**Government Reports Conclude Most of Us Will Die if the Power Goes Out**

Posted on [December 22, 2014](http://www.benjamindancer.com/Blog/2014/12/22/government-reports-conclude-us-will-die-power-goes/) by Benjamin Dancer

The report to the right is the single scariest government document I have ever read. It details what would happen to America if the lights went out in a technical language so precise there is no shying away from its conclusion. It is a rigorous and punctilious vision of the apocalypse.

I was so taken by the disturbing document that I wrote my best selling novel [*Patriarch Run*](http://www.amazon.com/gp/product/0996063102/) about it (which, by the way, Amazon is promoting for free through 12-23-2014). The government report published in April 2008 is titled *Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack.* (Click here for the Commission’s [website](http://www.empcommission.org/index.php) or on the image above to view the Commission’s report.)

What would happen if the power went out for good? It’s not a question many of us contemplate, probably because the answer is not reassuring.

It turns out that the power grid is quite vulnerable. There are a number of realistic scenarios that could bring it down, not just for a few days, but indefinitely. In addition to that, modern civilization depends on electricity. That is not a figure of speech. We have come to depend on electricity for food and water.

Because of this vulnerability, we have an opportunity to bring the left and the right together to create a more secure future with renewable energy. This synergism arises from the right’s concern about national security and the left’s concern about the environment.

There are many government, scientific and industry reports that detail how vulnerable our centralized power grid is to catastrophic failure. The title of the most interesting report, published in 2008 by the [Congressional EMP Commission](http://www.empcommission.org/index.php), is a mouthful: [*Report of the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack*](http://www.empcommission.org/docs/A2473-EMP_Commission.pdf). The popular vision of an EMP attack is that of a nuclear warhead detonated hundreds of kilometers above the Earth’s surface. The pulse of electromagnetic energy would wreak havoc on the electronics that are critical to the nation’s infrastructure.

Lest talk of such a catastrophe be dismissed as fear mongering, keep in mind that the weaknesses that make the power grid vulnerable to an EMP attack are the same weaknesses that make it vulnerable to a cyberattack or to a solar storm.

Because of their credibility, there are three other reports written about the EMP threat worth mentioning:

* [*High-Impact, Low-Frequency Event Risk to the North American Bulk Power System*](http://www.nerc.com/files/HILF-060210.pdf), a joint report by the North American Electric Reliability Corporation (NERC) and the U.S. Department of Energy
* A [series of reports](http://web.ornl.gov/sci/ees/etsd/pes/ferc_emp_gic.shtml) from the Federal Energy Regulatory Commission, the executive summary of which is titled[*Electromagnetic Pulse: Effects on the U.S. Power Grid*](http://web.ornl.gov/sci/ees/etsd/pes/pubs/ferc_Executive_Summary.pdf)
* [*America’s Strategic Posture*](http://media.usip.org/reports/strat_posture_report.pdf) by the Congressional Commission on the Strategic Posture of the United States

They all share the same conclusion: America is vulnerable and unprepared. The people in the know are worried about losing the power grid because, as the National Academy of Sciences (NAS) put it, “Electric power is modern society’s cornerstone technology, the technology on which virtually all other infrastructures and services depend.”

In a 2012 radio [interview](http://www.blogtalkradio.com/empact-radio/2012/06/13/episode-105-dr-michael-frankel), Dr. Michael J. Frankel, Executive Director of the Congressional EMP Commission and one of the nation’s leading experts on the effects of nuclear weapons, acknowledged, “Very few people are interested in nuclear threats…but, on the other hand, there are threats that private industry does place more credibility in…one is the threat of geomagnetic storms…but…geomagnetic storms can, in fact, be much larger than what they are currently protecting against.”

The NAS produced a report, [*Severe Space Weather Events–Understanding Societal and Economic Impacts*](http://lasp.colorado.edu/home/wp-content/uploads/2011/07/lowres-Severe-Space-Weather-FINAL.pdf), exploring the solar threat to our electrically-powered civilization. Every hundred years, or so, the earth is visited by a geomagnetic storm large enough to impact the power grid in a similar way as an EMP attack. As a matter of fact, there have been several storms in recent centuries that would have brought down the power grid if the grid had existed during those events. Take, for example, the geomagnetic storm that occurred in 1859, referred to as the Carrington Event; it disrupted telegraph services around the world. Today a similar storm could inflict catastrophic damage: “$1 trillion to $2 trillion during the first year alone…with recovery times of 4 to 10 years.”

There is no shortage of credible, dire warnings on the electrical grid’s vulnerability. Dr. Peter Pry, a member of the Congressional EMP Commission and Executive Director of the Task Force on National and Homeland Security, [testified](http://docs.house.gov/meetings/HM/HM08/20140508/102200/HHRG-113-HM08-Wstate-PryP-20140508.pdf) before the House Homeland Security Committee in May of 2014 that “a geomagnetic super-storm, like the 1859 Carrington Event or 1921 Railroad Storm…could kill 9 of 10 Americans through starvation, disease, and societal collapse.”

Moreover, the power grid is also vulnerable to a Stuxnet-like event. Stuxnet was a computer worm that attacked the PLCs (Programable Logic Controllers) of an Iranian nuclear facility in 2007 causing catastrophic failure to the facility’s centrifuges. A cyberattack is not a far-fetched scenario. According to the Department of Homeland Security, a similar type of computer virus shut down a power plant for three weeks in 2012 when a technician inserted an infected USB drive into the network.

Leon Panetta, Secretary of Defense from 2011 to 2013, gave a [talk](http://www.defense.gov/transcripts/transcript.aspx?transcriptid=5136) on Cybersecurity to some business executives in 2012. In describing the potential of a cyberattack, Panetta said, “We know that foreign cyber actors are probing America’s critical infrastructure networks. They are targeting the computer control systems that operate chemical, electricity and water plants and those that guide transportation throughout this country. We know of specific instances where intruders have successfully gained access to these control systems. We also know that they are seeking to create advanced tools to attack these systems…They could, for example, derail passenger trains or even more dangerous, derail trains loaded with lethal chemicals. They could contaminate the water supply in major cities or shutdown the power grid across large parts of the country….these kinds of attacks…would cause physical destruction and the loss of life.”

James Clapper, Director of National Intelligence, [told](http://www.intelligence.senate.gov/130312/clapper.pdf) the Senate Intelligence Committee in 2013 that a cyberattack was the biggest threat our country faced. “We judge that there is a remote chance of a major cyberattack against US critical infrastructure systems during the next two years that would result in long-term, wide-scale disruption of services, such as a regional power outage.”

Dr. Frankel also [testified](http://docs.house.gov/meetings/HM/HM08/20140508/102200/HHRG-113-HM08-Wstate-FrankelM-20140508.pdf) before the House Homeland Security Committee in May of 2014. His testimony focused on the lack of progress made to protect the United States from an EMP attack since the Commission’s 2008 report was published. He also discussed the nation’s vulnerability to a cyberattack: “the same result [as an EMP attack] could be achieved by simultaneous cyber-attack…Cyber and EMP threats have the unique capability to precipitate…multiple failures of these…control systems over a widely distributed geographical area, and such simultaneous failures…are likely to signal a wider and more long lasting catastrophe.”

The cyber threat is serious enough that the Pentagon announced to the world in 2011 that it would treat computer sabotage perpetrated by another country as an act of war. A military official put it to the[*The Wall Street Journal*](http://online.wsj.com/articles/SB10001424052702304563104576355623135782718) this way, “If you shut down our power grid, maybe we will put a missile down one of your smokestacks.”

Two out of the three scenarios described above, a massive cyberattack and an EMP attack, would require human intent, an intent to kill a lot of Americans. However, the country is in possession of a strong deterrent in that it can effectively retaliate against any actor precipitating such an event. In other words, America’s deterrent puts a massive cyberattack and an EMP attack in the same category as a nuclear war: mutually assured destruction makes the event unlikely.

A strong deterrent, however, is less effective against rogue hackers and terrorists. Moreover, the 100-year solar storm is a naturally occurring event that we actually expect to happen. There is no effective deterrent against the sun.

At this point in the conversation, one might reasonably ask how is it that the power grid is so vulnerable to sabotage? And how is it that in the absence of electrical power the population would starve?

There are three constituents of the power system: generation, transmission and distribution. Let’s start with generation. After an event such as what is being discussed here, there will be no more power generation. According to the Congressional EMP Commission’s report, power plants are designed to handle interruptions in load, but this event would “upset the protection and control system[s],” which means that the power plants would not be able to shut down correctly. The improper shut down of a power plant creates its own problem. “Power plants, particularly newer ones, are highly sophisticated, very high-speed machines, and improper shut down can damage or destroy any of the many critical components and can even cause a catastrophic failure.” Put simply, the Commission’s concern is that the machines inside the power plants would be destroyed.

The report goes on to say that, “Restoration of some damage can be very long term, certainly months and in some instances years.” The Commission is not worried about a few power plants that will need new parts and skilled workers to perform repairs. It is worried about a large percentage of the power plants in the country. Potentially, all of them.

Dr. Pry described it to me this way, “Cascading failures are inevitable in a centralized, highly interconnected system…Sabotage of just nine transformer substations can cause a national blackout–because the domino effect is inevitable in the Big Grid.”

It gets worse. Even if you were able to generate power, you wouldn’t be able to transmit electricity. The Congressional EMP Commission concludes that in the best case scenario it would take months to be able to transmit power again, but that is an optimistic view of the catastrophe. “Since the geographic area is so large…restoring the system from the still functioning perimeter may well not be possible at all or would take a great deal of time; the Commission estimates weeks to months, at least, in the best circumstance.” In other words, if there were a large solar storm or a Stuxnet-like event, we don’t know if we could ever get the nation’s power grid up and running again.

Which brings us to the third and final constituent of the power system: distribution. You’d need all the skilled labor available to repair the power generators, and it wouldn’t be enough. You’d have to repair a transmission system that could be beyond repair, and in addition to all that, there would be problems with distribution. The type of event we are discussing would induce “arcing across the insulators that separate the power lines from the supporting wood or metal poles. The arcing can damage the insulator itself and in some cases result in pole-mounted transformer explosions. Damage to large numbers of insulators and pole-mounted transformers could also result in a shortage of replacement parts, as these items are fairly reliable under normal conditions, and spares are not kept to cover widespread losses.” Unfortunately, even if you could find enough skilled laborers, which you couldn’t, there wouldn’t be enough spare parts to make the repairs.

Why not order more parts, you might ask. Because it’s not that easy. Here’s how the Commission states the problem, “there are roughly 2,000 transformers in use in the transmission system today at 345 kV and above…No transformers above 100 kV are produced in the United States any longer. The current U.S. replacement rate for the 345 kV and higher voltage units is 10 per year; worldwide production capacity of these units is less than 100 per year.” Although experts from the [Secure the Grid Coalition](http://securethegrid.com/) have informed me that “large transformer manufacturing capability in the United States” has “been brought back” since 2008, there is not enough manufacturing capacity to keep up with such a catastrophe.

Is it possible that with the concentrated power of the Federal Government that a problem such as the manufacture of these transformers could be overcome? Probably. But we’re talking about a compounding catastrophe. Manufacturing new transformers will not be enough. According to the experts, it would be extremely difficult, if not impossible, to keep pace with the escalating contingencies of such a disaster.

In summary, the problem is not that it will take a very long time to repair the power grid, it’s that there might never be a power grid again. Here’s how the Commission phrases the issue, “While stopping electrical supply over a broad geographical area nearly instantaneously is damaging, it is the time it takes to restore service that is important, assuming restoration is possible, which itself may be questioned…”

In a 2013 [interview](http://www.newsmax.com/Newsmax-Tv/electromagnetic-pluse-nuclear-device/2013/11/05/id/534949/), Dr. Pry warned that an EMP attack could succeed in “eliminating us as a civilization.” To understand the magnitude of this threat, we have to understand what happens to a modern civilization when the power goes out. Put simply, it starves.

According to the Congressional EMP Commission, the grocery store will run out of food in 24 hours. There will be no more water in the faucet. The Commission describes how the nation’s transportation system will be compromised. The oil refineries are as vulnerable as the power grid. There won’t be enough fuel. Other critical systems will be threatened: banking and finance, telecommunications, emergency services and the government itself. Without electricity or fuel, at least some of the items in the prior sentence will simply cease to exist.

The Commission’s report states that food production will collapse. Fertilizer is petroleum based, requiring electricity to manufacture. You need electricity to irrigate crops. Farm machinery requires fuel. To keep up with the country’s ballooning population the productivity of the American farmer has increased by more than 50-fold since 1900. How did this increase come about? Technology: machines, fertilizers, pesticides. None of which can be manufactured without oil and electricity. Electricity has also created efficiencies in food storage and food transportation. Without electrical power, farmers will be forced, in many ways, back to methods used a hundred years ago when food was grown on local farms, eaten seasonally and transported short distances. However, the population has outpaced such methods.

The Commission’s report describes the potential starvation of the population in an understated tone, “The United States no longer has a large labor force skilled in farming that could be mobilized in an emergency. The transformation of the United States from a nation of farmers to a nation in which less than 2 percent of the population is able to feed the other 98 percent is made possible only by technology. Crippling that technology would be injurious to the food infrastructure.”

Let’s step back for a minute and put all of this in perspective. If one of these three events were to occur on a large scale, a lot people are likely to die. Dr. Pry assumes a 90% casualty rate by the end of the first year. Whether or not that number is accurate, the stakes are high. Because of those stakes, there is a vibrant survivalist movement alive in America. A prepper can be understood as someone who actively prepares for emergencies and great disruptions in the social and political world order. To many Americans their obsession with catastrophe and preparedness seems crazy. A full appreciation of the threat, however, lends reason to the madness.

The grassroots movement about the power grid is also an intellectual movement. Academics, national security experts and policy makers serve on the boards of organizations such as [The NOAH Foundation](http://www.thenoahfoundations.com/%23%21about2/c4nz), [Secure the Grid Coalition](http://securethegrid.com/) and [EMPact America](http://empactamerica.org).

Furthermore, there is pending legislation in Congress. The [*SHIELD Act*](http://Shieldact.com)would amend the Federal Power Act to encourage cooperation between industry and government to address the current vulnerabilities of the electric grid. It was introduced to the House of Representatives in 2013 by Republican Trent Franks. In March 2014, the[*GRID Act*](http://democrats.energycommerce.house.gov/index.php?q=news/rep-waxman-and-sen-markey-introduce-grid-act-to-protect-electrical-grid-from-physical-cyberatta) was introduced by Democrats Henry Waxman and Edward Markey in the House and Senate, respectively. The bill provides the Federal Energy Regulatory Commission (FERC) with the authority to address physical, cyber, electromagnetic pulse, and other threats to the electric grid.

We know that relying on a centralized power grid tethers our civilization to the hope that the grid won’t go down. A decentralized power grid, known as distributed generation, would mitigate this risk by incorporating smaller power sources, such as renewable energy sources, closer to the end-user. Dr. Pry put it to me this way, “Decentralizing the electric power grid, by, for example, introducing more microgrids and renewables, would increase grid resilience against a natural or manmade EMP event and against all hazards–including cyberattack.”

“Most of the nation’s electricity comes from large central generation plants and moves over an extensive network of transmission lines, which would be difficult to defend,” states a Congressional Budget Office paper titled[*Prospects for Distributed Electricity Generation*](http://chpassociation.org/wp-content/uploads/2013/05/CBO-Prospects-for-Distributed-Electricity-Generation-03.pdf). “If more of the nation’s electricity supply originated in the homes and businesses where it was consumed, the adverse consequences of any attack that disrupted the network would be diminished.”

“I agree that it will be helpful to split up the existing electric power grid behemoth,” Dr. George Baker, Professor Emeritus at James Madison University and a member of the Board of Advisors for the Congressional Task Force on National and Homeland Security, said in response to my question about renewables and distributed generation, “Grid survivability would be greatly improved.”

“The solution,” Dr. Pry told me, “subdivide the Big Grid into protected ‘islands’ and independent microgrids and introduce more renewables, which are inherently microgrids…The military is trying to do this now to save their bases from catastrophic failure of the civilian grid–which provides 99 percent of the electricity they need to perform their missions.”

The threat to the civilian grid motivated the Pentagon to build independent power stations at military bases across the country. Captain Alex Stites of the Office of the Deputy Assistant Secretary of the Navy for Energy told [*The Wall Street Journal*](http://online.wsj.com/articles/hacker-terrorist-threats-spur-bases-to-build-power-grids-1413920177) that a 2013 attack on a California power station “made us think about our dependence, and how we position ourselves to reduce that risk.” While [moving to energy security](http://army-energy.hqda.pentagon.mil/programs/docs/Energy_Portfolio_15_Sep_10.pdf), the United States Army “will pursue renewable energy including solar, wind, biomass, landfill gas, geothermal, municipal solid waste and hydroelectric generation capacity.” The military is leading the country on distributed generation and renewable energy.

“What happens to the People if the Big Grid fails?” Dr Pry asked me, “The taxpayers who foot DOD’s bills will be, to say the least, surprised and disappointed to discover that while the Air Force still has electricity to fire missiles at ISIS, saving the People is not part of DOD’s plan. The taxpayer will be left in the cold and the dark.”

When I asked Dr. Baker about the national security benefits of renewables, he said, “Energy microgrids reduce reliance on our tenuous commercial grid and enable self-sustainable operations during disasters. But they do have risks. If not intentionally protected against EMP and GMD [geomagnetic disturbances or solar flares] they will not be available when needed most. It would behoove us to encourage manufacturers to include EMP protection at the outset.”

In the same radio interview as was cited earlier, Dr. Frankel discussed the “great disparity” between the military and the civilian response to the Congressional EMP Commission’s recommendations. Whereas the Department of Defense generally concurred with almost all of the recommendations and implemented a fairly vigorous protection program, the civilian side ignored all 75 recommendations to mitigate vulnerability to the nation’s critical infrastructure. “Very little or perhaps nothing noticeable has actually been done with that…Industry is very loath to spend any monies at all on any of this stuff.”

Although there is resistance from the status quo, investing in renewables benefits both national security and economic growth. “The technology demand of microgrids [renewables] is on the increase,” Dr. Baker said. “Some estimate the market will grow to $40 billion annually.”

In 2012, Roscoe Bartlett introduced a [Resolution](http://www.ourenergypolicy.org/encouraging-grid-security-with-distributed-generation/), which received support from former Director of Central Intelligence R. James Woolsey, to the House of Representatives that would have decentralized 20% of the power grid in the name of national security. The Resolution was not enacted.

One of the most interesting aspects of this issue is that power grid politics defy traditional partisan boundaries. For example, Barry Goldwater Jr., a former Republican member of the House of Representatives, is now the figurehead for the solar advocacy group [Tell Utilities Solar Won’t Be Killed](http://dontkillsolar.com/tusk/). Another fight over renewable energy is taking place in Georgia. The Green Tea Coalition (comprised of the Sierra Club, Occupy Atlanta, Georgia Watch, the National Association for the Advancement of Colored People and the Atlanta Tea Party Patriots) is waging that campaign against the state’s utility company.

Debbie Dooley, a nationally-known Tea Party leader and a founder of the Green Tea Coalition, summed up the situation when she told [*Midwest Energy News*](http://www.midwestenergynews.com/2014/09/11/qa-tea-party-star-heads-to-wisconsin-to-fight-for-solar/), “This is not a liberal issue…Our grid is so centralized, it’s a national security issue.”

If our centralized power grid is a threat to national security, if renewable energy and distributed generation make the country more secure, if renewables are good economics, and if renewable energy is a solution for which environmentalists advocate, what force is so powerful that it is keeping the nation from securing its own future?