



A backlash against wind and solar is testing Australia's political will to scrub carbon from its electricity sector.

tion by 2020. But it is struggling to meet its Paris commitments, in part because of shifting politics. Australia enacted a carbon tax in 2012 but abandoned it 2 years later, after Prime Minister Tony Abbott came to power. “The path we’ve been on has been heading in a very wrong direction,” Wood says.

Flat, arid, windswept South Australia, on the other hand, is blazing its own path. The state has some of Australia’s best wind and solar resources—and very little coal. In 2009, the federal Economic Development Board recommended that the state capitalize on its abundant renewables, and to spur their development South Australia set a renewables target of 33% of total energy generation by 2020. Helped along by federal incentives and regulations designed to speed new projects, wind farms and rooftop solar panels sprang up across the state. South Australia quickly blew past its original goal. Last May, unable to compete with government-backed renewables, the state’s lone remaining coal-fired power plant closed its doors, leaving the Pelican Point natural gas plant as South Australia’s only in-state fossil-fueled generator.

The finger pointing over the blackouts has put those gains in jeopardy. Turnbull and his colleagues in the Liberal Party (which is actually conservative) point to the blackouts as evidence that the state erred in shutting its coal-fired plants. Turnbull has called for a “technology agnostic” energy policy and voiced support for “clean coal.” And Liberals in South Australia have called for scrapping the state’s renewable energy target.

Yet postmortems on both blackouts largely exonerated renewables. A statewide blackout in September 2016 was caused by a severe storm—the worst in 50 years—that toppled power lines, energy officials said

in a review. As for the 8 February incident, the Australian Energy Market Operator last month said that it underestimated how much power would be needed during peak demand that sweltering day. As winds ebbed, a natural gas plant on standby couldn’t ramp up in time.

Nevertheless, balancing supply and demand as South Australia becomes evermore dependent on solar and wind is a challenge for grid operators. The way electrons are moved around the grid needs a major rethink, experts say.

Storage systems for tucking away excess wind and solar power for use after sunset and when winds falter should help address the reliability problem, says Hugh Saddler, an energy policy researcher at the Australian National University in Canberra. Giant storage batteries are one approach now being tested in Australia. Also gaining favor is pumped hydro, which uses excess renewable power to pump water into a high reservoir, where the water is stored until it needs to be released to generate backup hydropower. Last month, the federal Clean Energy Finance Corporation issued a AU\$54 million loan for a 50-megawatt solar development in Queensland that will incorporate pumped hydro storage.

In South Australia, such technical fixes may allow renewables to keep expanding. Rooftop solar panels continue to sprout up across the state. And a proposed “big battery” storage facility that would support a large-scale solar farm could help stabilize electricity supplies. If it’s built, it will be just down the road from the state’s newly shuttered coal-fired power plant. ■

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RESEARCH FUNDING

At 10, Europe’s ‘excellence’ fund ponders changes

The European Research Council has earned a reputation for quality—and for being risk averse

By Kai Kupferschmidt

In 2007, Canadian-born archaeologist Nicole Boivin struck gold. The European Commission had just created a brand new agency, the European Research Council (ERC), that promised generous grants for young researchers around the continent based on a single criterion: the quality of their work. Boivin, then 37 and a postdoc at the University of Cambridge in the United Kingdom, was among the first winners with a proposal that merged humanities and natural sciences to better understand early trade connections and biological exchange across the Indian Ocean. “At that point, for a young researcher like myself to get €1.2 million was astounding,” she says. And it came with a “pretty extraordinary” freedom: to spend the money as Boivin saw fit.

Ten years later, ERC has funded close to 7000 basic research projects and has won plaudits for sticking to excellence as the only yardstick. In 2016, independent scientists selected by ERC studied 199 completed projects and found that 70% had led to breakthroughs or major scientific advances. ERC likes to note that six grantees have won Nobel Prizes and three were awarded the Fields Medal, the highest honor in mathematics.

But after the anniversary celebrations around Europe end next week, the Brussels-based agency will face mounting pressure for change. Critics argue that ERC has too often played it safe in its funding choices and should pick more risky research, while scientists in southern and eastern Europe think they deserve a bigger part of the pie. Meanwhile, it’s unclear how ERC will be affected by the departure of its biggest beneficiary, the United Kingdom, from the European Union. And even

after 10 years, some still worry about ERC's independence from the bureaucracy of the European Commission.

ERC marked a radical departure for the European Union; unlike other research programs, it does not allocate funding according to political priorities or geographical considerations. A council of 22 scientists draws up calls for grants, sets up review panels, and awards funding. "The scientists are really in the driver's seat, which is a fantastic privilege," says ERC President Jean-Pierre Bourguignon, a French mathematician. ERC's budget, currently some €1.8 billion annually, makes up almost one-fifth of Horizon 2020, a 7-year research and innovation program that began in 2014.

But some chafe at the singular focus on excellence. Countries in southern Europe have cut their research budgets during the economic crisis, and now ERC is further weakening these countries by essentially redistributing their EU contributions to the research powerhouses in the north, says Francesco Sylos Labini, a physicist at the Enrico Fermi Center in Rome. And it's not just the money: "The few Italian researchers that get an ERC grant go to Germany or another country to do their research," he says.

The genital organs of *Drosophila santomea*, imaged with a confocal microscope by ERC grantee Virginie Courtier-Orgogozo.



ERC supporters counter that a more egalitarian distribution would undercut the agency's raison d'être, and that several other EU funding streams are net gains for southern and eastern Europe. For perspective, Bourguignon points out that ERC controls less than 1% of the money spent on research in Europe. Any country can become more competitive in ERC's contests, he adds, by spending more on its own research infrastructure. "It's like in sports," says former ERC President Helga Nowotny, professor emerita at ETH Zurich in Switzerland. "You have to start to train people before they can compete in the Olympics."

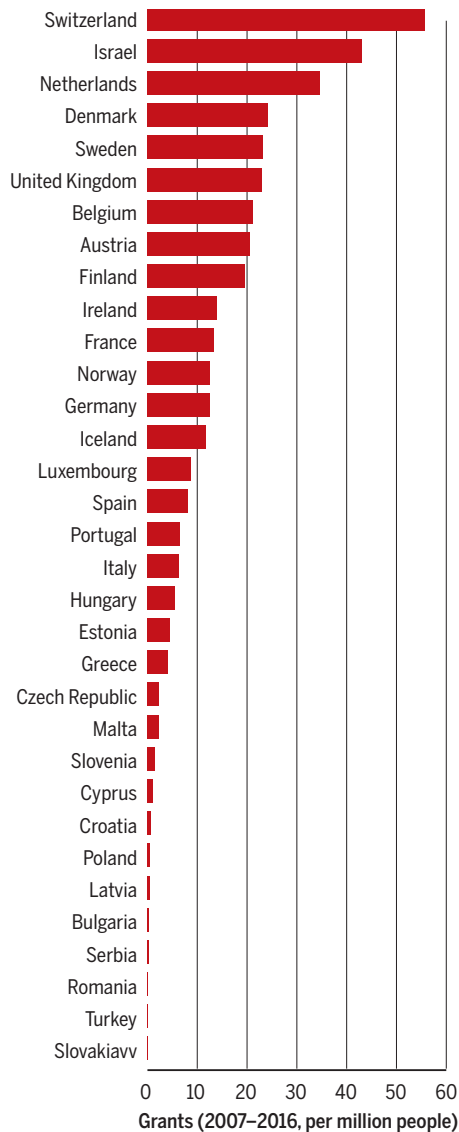
Other critics say ERC could be more adventurous, noting that although it boasts about funding Nobel laureates, none of the prizes was awarded for ERC-funded work. "If you see the projects that are awarded, none of them are really high risk," says Miguel Navascués, a physicist at the Institute for Quantum Optics and Quantum Information in Vienna. ERC funds only about one in 10 proposals; that means you need high marks from everyone on a panel to win a grant, Navascués says—which high-risk research is less likely to get. Nowotny says one remedy might be a panel dedicated specifically to frontier research. "The reputation is there, now the ERC could become more courageous," says Nowotny, whose editorial on ERC appears in this issue (p. 997).

Perhaps the biggest question hanging over ERC's future is Brexit. The United Kingdom bagged almost 1500 ERC grants between 2007 and 2016, more than any other country. Its departure could lead the European Union to slash its research funding and would remove a powerful advocate for ERC. The British played an important role in establishing ERC's focus on single projects based on excellence, says Thomas König, a political scientist at the Institute for Advanced Studies in Vienna, who worked as a scientific adviser to ERC. He and others would like to keep the United Kingdom involved in EU research. ERC's two biggest beneficiaries per capita, Israel and Switzerland (see graph, right), provide models: They aren't EU members, but pay a fee to participate in Horizon 2020.

Another key challenge will be to defend ERC's autonomy, for instance against political pressure to help certain countries or fund research that promises an economic pay-off. One opening for outside influence is the system for choosing ERC presidents. An independent panel nominates three candidates, from which the commission chooses one; the scientific council has no say in the choice. If someone too close to the commission makes it onto the shortlist, ERC's independence may be at stake,

Continental divide

In European Research Council grants per capita, countries in southern and eastern Europe are lagging, whereas non-EU members Israel and Switzerland do very well.



Nowotny says: "When I feel more pessimistic, I can see the commission slowly embracing the ERC too much."

Still, many say ERC has already changed the European research landscape by making excellence-based funding more widely accepted and launching the careers of an international cadre of researchers. An ERC grant is "a very prestigious line to have on one's CV," Boivin says. "It put me on the path towards getting the job that I have now"—director of the department of archaeology at the Max Planck Institute for the Science of Human History in Jena, Germany—"which I think is one of the best jobs in my field." ■

With reporting by Elisabeth Pain.



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