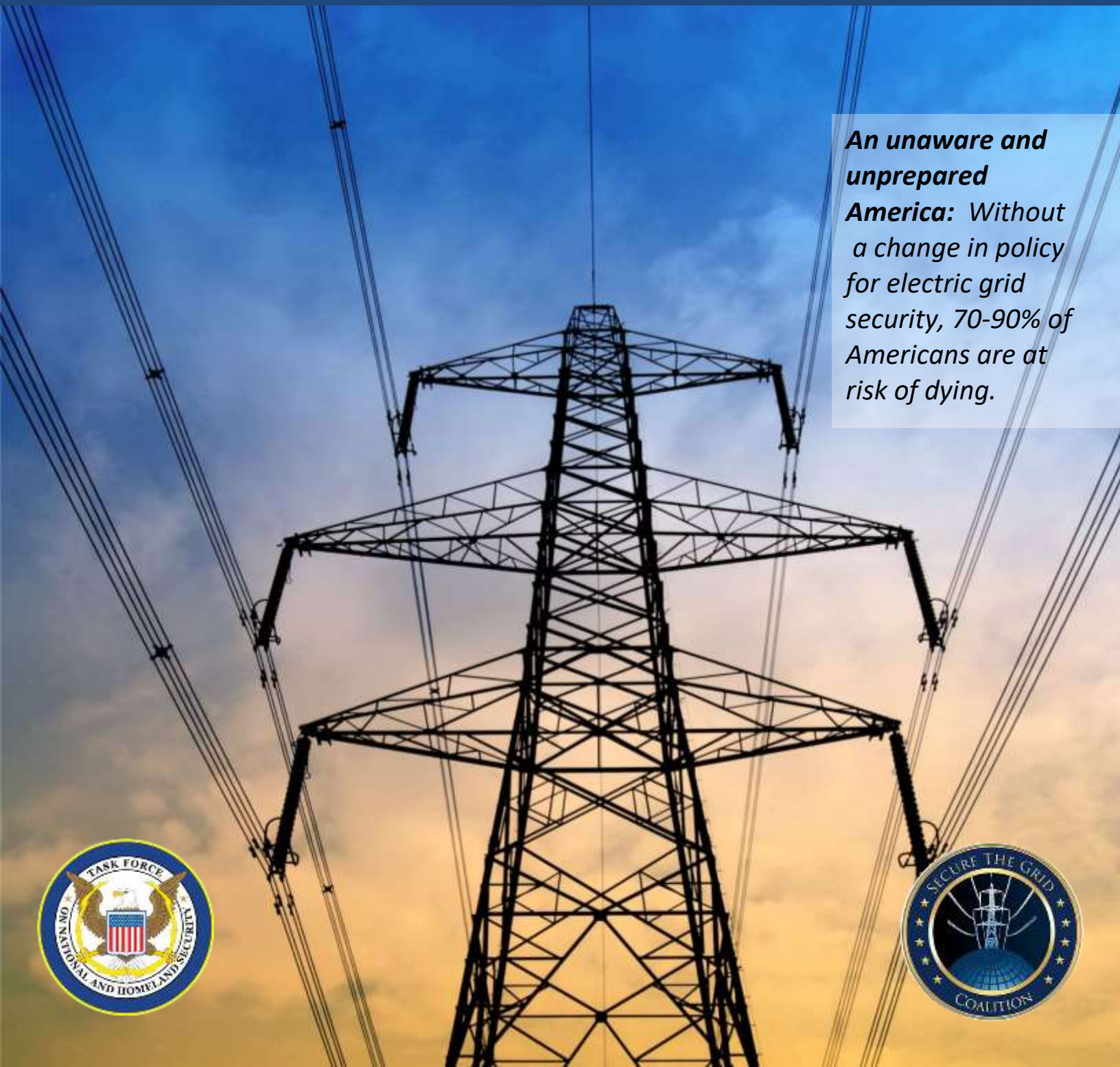
A Call to Action for America

A collaborative report by:
Task Force on National and Homeland Security, Secure the Grid Coalition, and other partners
October 2017



An unaware and unprepared America: *Without a change in policy for electric grid security, 70-90% of Americans are at risk of dying.*

A Call to Action for America

The goal of this document is to save lives.
You can help us save lives, including your own and your loved ones…

Our Vision: ***"We believe the citizens and the local, state and national governments of the United States of America can come together to save lives by protecting our electric power[1] and our critical infrastructures[2] - including water & wastewater, communications, emergency services, transportation, healthcare & public health, food & agriculture, energy, banking & finance - against any and all threats, including cyber, physical attacks, extreme solar weather, and non-nuclear and nuclear electromagnetic pulse (EMP). Together, we can save lives and protect America by taking action at the personal, local, state and national levels."***

Imagine the following:

Day 1, 3:00 p.m. EST (Noon PST): The power goes out across the entire continental United States. Transformers have blown out everywhere. Within minutes, all 61 commercially operating nuclear power plants across the Nation have "scrammed" (i.e. shutdown) their reactors, which is standard operating procedure during the loss of external electric power. Millions of TVs, laptops and computers have shorted out. Cell phones and landline phones aren't working. The Internet is down. Smoke is visible from a number of small fires across every community, but very few sirens from fire engines can be heard. Traffic lights are out, and a significant number of cars and trucks that were running are now inoperable and scattered about the roadways. Trains and subways are shutdown. ATM's don't work, banks close, and Wall Street closes. The Emergency Broadcasting Service and 911 are not operating. First responders are unable to communicate, coordinate or respond, not that they could get anywhere on the clogged roadways. Many of the planes that were in the air have crashed, and those that didn't must now attempt to land without help from air traffic control or ground radar. No one seems to know what's going on. By nightfall, most homes, hospitals, and elderly care facilities are without running water. The nighttime sky is pitch black across America, and the stars seem eerily bright overhead.

Days 2-3: There's a run on everything at the stores; those that are open will only accept cash or barter, since debit card readers are non-functioning. There will be no trucks coming to resupply the stores, since canning facilities, distribution centers, and interstate trucking all rely on the electric grid to function. There are long lines at the very few gas stations that have emergency diesel generators powering their pumps. In homes without emergency back-up power, anything remaining in freezers spoils and becomes unsafe to eat.

Days 4-5: Law and order begin to break down. Without communications and functioning electronic equipment, most emergency responders will likely stay home to protect their own families. Stores are looted for anything and everything. Many in the cities begin to evacuate to the suburbs, often by foot, overwhelming the already limited resources there. Emergency back-up diesel generators in most homes run out of fuel.

Days 6-8: Emergency back-up diesel generators run out of fuel at most water and wastewater facilities, radio and TV stations, hospitals, food processing plants and emergency services locations, if they weren't damaged or destroyed on Day One. There will be no tanker trucks coming to refuel. Hospitals are required to evacuate their patients if they are without external electric power for more than 72 hours, except there aren't any hospitals with electric power to evacuate their patients to. By now, there are few doctors, nurses and hospital staff members remaining, because the majority have gone home to protect themselves and their families. Many patients requiring constant care either have died or will die soon. Without firefighters and water pressure, a number of fires that started from a variety of causes, including nature, human error, or arson, burn out of control until there is nothing left to burn. As a result, entire city blocks and many homes are now in ashes. Without water pressure, there is no clean, safe drinking water available. Without wastewater processing, the situation becomes disgusting and dangerous very quickly as pressurized, raw sewage pours from toilets and sinks in the lowest elevations of the system. This makes millions of homes and apartments uninhabitable due to both the health risks and high levels of methane gas.

Days 9-14: Without law enforcement, the hungry and desperate masses break into their neighbors' homes for food and supplies. Armed groups and gangs roam the streets, preying on the weak and defenseless. Even "good people", if unprepared and forced to survive, do "whatever it takes" to feed their children and keep their loved ones alive. Like first responders, many in the stateside military and National Guard abandon their posts and rush home to protect their own families from the looters. Stateside military bases are 99% reliant on the civilian power grid and are just as "dark" as everywhere else. National Guard Armories around the Nation have been or will soon be looted by well-armed gangs intent on stealing loosely protected military vehicles and hardware. The thin layer of civilized society has begun to slip away in the fight for survival.

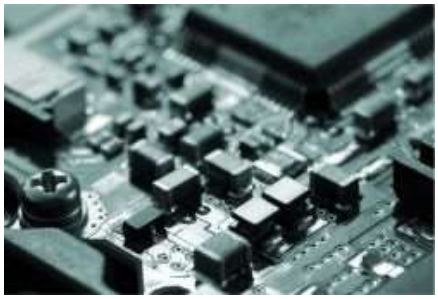
Days 14-30: By the end of Day 7, the Nuclear Regulatory Commission's (NRC) mandated diesel fuel supply for back-up emergency diesel generators at most nuclear power plants runs dry. For back-up generators and reactor cooling pumps damaged or destroyed on Day 1, there are two primary, central locations in the U.S. with spares that would need to be transported many miles on clogged highways to their destinations. If reactor plant operators are unable to operate and resupply fuel to back-up diesel generators, and if they are unable to power and operate reactor cooling pumps, reactor cores will eventually overheat and pools for spent fuel rods will eventually boil. If this is the case, over the next few days to weeks, many of the 61 commercially operating nuclear power plants with 99 nuclear reactors in 30 states (as of 5/30/17) will meltdown, just as the Fukushima nuclear power plant did in Japan following the tsunami of 2011[3]. Based on 2010 Census data, more than 120 million Americans live within 50 miles of a nuclear power plant. Their already bad situation will become far worse as grainy, radioactive debris blows downwind from failed reactor plants. There is nowhere to evacuate to, no one to oversee or coordinate any evacuations, and few methods available to communicate the problem. Adding to the social breakdown, many of the 2.3 million adults in federal and state prisons and county jails across the U.S. escape due to lack of power, resources and manpower to contain them. The first outbreaks of dysentery, cholera and typhoid, all brought on by drinking unpurified water and living in unsanitary conditions, begin to spread throughout the country. These and other treatable third world diseases, along with dehydration, starvation and murder, claim the lives of tens of millions of Americans. There are no hospitals to go to. There are no medications available. Even minor injuries and infections become life threatening. In most parts of the country, there is no one coming to help… and this is just the first 30 days following the grid being down.

Does this all sound like a bad apocalyptic movie or a "prepper" fantasy? We wish it was. What we have described above is the beginning of the collapse of the United States of America, caused by as few as one to three nuclear weapons detonated high in the sky above our magnificent, but totally unprepared, country[4]. The effect would be an ELECTRONIC shock wave that would burn up electrical power lines and transformers, and "fry" many electronic devices, such as portable radios, TV's, computers and telephones (especially those plugged into electric or telecommunications outlets).

This is NOT science fiction material but CONFIRMED SCIENCE. A similar result of losing power across the United States could have also been caused by a massive solar storm striking Earth, OR a sophisticated cyber-attack, OR a well-coordinated physical attack on our power grid. We have only scratched the surface in the story above, as living conditions would continue to worsen after day 30…

Does our government know about this? YES! ***No fewer than eleven studies conducted by or for federal agencies over the past decade have all agreed: the Nation's bulk power distribution system can be disrupted or destroyed over large areas due to various man-made and naturally occurring events.***[5] The "backbone" of our power grid is our massive, custom-built high voltage transformers, typically weighing between 200-400 tons each. Most of these are made overseas; require 12-18 months to order, build and ship; and often require additional months to transport over land and install. Additionally, the "Achilles heel" to the operation of both our power grid and our critical infrastructures are their almost complete dependency on computers and technology having very delicate microchips and microprossesors.[6]

How long can we continue to be lucky?

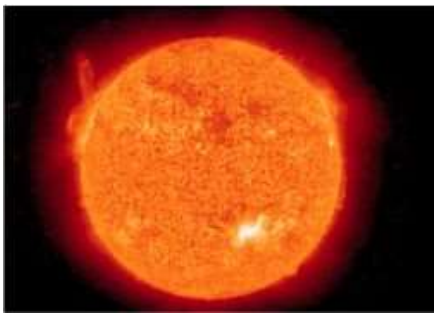


Cyber-Attacks: *"A massive and well-coordinated cyber-attack on the electric grid could devastate the economy and cause a large-scale loss of life"* - Dr. Richard Andres, U.S. National War College.

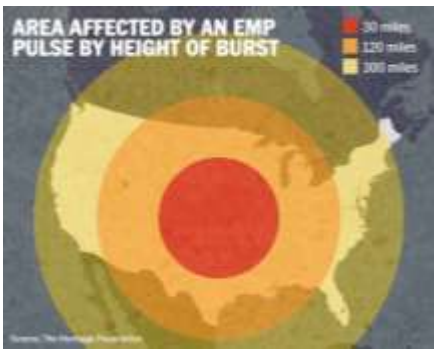
Roughly two dozen cyber-attacks per day are directed against our power grid and/or our critical infrastructures. The most threatening attacks, for example, would be attempts to destroy our difficult to replace, unprotected high-voltage transformers or to destroy critical infrastructure, such as cooling pumps at our nuclear reactor plants. With cyber-attacks, it is often difficult or downright impossible to determine the origin and culprit of the attack.[7]

Physical Attacks and Non-Nuclear EMP: ***"Destroy nine interconnection (transformer) substations and a transformer manufacturer and the entire United States grid would be down for at least 18 months, probably longer."*** - Internal memo, Federal Energy Regulatory Commission.

Around 1:00 a.m. on April 16, 2013, the Pacific Gas and Electric Company's Metcalf Transmission Substation in San Jose, CA was shot up by approximately a half dozen, masked gunmen armed with AK-47s. It was a well-executed mission that nearly knocked out power to Silicon Valley. The attackers are still at large; they left no finger prints or DNA. Besides the Metcalf Substation, other high voltage transformers around the country have been physically attacked, which is relatively easy to do; many substations are unguarded and surrounded by only chain-link fences with padlocked gates. Besides shooting at them, substations could also be attacked by Radio Frequency (RF) weapons or non-nuclear EMP weapons that can be purchased on-line without licensing requirements or built from parts purchased from local electronics stores and instructions from the internet.[8]



Geomagnetic Disturbance (GMD) from Extreme Solar Weather: According to NASA, a very large solar flare from our sun narrowly missed Earth by 9 days on July 23, 2012. It would have generated a geomagnetic super-storm, destroying many difficult to replace, unprotected high-voltage transformers and collapsing electric grids and life-sustaining critical infrastructures worldwide, putting the lives of billions at risk.[9] This event wasn't even reported by NASA or the news until 2 years afterwards. (The news cannot be relied upon to report information that is accurate, timely or critical.)



High Altitude Nuclear Electromagnetic Pulse (EMP or HEMP): Besides Russia, China and Iran, a failed nation state, such as North Korea or a terrorist cell, could detonate as few as one to three low-yield nuclear weapons 18 miles or higher in the sky above the atmosphere. While not directly hurting most people, except those dependent on electronic medical equipment such as pacemakers or hearing devices, it would cause an EMP effect a thousand times stronger than a surface nuclear detonation and potentially cause an extended blackout of the entire Continental United States. Like a cyber-attack, it could be very difficult or downright impossible to identify who attacked us, making retaliation

very difficult and causing attackers to think they could get away with it.[10]

Also, while we think of cyber warfare as "computer based hacking", Russia, China, Iran and North Korea all view nuclear EMP as "the ultimate cyber weapon" to be used either by itself or in coordination with other methods of attack they have available, such as cyber and physical attacks.[11] In comparison with other threats, nuclear EMP would cause significantly more damage to electronics with delicate microchips and microprocessors (e.g. computers and radios) within direct line of sight of the blast, greatly compounding the problem.[12] The "bad actors" of greatest concern are those who both hate us the most and have the least to lose if discovered. These include rogue states, such as North Korea and Iran, and terrorist organizations, such as ISIS and Al Qaeda.

An extended blackout of our power grid is on the short list of "Black Swan" [13] events that could effectively end the United States of America. Regarding a massive cyber-attack, physical-attack, solar GMD event or nuclear EMP attack occurring in our current state of unpreparedness, Dr. Peter Pry has stated:

> *"The Congressional EMP Commission on which I served calculated that within a year of a blackout that knocks out the national grid, we would probably lose up to 9 out of 10 Americans through starvation, disease, and societal collapse… The only reason we can sustain a population of 326 million Americans is technology. If you take that away, we don't have any way of feeding, providing water or even providing communications and government for an orderly society that is going to sustain 326 million Americans."* – Dr. Peter Pry, Executive Director for Task Force on National and Homeland Security, 2017.

If our government knows about this, what has been done about it? Next to nothing considering the gravity of the situation! If our electric grid is really this vulnerable, why hasn't Washington or the utilities industry adequately secured the electric grid before now? A partial answer is the lobbyists of the utilities industry have been working hard to down play this threat and to portray this issue as "alarmist fiction" because they are more concerned with profit margins than with the safety of the American people. The pockets of the utilities industry's lobbyists are deep, and Washington has been overrun with bureaucracy.[14]

Besides a few brave politicians and others in government pushing the issue, most have either conflicting political interests or misguided trust of "junk science" and lies[15], or they are more interested in their own re-elections[16], or they are lulled into a false sense of complacency from the "normalcy bias"[17], or they are simply unaware of the problem, or any combination of these factors. With most Americans unaware there is such a serious problem and the rest dismissed as "crazy preppers", there has been very little pressure placed on our elected officials, regulators, or the utilities industry to actually solve this problem.

A short summary of the Congressional EMP Commission: The EMP Commission was first established by the U.S. Congress in 2001 and served until 2008 to develop recommendations to protect the U.S. military forces, national electric grid, and other critical infrastructures from nation-ending threats of nuclear EMP attack and natural GMD from solar super-storms.[18] These reports are unclassified and anyone, including our enemies, is able to read them online. The findings and conclusions of the EMP Commission were conclusive.

The first pages of this document came largely from information provided in the 2008 report. The book, *Guilty Knowledge* (see footnotes), provides the executive summaries from both the 2004 and 2008 EMP Commission Reports, as well as 9 additional federal agencies' studies that all agree in their findings.

The EMP Commission was re-established in 2016 by the U.S. Congress due to the lack of implementation of the 2008 EMP Commission's recommendations to protect the electric grid and other critical infrastructures. These recommendations included protections from the growing threat of nuclear EMP attack from North Korea, Iran

and other potential adversaries, the ever present risk from extreme solar weather, and the increasing threats from cyber warfare and physical attack.

A highlight of the opposition to the Congressional EMP Commission's message: Since its re-establishment in 2016, various opponents in Washington D.C. have been hampering the EMP Commission's progress by withholding funding and vital administrative support. Meanwhile, nuclear-capable North Korea threatens the United States daily with the prospect of a high altitude nuclear electromagnetic pulse (EMP) attack; the sun continues to produce technology-killing geomagnetic solar storms; and both state-sponsored and non-state hackers continue to penetrate our grid with malicious and potentially devastating cyberattacks. In response, **the House Armed Services Committee and Department of Defense have, as of 31 July 2017, dismantled the only honest authority working to get the dysfunctional federal government to address these growing threats – The EMP Commission.** Moreover, the House Armed Services Committee's proposed 2018 NDAA disestablishes the current Commission before it can review the final draft of its final report, and establishes a brand new Commission — a recipe for disruption and further delay while new commissioners are appointed.

A Short Summary of Legislation: After many years of research and reports from multiple government and private sector agencies, heated political debate, and strong bi-partisan support (even one unanimously supported bill in the U.S. House), legislation in both the U.S. Congress and several states has failed primarily due to the well-funded efforts of special interest groups.[19] On October 13, 2016, President Obama signed the Executive Order, "Coordinating Efforts to Prepare the Nation for Space Weather Events" [20]in his last days of office. On December 23, 2016, the "2017 National Defense Authorization Act" was passed and included the complete language of the Critical Infrastructure Protection Act (CIPA) that had struggled for years to be approved.[21]

The passage of this Executive Order and CIPA marks a milestone in legislation and proves these are real problems facing America today, not just rantings by "extremists" as some media sources portray. The American people have been and continue to be misled. However, passing of legislation doesn't mean any laws are being enforced.

New bills addressing grid security continue to be introduced in 2017 and are working their way through Washington. However, none of these bills require the utilities industry to install specific hardware to protect critical components of the electric grid. Only a combination of hardware-based solutions plus procedural plans can adequately protect against all risks to our electric grid, including man-made EMP and natural GMD. The procedural-only plans proposed by the utilities industry are grossly inadequate to protect our electric grid and other critical infrastructures. **There is a reason why key military and government installations have used - both hardware based solutions plus procedural based solutions since 1962.**

What can be done?

A LOT! This is a very real but manageable problem. Solutions are readily available. Protecting our electric grid and critical infrastructures should be prioritized and placed immediately on a "war footing." This will require overcoming the steadfast resistance to government oversight and regulations by many in the utilities industry. Reform of the Federal Energy Regulatory Commission (FERC) is crucial. Staff appointments must be redirected to people committed first and foremost to the safety and well-being of the American people. FERC also needs to be given lawful authority to require the utilities industry to harden the grid to realistic standards. FERC currently does NOT have that authority, which permits the utilities industry to essentially regulate themselves with very little oversight by ANY outside government agency. Without such reforms, adequate grid security is highly improbable.

Perhaps the best and fastest way to overcome the obstacles to grid security is a Presidential Executive Order, which directs the Department of Energy to task FERC with protecting our most vulnerable, essentially irreplaceable critical transformer substations. In order to better protect against cyber and physical attacks, solar storms and nuclear EMP attacks, the following are needed: installation of surge protectors, neutral current blockers, as well as improved physical security that includes bullet proof metal enclosures at a total cost of less than $2 billion dollars (the equivalent of what the U.S. gives away to Pakistan every year in foreign aid). **The Federal government should pay for these costs from national security programs, which should greatly reduce the current resistance by the utilities industry.**

These actions would be a strong start. Estimates for significantly robust hardening are between $10-30 billion which **equates to less than $2 per person per year for 5 years**. As of September 2017, the civilian electric grid has **no** hardening. The best and least costly way to secure our electric grid is to use an "all hazards" strategy. It is senseless to protect the grid against some threats but not others. It is also far less expensive to harden the electric grid with a combined "all hazards" approach rather than "piece-meal" the hardening process by addressing each threat singularly. *(The utilities industries often report inflated estimates which are the result of "piece-mealed" solutions.)*

This paragraph is directed at the "techies" reading this document. A properly designed Faraday cage[22] can protect electronics from nuclear EMP, non-nuclear EMP weapons, directed energy weapons, accidental electromagnetic transients, such as from a ship's radar, and even kinetic threats from sabotage (e.g. bullets) and severe weather. Similarly, a properly designed surge-arrestor can protect electronics from nuclear and non-nuclear EMP weapons, natural GMD, and over-voltages caused by cyber-attack and severe weather. It is also much less expensive, when replacing electronics and electrical systems, to replace them with new electronics and electrical systems that are built with "all hazards" protection (from every threat up to the most severe which is nuclear EMP) than to go back in and retrofit systems that are not protected.[23]

There is much more that can be done. We have the ability, resources, knowledge and expertise; we just need the motivation and commitment to proceed. (For more technical solutions, please read this footnote at the end.)[24]

Whose problem is this? EVERYONE'S!

Is grid security a democrat vs. republican issue? Is grid security a liberal vs. conservative issue? Is grid security a race, religion, sexual orientation or gender issue? NO, to all of the above! This danger will kill up to 90% of us regardless of our personal differences. In regards to securing the electric grid, Frank Gaffney has stated:

> *"The vulnerability of America's electric grid is a ticking time-bomb. The government knows that if that vulnerability is exploited by enemies or afflicted by space weather, we could experience the end of our Nation as we know it. Many of our foes are aware of both the grid's susceptibility to attack and the potentially catastrophic consequences for this country and its people should it happen… Only the public is still largely in the dark about these dangers. If something is not done promptly to rectify the situation, our countrymen and women risk being kept in the dark permanently. We must secure the grid now."* – Frank Gaffney, President of the Center for Security Policy.

In order to save lives and protect America, we need to IMMEDIATELY: Educate as many concerned citizens as possible to spread the word to others to better personally prepare themselves against the possibility of a long term grid-down situation and to exert overwhelming political pressure at all levels of government. This political pressure should be focused on creating City Council Orders through to State Governor Executive Orders and all the way up to a Presidential Executive Order.

These orders should emphasize: 1) the protection and hardening of the key 20% of the existing national power grid that supports critical infrastructures in every community; 2) protection and hardening of these critical infrastructures themselves; 3) resiliency (i.e. back-ups and ability to "restart" the power grid in the event it goes down); 4) and finally, creation of new, "all hazards" protected "micro-grids" that would provide power directly to these critical infrastructures.

If we can keep water and wastewater, food, communications, hospitals and emergency services going, the American people would be able to "shelter in place" and not have to evacuate our cities. Our stateside military bases should lead the way in developing and utilizing "all hazards" protected "micro-grids" so that they are not completely dependent on the civilian power grid. As an attractive side-benefit, creating resiliency for our power and critical infrastructures also creates numerous new jobs and new industries.

In regards to the EMP Commission, the best solution would be to make it a "Presidential Commission on Critical Infrastructure Protection" answerable to the White House and thereby protect the EMP Commission from the obstructive political forces and self-interests that prevail in Congress and elsewhere in government. **To "get in the fight" to save the EMP Commission, go to: http://securethegrid.com and follow the "Save the EMP Commission Take Action" link.**

YOU CAN BE PART OF THE SOLUTION!

There are 4 things you can do and 3 of them would only take 15-20 minutes of your time.

1. **Forward this information** to family, friends, co-workers, church members, and groups you know.
2. **Write your federal officials** asking them to pass legislation requiring the utilities industry to use hardware-based solutions (not just procedural-only plans) as well as legislation to create emergency planning scenarios for grid down.
3. **Write your local and state officials** asking them to sponsor and support a bill at the local and state levels to begin the process of securing the electric grid and the critical infrastructures (such as water and wastewater) around your local area and state. When writing your officials, feel free to copy this entire letter. It is written with enough facts, information and references to prove that a very real problem exists, that solutions are available, and that action needs to be taken NOW. Continued excuses are unacceptable. If you know your zip including the 4 digit extension, you can easily find your U.S. and State officials. To find your U.S. and State Representatives (a.k.a. Congressmen) and Senators and your state's Governor go to this website: **https://www.usa.gov/elected-officials**
4. **Prepare yourself and your family.** The goal is saving lives, and certainly the lives of those you care about the most come first. There is a wealth of information about disaster preparedness following grid-down events available online. Start with the assumption that help won't be coming, and if it did, it could be many months away. Clearly, 3 to 14 days of food won't be enough. You would also need a way to collect and purify water to drink, and some means to properly defend yourself and your loved ones. We very much hope America never has to face a situation like this, but it is wise to be prepared for anything, just in case. The better prepared you are, the better able our government can direct limited resources to those who are less prepared.[25]

Concern without action achieves little, but concern with action can be unstoppable. There is much to be done to make our government officials take notice. For more information, go to either or both of the organizations listed below. Donations are greatly appreciated and help us to reach broader audiences who need to be aware of this information.

To Summarize: ***"We believe the citizens and the local, state and national governments of the United States of America can come together to save lives by protecting our electric power and our critical infrastructures - including water & wastewater, communications, emergency services, transportation, healthcare & public health, food & agriculture, energy, banking & finance - against any and all threats, including cyber, physical attacks, extreme solar weather, and non-nuclear and nuclear electromagnetic pulse (EMP). Together, we can save lives and protect America by taking action at the personal, local, state and national levels."***

This report is a collaborative effort by many members of the Task Force on National and Homeland Security, with assistance from equally committed members of the Secure the Grid Coalition as well as additional, allied organizations. It is intended to explain this issue of national importance, using as little scientific and technical language as possible (or at least explain the meanings in footnotes), so that the greatest number of Americans can clearly understand the issues and take action to secure their futures. This report should evoke both fear and anger in Americans, because only then will action be taken by our citizens. It should also provide hope to America, because this senselessly perilous situation is well within our Nation's ability to act on and resolve. We each just need to "roll up our sleeves" and get started…

Our organizations thank you for reading this and taking action to save lives. May God bless America.

www.emptaskforce.us

The Task Force on National and Homeland Security is an official Congressional Advisory Board recognized as such by the Ethics Committee under the name "Task Force on National and Homeland Security" and as a 501(c)(3) nonprofit under the name "EMP Task Force on National and Homeland Security". The Task Force on National and Homeland Security also provides leadership for and coordinates with other affiliated groups who are concerned about the loss of our power grid and critical infrastructures from any and all threats. The Executive Director for The Task Force on National and Homeland Security is Dr. Peter Pry.

www.securethegrid.com

The Secure the Grid Coalition is an ad hoc group of policy, energy, and national security experts, legislators, and industry insiders who are dedicated to strengthening the resiliency of America's electric grid. The Coalition aims to raise awareness about the national and international threat of grid vulnerability, and encourage the steps needed to neutralize it. It operates under the direction of the Center for Security Policy. The President of the Center for Security Policy is Mr. Frank Gaffney.

Footnotes:

[1]The **U.S. National Power Grid** is composed of the Eastern Interconnection, Western Interconnection and Texas Interconnection Power Grids. Much of Canada is included in the Eastern and Western Grids.

[2]The **16 Critical Infrastructure Sectors** are: Energy; Defense Industrial Base; Communications; Healthcare & Public Health; Emergency Services; Water & Wastewater Systems; Transportation Systems; Food & Agriculture; Information Technology; Financial Services; Nuclear Reactors, Materials, & Waste; Chemical; Commercial Facilities; Critical Manufacturing; Dams; and Government Facilities. All of these infrastructures are highly dependent on electricity and technology.

[3]Two excellent resources to learn more about the vulnerabilities of our nuclear power plants on loss of external electric power and what can be done about it: PRM-*50-96, a research-based analytical petition to supply long-term power for spent fuel pools at nuclear power plants.* Foundation for Resilient Societies: http://resilientsocieties.org/images/Petition_For_Rulemaking_Resilient_Societies_Docketed.pdf

And Campbell, Hershel and David Stuckenberg, *Electromagnetic Pulse and Space Weather and the Strategic Threat to America's Nuclear Power Stations, Final Report, June 2015*. The American Leadership & Policy Foundation.

[4]Forstchen, William R., *One Second After*. New York: Tom Doherty Associates, 2009. This is a fictional, but very realistic, account of what the first year would be like after a high altitude nuclear EMP attack set in the author's hometown of Black Mountain, NC. Its information is based largely upon the 2008 Congressional EMP Commission Report.

[5]Gaffney Jr., Frank J, *Guilty Knowledge: What the US Government Knows about the Vulnerability of the Electric Grid, But Refuses to Fix*. Center for Security Policy, 2014. The executive summaries of eleven Federal Agency studies, including the 2004 and 2008 Congressional EMP Commission Reports, have been compiled into this short (60 pages) reference book. (A PDF copy of the book downloadable at http://securethegrid.com/vulnerability along with an excellent "Threats to the Grid" PDF presentation.)

[6]The computers that are located throughout the power grid and within critical infrastructure are called Supervisory Control and Data Acquisition (SCADA). They typically look just like personal computers and take on responsibilities that used to be done by human beings, such as regulating power load on the electric grid, operating nuclear reactor cooling pumps, controlling natural gas pipelines, or operating water and wastewater pumps and systems.

[7]Koppel, Ted, *Lights Out: A Cyberattack, A Nation Unprepared, Surviving the Aftermath*. New York: Crown Publishers, 2015. This is an excellent study on the cyber threat, by award winning reporter, Ted Koppel.

[8]Maloof, F. Michael, *A Nation Forsaken: EMP: The Escalating Threat of an American Catastrophe*. Washington D.C.: WND Books, 2013. Besides covering solar GMD and nuclear EMP threats, the author also provides excellent information on non-nuclear EMP and RF weapons threats, which are devices easily made or purchased that can have devastating effects on electronics and transformers but often have limited damage radiuses of 1 kilometer or less.

[9]The massive solar flare that narrowly missed Earth in 2012 would likely have been similar in size to the **"Carrington Event" of 1859,** the largest solar flare on record to hit Earth. It caused fires in many telegraph stations world-wide and destroyed the recently laid trans-Atlantic Ocean telegraph cable. Solar flares of this magnitude are estimated to hit Earth every 100 to 150 years, and NASA estimates the likelihood of another at 12 percent per decade. Other scientific names for these regularly occurring natural events are "Coronal Mass Ejections" (CMEs), "Geomagnetic Disturbances" (GMDs), Magneto-Hydrodynamic (MHD) phenomena, "Natural EMP" and "Solar Storms".

[10]A **high altitude nuclear EMP** event could be accomplished without identifying the attacker and by making missile intercept extremely difficult by using a nuclear tipped, scud-type missile, launched from: a container ship in international waters along any of our coastlines (both Iran & North Korea have practiced launching missiles from container ships); a meteorological balloon; or a civilian jet aircraft on a suicide mission. This could also be done using a satellite, such as the two North Korean KMS-3 and KMS-4 satellites that currently and regularly orbit over the U.S. on the optimum trajectory for a surprise EMP attack if nuclear armed. The entire Continental U.S. could be crippled by several different combinations

of nuclear detonation, including one (1) nuclear weapon detonated at 250 miles or higher, which is the height of many satellites; three (3) nuclear weapons detonated at 18 miles or higher; or most effectively, three (3) nuclear weapons detonated at 80 miles or higher, which is well within the capability of scud-type missiles.

[11]Pry, Dr. Peter Vincent, *The Long Sunday. Nuclear EMP Attack Scenarios*. Washington D.C.: The Center for Security Policy Press, 2016. (Available on Amazon.)

[12]Two excellent videos to watch to quickly educate on the dangers to our electric grid and critical infrastructures from nuclear EMP and large solar storms:
EIS Council, *Black Sky*. 2014. http://www.eiscouncil.com/Video (14 minutes)
National Geographic, *Electronic Armageddon*. 7 August, 2013. http://emptaskforce.us/index.php/natgeo-electronic-armageddon/ (50 minutes)

[13]The **black swan theory** is a metaphor that describes an event that comes as a surprise, has a major effect, and is often inappropriately rationalized after the fact with the benefit of hindsight. What we call a Black Swan is an event with the following three attributes: first, it is an outlier, since it lies outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility; second, it carries an extreme 'impact'; and third, in spite of its outlier status, human nature makes us concoct explanations for its occurrence after the fact, making it explainable and predictable. A small number of Black Swans explains almost everything in our world, from the success of ideas and religions, to the dynamics of historical events, to elements of our own personal lives. Black Swan. In Wikipedia. Retrieved July 4, 2017, from https://en.wikipedia.org/wiki/Black_swan_theory

[14]The **Federal Energy Regulatory Commission (FERC**) is a U.S. government agency, established in 1977 to oversee the country's interstate transmission and pricing of a variety of energy resources, including electricity, natural gas and oil. The **North American Electric Reliability Corporation (NERC)** is a nonprofit corporation based in Atlanta, Georgia whose members are 70% owners and operators of the utilities industry. NERC's mission states that it is to "ensure the reliability of the North American bulk power system." FERC has very little regulatory authority on NERC; FERC can presently only suggest regulations on which NERC members have voting rights on whether or not they wish to adopt them. The utilities industry is the ONLY critical infrastructure that is virtually unregulated by the government and it underpins all of the other 15 critical infrastructures in the U.S. A useful analogy would be having building inspectors inspect and approve everything in a building project EXCEPT the foundation of the structure.

[15]Dr. William Radasky and Dr. Peter Vincent Pry, "Rebuttal to The EMP Threat: Fact, Fiction, and Response," July, 2010, [http://www.thespacereview.com/article/1656/1]. This is an excellent piece for the reader to gain valuable insight into "junk science" paid for and widely distributed by the utilities industry. The reader gains an appreciation of the scientific falsifications used by special interest groups to justify doing nothing in the face of national peril.

[16]There's an **Unwritten Law in Government** of "Thou shalt not panic or upset the American people", because it is bad for the economy and it is bad for re-elections to say otherwise. "There is nothing that can happen that the U.S. government can't help you with in a few short days" is how the public sentiment goes. The Department of Emergency Management previously stated citizens only needed three days of food; now they have extended their recommendations to two weeks. The assumption is help will always be there, no matter what, within that amount of time.

[17]The **normalcy bias** is a mental state people enter when facing a disaster. It causes people to underestimate both the possibility of a disaster and its possible effects because it causes people to have a *bias* to believe that things will always function the way things *normally* function. This may result in situations where people fail to adequately prepare and, on a larger scale, the failure of governments to include the populace in its disaster preparations. The assumption made in the case of normalcy bias is that, since one has never personally experienced a disaster, one never will. It can result in the inability of people to cope with a disaster once it occurs. People with a normalcy bias have difficulties reacting to something they have not experienced before. They also tend to interpret warnings in the most optimistic way possible. Normalcy bias is essentially a "desire for the status quo." "With a normalcy bias," writes one observer, "we project current conditions into the future. Normalcy bias is a form of denial where we underestimate the possibility and extent of a looming disaster even when we have incontrovertible evidence that it will happen. We assume that since a disaster never has occurred, then it never will occur. Consequently, we fail to prepare for a disaster and, when it does occur, we may be

unable to deal with it." Normalcy bias has also been called analysis paralysis, incredulity response, the ostrich effect and, by first responders, the negative panic. Normalcy Bias. In Wikipedia. Retrieved July 4, 2017, from https://en.wikipedia.org/wiki/Normalcy_bias

[18]Congressional commissions, like the **Congressional EMP Commission**, are instruments of last resort, established when departments and agencies and the U.S. Congress cannot achieve agreement on a controversial issue vital to our national interest. Typically, commissioners are senior statesman and nationally recognized scientists or experts, selected on a bi-partisan basis, so that their findings will be respected by all regardless of party affiliation. Congressional commissions typically are invested with broad legal powers to carry out investigations, compel departments and agencies to provide any and all relevant information, hold hearings to air all points of view, and to conduct research. The Congressional EMP Commission is currently (2017) chaired by Dr. William Graham, the foremost EMP expert in the Free World, who served as President Reagan's White House Science Advisor, was Director of NASA, and was on the defense science team that first discovered the EMP phenomenon during the 1962 STARFISH PRIME high altitude nuclear test. The EMP Commissioners and staff include some of our greatest scientists and strategic thinkers, including Dr. John Foster (designed most U.S. nuclear weapons currently deployed), Dr. Lowell Wood (formerly Lawrence Livermore National Lab, the most inventive American in history, holds world record for inventions), Ambassador Henry Cooper (former Director of the Strategic Defense Initiative), Dr. Peter V. Pry (formerly with the CIA, currently the Executive Director of Task Force on National and Homeland Security, author of numerous books on national security issues) and many others.

[19]The argument of many in the utilities industry typically follows this order: FERC and NERC report performances are high for reliance and resilience, the risks to the electric grid are highly inflated, and they have procedural plans in place to the address the security of the electric grid for most threats. FERC and NERC also frequently state grid security from man-made threats is an issue of national security and that the Department of Defense has not reported to them directly that grid security is an issue the utilities industry needs to address. Among NERC's concerns are the bottom line expenses of hardening/protecting the grid and an unwillingness to pay for these expenses, particularly for what they feel are "very remote probability events". Members of NERC feel they have many other events of higher frequency but lower impact with which to be more concerned.

[20]An excerpt from the **Presidential Executive Order on "Coordinating Efforts to Prepare the Nation for Space Weather Events**": "Extreme space weather events – those that could significantly degrade critical infrastructure – could disable large portions of the electrical power grid, resulting in cascading failures that would affect key services such as water supply, healthcare, and transportation. Space weather has the potential to simultaneously affect and disrupt health and safety across entire continents. Successfully preparing for space weather events is an all-of-nation endeavor that requires partnerships across governments, emergency managers, academia, the media, the insurance industry, non-profits, and the private sector."

[21]The **Critical Infrastructures Protection Act (CIPA)** amends The Homeland Security Act of 2002 and addresses the need for Electromagnetic Pulse (EMP) and Geomagnetic Disturbance (GMD) protection of all 16 critical infrastructure segments. This law requires the Secretary of Homeland Security to oversee an intelligence-based review of a complete strategy to protect and eventually prepare all 16 Critical Infrastructure Segments of the homeland against the threats of EMP and GMD.

[22]A **Faraday cage** or **Faraday shield** is an enclosure used to block electromagnetic fields. A Faraday shield may be formed by a continuous covering of conductive material or in the case of a Faraday cage, by a mesh of such materials. Examples of a Faraday cage would be a metal or aluminum foil covered box with no gaps anywhere, with insulation on the inside, protecting electronics on the inside.

[23]Lasky, Mary, *Powering Through From Fragile Infrastructures to Community Resilience*. InfraGard EMP Special Interest Group, 2016. (Available on Amazon.)

[24]The following would be actions that could be taken immediately to enhance grid resiliency and improve the prospects for recovery:

1. Dispatching tanker trucks of diesel fuel for back-up diesel generators to the most critical electric grid control rooms. Currently, some of these control rooms have only a few days of back-up fuel.
2. Building up on-site coal stockpiles at coal-fired baseload generation plants to 60 days or more.
3. Ensuring oil tanks at dual-fuel gas-fired generation plants are filled.
4. Maximizing the storage of natural gas in transmission pipelines (a process known as "linepack") serving electric generation plants. Storing significantly more natural gas in depleted gas basins and salt mines.
5. Metal buildings and electromagnetic protected cabinets for SCADAS, with filters for incoming lines.
6. Back Up Generators Installed, Set to "Manual Start", or Separated. Setting emergency diesel generators to" manual start" versus "automatic start" makes them less vulnerable to EMP and solar storms. This, however, is not a perfect solution, since the gap between the poles on the generator's manual control switch may still be small enough for EMP to flash over. The ideal solution is to further install a robust lever switch between the generator and the building system with a gap of several inches between the poles.

The following measures should be readied for swift implementation in the event an incoming ballistic missile-delivered EMP attack is detected or a solar storm is identified:

1. SCRAM (i.e. fast shutdown) of all nuclear generation plants.
2. Controlled shutdown of coal-fired plants with electronic controls to preserve the controls and prevent explosion due to uncontrolled combustion. (Steam turbines need to be carefully slowed down and stopped to prevent damaging the blades as the hot main shaft sags.)
3. Disconnection of transmission lines that have been modelled to have large induced currents due to the E3 (long wavelength) pulse. (To balance load and generation, load sheds will be required.)

Examples of necessary grid protection measures that will take longer to implement include:

- Resilient power for back-up cooling of nuclear reactors and spent fuel pools at nuclear power plants.
- Encryption of communications between grid control rooms and substations.
- Removal of malware in the electric grid inserted by the Russians, Chinese, and other bad actors.
- Mandates for cyber security fixes for critical grid equipment, both within the FERC supervised bulk electric system and for state-supervised distribution utilities.
- Real-time data feeds from utilities to a U.S. government operations center to establish 24/7 situational awareness for all energy infrastructures, including gas pipelines and the electric grid.
- Dual-drive compressors for natural gas pipelines that can run on both natural gas and electricity.
- Automated cyber security for grid controls, based on machine-speed protective measures.
- Rotating Equipment Isolation Devices (REID) installed at substations feeding the key generating, pumping, and compression installation of water, oil and gas pipelines, and on substations serving Military, National Guard, and Emergency Management bases.
- For "all hazard" protection to include solar storms and nuclear EMP, installation of surge protectors, neutral current blockers, as well as improved physical security that includes bullet proof metal enclosures at 2,000-2,500 essentially irreplaceable critical transformer substations, at a cost of less than $2 billion.
- Protection of grid control centers against solar storms and nuclear EMP effects.
- Hardening control systems against "all hazards", including EMP, at large hydroelectric facilities.
- Hardening on-site boiler control systems against "all hazards", including EMP, at coal fired plants.
- A regional network of industry-funded strategic reserves of extra high voltage transformers, with cost-recovery for utilities from ratepayers.

[25]Hollerman, Jonathan, *Survival Theory: A Preparedness Guide*. Pennsylvania: APOC Publishing, 2016. Jonathan Hollerman's book is well researched, honest and uncompromising. This book sheds light on what may be required to survive an extended national blackout and how most individuals, even those who have prepared for disaster, would probably still die in the lawless aftermath. It points to the overwhelming need to keep our critical infrastructures running, such as water and wastewater, so our population could "shelter in place", to restore power as quickly as possible to affected areas and to save the greatest number of lives in any grid-down event.