

A CHANGED ENVIRONMENT FOR FAS

New leadership in Congress creates possibilities for a new policy agenda of intense interest to FAS. Much of our most important work over the past few years has been easy to characterize by what we were against: blocking dangerous developments in nuclear weapons, new constraints on government information, and cuts in research spending. We now have, with a fiscally restrained but politically more receptive Congress, the challenging task of helping construct positive solutions to fundamental problems. During the next few months we will seek the counsel of the FAS board, advisors, and members on where best to focus our efforts. I will take this opportunity to present some thoughts to start the conversation.

Economic changes over the last century resulted in a tightly coupled world economy. Economic change has increased living standards around the world but the gap separating rich and poor is growing both among nations and within nations—including the US. This is shameful in itself but economic inequality, rather than conflicts over political ideology or religion, are likely to be the real engines of international turmoil for the foreseeable future. The danger is compounded because the free flow of information and goods has made it possible for countries with weak governments and non state terrorist groups to obtain terribly lethal powers – from access to sophisticated small arms, like shoulder-fired anti-aircraft missiles, to weapons of mass destruction including nuclear weapons. The fact that all nations live in the same atmosphere and biosphere has been underscored by frightening forecasts of the harm our accelerating industrial economy may have on our shared environment.

None of these challenges can be resolved without strong international collaboration or without coherent US leadership. This begins by taking aggressive actions to get our own house in order. It's essential to restore America's reputation as a place that can encourage both creativity and justice, that celebrates freedom, growth, and change while taking care to ensure that everyone can benefit from progress and that attention is paid to the environment and other non-market consequences of economic activity as a matter of routine.

These priorities assume that the US must maintain strength and vigilance to defend ourselves. But this does not imply leadership by intimidation and pursuit of unfettered freedom of unilateral action that seems to have been the consensus view of the US governing class for the past six years. It's a peculiar irony that the groups placing the greatest value on US unilateral freedom of action seem least concerned by the terrible constraints placed on US freedom of action by the need to maintain good relations with oil suppliers – few of whom share our values.

It is important that FAS seize this moment. Action on key issues in nonproliferation, energy, the environment, research, and education is badly overdue. The kinds of thoughtful, well researched concepts our community can offer have a uniquely receptive audience. It's time for us to move from defense to offense and develop concrete, actionable ideas that can be considered by a new Congress. I look forward to your thoughts about priorities and hope that you'll be willing to help us deliver. To start, I

have outlined some specific priority areas in a table appearing later in this document. They are built around four themes:

- 1. Enhancing the Nation's Security:** We must move beyond pork barrel projects left over from the Cold War and put our security resources where they matter the most. This includes making strategic investments in economic development and energy programs that could prevent conflict and setting an explicit goal of eliminating nuclear weapons.
- 2. Improving the Natural Environment:** Technological advances increase productivity of resources use to a point where people worldwide can enjoy improved living standards and amenities with dramatically reduced environmental harm.
- 3. Promote Innovation and Discovery:** Innovation is the driving force of our economy; it is the only hope for continued US leadership in the global economy. This includes innovation in education. The freedom to explore the unknown is the ornament and obligation of an advanced society.
- 4. Reform Government management of S&T:** Restore unbiased science and technology advice to the Congress and President and ensure that the actions of government and information available to government officials are accessible to voters except when restricted by clear, and challengeable, rules of classification.

Science and Policy Issues for 2008

Enhance the Nation's Security

The enormous debacle of the Iraq war has made it difficult to focus on the fundamental security issues facing US a decade after the end of the Cold War and simultaneously increased the urgency of addressing them. While the debate over Iraq deserves priority it would be a dangerous mistake to ignore deep structural problems in US defense priorities.

It's received wisdom in Washington that Reagan's massive defense buildup forced the Soviet Union into bankruptcy and collapse and there is an element of truth in this. Since the US won the Cold War decisively, we have never been forced to undertake a thoughtful review of security spending priorities. The momentum of cold war pork barrel spending continues unabated in spite of the fact that the Iraq war has created dangerous budget shortfalls in areas critical for troop support and equipment maintenance. We are still spending \$10 billion a year deploying anti-ballistic missile systems that have never demonstrated effectiveness against plausible attacks. Fighter aircraft designed to combat the Soviet Union continue to receive support. Efforts to close or consolidate bases or national laboratories or stop pointless weapons programs are frustrated. Indeed we have arrived at a point where any vote against defense spending, however egregious, is politically dangerous. Since few legacy programs can be stopped, innovations must be paid for with new money. But even with a tidal wave of red ink in national budgets, Iraq has strained defense budgets to the breaking point.

The decoupling of military spending from real defense priorities could be considered a comparatively harmless waste of money except for three problems:

- First we're finding that our military is not prepared to manage the wars that we actually need to fight. Our intelligence system is too often surprised and our troops are stunningly ill equipped when they actually have to defend themselves against poorly organized enemies equipped with primitive explosives and cell phones – let alone the sophisticated small arms that we and others have helped put into world circulation over the years.
- Second, programs like our nuclear weapons complex, supported at this point primarily as a pork barrel projects, have real and dangerous effects on US options for bringing these dangerous weapons under international controls.
- Most importantly, the politics of military spending blinds us to investments that might actually have the greatest impact on security. These include economic development that will provide jobs and hope to people now turning to fanatics for leadership. And they include research collaborations that could create alternatives to petroleum that could remove a force that has disfigured the foreign policy of the US, Europe, China, and many others by forcing alliances with distasteful governments.

We have the opportunity to redefine US defense priorities starting with the following.

1. Focus on prevention:

- *Rebuild the reputation of the US as a model of how a strong and prosperous society can operate with uncompromising ideals of justice, compassion, and tolerance.* A recent BBC poll showed that nearly half of the people polled in 25 countries thought that the US had a “mainly negative” influence on the world – and this fraction has been growing rapidly¹. US leadership is plainly impossible unless this trend is sharply reversed.
- *Form collaborative research alliances with Europe, China, India and other nations on strategies for minimizing the role of petroleum consistent with global environmental goals.* This would include high efficiency transportation technologies, and clean alternative energy sources. It makes little sense to try to gain competitive advantages for US firms in this area since most vehicle manufacturers and energy companies are multinational. The benefits of reduced dependence on petroleum anywhere in the world would serve the interests of the US (more on this later).
- *Secure economic development in countries where we have a clear strategic interest.* Priority should be given to Mexico and Turkey. Both are on the brink of becoming modern economies but both are also at great risk of collapsing into the hands of radicals. A prosperous Mexico would greatly reduce immigration tensions and drive economic growth in the US. A prosperous Turkey could show how Muslim nations can be full partners in a modern world economy. Success depends on ensuring that all parts of their societies benefit from development. Failure by either nation would be catastrophic to US interests.

- *Move to an economic assistance program that builds capacity for modern economies.* This includes greater investment, setting priorities by the recipient country's need, not by which domestic firms benefit, and eliminating US and European agricultural subsidies.

2. Move beyond Cold War legacy programs and focus on contemporary defense needs

- *Seek the worldwide elimination of nuclear weapons.* In today's world, nuclear weapons are instruments of terror. Given the superiority of US conventional forces, nuclear weapons have no essential role in the US arsenal. Bunker busting bombs are pointless even given perfect intelligence since even the largest weapon can be avoided by digging deeper. Any nuclear use would inflict huge numbers of civilian casualty from fallout and other effects and instantly turn a conflict into a calamity. But the growing number of weapons states is a clear danger to US security. The administration should conduct a broad, imaginative review of US nuclear weapons policy with the intent of effectively and convincingly ending the Cold War nuclear posture. The US should act immediately to break the logjam on negotiations on proliferation by signing CTBT and offering to eliminate all US weapons if acceptable protocols for dismantlement and inspections are agreed to. An international agreement should put the entire nuclear fuel cycle under strong international inspection or control, including the US fuel cycle, and stop all production of fissionable material worldwide.
- *Ban weapons in space:* The recent Chinese test underscored the necessity of working to free space from weapons. The US has a huge, asymmetrical interest in open access to space both for its economy and for the operation of its security apparatus. Other nations are quickly following suit. Space assets ranging from GPS locaters to communications and weather forecasts are becoming a part of the infrastructure of a modern economy. Open access to space is central for research on climate, weather, and astronomy. The benefits of a weapons free space environment vastly outweigh any advantage in freedom of US unilateral action.
- *Restore the integrity of the Defense Research and Development Process* A combination of budget cuts and pork barrel projects built around obsolete or misplaced objectives has endangered the future of US defense forces and intelligence and hobbled a critical part of the US research enterprise. DARPA and other key defense research organizations have been forced to shift to highly applied projects. The process of setting priorities for applied technology has been crudely distorted by political pressure to back projects like missile defense, hafnium bombs, and next generation fighter bombers to combat nonexistent threats while important ideas for strengthening intelligence and protecting soldiers in the field have gone begging.

- *Build a serious program for responding to a major outbreak of an infectious disease.* It is highly likely that the US will face a dangerous outbreak of a naturally occurring infectious disease during the coming decades and will be woefully unprepared. Programs to defend against natural disease outbreaks would be as effective in defending against malicious use of biological agents. Investment in infectious disease prevention and treatment should be accelerated. Immediate steps are needed to accelerate the development of vaccines and treatments and for creating stockpiles. Provision must be made for treating large numbers of patients through rapid expansion of medical facilities. Careful planning for quarantines and other activities need to be developed and practiced.

Protect the Environment

There is no serious doubt that human activity is altering the earth's climate in potentially catastrophic ways. Even skeptics are forced to admit that the risk is real and that prudence demands action if only as an insurance policy, the only serious debate is about how best to respond. This is a global problem demanding global solutions and international collaborations on research and policy are essential to ensure that remedies do not adversely affect the competitive positions of the US or other nations. But in the near term the US has an essential role to play in demonstrating how a prudent policy based on innovation can combine strong economic growth with reduced impact on the environment.

The core problem, of course, is that the most obvious answer to energy issues is also the most difficult to implement: ensuring that consumers pay the full cost of energy when they purchase gasoline, electricity, or other energy products. Energy production and use is responsible for the vast majority of air emissions including greenhouse gas emissions. An avalanche of studies has estimated the huge hidden costs of US energy consumption, but without visible impact. Clear price signals that include these costs are the best way to ensure that funds flow to the most efficient investments for providing energy services – automatically balancing investments in supplies and demand. It is also the best way to ensure that private research funds flow to the most promising areas. The obvious political problem is that the benefit of avoiding wars or climate catastrophes is distant and uncertain while prices at the gasoline pump are instantly understood and loathed. This political paradox has spawned a huge industry of second best solutions. One obvious casualty of a policy keeping energy prices artificially low is privately supported energy research. Aggressive federal investment in research essential and presently less than half what would be needed to mount a serious program.

Energy has its own federal agency because we can't solve this problem. We pay a huge price for decoupling energy policy and the many domestic economic issues that are entangled in energy issues. Policies dealing with innovation, housing, urban development, transportation, agriculture, and many others can have a greater benefit than any new energy production technology. Approaches to revitalizing innovation include the following:

1. Rebuild Energy Research around a DARPA model

Energy research has become bogged down in decades of pork barrel spending, ideological struggles, and federal laboratories unable to keep pace with commercial innovation. The need for a fresh start in energy research is well understood. In testimony before the Senate Energy Committee, Dr. Charles Vest, former President of the Massachusetts Institute of Technology (MIT), recently told the Congress: "On the whole, in recent decades, many of our best minds were not attracted into the science and technology of energy. We in universities allowed energy to slip into academic backwaters, and neither our energy companies, nor our national laboratories, nor the entrepreneurial community have applied enough intellectual and financial muscle to it. We have grown complacent in the face of a monumental challenge."

A creative response to this challenge now being considered by the Congress deserves strong support – building energy research around a model established by the Defense Advanced Research Projects Agency (DARPA). The classic DARPA style is simple. They define what they call "DARPA-hard problems," challenges of enormous importance to national security, but present technical problems so heroic that standard engineering can't begin to address them. These projects, along with a considerable amount of money, are assigned to managers chosen because of their well-respected grasp of the relevant subject matter, their ability to manage complex projects, and their creativity in searching for precedent-shattering ideas. When DARPA was in its prime it gave managers freedom and three to four years to attack the problem, using talent and

Energy research challenges: safe, affordable, practical technologies for:

- Practical carbon sequestration
- mobile power conversion with >50% efficiency using liquid fuel
- auto engine replacements with >60% conversion efficiency from liquid fuels
- light sources 50% more efficient than today's fluorescents
- refrigeration/heat pumps twice as efficient as today's chillers
- electric storage for 10^{-1} to 10^7 kwh
- photovoltaic modules at less than \$2 per watt
- windows with tunable optical properties (reflectivity and emissivity)
- just in time production of complex chemicals and self assembling structures mimicking biological processes
- safe, energy efficient building shells
- efficient conversion of all parts of a plant (cellulose, hemicelluloses, lignin) to fuels and other chemicals

ideas wherever they can be found. DARPA has been unusually effective in building teams from university faculty, people from innovative startup firms, and researchers in large businesses who have never met each other, often making them an offer they can't refuse – the chance to work on a fascinating problem with enough money and enough time to make a difference.

This is obviously a high risk approach. DARPA projects have crashed and burned in spectacular—occasionally embarrassing—ways. But the payoffs can be huge. Author Michael Dertouzos estimated that DARPA was behind “between a third and a half of all the major innovations in computer science and technology.” Many of the people involved in these projects went on to launch major businesses including Sun Microsystems, Silicon Graphics, and Cisco Systems – which began with DARPA-developed packet switching and internet gateways.

Letting the DARPA system work requires unusual forbearance on the part of both the Congress and administration officials. Over the years, it's been sustained only because some extremely senior person in the Administration or Congress stepped in to protect it from continuous pressure to cut long-term investment to pay for immediate needs.

An effective energy ARPA can play an essential role in finding new energy technologies that can look for fresh new approaches and bring new players to the table. Like DARPA in its heyday, the organization can be lean, respond quickly to new opportunities, bold in dumping failed projects, and flexible in connecting the best people in industry and in academia.

Congress must take great care in the details of designing an effective DARPA-like research program. The experiment in establishing an ARPA for the Department of Homeland Security has gone badly wrong, and the organization may never be able to escape the confusion of this ungainly new agency. It is critical that the new energy organization be protected so that it can focus on the most important future challenges, take risks, and track down talent.

2. Emphasize energy productivity and conservation and integrate these goals into the missions of critical federal agencies

We have only begun to understand that higher living standards do not automatically demand greater consumption of energy and materials. A fair review of energy investments shows that reducing the need for energy almost always is more cost effective than investments in new energy supplies. Recent advances in three key technology areas provide some insights:

- *Information technology:* New computational and communication technology has been responsible for a major share of US and world economic growth but these businesses manipulate and move bits and bytes, not people and materials. These tools in turn can greatly improve business processes, encourage efficient design and production, and eliminate wasteful process steps.
- *Materials:* Composites, designer alloys, and other innovations increase strength and durability while reducing the mass of materials used.

Fabrication at the atomic scale can provide products exquisitely tailored to function with little waste in production.

- *Bioengineering*: Biological systems at every level should give us inspiration about what is possible. Living cells can manufacture thousands of complex structures and chemicals on demand providing only what is needed when it is needed and where it is needed. And many of these materials can be disassembled when they are no longer needed and the pieces reused within the same cell. The energy production and use is similar. Energy is stored and transported to where it is needed and applied to production in precisely the amounts needed. Nothing is set on fire and the small amount of waste is biodegradable.

Three familiar areas deserve priority concern: vehicles, which account for 70% of US petroleum consumption (if asphalt for highways and transmission oils are included), and buildings, which consume 70% of US electricity including space conditioning and lighting for industrial facilities. Agriculture is important because of the huge energy demands from chemical fertilizers, the volume of material transported, and its potential to become a net producer of energy.

The economies of construction, transportation, and agriculture face an antique and extraordinarily inefficient tangled mixture of federal, state, and local rules that frustrate innovation. The power of incumbent institutions profiting from this state of affairs means that the political forces arrayed against change are extraordinary. But unless a dramatic change is made in the way these institutions manage change and innovation, we will frustrate discovery that can rewrite the rules of energy use and generate attractive new jobs and business opportunities. Repeated studies show that real productivity growth depends more on institutional adaptability to change than on raw inputs of capital, labor, and technical know how.

Specifically:

- *The Department of Housing and Urban Development (HUD)* should move beyond its New Deal mission and focus on building safe, efficient, affordable, livable communities. This means shifting from an ancient system of formula driven grants and subsidies to programs that ask communities to compete in proposing housing standards and creative investments in urban design that meet ambitious energy, environmental, and safety designs. It should also move beyond simply subsidizing the energy bills of inefficient homes occupied by low income families to investments in efficiency that could make these families more comfortable at a lower cost. HUD should also undertake a major research mission of its own to support these goals. HUD is almost alone among federal agencies in having no major research program to support agency goals. Standards for buildings and building components should encourage innovative approaches to energy efficiency and safety. The current patchwork of federal, state, and local standards often discourage precisely the new approaches needed. Standards are not published online since many are set by private organizations that support themselves by charging fees for the information. HUD should be charged with fixing this.

- *The Department of Transportation (DoT)* should also shift its priorities from a pork-ridden allocation of highway funding to competitive grants based on regional transportation systems that meet high standards for efficiency and safety. DoT administers the automobile and truck fuel economy standards that are absurdly out of synch with current needs. The on-road fuel economy of personal vehicles should double in the next 15 years—beware of accounting tricks that prevent this. Incentives for creative transportation design must be developed in close collaboration with the “urban development” mission of HUD. Transportation systems meeting efficiency and safety goals depend critically on minimizing the need for transport as well as on the means of transport. DoT should also rebuild its research capabilities to focus on key efficiency and safety problems largely buried in the stampede to support homeland security. Key research objectives are being ignored. Air traffic management is critical to energy efficiency of the rapidly growing airline industry. Innovative aircraft designs can improve efficiency. More than 43,000 Americans are killed and nearly 3 million injured in highway accidents each year. Increases in automobile efficiency should be coupled with greater safety.
- *The Department of Agriculture* is paralyzed by anachronistic incentives that waste resources and undermine innovations that could stimulate rural economic development. A careful review of programs and missions could build new industries around cellulose production from waste and stover, energy rich crops, and wind energy. Sensible incentives could produce higher quality food products with greatly reduced energy use.

Promote Innovation and Discovery

America has an enviable record not just in inventing new technologies but in having firms with the flexibility and creativity needed to take full advantage of these inventions. This has depended on a strong program of public support for basic and applied research and a comparatively flexible, performance-based regulatory program. But success cannot lead to complaisance in the face of pressing research needs and the growth of sophisticated innovation centers worldwide.

1. Major increases in research funding at NSF, NIST, and NIH

The coming decade promises to deliver a spectacular set of discoveries in basic science but federal funding must rise sharply to take advantage of the opportunities. The benefits of this research are enormous but they are also very broad. Corporate research managers can never guarantee capturing financial returns on basic research, which makes federal investment essential. But a large fraction of highly rated research proposals are going unfunded. This means that the benefits of this work will be delayed or that the research will be conducted elsewhere.

It is important to ensure that the nation provide a balanced investment that supports good work across disciplines. Growth in the physical sciences must be in addition to, not instead of, increases in biological research. Some of the most promising

research in biology lies at the intersection of physics, mathematics, engineering, and biology and it is time that the biology budgets include investments in facilities like large computational grids to support biological research. We should:

- Double research spending in the physical sciences over a five year period
- Increase research funding for biological research at least 3 percent over inflation each year
- Ensure secure and growing funding for economics and other social sciences research.

It's extremely difficult to argue for major increases for science on the basis of abstract arguments that science investments pay enormous returns. Grand challenges such as the war on cancer, or going to the moon have stimulated great excitement followed by investments. Since these challenges can also distort priorities and drain resources from other worthy research, the dangerous bargain that must be struck is finding a challenge that is large enough and clear enough to muster national support but also where funding growth would be driven in many key areas. A short list might include:

- *Finding 95% of the universe:* A combination of physics and cosmology has revealed evidence for phenomena and particles beyond the scope of the standard theory. The measurements and theory that could explain dark energy and dark matter will be a great adventure
- *Predicting cell behavior:* A wealth of insights into gene expression, cell signaling, and other features of cell control are approaching the point where we can predict the response of cells, tissues, and organs to attacks and to therapies. This can be a defining goal for future biological research.
- *Explaining climate change:* Much remains unknown about the dynamics of the way astronomical cycles, and temperature and chemical changes in the oceans and atmosphere affect global and regional climates. The steady decline in recent years in investment in climate analysis and in measurements using satellite and other data gathering tools must be reversed.

Good research, of course, depends on good management. Given the shortage of new funds it is increasingly apparent that we must end programs that may have been important a generation ago but are difficult to justify given today's priorities. Concrete steps should include:

- Design new models for establishing research priorities and selecting among competitive ideas that are most likely to put money where innovation will be greatest. DARPA models should be considered closely but the fate of the Homeland Security ARPA provides a cautionary tale about the care that must be taken to ensure that such groups have the needed independence from political masters and legacy institutions.
- Eliminate pork and entitlements. It's essential to have research institutions that can operate national research facilities and allow skilled teams to work on critical domestic and security research topics for extended periods of time. But much of the research infrastructure created

during the cold war is no longer suited to a world where access to dynamic industrial research and university groups is essential and where many of the researchers are not US citizens. Legacy institutions should be able to compete for their funding for new research centers but should not have an entitlement.

- Manned space flight should have to compete on equal footing with other priorities for research in physics and astronomy. It should be forced to demonstrate that it has higher intellectual returns on investment than competing demands for research.

2. Innovation in education

Educational technique must be an integral part of any national innovation program. The US spends about a trillion dollars a year on education and training, making it one of the largest parts of the US service economy. And the demand is growing. People in virtually every job find themselves dealing with constant change, new technologies, and new team members. Employers are looking both for traditional skills including competence in science and math and communications and for “21st century skills” including decision-making under uncertainty, and an ability to gather information from ambiguous sources and learn new fields quickly. The challenge is made greater by the enormous diversity of the backgrounds, experiences, and interests of people who need education and training in the US. New tools for conveying and measuring expertise and tailoring learning to individuals are essential for meeting this challenge. Much of this capability has already been demonstrated in tools developed for entertainment and business but private firms cannot justify the research needed to put these tools to effective use in learning.

It is time to take a fresh look at the unique role of federal funding in education.

Core functions can include:

- *Research on how to make education more productive and more responsive to the needs of a diverse population.* Indeed, federal failure to mount a major, sustained, and well managed research program in this field may be the largest single gap in the current national R&D portfolio.
- *Support for the development of curricula materials including integrated performance measurements that make full use of new technology – including the ability to include continuous reviews, updates, and improvements based on nationwide experience.*

Education institutions would be free to use, modify, or ignore these materials. But they could provide a systematic way to evaluate authentic

Learning Science and Technology Research Challenges

- Knowing how and when to use open, discovery based learning
- Systems for collaborative construction and review of simulations
- Multimedia systems to answer questions reflecting context, who is asking, and a learning strategy
- Methods for assessing mastery of complex expertise
- Effective combination of artificial and real intelligence

expertise including the new kinds of skills needed by Americans today. Simulation-based assignments can determine whether students have practical grasp of the information that transfers into an ability to meet real challenges. Well designed, these are challenges that students will tackle enthusiastically.

- *A new kind of public media.* Public radio and TV are already moving to embrace web-based distribution of their materials but this is clearly just the beginning. It is time to consider whether a new kind of public media should be built, one that embraces emerging techniques for mixing communication and computational resources to create persistent, collaborative, on-line worlds.

Reform Government management of S&T

Undertaking an effective new program in Science and Technology requires management reforms in the federal government itself. This includes:

1. Reestablishing OTA or an equivalent

Congress can not operate successfully as an independent branch of government without its own source of science and technology advice. To be an effective replacement for the late Office of Technology Assessment (OTA), an organization should have adequate resources (at least half of the old OTA budget or \$20 million/year) and independence. The organization could be given a formal role in helping organize annual hearings on the entire S&T budget – something that would require the collaboration of several committees.

2. Strengthening OSTP through statute

The White House's Office of Science and Technology Policy should be given the authority now available to the NSC to assess key S&T issues and bring them to the president for decision. It should have a central role in designing the overall national R&D budget and presenting it to the Congress. Doing this requires a significant permanent staff and funds to charter research at the National Academies of Science or other institutions.

3. Ensuring maximum openness and transparency:

Democracy depends on citizens able to understand what their government is doing and critics who propose alternatives. Much information needed to review government decisions, identify potential problems or opportunities in areas ranging from security to health care require information only available from government sources. It is essential that government information be available and easy to access. There are obvious exceptions – such as the need to protect information that could compromise national security or that could reveal personal or proprietary information. Clear and transparent rules should govern the areas where these protections apply and there should be straightforward ways to challenge decisions. A host of vague and dangerous new restrictions on government information have emerged in the past few years. Congress should move quickly to restore secrecy policy that builds secure walls around information that should be protected while ensuring maximum possible transparency in public affairs.

The US scientific community has an obligation both to help the new Congress define an agenda in these critical areas and build a national consensus for action. It's



clear that none of the critical challenges facing the federal government can be resolved unless creative, dedicated people are willing to take the time to engage in the debate and encouraged to take key administrative positions in the federal government.

ⁱ http://www.globescan.com/news_archives/bbcusop/