

Future heatwaves will knock nuclear, gas and coal power plants offline

[By Michael Le Page, *New Scientist*, Aug 9, 2018](#)

As large parts of the northern hemisphere [swelter in record heat](#), yet another consequence of global warming is becoming apparent. Across Europe, several [nuclear reactors](#) and at least one coal-fired plant have had to be temporarily shut down, and others have reduced their output.

The world gets [80 per cent of its electricity from power plants that needs lots of cool water](#), which is a major problem in a warming and drier world. If nothing is done, there could be major power outages during the even hotter heatwaves of the near future.

Nuclear, gas and coal-fired plants all generate electricity by turning water into steam and using it to drive turbines. The steam then has to be cooled back into water for reuse.

Power failure

Almost all thermoelectric power plants, as they are known, use water taken from rivers or the sea to cool the steam. Unsurprisingly, that doesn't work if the cooling water is too hot. Last week, for instance, [the Ringhals 2 nuclear reactor in Sweden was shut down](#) for a few days because sea temperature exceeded the 25°C design limit.

Power plants pumping out warm waste water can also fall foul of conservation laws – if rivers get too hot, wildlife would die en masse, which is not permitted in many countries. This is why four reactors in France had to shut down over the past week.

Finally, you can't cool a power plant if there isn't [enough water](#). Earlier this year, [several coal-fired power plants in India had to be shut down for](#) just this reason.

Clearly, all these problems are going to get worse as the world warms. According to [one study](#), between 2031 and 2060 the generating capacity in Europe and the US could fall by nearly a fifth in summers on average.

Energy extremes

But the real problem will come during periods of extreme heat and drought, when [generating capacity could plummet by more than 90 per cent in places](#). While hot, dry regions like southern Europe and the south eastern US will be worst affected, this will be an issue [even in the UK](#).

The worst case scenario would be a prolonged power outage during an extreme heatwave in an area already dependent on summer air conditioning, such as the city of Phoenix in Arizona. The result could be [a major disaster with an impact rivalling that of hurricane Katrina](#).

So how do we ensure there's enough power to keep fans and air conditioners running during summers far hotter and drier than this one? There is a whole range of things that should be done, from diversifying our electricity supply to reducing peak demand in summer.

While wind power dwindles during heatwaves, for instance, solar power is plentiful and clean. So building more solar farms is a win-win approach.

[Designing for a hotter world can also make a big difference](#). For instance, newer nuclear reactors take cooler seawater from deeper down and so have been able to keep running.

But it's not always so easy. Many power plants recycle water in cooling towers, which avoids the problem of pumping hot water back into rivers. But this approach uses more water overall. And while air cooling can be used instead of water cooling, it's less efficient and therefore more expensive.

The bottom line is that making our electricity systems more resilient requires both money and joined-up thinking – and both are in short supply.