

universities, the government has introduced reforms that categorize institutions according to their research or teaching focus, and that allocate funding on the basis of performance. The government wants leading research institutions to compete globally for the best students and faculty.

Atsushi Sunami, a science-policy specialist at the National Graduate Institute for Policy Studies (GRIPS) in Tokyo, agrees with this aim, but says that to succeed, the government will need to increase its research funding. And money alone will not be enough, says Hiroshi Nagano, also a science-policy specialist at GRIPS. For universities to become world class, they need autonomy to decide their research and teaching focus, he says. “The current policy is oriented in the opposite direction.”

BASIC RESEARCH LEFT BEHIND

Changes to the university system implemented by Abe's government are designed to make academia more responsive to the needs of society and industry, in the hope that it will boost low private-sector investment in research. Although scientists broadly encourage this increased collaboration, some say that it has compromised support for basic research. “The government should focus on the development of basic research to supply seeds or ideas to applied sciences,” says Onishi.

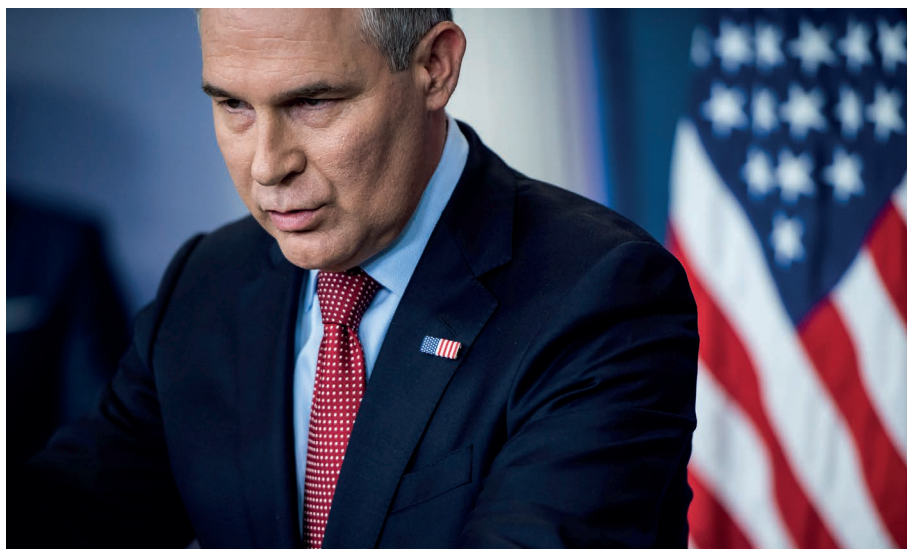
Science leaders point to other big concerns about the future of Japanese research. Minicharini Hamaguchi, head of the Japan Science and Technology Agency in Kawaguchi, says that the domestic workforce will be insufficient to keep up with changes in science, technology and innovation, given the country's rapidly ageing population. He

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says that policies are urgently needed to encourage more women and foreigners into science and to boost the number of students in doctoral courses, which has dropped by 18% since 2003.

Students who pursue research careers are finding it harder to get jobs. Budget cuts have depleted permanent research positions at universities, and fewer younger researchers are securing permanent posts: the number of research associates on short-term contracts more than doubled from 2007 to 2013.

Biologist and 2016 Nobel prizewinner Yoshinori Ohsumi has warned that the situation for young researchers will jeopardize the country's chances of winning future Nobel prizes. Japan has the second-highest number of science laureates in the twenty-first century after the United States — but, Ohsumi says, that record is unlikely to hold. ■



EPA administrator Scott Pruitt has questioned his agency's authority to curb greenhouse-gas emissions.

CLIMATE CHANGE

US agency moves to revoke emissions limits

Environmental Protection Agency disavows power-plant rule.

BY JEFF TOLLEFSON

The US Environmental Protection Agency (EPA) is moving to repeal former president Barack Obama's landmark regulations to reduce greenhouse-gas emissions from power plants.

The agency's proposal, introduced on 10 October, is a step towards fulfilling President Donald Trump's promise to end the “war on coal”. But the repeal plan, which faces a lengthy review process, is certain to spark lawsuits from environmental groups and many states that support Obama's climate policies.

US emissions from electricity generation have been falling in recent years as energy companies have shifted away from coal, and towards cheap natural gas and renewables. The Obama-era power-plant rule is designed to accelerate that trend, by reducing greenhouse-gas emissions to 32% below 2005 levels by 2030.

The policy was made possible by the Supreme Court's decision in 2007 that carbon dioxide and other greenhouse gases are pollutants under the terms of the Clean Air Act. Two years later, the EPA ruled that these gases are a threat to human health and the environment. This allowed the agency to draft regulations to limit greenhouse-gas emissions.

Still, the Obama power-plant rules have been mired in legal challenges. In 2016, the US Supreme Court blocked the rule from

taking effect until the resolution of a lawsuit brought against the EPA by industry groups and 27 state governments. That case is on hold while the Trump administration reviews the rule.

The legal fight over the EPA's plan to repeal the Obama power-plant regulations will probably focus on whether the Clean Air Act allows the agency to require that companies alter their energy portfolios to reduce emissions. The Obama administration set emissions limits and allowed states and companies to decide how to meet them, with options that included reducing energy consumption and developing new sources of renewable energy.

The Trump administration says that the EPA overstepped its legal authority when it finalized the rule. The administration argues that the Clean Air Act allows only regulations that can be implemented at power plants.

Jonathan Adler, who heads the Center for Business Law and Regulation at Case Western Reserve University School of Law in Cleveland, Ohio, says the Trump administration can reasonably argue that the Clean Air Act was not designed to regulate greenhouse gases. He adds that courts often defer to federal agencies on regulatory matters if they have followed all legal and procedural requirements.

“Some of the same legal doctrines that helped the Obama administration defend its regulatory decisions will now help the Trump administration,” Adler says. ■