

# It's all about the climate

The Biden administration proposed a huge boost in US federal research spending. Materials science, and many other fields, would win big if Congress agrees to the president's sweeping agenda.

The mood regarding US science policy is decidedly different in Washington DC these days. Republican Donald J. Trump has been replaced by Democrat Joe Biden, in a change that has many scientists breathing a sigh of relief. Trump had fought to downplay the role of science in many areas of federal policy and proposed slashing research budgets at many agencies (*Nat. Mater.* 17, 291; 2018).

Soon after his presidency started in January, Biden put forward a US\$1.9 trillion COVID-19 economic stimulus package, which Congress passed and which included tens of billions of dollars for pandemic response including vaccine distribution. On Earth Day, 22 April, he announced the US aims to cut its greenhouse-gas emissions at least 50% from 2005 levels by the end of this decade — the nation's most ambitious climate pledge yet. A broad agenda to dramatically increase research funding across federal agencies has also been proposed. This would benefit many areas of materials science, particularly in advanced energy technologies and any fields related to fighting climate change.

Two announcements for research boosts were made: a US\$2.3 trillion infrastructure proposal on 31 March, and then, on 9 April, a suggested budget for the government for the next fiscal year, beginning 1 October. These proposals are the opening salvo in discussions with Congress, who will ultimately decide the federal research budget. But Democrats control both houses of Congress, giving these ideas a decent shot of becoming reality. Biden's proposals would translate into a significant expansion in federal research, adding areas such as climate change and clean energy to fields advanced during the Trump administration, such as quantum information science and artificial intelligence.

Among the biggest winners in Biden's proposals would be the National Science Foundation (NSF), which if funded at his suggested level would get a 20% boost to \$10.2 billion. That includes \$1.2 billion — \$500 million more than last year — towards NSF research in climate and clean energy, including renewable energy technologies and materials sciences.

Further details on how these funds would be distributed are expected in the coming months. But Congress is likely to support



Joe Biden addresses the audience during the US climate summit on 22 April. Credit: Al Drago/Getty

big boosts for NSF. Separate from Biden's proposals, lawmakers in both houses of Congress have recently put forward bills that would increase NSF's funding and power. They would create a new technology directorate within NSF, focused on translating basic research discoveries into societal benefits and likely funded with at least \$1 billion a year. Biden has signalled support for the idea of a technology directorate at NSF; his infrastructure proposal from March includes an extra \$50 billion for the agency, spread out over an unspecified number of years to help launch the new directorate. Investments would include semiconductors and advanced computing, advanced communications technology, and biotechnology.

At the Department of Energy, Biden proposes injecting \$7.4 billion — more than \$400 million than last year — into the Office of Science. He proposes reworking the department's fossil-energy office with additional funding for decarbonizing technologies such as direct carbon capture and storage. Across the entire Department of Energy, more than \$8 billion — an increase of at least 27 per cent over last year — would go to technologies including advanced nuclear energy technologies, electric vehicles, green hydrogen, and new approaches to air conditioning and refrigeration.

At the National Institute of Standards and Technology, the president would more than double last year's funding for manufacturing programmes, to \$442 million, including bolstering design and manufacture of semiconductors in the US. Basic research would grow to \$916 million — \$128

million more than last year — to study climate-resilient building codes, quantum information science, and biotechnology, among other fields.

Few details are available regarding Biden's proposed budget for the Department of Defense, other than that it would receive a 1.6% boost, to \$715 billion, and that research and development would focus on next-generation defence capabilities. The National Institutes of Health would get \$51 billion — \$9 billion more than last year — though few details are given, other than \$6.5 billion of that would go a new Advanced Research Projects Agency (ARPA) specializing in diseases such as cancer, diabetes, and Alzheimer's.

Biden's team also plans to launch a new ARPA for climate, which would coordinate innovative efforts to reduce emissions. Areas of emphasis might include carbon-neutral building materials, sustainable fuels for aircraft and ships, and emissions-capturing technologies for steel and concrete manufacturing.

To revitalize aging research infrastructure around the country, Biden has proposed ploughing \$40 billion into unspecified laboratory facilities over an unspecified number of years. Half of the money would be designated for minority-serving institutions, including historically Black colleges and universities. The funds would apply to physical research facilities as well as computing capabilities and networks.

Biden highlighted his commitment to tackling climate change by appointing key advisors into top positions, including former secretary of state John Kerry as a special climate envoy and oceanographer Jane Lubchenco at the Office of Science and Technology Policy (OSTP). Biden also elevated the head of OSTP — geneticist Eric Lander has been nominated to the position, but not yet confirmed — to his Cabinet.

It remains to be seen how all these climate-intensive efforts in Washington will play out. But one thing seems clear: any materials research that touches on climate or energy is likely to do well in the Biden era. □