nature

scientists' determination to press ahead with editing human germline cells – eggs, sperm and embryonic cells – has been sounding alarm bells for nearly five years. Editing could produce unpredictable changes that an individual's descendants will inherit – with potentially wide-reaching societal implications. Academies, governments and ethicists have been considering how to regulate this. But the manner in which it is being done is suboptimal.

In 2018, the World Health Organization (WHO) set up an independent expert panel to advise on the oversight and governance of human genome editing. A separate international commission on the clinical use of human germline genome editing gathered for its second meeting in London last week. This commission was established by the US National Academy of Science, the US National Academy of Medicine and Britain's Royal Society, to recommend standards and criteria for germline genome editing. Both will report next year, and the commission's report will feed into the WHO process.

But the WHO panel has already recommended setting up a public registry for genome-editing experiments. It has also made an interim recommendation that "it would be irresponsible at this time for anyone to proceed with clinical applications of human germline genome editing", which has been accepted by the agency's leadership. The international commission has yet to say what it thinks, but it would make little sense for it to disagree.

It isn't entirely clear why separate initiatives are needed, and it is unfortunate that representatives of people with disabilities are not part of the decision-making process. However, it isn't too late to rectify these issues, and the two initiatives must, in the end, converge.

There are very real risks that unregulated clinics claiming to be able to eliminate inherited conditions will use untested, possibly harmful procedures. A sure-fire way to give such clinics the green light is an absence of agreed global standards. When the two groups report next year, they must speak with one voice and have more inclusive representation.

A shock to the system

California's universities must help to design and build a clean and resilient power grid.

Confusion reigned the first time that the University of California, Berkeley, lost its connection to the city's electricity grid, on 9 and 10 October. Campus officials were unable to say how long the university's power plant could provide emergency electricity for crucial facilities – such as freezers containing valuable research specimens. Some scientists didn't even know which electric plugs to use to access back-up power. As a precaution, researchers packed freezers with dry ice, and some sent their most important samples to other institutions.

This chain of events can be traced back to last November, when a faulty transmission line sparked the deadliest wildfire in California's history. The Camp Fire tore through the town of Paradise, killed 86 people and levelled thousands of homes and businesses.

Faced with an estimated US$30 billion in insurance claims from that fire and others in 2017, the state's largest utility provider, San Francisco-based Pacific Gas and Electric Company (PG&E), filed for bankruptcy in January. Then, when hot, dry winds raised the fire danger in early October, the company cited legitimate liability concerns and shut down major sections of the electricity grid to prevent more blazes from breaking out.

Evidence that global warming is promoting more frequent and severe wildfires has been mounting for decades, and the fact that electrical equipment can start fires, and contribute to their spread, is hardly news. But few could have predicted that vast stretches of California – the world's fifth-largest economy and a global hub for research and innovation – would be paralysed by a combination of wildfire and electricity blackouts.

> **"A safe, clean, efficient, resilient grid has to be a shared responsibility, and not something for politicians alone to fix."**

Safeguarding lives and habitats from these catastrophes has to be the top priority for the state's decision makers. Solutions for upgrading the grid range from the obvious to the technological. Electrical equipment should be kept clear of vegetation, with power lines buried underground, where feasible. Cameras, sensors and other systems could allow grid operators to detect and isolate problems with speed and precision. There are also measures that Berkeley and other institutions can take, such as reducing their energy demands and allocating limited emergency power to only the most urgent needs.

At the same time, California's research and technology institutions, and its decision makers, could harness more of the state's considerable research muscle in energy and energy policy to address the bigger picture: creating a more resilient, cleaner grid for the whole state.

Researchers at Berkeley and elsewhere have spent years developing smart-grid technologies that allow more control of where electricity goes and when. Economists are calculating the costs and benefits of different kinds of energy infrastructure, such as installing solar panels, or using fuel cells powered by renewably produced hydrogen.

More of this pioneering work should be deployed to solve problems in the institutions' home state. Like the back-up power system that Berkeley used when the grid failed, a wider network of increasingly smaller grids that can be isolated or boosted as needed might be the future.

California's fires are now a chronic problem. A safe, clean, efficient and resilient grid has to be a shared responsibility, and not something for politicians alone to fix. The state's dynamic research, technology and innovation communities must step up to solve the problems in their individual organizations and at the same time craft wider solutions that help California – along with regions worldwide – adapt to our thirst for more energy in an increasingly warmer world.