

SPECIAL REPORT

Physics wins the US budget race

Energy and competitiveness are the buzzwords in George W. Bush's proposal for spending in the next fiscal year. But will the president's push really benefit researchers?

On 6 February, physical scientists in the United States got some rare news: a big funding boost for next year, courtesy of President George W. Bush. But it seems that the budget for other disciplines must remain flat, or drop slightly, to make up for the physics push in a science budget that drops slightly overall.

As part of a \$5.9-billion 'American Competitiveness Initiative', the president has proposed a funding increase of almost a billion dollars for research at the National Science Foundation (NSF), the Department of Energy (DOE) and the National Institute of Standards and Technology. Together, these bodies finance the lion's share of physical-sciences research in the United States. An additional \$380 million will be put towards applied energy research, in an effort to reduce the nation's dependence on foreign oil.

"This funding will support the work of America's most creative minds as they explore promising areas such as nanotechnology, supercomputing and alternative energy sources," Bush said on 31 January during his annual State of the Union address.

But science budgets at other agencies, such as the National Institutes of Health and NASA,



Bush has come through for physicists, but the budget is harsher on others.

are not likely to be so generous (see 'Biomedical funding remains flat' and 'Science at NASA takes a hit'). If Bush's proposal is accepted by Congress, the overall budget for 'federal spending in science and technology' — a measure formulated by the National Academies — will drop by 1% from last year to \$59.8 billion (see chart). "The point is, we're prioritizing," says John Marburger, the president's science adviser.

In an annual ritual, Monday saw the US president release his suggestions for spending government money: a \$2.8-trillion plan for fiscal year 2007, which begins on 1 October 2006. The budget includes cuts in health care,

education and the environment, and increases for defence and homeland security. It does not include money to cover the war in Iraq or the aftermath of Hurricane Katrina, both of which have contributed to a sense that funds are particularly tight this year.

In science, Bush proposes that the largest percentage increase in funding should go to the DOE, which oversees most of the nation's large physical-science facilities. Under his plan, the department's Office of Science will see an impressive 14% increase, to

\$4.1 billion, in 2007. Among specific projects, an extra \$100 million will go to the Spallation Neutron Source, which is set to begin operations this year at Oak Ridge National Laboratory in Tennessee. An additional \$87 million will go to nuclear-physics facilities, including those at Brookhaven National Laboratory in New York and the Thomas Jefferson National Accelerator Facility in Virginia; this is a relief after earlier budget cuts had raised fears of cutbacks or even closures at these labs. And \$60 million will go to funding the US commitment to ITER, an international fusion experiment based in Cadarache, France.

The energy department also wants to spend

Biomedical funding remains flat

Spending on biodefence and pandemic influenza mark the few bright spots in an otherwise dreary budget proposal for the National Institutes of Health (NIH). President George W. Bush has asked Congress to give the agency \$28.6 billion in 2007 — the same amount it received in 2006, when it absorbed its first spending cut in 36 years (see *Nature* 439, 129; 2006).

All of the NIH's major institutes and centres will see their budgets fall under the 2007 plan, except for the National Institute of Allergy and Infectious Diseases and the

NIH director's office (see briefs, opposite). But \$17 million is slated for preparations for the possibility of pandemic flu. The agency is also launching a programme to study the interactions between genes and the environment, and their effects on disease (see page 643).

The NIH's roadmap for medical research, which lays out a long-term plan to translate basic research findings into clinical applications, will also get a \$113 million increase, rising to \$443 million. It is one of NIH director Elias Zerhouni's hallmark initiatives, although the boost is

less than he asked for when he started the project in 2003 (see *Nature* 425, 438; 2003).

Overall, the NIH estimates that the budget constraints will lead to a 1.7% drop in the number of grants it awards. Nevertheless, Zerhouni vows that the number of competing grants, which include those awarded to new projects, will not be cut. "I think it's very important that new investigators do not get discouraged," he says.

If Congress agrees to the president's request, it will be the fourth year in a row that the NIH's budget has not kept pace with the

rising cost of research due to inflation. As a result, says David Moore of the Association of American Medical Colleges, the agency's budget could end up being 10% less than it was at the end of 2003, in inflation-adjusted dollars. "We're obviously very concerned," Moore says.

He and other biomedical research advocates plan to ramp up their lobbying on Capitol Hill, as some lawmakers feel that the NIH should be content with the five-year doubling of its budget, which was completed in 2003.

Erika Check



COULD A SPRINKLING OF DIRT SAVE THE GLACIERS?
Knowing how spiky glaciers form could give clues about how to slow ice melt.
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Science at NASA takes a hit

Astronomy and planetary science would suffer under the Bush budget, which plans to send astronauts back to the Moon and keep flying the space shuttle to the International Space Station.

Under the president's \$16.8-billion request for NASA, the agency's overall budget would stay essentially flat, rising only 1% from last year.

But the Moon exploration programme would grow 30%, to \$3.98 billion in 2007. And the space shuttle and space station would get an additional \$2.6 billion between 2007 and 2010 over what the agency projected last year.

To balance those increases, 'science' spending would be held to a 1.5% increase next year and 1% in following years. Standing at \$5.25 billion today, the science budget was last year projected to climb to \$6.8 billion by 2010. But NASA administrator Michael Griffin now says: "We cannot afford such growth."

The list of casualties includes projects that are cancelled or deferred indefinitely, such as the Terrestrial Planet Finder and a Mars sample-return mission. Others have just been delayed, such as the Space Interferometry Mission, which will slip three years.

Some, including the SOFIA airborne observatory, are in limbo pending a budgetary review (see *Nature* 439, 515; 2006). Still others that had hoped for start-up funding in 2007 will now have to wait, including a mission to Jupiter's moon Europa that Congress had specifically requested. And research grants to scientists will be reduced, particularly in the area of astrobiology.

The complaints were loud and immediate. "They're starving science to feed an emaciated space shuttle," fumes a Democratic congressional staffer.
Tony Reichhardt

\$250 million on a controversial new programme to reprocess spent nuclear fuel and use it in reactors. Department officials say that the programme would reduce nuclear waste, but critics worry that the process is expensive and could lead to the proliferation of nuclear weapons (see *Nature* 439, 509–510; 2006). "It is just incredibly misguided and ill-timed," says Paul Leventhal of the Nuclear Control Institute in Washington DC.

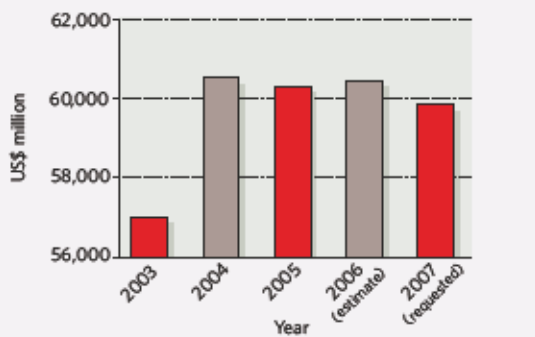
Less controversial are plans to increase funds for research on renewable energy. Solar enthusiasts are chuffed at a nearly 80% rise to \$148 million for work on photovoltaic cells, and fans of wind energy should see their research boosted by 13% to \$44 million. The request also provides increases for research on biofuels, hybrid batteries and hydrogen.

Meanwhile, the NSF would receive a 7.9% increase to \$6 billion under the president's plan. The boost would include major increases for information technology and infrastructure, and a contribution to the National Nanotechnology Initiative. Another new programme will fund grants for roughly 500 additional scientists, according to NSF director Arden Bement.

The budget request also calls for an increase of \$104 million in core funding to the National Institute of Standards and Technology. However, congressional earmarks eliminated by President Bush would cause the agency's overall budget to fall by 6% to \$535 million.

Physicists were overjoyed by the president's

FEDERAL SPENDING ON SCIENCE AND TECHNOLOGY



SOURCE: OFFICE OF MANAGEMENT AND BUDGET

newfound support. "This is great," says William Happer, who ran the Office of Science under the first president Bush. "The physical sciences have really been neglected for a long time." Mike Lubell, head of public affairs at the American Physical Society, adds that the request builds on a growing congressional push to increase funding for the hard sciences (see *Nature* 439, 517; 2006). "Everybody seems to be seeing this the same way," he says.

The final decision on how much to spend now rests with Congress, and it remains to be seen whether budget-makers will see eye-to-eye. "The budget as a whole is not generous," says David Goldston, Republican chief of staff for the House Committee on Science. "But I would say that science programmes enter the fray in a strong position."

Geoff Brumfiel and Emma Marris, with additional reporting by Jacqueline Ruttiman
See pages 633 and 646 for more on the budget.

BUDGET BITES

Giving credit

By far the largest part of the president's new 'competitiveness initiative' would go to private industry, in the form of a \$4.6-billion tax credit. The credit is currently awarded by Congress to companies that invest in research and development on a year-to-year basis, but the administration argues that this makes it hard for industries to plan investment in long-term research. By making the credit permanent each year, the White House hopes to encourage growth in the nation's approximately \$200-billion industrial-research sector. But it won't come cheap: estimates show the credit will cost federal coffers \$86.4 billion by 2016.

Down at defence

Although the president's plan would increase physical-sciences spending in the civil realm, the funding of basic and applied research in the defence department would drop by 11% to \$5.9 billion. The cuts are partly an attempt to scale down the department's huge budget, but they also reflect a shift in priorities, away from fundamental science towards weapons development.

Biodefence boost

Meanwhile, spending on biodefence continues to rise. The president has asked for an extra \$178 million compared with last year in biodefence spending for the Department of Health and Human Services. This includes a stash of \$160 million that would help specific projects to compete for funding from Project BioShield, a US programme that buys countermeasures against bioterror threats.

Other agencies — including the Environmental Protection Agency, the Food and Drug Administration, and the Centers for Disease Control and Prevention — get a total increase of \$100 million to help protect the nation's food and water supply against terrorist attacks, and to help fund the national stockpile of countermeasures.

Oceans aweigh

A welcome change may soon wash through ocean research. With its increased budget, the National Science Foundation aims to improve access to Arctic waters by building a new Alaska region research vessel. This would replace the ageing *RV Alpha Helix*. The vessel is expected to accommodate 500 researchers and students annually and be able to penetrate ice up to three feet thick. The agency is also planning an Ocean Observatories Initiative, to fund an interrelated network of stations, including those on the sea floor, on the coast and floating as buoys.