is time-of-day pricing. For any locality, optimal electricity generation is a diversified affair. High capital, low fuel-intense plants provide the base of production while low capital, high fuel-intense technologies provide peak generating capacity. The former are less polluting, but inefficient to operate on a peak-power only basis. Time-of-day pricing provides consumers an incentive to smooth out their electricity use, thereby minimizing the need for peak power production. Improvements in metering technologies allow a greater use of time-of-day pricing.

We can obtain the same type of improvements in energy efficiency by a more interconnected electric grid and more efficient electricity markets to fill those grids. These changes will require both technological and regulatory improvements to succeed. Furthermore, the lack of interconnection standards or guidelines for electricity supply impede the use of distributed energy technologies and load management techniques. As a result, developers of small, renewable energy projects must negotiate interconnection agreements on a site-by-site basis with local distribution companies, which are often opposed to distributed generation projects because of increased competition.

The list of potential gains from technology goes on and on. No doubt, some yet-to-be-developed technology will provide us with an even cleaner environment. The key point is not the individual technologies involved, but the fact that science and technology play a key role in making our lives better and our environment cleaner.

Let me add to that an economic fact of life: Science and technology, as well as the environment, prosper in a growing economy. Prosperity allows us to commit ever-increasing resources to cleaning up our environment and to developing the science and technology that will lead to future economic growth and environmental improvements. This is not principally the case for making larger commitments of public sector resources that are made possible by larger tax collections from a bigger economy. In fact, the great majority of scientific and technological advances and their applications take place in the private sector.

We can look at a bit of financial math. Currently, the average annual real rate of return on corporate investment in America is about nine percent. That includes both plant and equipment investment as well as investment in research and development. A stream of research that yields a nine percent return over a long period of time literally makes dreams come true. Stated simply, a nine percent return over a century in a new technology will lower the cost of doing something by a factor of 5,000. For example, Dennis Tito paid the Russians $20 million to be the first tourist in space. Given nine percent returns, the cost of a similar vacation in space in the year 2100 will be around $4,000 (in current dollars), a bit less than the current round-trip business class airfare from New York to London.

Similar investments over the previous century have brought down the cost of many products—from light bulbs to space flight. In 1900, a light bulb cost roughly $20 in today's money; today it costs 40 cents, lasts at least ten times longer, and uses a fraction of the electricity to generate the same amount of candlepower.

The benefits of actual technological change are even greater. One modern 100-watt incandescent bulb burning for three hours each night would produce 1.5 million lumen-hours of light per year. Today, it costs a worker making $30,000 per year about 40 minutes of labor to pay for the needed energy and light bulbs for the year. In the last century—before electricity—obtaining this amount of light would have required burning 17,000 candles, and the average worker would have had to toil almost 1,000 hours to earn the dollars to buy the candles.

Or consider space flight. Of course, this technology was impossible a century ago, but even 40 years ago, when President Kennedy assigned us the task of "sending a man to the moon and returning him safely to Earth," such a task was enormously expensive. The budget of the National Aeronautics and Space Administration (NASA) during much of the 1960s consumed nearly one percent of GDP, the equivalent of almost $80 billion per year today, and it took almost a decade of such spending to accomplish that task. Today, the entire NASA budget is just $13 billion.

This financial math is important when considering some of the biggest environmental challenges we face today. When confronting long-term challenges—and the environment is certainly one of these—investing in the research and development of new technologies, with actual applications decades in the future, is far more cost-effective than trying to continue with existing technologies.

The Kyoto Protocol

It is for precisely this reason that the Administration opposes the Kyoto Protocol to the United Nations Framework Convention on Climate Change. We believe the Kyoto Protocol could damage our collective prosperity and, in so doing, actually put our long-term environmental health at risk. Fundamentally, we believe that the Protocol will fail to significantly reduce the long-term risks posed by climate change and, in the short run, will seriously impede our ability to meet our energy needs and economic growth. Further, by imposing high regulatory and economic costs, it may actually reduce our capacity to find innovative ways out of the environmental consequences of global warming and to achieve the necessary increases in energy production.

First, consider the supposed benefits of the Protocol. Under the terms of the agreement, the estimated level of greenhouse gases expected in the year 2010 will instead be put off by a little over a decade. Few of the developed nations who say they support the treaty have, in fact, undertaken domestic policies to lend credibility to the assertion that they will meet the Protocol's targets. The two leading exceptions are Britain and Germany. In Britain's case, abandoning the intensive use of coal and switching to the use of new natural gas discoveries made the conversion fairly easy. In Germany's case, including the industrial base of the former East Germany in the treaty's 1990 base year made attainment easy. It would have been cost-effective to shut down much of East Germany's highly polluting electricity generation even without the treaty. Looking at the other nations, attaining the treaty's goals is not realistic. A further 27 percent reduction by Japan and a 22 percent reduction by Canada are as unlikely as the 30 percent reduction by the United States from its projected 2010 levels.

A large problem of the Kyoto Protocol is its lack of inclusiveness. Much of the projected growth in greenhouse gas emissions is likely to come from the developing world. How one deals with this issue is crucial to increasing the quality of life for the great majority of people on this planet and for controlling global warming.

It should also be noted that the Protocol does little to promote investment in new technologies even though these advances offer the greatest long-term potential reward in terms of both reducing the effects of global warming and raising the quality of life on the planet. Recall that technological solutions are most likely to succeed if investment and research are allowed to take place over a long period of time. The Kyoto

Protocol, by requiring dramatic up-front reductions in greenhouse gas emissions by those countries with the greatest ability to do such research, turns this on its head. The Protocol makes innovation largely irrelevant by imposing onerous restrictions before technological solutions can be developed. It compounds this problem by making no requirements for reducing greenhouse gas emissions over a much longer term or for mitigating the environmental effects of global warming.

Indeed, while the degree of uncertainty now associated with the science of global warming suggests some modesty about the degree of certainty attached to any action, the treaty requires that the United States and other advanced nations commit enormous amounts of resources to the project. These resources must be expended today, when uncertainty is high, while little is required in the distant future, when uncertainty might be significantly lower.

A Clinton Administration study estimated that the Kyoto Protocol would involve costs of between 0.6 percent and four percent of GDP. Electricity prices would run anywhere between 20 and 86 percent higher than current levels. Gas prices would increase between 14 and 66 cents per gallon. In light of the very limited environmental benefits, a commitment as structured as this is not prudent.

Worse, the Protocol goes out of its way to raise these costs. This anti-economic reasoning involves treaty-imposed inflexibility in allowing the use of a number of creative options. As a practical matter, proponents of the Protocol have worked against such promising solutions as reforestation and more sensible agricultural land use that would likely provide enormous quality of life externalities for people on all parts of the planet. We should not exclude these options from consideration.

It is natural that the United States government would object to a treaty that requires twice as much reduction in emissions from the United States as from Europe and Japan combined. This is not a judgment of the Bush Administration, but reflects a long-standing view of the political process. In 1997, the Senate approved a resolution by a vote of 95-0 to not ratify the Kyoto agreement in its present form. In last year's presidential election, neither party platform supported ratification of the Kyoto Protocol.

We oppose this failed attempt at negotiating a solution to the problem of excessive emissions of greenhouse gases. Sound public policy should encourage efficiency, not dictate austerity by telling families and businesspeople to restrict the efficient use of energy. While our plan reduces wasteful use of energy, it does not seek to shrink our economy or lower our living standards. People work very hard to get where they are. And the hardest working are the least likely to go around squandering energy, or anything else that costs them money. Our strategy will recognize that the present crisis does not represent a failing of the American people.

Conclusion

To speak exclusively of conservation, environmental protection, or increased energy production, is to duck responsibility for all the consequences of what one proposes. Sound, comprehensive energy, economic, and climate change policies require that we focus on multiple objectives. Happily, if we make the right decisions today and establish an environment where innovation can flourish, these objectives are achievable and mutually reinforcing. America's energy and environmental challenges are serious, but not insurmountable. Most importantly, it is impossible to understate the role that science and technology will play in solving these problems.

The bad news is that our short-term energy problems are likely to get worse before they get better. The good news is that America has a new leader who is strongly committed to long-term, responsible, and effective reforms that will improve both the environment and our supply of energy. Combined with the American people's unsurpassed ability to mobilize, innovate, and resolve problems, I am confident that our nation will be able to enjoy an ever-greater quality of life in the decades to come.

3 Advancing Innovation: A Call for Presidential Leadership

Admiral James D. Watkins, USN (Ret.)

I have witnessed processes related to the governance of science and technology initiatives at the national level from a variety of vantage points. As Chief of Naval Operations and a member of the Joint Chiefs of Staff in the 1980s, I watched science and technology (S&T) work well in national defense and eventually win the Cold War. Our strength was and remains the timely fielding of new threat-deterring technologies and systems born out of innovative research. Of course, during the Cold War, the Soviets provided the needed catalyst that forced us to institute an aggressive and sustained national security research and development (R&D) program. The Soviets could not win the frantic back-and-forth of this science and technology competition; they knew it, and finally gave up the race at Reykjavik, Iceland. We must not forget this lesson of the powerful S&T threat to the Soviets that came out of our accelerated R&D commitment to move away from the distasteful strategy of mutually assured destruction toward the more acceptable one of strategic defense.

Then, as chairman of President Reagan's Commission on the Human Immunodeficiency Virus Epidemic, I watched as my number one recommendation was ignored. I recommended that we work with states and researchers to develop suitable curricular material for K-12 human biology that was properly tailored to the level of student maturation and included in all required pre-college science curricula. Few, if any, received or cared about this message. My goal was to equip our youth with knowledge about their own physiology so they could become part of the solution to the many emerging and complex health-related problems.

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Youth would be exposed to the scientific basis on which they could "say no" themselves to self-destructive behavior instead of being pontificated to by adults. One of the eight national goals set by the 1989 National Education Goals Panel held in Charlottesville, Virginia, was that our students would be number one in math and science by the year 2000. As far as I know, only our fourth graders have come close to achieving that goal. The need for effective curriculum materials is obvious.

Subsequently, as Secretary of Energy at the decade's turn into the 1990s, I saw defense S&T begin to degrade in priority toward the end of the Cold War. The old habit of using the fear of the Soviets to drive so much of our national R&D effort became quickly outmoded. In its place were the terms "peace dividend" and "dual-use technologies." The drive toward "relevance" set the priority for future scientific investments. We saw the Department of Defense rapidly decrease its research portfolio. There was general apathy and little political support for maintaining a strong national scientific research base. In fact, for most of the decade of the 1990s, it was a monumental annual struggle to defend basic research needs for the Department of Defense, despite the exploding number of national security uncertainties facing us in the post-Cold War world. This world should demand more, not less, basic research and technology development to keep open all our options for addressing future unknowns. Of course, such a struggle has classically been the case in the nondefense agencies where support for R&D has always been an annual and difficult fight (except for the National Institutes of Health).

In the nondefense side of my Department of Energy work, I watched the sad story of the Superconducting Super Collider as it fell in 1992, to the new buzz word "relevance," to indifference to basic research and possible resultant new discoveries (e.g., high temperature superconducting materials), and to a totally unresponsive policy-making process in the area of S&T and foreign affairs. This was a loss of an exciting crusade to understand the fundamental makeup of matter.

I also watched the advocacy-only policy approach in dealing with the new and emerging challenge of global warming. Prior to the U.S. participation in the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, I witnessed our inadequate intergovernmental preparation. We had prepared no integrated and coordinated set of S&T objectives to parallel political advocacy. As a result, we can rightfully be criticized for being "down on" the emerging international protocols rather than being "up on" the good S&T-based

alternatives that offer reasonable balance with the real world of modest and sustained economic growth for our nation.

Finally, I have watched the emergence of a general public and congressional apathy toward using scientific justification to underpin good public policy legislation in such fields as national energy policy; nuclear, toxic, and hazardous waste management; and the reliability and safety of the nuclear weapons complex. In fact, many single-purpose "advocates" see using good science underpinning to effect rational public policy "as a thinly veiled threat to throw obstacles in the path of their advocacies."

From all of these vantage points, I have concluded that our nation's science and technology policy-making process is antiquated, ineffective, and inefficient. It needs radical restructuring to be competitive in the new dot-com and mono-polar world of the 21st century. I was questioned recently at a public seminar on the 43rd President and the 107th Congress, which was sponsored by the Center for the Study of the Presidency. Dr. David Abshire, the Center's president, asked me as a member of the S&T panel what I would advise the President on S&T. I would tell him the following:

Mr. President, one of the sad commentaries on our political process is the benign neglect too often assigned to one of the most powerful long-range drivers of a continuing strong national economy, healthy quality of life, and assured national security. This driver is an effective science and technology strategy and an efficient process for its implementation. Alas, few politicians are elected on the basis of their interest in such a thrust. Yet, repeated studies and reports have assessed our current S&T process at the national level as broken and in need of repair.

Below are a few of the studies and reports on S&T conducted over the past decade since the end of the Cold War.

Science and Technology in U.S. International Affairs. (January 1992. Carnegie Commission on Science, Technology, and Government.) Nothing was done until the year 2000.

The State-Federal Technology Partnership Task Force: Final Report. (Sept. 5, 1995. State-Federal Technology Partnership Task Force.) Report developed by 20-member Task Force created at the request of Dr. Jack Gibbons, and co-chaired by former Governors Celeste and Thornburgh. No lasting infrastructure improvements are evident as yet.

Allocating Federal Funds for Science and Technology. (1995. National Academy Press.) Frank Press, chair of the Committee on Criteria for Federal Support of Research and Development made 13 recommendations in this report. No real impact has been noted as yet.

Unlocking the Future: Toward a New National Science Policy. (September 24, 1998. U.S. House of Representatives Committee on Science.) Rep. Vernon Ehlers (R-MI) chaired the hearings for the House Science Committee and made a wide range of recommendations, which were published in this report. Little action has resulted to date.

The Pervasive Role of Science, Technology, and Health in Foreign Policy: Imperatives for the Department of States. (1999. National Academy Press.) Robert Frosch, chair of National Research Council Committee on Science, Technology, and Health Aspects of the Foreign Policy Agenda of the United States, provided this report in response to former Secretary of State Madeleine Albright's request for a blueprint to improve S&T in the State Department. Maybe it will reform, but not without strong external intervention by the new Administration and not without strong interest by the congressional science and foreign affairs committees.

Advancing Innovation: Improving the S&T Advisory Structure and Policy Process. (Winter 2000. Center for the Study of the Presidency.) This report headed up by David Abshire wrapped up ten years of expressed concerns and made many of the recommendations all over again.

What these leading national experts have all been saying, since the end of the Cold War, is that the current science and technology process is flawed. It needs considerable reworking to ensure maintaining, over the long term, a competitive U.S. world leadership position in nearly all matters that define our way of life. In ocean science and technology alone, the National Academy of Sciences (NAS) has published over 30 studies. No more studies are necessary.

So, Mr. President, here are just a few specific recommendations born out of all these reviews and studies that you and your new team should consider:

- Appoint a presidential science advisor with stature to whom you will actually listen. Then act on broad national S&T matters of import to the nation and the world on the basis of the advice you get. In addition, you should assign this individual as principal S&T advisor to the Director of the Office of Management and Budget (OMB). This will help ensure coordinated S&T budget guidance to those agencies involved in research, particularly those adopting structured R&D approaches where horizontal R&D budget integration is deemed important (e.g., ocean science and technology where 12 federal agencies are now integrated by law).

- Have your team work with the congressional Authorization and Appropriations Committees to encourage them to accept a five-year nondefense basic research budget from each of the major agencies with an S&T portfolio. This will add long-sought-after stability to the scientific research base. Congress has always allowed this for the Department of Defense and is now beginning to move in this direction selectively for other agencies [e.g., the National Science Foundation (NSF) for 2002 in selected areas]. This needs a further push from your Administration.

- Give guidance to your team to integrate R&D among federal agencies in those broad areas of science where they can receive mutual benefit from more structured interaction with one another by leveraging scarce research dollars. Ocean S&T successes are only the tip of the iceberg.

- Direct OMB to track S&T separately from R&D as defined by the NAS report. This will enable us to present a clearer picture of our long-term investment in the national science portfolio and better facilitate adjusting priorities and focus when appropriate. For example, we ought to double the NSF budget over the next five years so that investments in basic scientific research across all their core science areas will be more in balance with the basic research investment in health at the National Institutes of Health. To do this properly, we first need to know what our science portfolio is today.

- Revamp the existing Science Advisory Board structure so that the President's Committee of Advisors on Science and Technology, the Office of Science and Technology Policy, and the Office of Management and Budget are more interconnected with the Secretary of Energy Advisory Board, the Defense Science Board, the National Science Board, the National Oceanic & Atmospheric Administration Science Advisory Board, etc.

- Have your team work with the congressional leadership to encourage them to accept, in addition to the classic, vertically oriented budgets, a horizontally integrated budget for those S&T areas brought together in formally established multiagency partnerships. This has been done in the area of ocean science and technology under the National Oceanographic Partnership Act of 1996. In this connection, also encourage congressional leadership to hold periodic Joint Authorizing and Appropriation Committee hearings on selected, broad, cross-agency S&T matters to address interactive programs among participating multiple federal agencies. This will need a push from both you and the congressional leadership to overcome traditional committee jurisdictional problems.

- Help bring the Department of State and its Authorizing and Appropriations Committees on Foreign Relations into the S&T arena. Encourage them to do what the Frosch and Ehlers reports said to do. Congress must be an early and continuing partner when planning any large future investment that could be born out of promising research, particularly when international collaboration will be required. An example of the latter case would be the development and fielding of an integrated ocean-observing system for enhanced climate prediction modeling. This system has the potential to address the ramifications of global warming and population growth on health, agriculture, coastal hazards, etc. This is all now achievable because of rapidly emerging technologies. This process is already underway for the oceans but will need your support if it is to become self-sustaining.

- Establish a task force to integrate these and the remaining recommendations of the Center for the Study of the Presidency in their report *Advancing Innovation*, along with portions of the other reviews I highlighted that are still relevant to this matter. This task force should develop a broad S&T strategy for your consideration and implementation in close consultation with congressional leadership.

Mr. President, the timing seems to be right to do all of this. Fortunately our information also says that Congress would be receptive to such a broad S&T restructuring process, one which cries out for top-level attention.

If you do this, you will have given new life to one of our greatest national strengths, i.e., developing new technologies, born out of the finest research intellects and institutions in the world. Restructuring science and technology policy will help this nation maintain its economic competitiveness, quality of life, and national security in the 21st century.

4 A Science and Technology Policy Focus for the Bush Administration

David H. Guston, E. J. Woodhouse, and Daniel Sarewitz

With the administration of George W. Bush commencing under especially difficult political circumstances, careful consideration of science and technology (S&T) policy could well be relegated to the "later" category for months or even years to come. Science advocates may interpret early signs of neglect as a call to lobby Congress for a proposition that already has significant bipartisan support: still larger research and development (R&D) budgets. We believe that sound stewardship of publicly funded science requires a more strategic approach.

In FY 2001, the federal government will spend almost $91 billion on R&D. With anticipated increases in military R&D and proposed doublings at the National Institutes of Health (NIH) and the National Science Foundation (NSF) fueled by budget surpluses as far as the forecasts can project, next year's R&D budget could easily top $100 billion. How will President Bush assure himself and the U.S. public that this unprecedented expenditure is being put to good use?

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The traditional approach to the management and accountability of research involved relying on scientists themselves to do everything from asking the right research questions to making the connections between their research findings and marketable innovations. However, successive administrations have broken with this tradition over the past 20 years. During the Reagan era, the Bayh-Dole Act changed intellectual property law to provide monetary incentives to researchers and their institutions for engaging in commercial innovation. The elder Bush's administration more clearly articulated public questions for which scientific answers were sought, as exemplified by the U.S. Global Climate Change Research program. Strategic planning in research agencies, notably NIH, also began during this period, as did programs with more explicit social relevance such as the Advanced Technology Program (ATP). The Clinton administration created additional crosscutting initiatives in areas such as information technology and nanotechnology, implemented the Government Performance and Results Act (GPRA), expanded ATP, and pursued other programs aimed at particular goals, such as the Partnership for a New Generation of Vehicles.

Although these and similar policy innovations have been valuable, new challenges are arising as much from the successes of the earlier policies as from their shortcomings. In particular, although R&D budgets have been increasing in large part because of high hopes for positive social outcomes, some of the basic steps necessary to facilitate an outcomes-oriented science policy have yet to be taken. We believe that the needed policies can be crafted in a fashion consistent with both the values of a Bush administration and the rigors of bipartisan politics. Our recommendations fall into two broad categories: R&D management and public accountability. They focus on a vision of intelligent and distributed stewardship of the R&D enterprise for public purposes.

R&D Policy for Societal Outcomes

Publicly funded science is not an end in itself, but one tool among many for pursuing a variety of societal goals. More research as such is rarely a solution to any societal problem, but R&D may often combine with other policy tools to enhance the likelihood of success. Decision-makers need to view the problems they are confronting and the tools at their disposal (including R&D) in the broadest possible context. Only then can they effectively set priorities and make the tradeoffs necessary to develop effective and comprehensive policies.

Health and health care, for example, encompass a notorious amalgam of policy considerations that include advancing the frontiers of science, ensuring access to an increasingly expensive medical system, safeguarding the workforce and the environment, promoting behavior that improves health, and dealing with the societal implications of an aging population. Effective health policy will necessarily address a portfolio of options relevant to each of these interrelated areas. Analogous arguments apply to issues as diverse as entitlement reform, education, workforce development, and foreign relations.

R&D management in the executive branch is not yet structured to achieve such integrated policymaking. Previous efforts to craft more integrative science policies focused on overcoming agency-based balkanization of R&D activities. The National Science and Technology Council (NSTC), and the Federal Coordinating Council for Science, Engineering, and Technology that preceded it, facilitated cross-agency communication and cooperation in S&T matters and coordinated research efforts on problems of national or global import, such as biotechnology and climate change. By and large, however, these efforts considered policy actions that were internal to the research enterprise. (One exception has been the interaction between the NSTC and the National Economic Council in the area of technology policy.) Thus, not only has science policy not been integrated with related areas of policy, but it has also remained marginalized in the federal government as a whole.

This marginalization is not necessarily bad for R&D funding. Increasing generosity toward NIH can be interpreted as fallout from the collapse of larger efforts to reform the health care system. But this exception proves the rule: While biomedical science flourishes, the health care delivery system remains chronically dysfunctional, and levels of public health remain disappointing compared to those of other affluent nations.

Better integration of science policy with other areas of policy is a top-down activity that must be initiated by the White House. One important step would be to appoint people with substantial knowledge and experience in R&D policy to high positions in relevant nonscience agencies. In some cases, new positions may need to be created as a first step toward treating policy in a more integrated fashion. An example of such a position is the undersecretary for global affairs at the Department of State, created by President Clinton to take responsibility for many complex issues that include a scientific component, such as global environment and population. In a parallel move, President Bush should appoint people with deep understanding of relevant social policy options at high levels in the major science agencies and on advisory panels such as the National Science Board and the President's Committee of Advisors for Science and Technology.

Crosscutting mechanisms such as NSTC need to be reconfigured and reoriented so that they can consider the full portfolio of policy responses available to address a given issue. For example, although previous NSTC reports on subjects as diverse as nanotechnology and natural disaster reduction have done a reasonably good job of situating their discussions in a broader social context, their recommendations have been limited to simple calls for more research. Yet it is impossible to know what types of research are likely to be most beneficial without fully considering the other types of policy approaches that are available. A Committee on Science, Technology, and Social Outcomes should be added to NSTC to coordinate the federal government's social policy missions through research and to spur attention to policy integration in NSTC as a whole. One specific task of the committee could be to build on the General Accounting Office's congressionally mandated research on peer review to examine how the R&D funding agencies incorporate social impact and other mission-related criteria into their review protocols.

Finally, recurrent calls for greater centralization of science policy—in particular the creation of a Department of Science—should be resisted, as should suggestions to create the position of technology advisor separate from the president's science advisor. The real need is for better integration of science policy with other types of social policy, rather than for greater isolation of science policy.

Public Accountability

The explosion of public controversy over genetically modified foods and the publication of Bill Joy's now-famous article in *Wired* about the potential dangers of emerging nanotechnologies are recent examples of a trend with profound implications for future R&D policy. In essence, it appears that citizens in affluent societies are insisting on much greater and more direct public influence over the direction of new technologies that can transform society in major ways. Failure to engage this trend could have a profoundly chilling effect on public confidence in S&T.

Mechanisms are needed that will enhance public participation in the process of technological choice, while also ensuring the integrity of the

R&D process. Two types of approaches can easily be implemented. The first is to create public fora for discussing R&D policy and assessing technological choices. The second is to integrate evaluation and societal impacts research into all major federal research programs.

Public Fora

A decade ago, the bipartisan Carnegie Commission on Science, Technology, and Government recommended the creation of a National Forum on Science and Technology Goals, aimed at fostering a national dialogue on R&D priorities. Little progress has been made in this direction, although it remains a useful idea. To be successful, any such process will need to ensure broad participation focused on particular regions or particular types of S&T, or both. The recently completed National Assessment on Climate Change, despite its considerable shortcomings, at least demonstrates the organizational feasibility of this sort of complex participatory process even in a large nation. At a smaller and more distributed scale, consensus conferences and citizens' panels have demonstrated the ability not only to clarify public views as a basis for policy decisions, but also to increase public understanding about particular types of innovation and to reaffirm all participants' faith in government by the people.

How might such processes play out? Consider the specific case of benign chemical syntheses and products, often called "green chemistry." As recently outlined in *Science* by Terry Collins, the promise of safer chemicals is profound. Yet few on the Hill, at the agencies, or even among the major environmental groups have heard much about benign chemical R&D. NSF has devoted no special attention to this area of research, despite a far more pressing societal rationale for it than for the well-funded initiatives in nanotechnology and information technology. Scientific societies and other traditional players have little incentive to act, despite the potential for major health, environmental, and commercial benefits. Yet chemicals in the environment are an issue of huge public concern. Public fora on chemistry R&D could allow interested people to learn about options and opportunities, to work with critical stakeholders to consider whether benign chemistry should be higher on the federal R&D agenda, and to compare the potential costs and benefits of green chemistry to other uses of public R&D dollars. Far from being a threat to science, such enhanced public participation is likely to be highly beneficial.

Research on Outcomes

Public fora on R&D priorities need to be supported by knowledge about how R&D programs achieve their goals and about alternative innovation paths and their potential implications for society. Current programs in the ethical, legal, and social implications (ELSI) of research attached to the Human Genome Project and the initiatives in information technology and nanotechnology are a tentative step in this direction. The ELSI programs set aside a small percentage of the research program's budget for peer-reviewed research on societal aspects of innovation. But this work is not sufficiently integrated into either the science policy process or natural science and engineering research to have much impact. To increase its public value, the concept of ELSI needs to include two additional elements: policy evaluation of R&D programs and integrated social impact research.

First, ELSI programs have generally not supported research to evaluate how well the core natural science research initiatives select and achieve social goals. Such evaluation research could build on the research agencies' own efforts at evaluation under GPRA, which have typically been competent but lackluster. Although a set-aside for evaluation would not necessarily feed directly back into the decisions that research agencies make about their programs, it would both broaden participation in research evaluation and provide useful information for the agencies, the Congress, and public groups interested in governmental accountability.

Second, we believe that ELSI-type programs must be structured to cultivate collaboration between natural scientists and social scientists on integrated social impact research. Such research would improve our ability to understand the societal context for important, rapidly advancing areas of research and to visualize the range of potential societal outcomes that could result. Prediction of specific outcomes is of course impossible, but much can be learned by developing plausible scenarios that extrapolate from rapid scientific advance to potential societal impact. By expanding on well-established foresight, mapping, and technology assessment techniques, social impact research programs would identify a range of possible innovation paths and societal changes and use this information to guide discourse in the public fora on R&D choices and to inform decisions on R&D policy. The potential value of such knowledge has been recognized at least since John R. Steelman's 1947 report *Science and Public Policy*, which recommended "that competent social scientists should work hand in hand with the natural scientists, so that problems may be solved as they arise, and so that many of them may not arise in the first instance."

Every significant federal research program should include policy evaluation research and integrated social impact research, supported at a modest proportion—five percent should be sufficient—of the total program budget.

The structures and strictures of U.S. science policy focus so strongly on budgetary concerns that the organizational and management implications of the dynamic context for science in society receive remarkably little attention. Intelligent policymaking in complex arenas inevitably involves learning from experience, adroitly readjusting priorities as once-promising ideas play out and as new opportunities arise. But trial-and-error learning is far from easy, in part because cognitive and institutional inertia builds up around the existing ways of doing things and in part because government has not yet fully learned how to take advantage of the ability of its officials and the general public to learn.

In our view, therefore, the major science policy challenges for the new administration are to improve its ability to manage the burgeoning R&D enterprise for the public good, to enhance the capability of publicly funded R&D institutions to respond to the public context of science, and to ensure that the scores of billions of dollars in R&D funding represent an intelligent, considered, and well-evaluated investment and not the mindless pursuit of larger budgets. We believe that the two broad areas of action recommended here can provide a starting point for a politically palatable, and even potent, science policy agenda.

5 Science and Technology in the National Interest: The Presidential Appointment Process

Committee on Science, Engineering, and Public Policy, The National Academies

Introduction

Central to the federal role in promoting and managing research are some 80 senior scientists and engineers appointed by the President and confirmed by the Senate. The positions listed [at the end of the Chapter] are 50 of the most sensitive and influential of these positions that we believe should be filled as soon as possible by each new administration.

High-quality appointees are crucial in providing guidance on changing societal issues (especially those which pertain to the "new economy"), managing large research and development programs, and overseeing regulatory activities that have large technical components. Our own experience leads us to believe that the quality of past appointees has been high and that the nation's global leadership depends on continued success in recruitment. However, we and many of our peers are concerned that the pool of talented people drawn to the nation's capital is reduced by the growing obstacles to government service.

A series of relevant reports have illuminated shortcomings in the appointment process—not only in S&T, but in every field. An increasingly complex web of restrictions makes it difficult for appointees to enter

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government service and then resume their careers after government service. Despite sound suggestions for improvements, conditions have remained the same or worsened.

We believe that the many deterrents to government service identified in this and similar reports can be reduced by initiating the nomination process earlier, reducing financial and professional obstacles to service, and shortening key phases of the approval process. In the remainder of this report, we focus on those three essential steps, using the information in the earlier reports as a basis. Information from these past reports is indicated by superscript references to the list at the end of this report.

More details on our methodology and background data on our findings are available at our Web site at www.nationalacademies.org/presidentialappointments.

Finding 1

Timely selection of scientists and engineers is important.

Recent decades have seen a steady increase in the number and complexity of issues coming before the President.[5] These issues arise from increases in scientific knowledge and technological development, their application in society, and increased understanding of their impact on society. Resolution of such issues requires S&T expertise and balanced judgment.

For a new administration, a fast start in identifying and nominating highly qualified scientists and engineers to fill key positions is important—beginning with the assistant to the President for science and technology (APST). Initiating the appointment process for other key S&T leadership positions early is also important because appointees need to be in office by late spring or early summer if they are to interact with Congress on the current budget submission and to begin preparation of the next. To meet that deadline, the President needs to submit nominees to the Senate no later than April.

A "qualified" candidate for an S&T presidential appointment would likely have an advanced degree (probably a doctorate) in science or engineering, management and leadership capability, and a good reputation among peers.

The President-elect needs a trusted and respected APST-designee as early as possible to help identify S&T leaders for agencies and departments, set initial policy priorities for the new administration, and address budgetary questions concerning S&T investments in health, defense, energy, and other major components of the imminent budget message to Congress. That person also should have connections within the S&T community to make it possible to identify qualified candidates for S&T leadership positions in the new administration.

Recommendation 1

Initiate the appointment process for key S&T leadership early.

The first step toward building technical competence in the new administration is to ensure that the transition team has expertise in science and technology. In advance of the election, each presidential candidate should appoint advisors with S&T experience to their transition team.

Soon after election, the President-elect, with the guidance of these advisors, should identify a respected and compatible candidate for the position of APST. This should be a person who can advise the new President on strategic planning and who is familiar with major issues that require daily attention. The approval process for the APST should be put on a cabinet-level fast track.

The APST should be both a senior member of the White House staff, consulting on policy and budgetary issues, and the director of the statutory Office of Science and Technology Policy (OSTP). Once identified, the APST-designee should work with the transition team quickly to begin the process of identifying and recruiting scientists and engineers for S&T leadership posts (see “50 Most Urgent Science and Technology Presidential Appointments”). A list of candidates should be submitted to the President-elect as early as possible.

Finding 2

The pool of talented S&T candidates for presidential appointments is less broad and deep than it should be.

To make the best use of the nation’s S&T expertise, the President must be able to draw on a broad and deep pool of talent. That is not now the case. In a recent poll of all presidential appointees, only 11 percent said that their fellow appointees represented the “best and brightest,” whereas 79 percent reported that they were a “mixed lot”—some highly talented, others less so. Respondents also said that just over one-third deserved a grade of "high competence" for their service in government.[2]

In our collective experience, many prospective candidates refuse even to be considered for government posts. The pool of qualified candidates for presidential S&T appointments is insufficiently broad (representation from industry is low) and deep (some qualified candidates do not agree to enter the pool).

No records are kept of how many people have declined nomination or withdrawn early or their reasons for doing so. However, we can analyze the institutional origin of appointees just before nomination as a surrogate measure. As shown in Figure 1, the percentage of S&T appointees who came directly from industry declined significantly from 25 percent in the Reagan-Bush years to 12 percent in the Clinton years. Of particular concern is the low representation of people with managerial experience in the pharmaceutical, chemical, and information-technology industries. Recruitment of leaders in emerging fields (for example, biotechnology and information technology) is especially difficult.

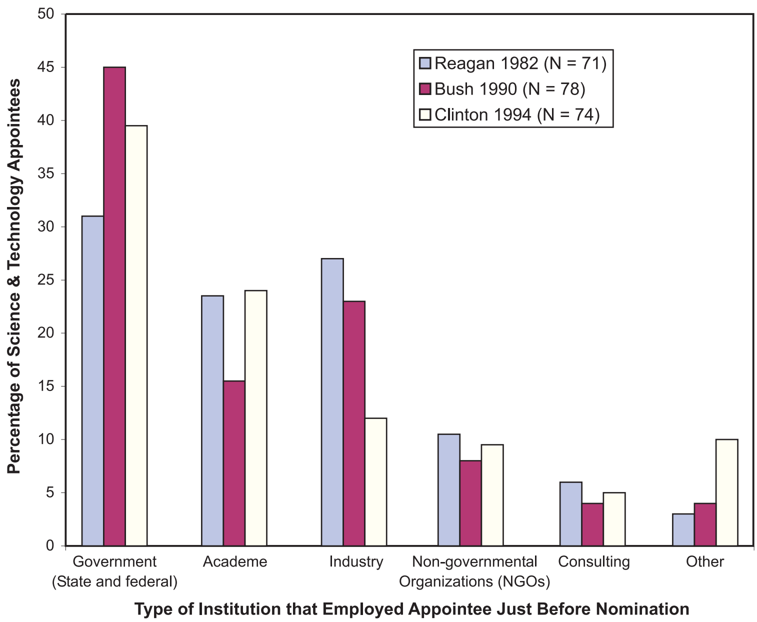
The attractiveness of government service to scientists and engineers is often diminished by professional losses (the need to interrupt research, an irreversible career shift toward management, and time away from a fast-moving field) and financial losses (unduly complex and restrictive preemployment and postemployment requirements).

One cause of decline that a new administration can help to control is preemployment and postemployment restrictions. Sensible standards clearly are necessary to prevent conflicts of interest, but we believe that the number and complexity of requirements have risen steadily and to the point where they deter potential candidates from accepting presidential appointments.

A move to Washington, DC to undertake an appointment might require severing all ties with employers; forgoing pension benefits; selling stock, options, or other financial interests in companies at unfavorable terms; and forgoing options that are not yet vested (a particular problem for those in emerging fields). The recent discussion of the options provided by a company to one of the vice-presidential candidates is an example of the financial losses that might be incurred if an appointment is accepted.

Departure from Washington can also carry restrictions for science or technology appointees. These restrictions can include permanent bans from any attempts to influence the government on matters in which they participated, two-year prohibitions against communicating with the

Figure 1
Science and Technology Appointees in the Second Year of the Reagan, Bush, and Clinton Administrations by Institutional Background.



Source: Data collected by the National Academies' Panel on Ensuring the Best Science and Technology Presidential Appointments.

government on matters that were pending during service, and bans from communicating with one's former agency. The restrictions can curtail one's professional postgovernment options, especially in industry.

Furthermore, variations in preemployment and postemployment restrictions among agencies, departments, and congressional committees create an environment of uncertainty and inequity for appointees. All those entities can impose supplemental restrictions or specific interpretations. For example, see *www.usoge.gov/usoge006.html#supplemental*.

In sum, on the basis of our experience, we believe that the decline in the number of S&T appointees from business and industry from the Reagan-Bush years to the Clinton years is due not to philosophical differences between the two parties, but rather to the preemployment and postemployment restrictions.

The panel found, in its discussions with members of the legal community, that because many of the restrictions cited above are statutory, few substantial changes can be made without the participation of Congress. For that reason, the executive and legislative branches share the responsibility for reducing the obstacles to public service for S&T leaders. Changes in preemployment and postemployment restrictions and requirements would need action by both.

Recommendation 2

Increase the breadth and depth of the pool of candidates by reducing the financial and vocational obstacles to government service.

The President-elect should make every reasonable effort to increase the "breadth and depth of the pool." This can begin with basic steps to improve recruitment, such as ensuring S&T expertise in the Office of Presidential Personnel. The President-elect can also make more effective use of recruiting by departments and agencies. Similarly, academe, industry, and disciplinary societies should actively encourage midcareer scientists and engineers to take leadership positions in the federal government.

Because the next transition is just around the corner and the nation needs to recruit from a broad and deep pool of qualified appointees, the executive and legislative branches should take action immediately to reduce as many financial and vocational obstacles as possible.

Since both the executive and legislative branches share responsibility for reducing the obstacles to public service, the President and Congress should establish a bipartisan framework—that includes representatives of the executive branch, Congress, and the Office of Government Ethics—to identify actions that should be taken by the President and Congress to broaden and deepen the pool of qualified persons willing to consider presidential appointments.

Specifically, the bipartisan framework should clarify and standardize preemployment and postemployment restrictions, strive to reduce unreasonable financial and professional losses for those who serve, and suggest other ways to enlarge the pool of qualified candidates.

Some specific changes that could be evaluated are a *de minimis* rule (limiting required divestiture if only a small percentage of a company or a small portion of one's assets is involved), reduction in the restrictiveness of blind trusts, continuation of health-insurance and pension-plan coverage, and maintenance of equitable treatment of the unvested portion of options.

We are reluctant to recommend a framework because of the time needed to form and implement such an activity. However, given the many reports issued on this topic in the last ten years and the complicated legal nature of the issues, a bipartisan discussion among the parties involved seems to be the only answer where long-term solutions are needed.

Finding 3

The appointment process is slow, duplicative, and unpredictable.

As shown in Figure 2, the time to complete the appointment process has steadily increased in recent years. From 1964 to 1984, almost 90 percent of presidential appointments were completed within four months—from the time that appointees were informed by the White House that they were being considered for appointment to Senate confirmation. From 1984 to 1999, only 45 percent of appointments were completed within four months.[2]

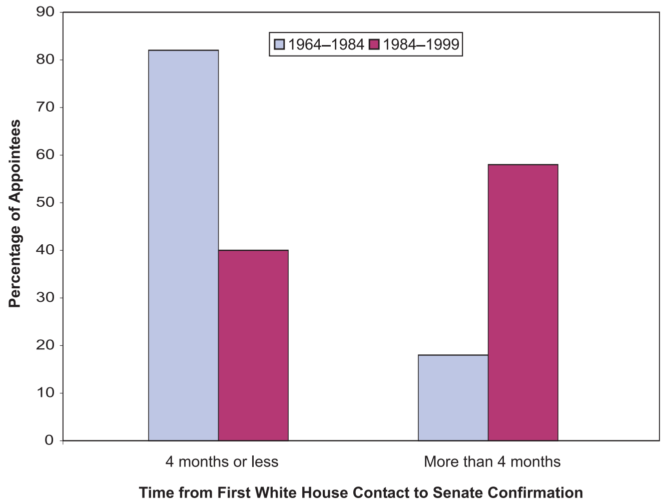
The President has control over only the prenomination portion of the process. This includes the timeliness of identification, recruitment, and checking the background of potential candidates as well as the timing and timeliness of the checks performed by the Federal Bureau of Investigation (FBI).

The current prenomination evaluation of a candidate is linear. The background check on a candidate is not begun until a number of other steps are completed. Because a check for a political appointment includes issues beyond those for a security clearance, the clearance process is repeated by the FBI for all persons who have not already had political-appointment clearances.

Many scientists and engineers—especially those who might be asked to serve in the largest mission-based agencies (for example, the Department of Defense and the Department of Energy)—already have high-level security clearances, which could be used to jump-start the more extensive clearances for a presidential appointment.

Moreover, White House tracking procedures frequently fail to provide timely reports to candidates while they are making their way to nomination status. That is often the time when prospective nominees

Figure 2
Time for Nominees to Complete the Presidential Appointment Process, 1964–1984 and 1984–1999.



Note: time to complete the presidential appointment process is defined in the report below as the time between first White House contact indicating consideration for appointment and Senate confirmation.

Source: The Merit and Reputation of an Administration: Presidential Appointees on the Presidential Appointments Process, *page 8. The Brookings Institution and The Heritage Foundation, April 28, 2000.*

are most in need of information from the White House. After nomination, the legislative-affairs and related offices of the department or agency involved typically take the lead in shepherding nominees through the Senate and providing update information.

One recent nominee reported: “I assumed that this was going to be a reasonably expeditious process … Had I known that I was going to be a ship adrift in the sea, I probably would have taken more personal initiative to ensure that the matter was being pushed along.”[2]

Recommendation 3

Accelerate the approval process for all nominees in S&T positions.

The White House should streamline its own approval procedures and work closely with the Senate to speed the appointment process. The President should, in collaboration with the Senate, adopt the goal of completing 80 to 90 percent of appointments within four months, which was the norm from 1964 to 1984. If additional personnel are needed to meet that goal, special funding should be requested from Congress to hire them.

The background investigations of candidates should be streamlined, incorporating results of previous investigations. The White House should improve its tracking system so that it can deliver timely reports to candidates on the status of their appointment during stages in which it has control over the process.

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For more information see www.nationalacademies.org/presidentialappointments

50 Most Urgent Science and Technology Presidential Appointments*

EXECUTIVE OFFICE OF THE PRESIDENT

White House Office

- Assistant to the President for Science and Technology†

Office of Science and Technology Policy

- Director†
- Associate Director for National Security and International Affairs
- Associate Director for Science
- Associate Director for Environment
- Associate Director for Technology

Council of Economic Advisors

- Chairman and members

Council on Environmental Quality

- Chairman

DEPARTMENTS AND INDEPENDENT AGENCIES

Agriculture

- Under Secretary for Research, Education and Economics
- Under Secretary for Food Safety

Commerce

- Under Secretary for Technology
- Administrator, National Telecommunications and Information Administration
- Director, National Institute of Standards and Technology
- Administrator, National Oceanic and Atmospheric Administration
- Under Secretary for Economic Affairs
- Director, Census Bureau
- Commissioner of Patents and Trademarks

Defense

- Deputy Under Secretary of Defense for Acquisition, Technology, and Logistics
- Director, Defense Research and Engineering
- Assistant Secretary of Defense for Health Affairs
- Assistant Secretary of the Air Force for Acquisition
- Assistant Secretary (Acquisitions, Logistics, and Technology), Army
- Assistant Secretary (Research, Development, and Acquisitions), Navy

Education

- Assistant Secretary for Educational Research and Improvement

Energy

- Under Secretary for Energy, Science, and the Environment
- Under Secretary for Nuclear Security‡
- Assistant Secretary for Energy Efficiency and Renewable Energy
- Deputy Administrator for Defense Programs
- Director, Office of Science
- Director, Energy Information Administration

Health and Human Services

- Assistant Secretary for Public Health and Science§
- Assistant Secretary for Planning and Evaluation
- Surgeon General§
- Director, National Institutes of Health
- Commissioner, Food and Drug Administration

Housing and Urban Development
Assistant Secretary for Policy Development and Research

Interior
Assistant Secretary for Water and Science
Director, US Fish and Wildlife Service
Director, US Geological Survey

State
Under Secretary for Arms Control and International Security Affairs
Under Secretary for Economic, Business, and Agricultural Affairs
Under Secretary for Global Affairs
Assistant Secretary, Oceans and International, Environmental, and Scientific Affairs
Assistant Administrator, Bureau of Global Programs, Field Support, and Research, Agency for International Development

Transportation
Administrator, Federal Aviation Administration
Administrator, National Highway Traffic Safety Administration
Administrator, Research and Special Programs Administration

Veterans Affairs
Under Secretary for Medical Affairs

Environmental Protection Agency
Assistant Administrator for Research and Development

National Aeronautics and Space Administration
Administrator

National Science Foundation
Director
Deputy Director

Notes

** This list is based on the panel's judgment as to which of the roughly 80 S&T positions are the most urgent. This list includes both positions that are important for science and engineering research policy and those that provide scientific and technical analysis to inform decision-makers on many societal issues.*

† In recent years, the same person has held the post of Assistant to the President for Science and Technology and Director of the White House Office of Science and Technology Policy (OSTP).

‡ This person currently also directs the National Nuclear Security Administration.

§ In recent years, the same person has held the post of Assistant Secretary for Public Health and Science and Surgeon General, but this has not always been the case.