Time To Take Power Protection More Seriously?

Worldwide Power Cuts

Most people have read news reports about the recent massive US power cut, which has now been labelled 'Blackout 2003'. Although that label tends to imply an annually recurring event, we now have a clearer picture as to the causes and contributing factors that can lead to 50 million Americans being without power for up to 48 hours.

The US has been described as a 'Superpower with a Third World grid'. Unlike the UK there is no 'National' Grid across the US, as local area power networks owned by large corporations are responsible for delivering the power to cities. Each Network is connected to several others to allow trade of power from areas where supply outstrips demand to more populated centres. In general across the North Eastern Seaboard of the US, Power flows from Canada and Ohio first east and then south to New York and New Jersey. The deregulation leads to a fiercely competitive price market for power as under normal conditions there is more power generated than there is infrastructure to deliver it. It is the cross country high voltage wires that are the weak link in the Power Chain.

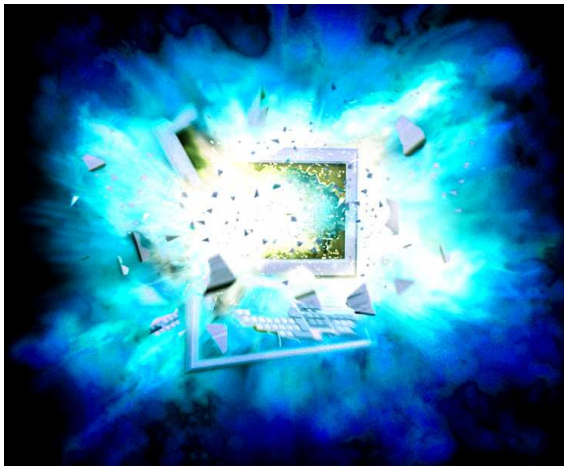
Contributing Factors

During the summer, power demand drops off to typically half of peak winter demand. This predictable drop allows for shutdown and routine maintenance of power stations. However, September 11th has caused a much larger number of Americans than usual to holiday inside the Continental US; consequently demand has remained higher than predicted.

Furthermore Americans rely heavily on air conditioning, and in periods of hot weather demand during the middle of the day can peak above winter levels, where heating is frequently timed for cheaper off peak power.
Across the Eastern Seaboard geography has led to a large dependence on nuclear reactors, while for safety and operational reasons a nuclear power plant is dependant on an outside source of electricity to function.

A Summary of the actual events

On the morning of August 14th there were several as yet unexplained power fluctuations at grid level (345,000 volt interconnecting transmission lines). These 345kV lines are named from the two towns/areas they join, and by 2pm a coal plant in Eastlake Ohio "tripped". When a part of the grid trips or disconnects it is usual for other parts to take over the supply seamlessly for the duration of repair until it is brought back on line.



Of the two main lines taking power east across Ohio, one tripped just after 3pm (again for unexplained reasons) leaving the other responsible for all of Ohio's power export. By 3.30pm this line had overheated to such an extent that the cable sagged into a tree shorting out the last link out of Ohio and triggering a chain reaction.

Over the next 20 minutes the connection point where Ohio's grid joins the Eastern Grid saw 'wild' power fluctuations, tripping and reconnecting as the automated systems tried to compensate for a supply lower than the demand. By 4.10pm Cleveland becomes the first sacrificial lamb – at 300MW it was the largest local load that could be dumped and in reality the problem should have stopped there. Unfortunately the wild power swings with no explanation lead to two other Coal Fired Power stations one in Michigan and one in Ohio to trip out leaving the remaining supply below a critical level. Over the next 15 minutes 8 Nuclear power stations across the East Coast shut down as their safety protocols demand, leaving 50 million Americans and a few Canadians in the dark.

The power was restored slowly but surely starting from Ohio and moving east and then south, but progress had to be slow as demand could never be allowed to outstrip supply or the whole system would come tumbling down again. Consequently, some parts of Michigan didn't get power back until Sunday.

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The Ripple Effect

Although everybody is aware of the primary effects of a power cut, the secondary or ripple effects can be even more far reaching. Traffic in central New York came to a standstill, many people chose to stay at home on Friday but by then most freezers and fridges had defrosted and food was going off in the heat. The garbage started to pile up and the garbage collectors where at home too. It has been estimated by the Mayor's office that five days without garbage collection would bring the city to a standstill with blocked streets. And that doesn't even take into account the health hazard this would cause.

The long duration of the power cut also lead to boil water warnings across much of the area. However, many people were unaware that the water wasn't safe, as only battery powered radios and TVs were working.

Major Oil refineries in the region shut down, leading to a shortage of petrol and increased prices. Although the Department of Energy claims the US has oil reserves for 30 days, many economists have pointed out that the Strategic Oil reserve would only be used for military or critical applications and that consumer level reserves are closer to two days.

Initially, many people feared that terrorism had struck once again. Of course, this is unlikely, but not for the reasons you may think. A well orchestrated terrorist attack could have taken out a much larger area and done so almost continuously until the terrorists themselves were caught. It needn't even have involved high technology or specialist skills, as demonstrated by a power outage that occurred in Georgia (formerly part of the USSR) a week after the US failures. A few terrorists with mobile phones and machine guns would have caused a much longer power cut.

London's Problems

Moving on to London's power cut on August 28th, it almost seems as though we are intent on copying everything the Americans do. At 6.15pm a power cut that affected south and central London and most of Kent brought much of the area to a standstill.

Although the power cut lasted just 34 minutes the actual level of disruption was much greater partly because underground trains were in the process of being evacuated and power could not be restored due to the danger of people on the tracks. This cut was attributed to a freak failure by our National Grid, and in fact power was partially restored by re-routing before the damaged link was fixed. The power cut affected 150,000 homes and over half a million commuters, the only beneficiaries being central London pubs which were heaving with stranded people.

So the total cost of all this disruption has been estimated at over 6 billion dollars and US economists claim it is therefore hardly a blip on the radar, but if you were caught on even the edges of one of these problems wouldn't you take power protection more seriously?

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