

the Chinle formation (see 'Hidden history'). It will travel, with several breaks in time, through the Moenkopi formation and stop in rocks about 235 million years old. The record then skips tens of millions of years into rocks from the Permian period that preceded the Triassic.

"We know parts will be missing," says Geissman. But getting a nearly complete record for much of the Triassic, in such well-studied rock layers, is bound to offer a trove of information.

Geologists have explored the Petrified Forest area since the 1850s, most recently for its rich array of Triassic fossils. Since 2004, for instance, several skeletons have been unearthed of an extinct crocodile-like animal called *Revueltosaurus*, previously known only from its teeth. Early dinosaurs such as the dog-sized *Coelophysis* also roamed there, and radiometric dating has shown how these dinosaurs were related to those in other parts of the Americas<sup>3</sup>.

Spectacular, fossil-bearing rocks sprawl almost everywhere in the park, says Bill Parker, Petrified Forest's palaeontologist. The challenge is tying separate discoveries into a coherent, well-dated story. Many surface rocks are weathered so badly that they distort fossil relationships and make radiometric dating all but impossible. "It's not like the Grand Canyon, where you can just hike down and see all the rocks in their proper order," says Parker. "A core eliminates all of that problem, when you get one single section all the way down." Drilling in US national parks is allowed at the discretion of the park superintendent. Petrified Forest is unusual in calling itself a science park and in having Parker on staff as a full-time palaeontologist.

The big question for researchers is when drilling can begin. The team had hoped to start on 8 October, but that plan is now in doubt. Petrified Forest National Park, along with the rest of the US government, shut down on 1 October. The park will not reopen until Congress agrees on a plan to keep the government funded. If delayed too long, drilling may have to be rescheduled for next spring.

Ultimately, if the project's science findings are strong, it will pave the way for further studies of the Triassic's buried history. The team already has its eye on other cores that it could drill. ■

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## POLICY

# Overhauls set scientists on edge

Australian government axes carbon tax and designated science minister, but says it will not cut research funding.

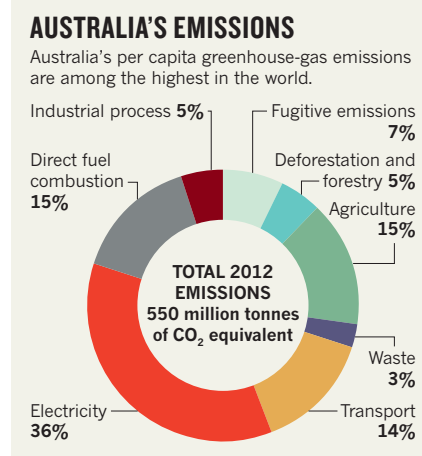
BY CHERYL JONES

Changes made by Australia's newly elected conservative government, sworn in on 18 September, are unnerving scientists. Prime Minister Tony Abbott was quick to renew his pre-election pledge to axe the country's carbon-pricing scheme, and the Coalition administration has begun to kill off some of the main government agencies tasked with tackling climate change. Abbott opted not to appoint a single minister for science, deciding instead to spread responsibility for it over several ministries, including industry and education.

It is a tricky time for people working in carbon policy in Australia, and scientists are worried that research into global warming is under threat. David Karoly, an atmospheric scientist at the University of Melbourne, says that it is unclear whether funding for climate-change studies, including those conducted by the Bureau of Meteorology and Australia's national science agency, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), will be held at current levels.

University research may also be vulnerable. "There are fears about the funding of climate-change research, particularly on mitigation," says Karoly.

Australia is a world leader in climate-change research. As one of the world's biggest emitters of greenhouse gases per capita (see 'Australia's emissions'), its scientists have been a big part of the Intergovernmental Panel on Climate Change. Overall, the country has a high scientific output (see 'Punching above its weight'). But some fear that this work may be in jeopardy. The



government has already closed the country's Climate Commission, a public-education body, although plans are afoot to revive it as a private entity. And the government wants to close the Climate Change Authority, which provides advice on emissions reductions, says Karoly, a member of the authority's board.

The Clean Energy Finance Corporation, or 'green bank', a Aus\$10-billion (US\$9.4-billion), 5-year programme established by the former administration to provide loans for the commercialization and deployment of clean-energy technologies, is also under threat.

Responsibility for carbon policy will form part of the environment portfolio, held by minister Greg Hunt. Until now, the centrepiece of the policy was the carbon 'tax' introduced in 2012 by the Labor government, with support from the Greens. The price was not strictly a tax, but, rather, was a permit system that functioned similarly to a tax, and was ▶

SOURCE: AUSTRALIAN DEPT OF CLIMATE CHANGE AND ENERGY EFFICIENCY



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## NATURE PODCAST



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SOURCE: AUSTRALIA'S CHIEF SCIENTIST

► intended to become an emissions-trading scheme in 2015. Australia's 260 largest emitters faced a price of Aus\$24 per tonne of carbon dioxide emitted, says Frank Jotzo, a climate-change economist at the Australian National University in Canberra. He says that the price is about three times that set by the current emissions-trading scheme of the European Union.

But the Coalition looks set to act on its promise to replace the system with a 'direct action' plan, which it hopes will meet Australia's target to cut greenhouse-gas emissions by 5% from 2000 levels by 2020. Direct action focuses on government payments to companies that cut their emissions below a specific level, Jotzo says.

Last week, responding to the release of the IPCC's latest report, Hunt said in a statement that the report reinforces the government's "bipartisan support for the science and the targets set for emissions reductions". However, the government's stance on carbon policy and the science-policy vacuum since it came to power have fuelled fears about support for climate-change research.

The Coalition released few science policies during its election campaign or when it first came to power, but the scientific community was taken by surprise by Abbott's decision that his "back-to-basics" government would lack a designated minister of science. The government said that

**"There are fears about the funding of climate-change research, particularly on mitigation."**

**PUNCHING ABOVE ITS WEIGHT**

Australia's research and development spending is moderate, but its scientific output is among the world's highest per capita.



the move was aimed at simplifying ministerial and departmental titles. (Critics have pointed out that the incoming government has designated a sports minister.)

Responsibility for university research rests with the education ministry, but oversight of government research agencies such as the CSIRO now falls under the purview of the industry minister, Ian Macfarlane.

The industry portfolio will also include natural-resources policy, an area that will consume much of Macfarlane's time, says Kim Carr, former minister for innovation, industry, science and research, and for higher education, who is now the shadow minister for those portfolios.

"I championed the idea of building an innovation portfolio," Carr says. "It was about putting science and research at the centre of

the transformation of Australian society. My concern was that if it was in the education area alone, there was a real chance that it would be marginalized. The political attention always goes to the teaching programme, not the research programme." Macfarlane was unavailable for comment.

John Rice, executive director of the Australian Council of Deans of Science, an organization that promotes the development of science in universities, says that the new portfolio configuration poses a "considerable challenge for the government in creating a strong interplay between basic research and innovation".

"I would have thought this government, more than any other, would have recognized the importance of science in supporting the economy," he says.

However, Michael Gallagher, executive director of the Group of Eight, an organization based in Canberra that represents Australia's research-intensive universities, welcomes the move. "There is a narrow culture of short-term, commercially oriented research prevailing in an industry portfolio, whereas Abbott has a broader view of what universities are about," he says.

Christopher Pyne, the education minister, says that the CSIRO and universities will continue to work closely together. "Changing the structure of portfolios will not have an impact on that," he says.

He adds that there will be no cuts to university research, but "some funding will be reprioritized for medical research". He did not respond to a question about the fate of climate-change research. ■

LAW

# Uncertainty on trial

Former US drug-company chief appeals conviction for fraud over interpretation of results.

BY EWEN CALLAWAY

Once a pharmaceutical executive and socialite, Scott Harkonen now lives under house arrest and faces professional debarment. His crime: misrepresenting scientific data. But Harkonen is arguing to the US Supreme Court that he did not misrepresent anything.

Federal prosecutors convicted him in 2009 of wire fraud — using false communications to obtain money — for hyping the results of a clinical trial and encouraging the unapproved use of his now-former company's lung-disease drug. Eighteen months later, a judge sentenced him to six months' home confinement and a US\$20,000 fine; in March this year, a federal

appeals court upheld the conviction.

The United States' highest court will soon decide whether to hear Harkonen's final appeal. His supporters, who include statisticians, clinical researchers and legal scholars, say that his conviction relied on a poor grasp of statistics, and sets a precedent that could criminalize speculation in grant applications and papers.

"You don't want to have on the books a conviction for a practice that many scientists do, and in fact think is critical to medical research," says Steven Goodman, an epidemiologist at Stanford University in California who has filed a brief in support of Harkonen.

The US government sees the case as a warning to those who illegally promote medicines. "Mr Harkonen lied to the public about the

results of a clinical trial," the lead investigator said after Harkonen's conviction.

The case centres on a clinical trial sponsored by InterMune, a company based in Brisbane, California, which Harkonen headed from 1998 to 2003. It tested whether a drug called  $\gamma$ -interferon, sold as Actimmune and already approved to treat a rare immune disease, helped people with idiopathic pulmonary fibrosis (IPF), an incurable lung condition.

The results were measured in terms of participants' survival and lung function — primary endpoints, or targets, that had been identified before the trial began. On 16 August 2002, Harkonen and other company executives learned that the 162 participants who had been given  $\gamma$ -interferon had fared no better than ►