

Past power failures 'dress rehearsals' for frequent future blackouts

Paper warns that lights will go out with increasing severity as demand for electricity for gadgets soars amid inadequate investment

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Soaring electricity demand for air-conditioning, iPads and increasingly cars, combined with a growing population and inadequate investment in creaking power networks, is pushing the world towards frequent blackouts, academics warn.

China, Brazil and Italy have all had significant power failures in the past decade but these are just "dress rehearsals for the future" in which the lights will go out with increasing frequency and severity, predicts a new paper, *Blackouts: a sociology of electrical power failure*.

The authors, Hugh Byrd of Lincoln University in the UK and Steve Matthewman of Auckland University in New Zealand, argue that the west needs to abandon the idea of uninterrupted electricity supply.

"Supply will become ever more precarious because of peak oil, political instability, infrastructural neglect, global warming and the shift to renewable energy resources. Demand will become stronger because of population growth, rising levels of affluence and the consumer addictions which accompany this," they argue.

They note that there have already been frequent warnings about future blackouts in Britain from as early as 2015 from government advisers, network operators and the energy regulator, Ofgem. Byrd and Matthewman argue the picture is broadly similar across the world, with the American Society of Civil Engineers warning that US generation systems could collapse by 2020 without \$100bn of new investment in power stations.

The enormous growth in demand across the US is highlighted by figures showing that even as long ago as 2007 commercial and domestic air-conditioning alone consumed 484bn kilowatt hours of electricity - not much more than the country's total energy consumption in the mid-1950s.

It has grown substantially since then, while air-conditioning sellers have moved on to China, where household ownership of units has tripled in a decade and is still growing at 20% a year. India is showing the same pattern, says Byrd, a professor at Lincoln's school of architecture, and Matthewman, an associate professor from Auckland's sociology department.

Their report records a growing pattern of failures in power systems, starting with 50 million people being plunged into darkness on 14 August 2003 across the north-eastern US and Ontario, 60 million offline on 10 November 2009 in Brazil and Paraguay, and 600 million affected by failures across India on 31 July 2012.

However, the authors note that the move to renewable - often intermittent and weather-dependent - energy can also exacerbate the problem. There were blackouts in Kenya and Venezuela in 2010, and Tanzania in 2006, that were blamed on shortages of rain for hydroelectric power schemes.

Research shows that in the US power outages have caused annual losses of up to \$180bn, but economic cost is not the only concern. Food safety, crime rates, transport problems and the environmental cost of diesel generators all come to the fore during a blackout, the authors say.

"Infrastructural investment across Europe and the US has been poor, and our power generation systems are more fragile than most people think," said Matthewman. "The vulnerability of our electricity systems is highlighted by one particular blackout which took place in Italy in 2003, when the whole nation was left without power because of two fallen trees. This reality is particularly alarming when you consider the world's increasing dependency on electricity."

The problem has also been made worse in the developed world, where power systems are taken for granted. The easier technologies are to use, the less they are reflected on and yet they will have devastating and far-reaching social as well as economic impacts, the report argues.

Byrd added: "Electricity fuels our existence. It powers water purification, waste, food, transportation and communication systems. Modern social life is impossible to imagine without it, and whereas cities of the past relied on manpower, today we are almost completely reliant on a series of interlocking technical systems."

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