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Neo-Conservative Science and Technology Policy -
The Rise of Science for Politics

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Science and technology policy in the government of the United States has traditionally been an area less subject to partisan politics than other areas of public policy. The ability to steer a course based on merit of scientific knowledge has been a foundation of the government's contributions to the advance of science and technology and its contributions to society.

Yet as science and technology advance and integrate into many facets of modern society, so too does the temptation to bend the course and conduct of science and technology to serve political purposes. The U.S. government's approach to science and technology policy has taken a significant shift in the past four years: "science for politics" has emerged as a dominant theme. This use of science for political ends reflects the enhanced role of science to strengthen political power and ideology, a form of *Neo-Conservative Science and Technology Policy*.

High priority issues in science and technology policy that reflect this paradigm include climate change, energy, the hydrogen economy, and advanced manufacturing technology. Science no longer informs these policies, but is a tool of politics.

These changes in the science and technology policy paradigm affect not just the approach to issues, but also the infrastructure and practices of science and technology. A politically driven approach is corroding the provision of high level scientific advice to policy, and narrow lens of political purpose is leading to the neglect of important issues such as the health of the physical science base and the condition of our S&T human resource.

Protecting the integrity of the science and technology enterprise is a growing concern in this environment. Shoring up core practices such as merit review, and defending the enterprise through "good management" will be of growing importance if this trend continues.

Neo-Conservative Science and Technology Policy -
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Science and technology policy in the United States is in a period of substantial change. The relationship between science and policy has shifted in the way that priorities are set, issues are addressed, and the way they shape the scientific infrastructure. The traditional conception of science informing policy and policy acting to support science has been interrupted by a new dynamic: science serving politics.

At the beginning of the current Presidential Administration, there was concern that science and technology policy might lapse into a state of dormancy. The incoming Administration had made few statements regarding science and technology policy and the high level science and technology policymaking apparatus seemed slow to evolve.

However, shortly after the new Administration took office, a series of important policies were implemented with substantial science and technology content. This paper will provide an overview of these policies, the dynamic between science and the policymaking body, and the role that well designed planning and evaluation may have in sustaining the integrity of the science policy process.

Early Science Policy Actions

Box A presents a summary of some of the early science and technology policy actions of this Administration. As illustrated in the Box, there were numerous major policy decisions with substantial science and technology content in this period: the launch of a National Energy Strategy, withdrawal from the Kyoto Protocol on Climate Change, acceleration of anti-ballistic missile defense, proposed elimination of the Advanced Technology Program for manufacturing technology development, strict limits on stems cell research, and the selection of a Science Advisor, after all of these decisions had been made.

The Administration relabeled the Partnership for a New Generation of Vehicles as the Freedom Car program, repackaged the Global Change Research Program as the Climate Change Science Program, and created a hydrogen energy research initiative with a much higher level of funding than in the past.

From this list of activities, it appears that the Administration has actually been quite active regarding policies involving science and technology. The issue and the change, however, is regarding how those policies are shaped.

Box A

Examples of Major Science and Technology Policy Actions early in the Current Administration

- February 2001, President Bush announced a National Energy Task Force
- February 2001, President Bush announces acceleration of Star Wars
- February 2001, President proposed elimination of the Advanced Technology Program
- March 2001, President Bush announces withdrawal from Kyoto Protocol on Climate Change to refocus on the science
- June 2001, President Bush announces Stem Cell Policy
- October 2001, Science Advisor Confirmed
- January 2002, President Bush announced a Fuel Cell Car Initiative
- February 2002 and 2003, President Bush proposed a cut in Defense Basic and Applied Research
- Spring 2002, President Bush agrees to promote a Department of Homeland Security, but no major place for Science and Technology
- Throughout 2002, incidents of international researchers not gaining their visas increases
- January 2003, President Bush announced a Hydrogen Energy Initiative

Science for Politics – the Emergence of a Neo-Conservative Science and Technology Policy

The traditional conception of science and public policy is one in which science informs policy making and policy making supports the provision of high quality science. This is outlined in the schematic drawing in Figure 1.

However, in the current Bush Administration, a new dynamic has gained prominence: the priority on science to meet political objectives. As illustrated in the right side of Figure 1, science for politics is a key feature underlying science policymaking today.

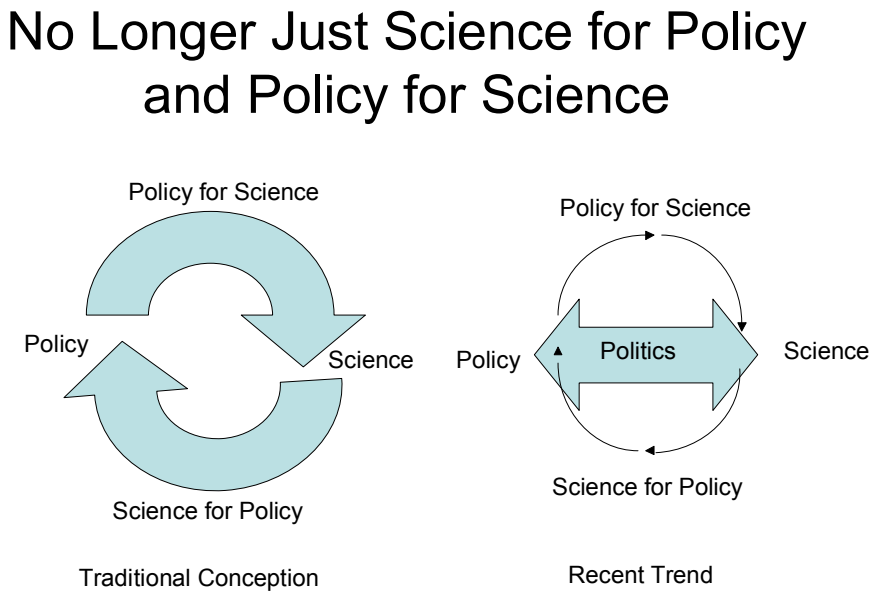

Figure 1. Traditional conception of the loop between Science for Policy and Policy for Science, and the new dynamic with a strong political dimension.

In this new science policy dynamic, the driving interest for any initiative is the political or ideological value of the policy, rather than scientific analysis or socio-economic policy analysis. Reflecting the neo-conservative approach to power in policy, achieving the political and ideological agenda is of highest priority. Science is the servant of politics, and where science does not have political value, it is endangered. This focus on strengthening political position with science as a tool reflects a trend that is termed here as "Neo-Conservative Science and Technology Policy."

To illustrate this change in the science policy process, the remainder of this paper will examine the impact on issues – energy, hydrogen, climate change, and manufacturing technology – as well as the impact on the scientific enterprise itself.

Energy

The first major initiative with major science and technology content was the Administration's National Energy Policy. (NEPDG 2001) Within weeks of taking office, the Administration formed an Energy Task Force, headed by the Vice President. The

rationale seemed quite logical, California had suffered blackouts that summer and the Northeast was experiencing winter fuel shortages and high heating bills. A comprehensive look at the energy situation of the country with comprehensive rethinking of energy policies seemed warranted.

However, early into the process, hints of the Administration's energy preferences quickly emerged. The most noticeable break with past policies was a dilution of the priority placed on energy efficiency and renewable energy. This thinking was revealed in the Administration's budget request to Congress issued in February 2001.

The budget request called for substantial reductions in support for research and development in many energy efficiency and renewable energy areas. These are summarized in the Table 2.

Table 2. Administration Budget Requests for Energy Efficiency and Renewable Energy R&D for FY 2002 (made in February 2001)

Proposed Budget Cuts to Energy Efficiency and Renewable Energy R&D with First Bush Administration Budget (FY 2002)

Renewable Energy Resources - down 36.4% from $373,179 million to $237,477 million.

- Biomass and biofuels energy systems, the largest line item, cut 5%, from $85.268 million to $81.955 million
- Geothermal technology development cut 50% from $26.911 million to $13.900 million.
- Hydrogen Research, initially slated for a cut of 50%, later held constant at $26.881 million.
- Hydropower, initially slated for a cut of 50%, later held constant at $4.989 million.
- Solar energy cut 53.7%, from $92.681 million to $42.932 million.
- Wind energy cut 48.1% from $39.552 million to $20.500 million.
- Electric Energy Systems and Storage, initially slated for a cut of 34%, later held constant at $51.746 million.

- Energy Efficiency – Proposed Cuts
- Building research and standards, down 50% from $64.2 million to $32.4 million
- Federal Energy Management Program, down 48% from $25.7 million to $13.3. million
- Industrial technologies down 41% from $148.6 million to $87.7 million
- Transportation technologies down 22% from $255.4 million to $198.4 million.

Energy efficiency R&D for buildings down 50%, for industrial technologies down 41%, for transportation down 22%, and for national energy management down 48%. Many renewable energy accounts also faced severe cuts: solar energy R&D down 53.7%, wind energy R&D down 48.1%, electrical energy systems R&D initially proposed for a 34% cut, and hydrogen energy initially proposed for a 50% cut.

The Vice President made this shift in priorities clear when he defended the move away from energy conservation, noting that "Conservation may be a sign of personal virtue, but it is not a sufficient basis for a sound, comprehensive energy policy."

Is this because there was evidence that the energy efficiency and environmental programs did not work? No. In fact, evidence was to the contrary. The National Academy of Sciences conducted a review of DOE Energy Efficiency programs and found that from the period 1978 to 2000, these program generated a 4:1 return on investment. For a $7 billion investment there was over a $30 billion benefit to the country. Analysis within the Department of Energy covering a more comprehensive list of programs in energy efficiency and renewable energy founds an even larger return in economic benefit to the public. (USDOE 2002)

An important priority of this Energy Strategy was the deregulation of Federal lands for oil drilling, mining, and the cutting of timber. Perhaps even more important than the "energy goal" of this report was the underlying goal to deregulate the use of Federal lands, including national parks and monuments, for resource exploitation.

A symbol of this priority on resource exploitation is the Alaskan National Wildlife Refuge (ANWR). ANWR is a 1.5 million acre coastal plain on the northern shore of Alaska. Environmental advocates note that it is one the last pristine wild places and one of the largest sanctuaries for Arctic animals, a birthing ground for arctic wolves, caribou, polar bears, grizzlies, and musk ox. They argue that damage to this area is not worth the damage produced by drilling and refining, which at its peak in 2027 would account for only 2 percent of US oil needs.

The drilling of ANWR became a symbol of the Administration's National Energy Strategy as well as reflection of the primary target and concern about the bill, broadened land exploitation.

How did the science community inform the development of this National Energy Strategy? To this date, this remains a mystery. However, all evidence thus far reveals little participation. The key White House meetings with "stakeholders" were held in secret in the White House and the White House has refused to identify which outside groups were included in these discussions. However, the widespread criticism is that these meetings were primarily held for energy development companies- companies that were also active financial donors to the Administration and its political party. The science community, environmental groups, citizens groups were excluded from these meetings. Thus on the first major science and technology initiative of the Administration, the science and technology community was not involved in informing the policymaking process.

Climate Change

On March 29, 2001, President Bush announced the withdrawal of the United States from the Kyoto Protocol on Climate Change. This was one of the Administration's first major science and technology policy announcements with immediate consequences for the

global community. The Administration argued that this treaty was "flawed," because the science was still uncertain, and it argued that the Treaty's real meaning lied in potential economic damage to the U.S. rather than in protecting the climate.

The Kyoto Treaty

However, there was no scientific basis for this conclusion and the Administration offered no alternative to address climate issues. Here again, politics led the science. Among the first industries to be affected by a reduction of carbon dioxide and other greenhouse gas emissions are the energy producers and the major energy conversion industries, such as automobiles. These industries have traditionally been heavy supporters of the Republican party, and the President's own background is in this industry. Industrial lobbyist were firmly set against this Treaty.

After making the decision to withdraw from the Kyoto Protocol, the Administration then turned to the scientific community and said in essence, it is your challenge to clarify the climate change issue and to resolve uncertainties. The Administration also announced that it would create a Climate Change Research Plan as evidence of its serious commitment to the science of climate change.

By 2002, the Administration announced that it would request $80 million for this climate change research effort. However, to make it look more substantial, the Administration combined it with the much larger and much broader Global Change Research Program (GCRP). The legislatively mandated GCRP is a $1.7 billion effort that examines all changes of the global – marine, terrestrial, atmospheric, and geophysical. At first, scientists commented that the Climate Change Science program might be a positive addition to the GCRP research effort. However, then the Administration announced that it was not an addition to GCRP, it would subsume GCRP. That is, the new $80 million effort would become an umbrella over the much larger and broader $1.7 billion program. Needless to say, the scientific community was not pleased.

This ad hoc, back-filling approach to policy making was reflected in the quality of the program planning. The National Academy of Sciences reviewed the draft plan of this effort and found it lacking in many ways.

The plan, the experts concluded, lacks "a guiding vision, executable goals, clear timetables and criteria for measuring progress, an assessment of whether existing programs are capable of meeting these goals, explicit prioritization and a management plan." (NAS 2002)

"In some areas, it's as if these people were not cognizant of the existing science," said one member, Dr. William H. Schlesinger, dean of the Nicholas School of the Environment and Earth Sciences at Duke University. "Stuff that would have been cutting edge in 1980 is listed as a priority for the future." "For example, the report said, far more is already known about human activity's contribution to global warming than is suggested by the

administration's plan, which, the panel said, expresses too much uncertainty about the question."

The NAS also found that the plan listed dozens of disparate research goals without setting priorities - a particularly important failing, it said, inasmuch as the plan is intended to integrate about $1.7 billion a year in climate research now being conducted by more than a dozen agencies.

Although science is at the heart of the Climate Change Science Program, it is telling that at the top, within the White House Policy and Program Review group, the voice for science is absent. The participants are the National Security Council, the Domestic Policy Council and the National Economic Council. Missing is the Office of Science and Technology Policy. OSTP is given an operational, secretariat role, not a policymaking role.

Hydrogen

The Administration's National Energy Strategy laid out description of their key energy priorities as introduced earlier. Missing from these priorities was any highlighting of hydrogen energy. Yet within one year the President announced a Freedom Car Program, and in 2003 the President announced a large Hydrogen Energy Initiative – Freedom Fuel.

In the President's State of the Union Address of January 2003, he announced the Hydrogen Energy Initiative at a projected proposed budget of $1 billion over 5 years. This in fact would be a major increase Federal support for hydrogen research.

If this did not come from the comprehensive National Energy Strategy, where did it come from?

Again it is instructive to examine the politics behind the policy. The Administration was under pressure to raise Corporate Average Fuel Economy (CAFÉ) standards, the fuel efficiency standards that all manufacturers must meet for their vehicle fleets. There was pressure to raise existing standards, which had not been touched in 20 years, and to apply these standards to Sports Utility Vehicles (SUVs) which now account for almost half of new car sales in the United States. The Administration wanted to avoid this measure.

The Administration also faced criticism that they were not seriously addressing energy efficiency and renewable energy but only favored oil and gas, and that they were still doing little to address global warming.

But perhaps even more important were domestic political dynamics. The key lobbyist for the Hydrogen Energy Initiative was Robert Walker, former Congressman and former Chairman of the House Science Committee. Robert Walker was also part of the Republican Leadership in the House of Representatives. He was a avid proponent of hydrogen energy when in the House, and coincidentally, America's largest merchant

hydrogen producer, Air Products and Chemicals, is headquartered in his Congressional District.

Adding to the suspicion that this might be more of a political move than an earnest attempt at moving the nation toward a hydrogen economy, was the lack of an implementation plan or intermediate milestones. Unlike the hydrogen programs in Europe and Japan, which have milestone targets for increasing hydrogen use in vehicles, the U.S. program has none. There is only one target, which is commercialization by 2020. Also, other hydrogen technology research such as hydrogen combustion, are eliminated.

The Editor of Science magazine, Donald Kennedy, captured the issue an editorial in August 2004: "The trouble with the (Bush Administration's) plan to focus on research and the future, of course, is that the exploding trajectory of greenhouse gas emissions won't take time off while we are all waiting for the hydrogen economy." (Kennedy 2004)

Manufacturing – Advanced Technology Program

The Advanced Technology Program was created in the 1989 by Congress to address declining manufacturing competitiveness. It is the only U.S. government R&D program specifically aimed at strengthening technologies for the purely commercial uses (the vast majority of US Federal R&D is directed to a social mission such as health, energy, etc.)

However, from the outset, this program was viewed by Republicans as a "Democrats Program." The key sponsor was Senator Hollings of South Carolina, a Democrat, and the House Science Committee, chaired by Congressman Robert Roe, also a Democrat. The Republican opposition called the ATP a corporate welfare program that put the government in the position of picking winners (which it would do badly) and distorting the commercial marketplace with Federal R&D dollars.

For reasons that are still unclear, a group of Republicans developed a passionate dislike of the ATP program, including the later Republican House Science Committee Chairman Robert Walker. Because of the persistent opposition to this program, there have been numerous calls for evaluation. This is perhaps the most thoroughly reviewed R&D program of the 1990s. Reviews were conducted internally by NIST and its Visiting Committee, by technology assessment specialists, as well as externally by the National Academy of Sciences. All concluded that the program was well managed and that it had a positive impact on high risk innovation while complementing, not displacing, private sector investment. Even the Bush Administration's Department of Commerce conducted a review of the program and recommended that it continue. However, despite numerous positive evaluations, the Bush Administration has proposed to eliminate the ATP program in every one of its budget proposals.

Program assessment means little when the opposition is ideologically pursuing its aims.

The Infrastructure of Science

In addition to affecting issues in science and technology, the Neo-Conservative S&T Policy approach is also affecting the integrity and robustness of the science and technology enterprise itself. "Policy for Science" has also been weakened by "Science for Politics.

Science Advise

The provision of scientific advice to the government has a long history in the U.S., with a high priority traditionally assigned to the integrity of the process. There has generally been bipartisan agreement that scientific analysis is the main driver of the advice, with policymakers free to take up the advice or reject it. The integrity of scientific advice was assigned a high priority.

However, in this Administration, there has been evidence of politics intruding deeply and frequently into the scientific advisory process, diluting the distinction between advice that is scientific versus advice that is political.

Of high visibility recently is the concern articulated by the Union of Concerned Scientists (UCS) that political strategy is now corrupting scientific evaluations and advice. The criticisms are very pointed, with the UCS arguing that the Administration's politicized process is guilty of :

- Suppression and distortion of scientific findings
- Manipulation of scientific advisory mechanisms to prevent views contrary to political agenda
- The use of political litmus tests for scientific advisory panel appointees.
- Censorship and distortion of scientific analysis, and manipulation of the scientific process

Examples of specific cases are summarized in Table 3.

There was a fast response from the Office of Science and Technology Policy dismissing these concerns as overstated. However, neither OSTP nor any other Administration source has disputed each of these cases.

Table 3. Cases of Alleged Political Intrusion into the Scientific Assessment and Advisory Process (Union of Concerned Scientists 2004)

Cases: The Environment-Deleting Scientific Advice on Endangered Salmon-Endangered Species: Florida Panther, Bull Trout, Trumpter Swans-Mountaintop Removal Mining-Climate Change-Mercury Emissions-Multiple Air Pollutants-The Endangered Species Act-Forest Management
Cases: Public Health-Emergency Contraception-Abstinence-only Education-HIV/AIDS Education-Airborne Bacteria-Breast Cancer
Cases: Advisory Committees-Fogarty International Center Advisory Board-President's Council on Bioethics-Arms Control Panel-Army Science Board-National Nuclear Security Administration Panel-NIH: Drug Abuse Panel-Lead Poisoning Prevention Panel-Workplace Safety Panel-Reproductive Health Advisory Committee
Cases: Additional Topics -Office of Management and Budget (OMB) Peer Review-Aluminum Tubes in Iraq

Support for the Physical Sciences

One of the weaknesses of an approach to science policy that is heavily influenced by political motivations and political salience is that those aspects that are important but not political can easily be overlooked. Such appears to be the case with the continued waning support for physical science R&D by the U.S. government.

Beginning in the Clinton Administration and continuing into the Bush Administration was a political decision to "double" the R&D budget for the National Institutes of Health. However, as health research experienced this dramatic growth, the physical sciences, by contrast have seen a steady decline.

While serving as President Clinton's Science Advisor, Neal Lane made a top priority of stopping this decline and increasing the level of physical science R&D support. He was successful in turning the general dialogue in this direction and in gaining bipartisan support in the Senate and House of Representatives for this priority.

Under the current Bush Administration, the President's Committee of Advisors on Science and Technology (PCAST) made a similar recommendation, stating in 2002:

"All evidence points to a need to improve funding levels for physical sciences and certain areas of engineering. Testimony from public private sector representatives indicted that 'of greatest concern to the scientific community is the balance between the physical and life sciences.' Moreover, U.S. industry representatives expressly stated that "physical sciences need sustained increases immediately," to support the scientific advancement, technological innovation, and human resource development required for continued economic competitiveness. However, from 1993-2002, physical sciences and engineering have received the smallest increases (or in some years, decreases) in federal research investments. Consequently, we suggest that FY 2004 presents the appropriate opportunity to double federal research investments in physical sciences, and 4 major engineering fields (i.e. electrical, mechanical, chemical and metallurgy & materials) from the FY 2002 levels."

However, the Administration opposed this move. This is not an issue with substantial political value. President Bush's Science Advisor, John Marburger, has dismissed this effort saying that the President does not believe in arbitrary doubling objectives as they lack rigorous justification. He did not explain why the President supported the doubling at NIH which had much less debate than the NSF legislation.

Here is where the story gets a bit more complicated. In 2002, Congress passed a bill calling for the doubling of the budget for the National Science Foundation over 6 years. (H.R. 4664). .Yielding to bipartisan pressure, and requiring the budget increases to be simply targets, not mandates, the President did sign the bill which was part of a broader NSF reauthorization on December 19, 2002. However, even after signing the bill, the Administration has proposed only small increases in the NSF budget, well below the targeted amounts.

NSF is not the only organization supporting a substantial amount of physical science research. The DOE Office of Science has a budget of over $3 billion to support basic physical science research, often involving large facilities. However, as this program is even less politically visible, it budget has not moved in many years, being flat throughout the Bush Administration.

Science Education

An area of somewhat surprising neglect is science and math education. One of the current Administration's first major bills was the No Child Left Behind Act. The purpose of this Act was to support programs and standards that would raise the performance of students, reflecting the President's commitment to education. Yet on the very day that the President signed this bill into law, appropriators and the Administration were negotiating a 95 percent cut in science and math training at the Department of Education.

The budget for these science and math education programs dropped from approximately $240 million to $12 million. The science and math constituency is simply not a high priority political constituency.

Subsequently, the Administration has been working with Congress and is attempting to move funds from NSF to the Department of Education's science and math programs. This would remove awards from NSF's well organized merit review system and place the funds in block grants to State Governments, which could be used in many different ways (block grants are favored in general by the Republicans.)

Thus, again, a budget issue is not simply a matter of money, but a matter of shifting control over government resources.

Strengthened Program Management – A Countervailing Force

In the midst of this major shift in the conduct of science policy, there is one set of Administration priorities that may act to help preserve some of the integrity of science and technology in the government – the priority on "better government."

All Administration's over the past 40 years have created initiatives to foster a more efficient and effective government. The Bush Administration is no different. In the summer of 2001, the Bush Administration created the President's Management Agenda, and in the Summer of 2002, the Administration launched the Program Assessment Rating Tool (PART). In addition, there is the Congressionally mandated Government Performance and Results Act (GPRA) that was established in 1993. .

One theme that is supported across all management plans merit review. The value of merit review as a central practice of the US science policy enterprise is enshrined and strengthened in these initiatives and through direct memos of the Office of Management and Budget (OMB) to the R&D agencies. Agencies are encouraged to have merit review targets. For example, NSF has a target of having at least 85 percent of proposals undergoing merit review and they achieved 89 percent in 2003. The DOE Office of Science has a target of 80 percent and they achieved 96 percent in 2003.

One of the effects of a carefully designed and protected merit review program is that it protects the research from political interference at the project level. At least when it comes to the selection of the science, these procedures may help to slow the penetration of politics.

Similarly, clearly defined procedures for program administration and for program planning , which are also called for in the management initiatives, will make political intrusion more difficult.

From the bottom up, these management initiatives have the effect of stemming the tide of politics into the actual conduct of science, and help sustain the enterprise in times of turbulence.

Conclusions

Science policy in the United States has been highly active under the Bush Administration with a new operational paradigm. The traditional model of science for policy and policy for science is not as accurate today. A new dynamic has emerged in which science for politics has come to prominence, reflecting a Neo-Conservative Science and Technology Policy. Priorities are defined much more by the political agenda and ideology in a process that is far more unilateral than in the past. Science is becoming more a tool for politics rather than a source to inform policy. Policy is less and less guided by the arguments of science. Evidence of this is crystallized by the intrusion of politics into the scientific advising process.

Because political value plays an important role, the lack of political salience can hurt the science enterprise. The physical science research base and education in science and math are two areas that have been weakened by the lack of political value.

Forces to counteract this trend are uncertain, but one factor that may prove to be of benefit is the importance assigned to better management of the government. Improved transparency and strict merit review are among the management practices that may help the scientific enterprise in this period of turbulence. A priority on better management may protect through procedure that which is threatened by politics.

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