► buildings and laboratories, and berths so scarce that many scientists must sleep in tents at the peak of the summer crush, when some 45 researchers may be on site. In winter, at least five technicians must stay to maintain atmospheric measuring equipment. The winter staff will at least double when the radio telescope arrives, as will the station's power needs.

The US National Science Foundation (NSF), which pays for Summit's infrastructure and oversees much of its science, plans to adapt, in part, by spreading out the facilities. The agency has drafted a plan that would put the telescope more than a kilometre away from the current station, move the airstrip further east, and build an atmospheric observatory in the sector designated for clean air and snow measurements.

Greenland's excellent observing conditions make the development worth the trouble, says Paul Ho, an astronomer and former director of Taiwan's Academia Sinica Institute for Astronomy and Astrophysics (ASIAA). Operators also plan to link the telescope with the Atacama Large Millimeter/submillimeter Array (ALMA) in Chile, about 9,000 kilometres away, to produce combined observations much sharper than either facility could produce alone.

In fact, the huge Greenland radio dish was originally built as a prototype for ALMA. In 2011, a consortium led by the ASIAA and the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, obtained the telescope in a controversial deal that saw an instrument built with US funds transferred to an international consortium (see *Nature* 470, 14; 2011). Parts of the antenna are now in several countries as it gets adapted for polar conditions. Plans call for it to be shipped to Thule, Greenland, in the next few years and then hauled 1,200 kilometres to Summit.

ASIAA is trying to raise US\$10 million to \$15 million to help pay for the telescope's transport and setup, and a big part of the pitch includes a request for funding green-energy technologies. Ho says that astronomers are aware that the site needs to remain as clean as possible. "We want to preserve that, absolutely. In all ways possible," he says. Still, it is not clear what renewable source would work best. Solar energy cannot provide power during the long Arctic winter. A wind generator has been tested at the site, but the wind is gusty and unreliable.

The real obstacle to improving the station might be cost. The NSF is not releasing specific estimates, but it will probably have to squeeze its current Arctic facilities budget — around \$40 million annually — to find money for Summit improvements.

"If we can handle these conflicts and make sure that the emissions don't impact the atmospheric measurements, it will bring a higher profile to Greenland," says Jack Dibb, an atmospheric chemist at the University of New Hampshire in Durham and member of the NSF's scientific advisory group for Summit. "We can do it — if we spend the money." ■

A slashed budget sparked protests in June by government-funded scientists in Canberra.

POLICY

Australian cuts rile researchers

Political scorn on top of shrinking funds creates hostility between scientists and Tony Abbott's government.

BY DANIEL CRESSEY

Australia is booming. The country's economy is strong, and this year the Organisation for Economic Co-operation and Development put the nation at the top of its 'better life' index — an attempt to quantify well-being in industrialized countries.

But many scientists Down Under are not feeling on top of the world. Just over a year since taking office, the coalition government, under the leadership of the Liberal Party's Tony Abbott, has cut several basic-research programmes and put science under the auspices of industry minister Ian Macfarlane — who last month dismissed those who complained about the consolidation as "precious petals in the science fraternity". Last week, another government minister threatened that two key basic-research programmes could be targeted if parliament resists proposed cuts

in higher-education funding. This came just days after the Australian Greens party released an analysis produced by the Parliamentary Library showing that government spending on research and development fell to 0.56% of gross domestic product for 2014–15, its lowest level since 1989–90 (see 'Lean years').

"It is getting noticeably more difficult to get funding, with success rates for various fellowship and project grant schemes declining," says Darren Saunders, a medical researcher at the University of New South Wales in Sydney. "There is a very real perception that our current government doesn't value or respect science and scientists as highly as we would like."

The 2014–15 budget, released in May by the current government, cuts millions of dollars in research funding from government agencies such as the Commonwealth Scientific and Industrial Research Organisation (CSIRO), which employs thousands

CSIRO STAFF ASSOCIATION

of scientists at various locations. At CSIRO alone, hundreds of jobs will be lost this year and the organization's annual budget will be cut by Aus\$30.9 million (US\$27 million).

"I've been involved with CSIRO for 15 years and the feedback everyone is getting is that morale is at an all-time low," says Sam Popovski, a former agricultural scientist who is now a full-time trade-union representative for the CSIRO staff association.

Popovski points out that the previous government also made cuts to the CSIRO, which by mid-2015 will have lost one in five staff over the past two years, he says. Of roughly 1,300 job losses, Popovski estimates that more than half can be attributed to the Abbott administration, with another 300 caused by cuts from the previous government and 300 as a result of an internal reorganization.

DOWN AND OUT

The government has also cut the budget of the Australian Research Council, the main source of non-medical government research grants. Leslie Field, secretary for science policy at the Australian Academy of Science and vice-president of the University of New South Wales, says that the move is likely to reduce grant success rates below their current level of around 20%, thus eliminating support for a significant share of Australia's high-quality research. On the government's general science spend, Field says: "There is no question that the cuts will have a negative effect on Australia's science system."

Proposed changes to the nation's higher-education system threaten to make a difficult funding situation even tougher. The government is seeking to cut hundreds of millions of dollars from funding for student places, and wants to remove a cap on student fees to allow universities to claw back the difference. But the proposal has run into trouble in parliament. In response, education minister Christopher Pyne said in parliament on 2 October that if the reform does not pass, the government could reduce scientific programmes to compensate. Cuts to the National Collaborative Research Infrastructure Strategy, which supports scientific facilities, and the Future Fellowships programme, designed to support 'outstanding' mid-career researchers, would cost up to 1,500 jobs, he said.

Because universities can use student fees to subsidize their research, doubt over student

LEAN YEARS

The Australian government's spending on research and development (R&D) has stagnated in real terms since 2011–12 (bottom), and has fallen to its lowest level in 25 years when expressed as a share of gross domestic product (top). Changes in leadership are also shown.

funding further threatens the scientific community, says Brian Schmidt, an astronomer at the Australian National University in Weston Creek and a Nobel laureate. "There's huge uncertainty right now," he says — especially for early-career researchers.

Not all areas of science have faced cuts in the past year. The Abbott government has strongly backed medical research, announcing that it wants to create a billion-dollar Medical Research Future

"There is no question that the cuts will have a negative effect on Australia's science system."

Fund, which would invest Aus\$20 million for 2015–16, rising to Aus\$1 billion by 2022. Although this potential extra funding — which must still be approved by parliament — is welcomed by medical researchers, there is concern over the proposal that this money would be raised by a Aus\$7 fee for people to visit a doctor.

"That medical-research fund of course is welcomed by the medical-research community," says Peter Doherty, an immunologist at the University of Melbourne and a Nobel laureate. But he adds that "the funding mechanism has created a lot of hostility" towards medical research. Charities have expressed

concern that public donations could decline as a result of the charge.

Some researchers say it is telling that the Abbott government has done away with a dedicated science minister, instead making industry minister Macfarlane responsible. Last month, Macfarlane lashed out at those who complained about his dual role with his now-famous 'precious petals' quote. He took umbrage at what he said was the insinuation that he did not care enough about science by saying: "I'm just not going to accept that crap." In a e-mail to *Nature*, Macfarlane said: "It's no accident that science is in the industry portfolio." He added that the government would soon release a 'competitiveness agenda', of which a key element would be creating stronger links between business and research.

Schmidt calls the 'precious petals' comment "poorly judged", but puts it down to ongoing "name-calling" between the government and its critics in the science community.

Other researchers are angrier. The comment inspired US researcher Ainsley Seago, who studies beetles at Macquarie University in Sydney, to create 'I'm a precious petal' T-shirts for irate scientists. Macfarlane's quote "was terrifically insulting", she says, and reminiscent of the "science-hostile Bush administration". ■

EXPLAINER

How disease detectives are working to contain Ebola in West Africa
go.nature.com/5sofin

MORE NEWS

- Gravity map uncovers sea-floor surprises go.nature.com/oyfyio
- Moon's largest plain is not an impact crater go.nature.com/tv3f2n
- Disclosing conflicts of interest has unintended effects go.nature.com/iff5llc

DISEASE

Computer scientist makes prion advance
go.nature.com/1mhpsc