A Call to Action for America

A collaborative report by:
Task Force on National and Homeland Security, Secure the Grid Coalition, and other partners
Updated and Revised, June 2020

An unaware and unprepared America: *Without a change in policy for electric grid security, 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 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, and financial services - against any and all threats, including those from extreme solar weather, nuclear and non-nuclear electromagnetic pulse (EMP), physical and cyber-attacks. Together, we can save lives and protect America by taking action at the personal, 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 in the body of the text (and go into greater detail in the footnotes), so that the greatest number of Americans, particularly those in a leadership capacity, can clearly understand the issues. This report should evoke both **Anger** and **Courage** in Americans, because only then will action be taken. 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 Vincent Pry, and his vast body of work in this field is relied upon throughout this "Call to Action"; his full biography is included in the footnotes.[3] The Task Force on National and Homeland Security is managed by its Director of National Operations, Glenn Rhoades (glenn.rhoades@emptaskforce.us).

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 to encourage the steps needed to neutralize it. The Secure the Grid Coalition operates under the direction of the Center for Security Policy and is managed by its Director of Infrastructure Security, Tommy Waller (twaller@centerforsecuritypolicy.org). The Executive Chairman and Founder of the Center for Security Policy is Frank J. Gaffney, Jr.

Imagine the following:

Day 1, Noon EST (9am PST): The power goes out across the entire continental United States. High Voltage Transformers have blown out everywhere. Within minutes, all 58 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 refrigerators and freezers spoils and becomes unsafe to eat.

Days 4-6: 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 7-10: 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 1. 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 from blown High Voltage Transformers and electrical equipment on Day 1, additionally from 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.* In the same manner, hundreds of wildfires burn out of control throughout the US, until they eventually burn themselves out. *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 the high levels of methane gas.

Days 11-15: 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 go 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, weapons, supplies and hardware. The thin layer of civilized society has begun to slip away in the fight for survival.

Days 16-30: 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 58 commercially operating nuclear power plants with 96 nuclear reactors in 29 states* (as of 4/15/2020) *will meltdown*, just as the Fukushima nuclear power plant did in Japan following the tsunami of 2011.[4] *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. are either let free or escape due to lack of power, resources and personnel 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 nationwide. It'll get much worse in the days and weeks to follow…**

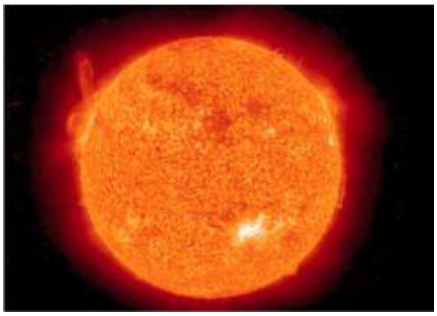
Does this all sound like an apocalyptic movie or a "prepper" fantasy? We wish it were. What we have described above is the beginning of the collapse of the United States of America caused by as few as one to three nuclear weapons detonated high in the sky above our magnificent, but totally unprepared, country.[5] 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. The worst case scenario described above, High Altitude Nuclear Electromagnetic Pulse (EMP or HEMP), has been known and studied by the Department of Defense and our Government ever since the 'Starfish Prime' nuclear test on July 9th, 1962; this was one of a series of five tests by the US, testing the effects of nuclear weapons in high-altitude/lower outer space.[6] We could also lose our electric power and our critical infrastructures dependent upon electric power for an extended period of time across the United States by a massive solar storm striking Earth, OR a well-coordinated physical attack on our power grid, OR a sophisticated cyber-attack, OR any combination of these threats.

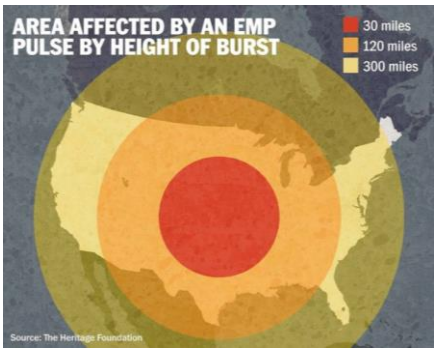
Does our government know about this? YES! ***No fewer than eleven studies conducted by or for federal agencies over the past decade have all agreed: the Nation's bulk power distribution system can be disrupted or destroyed over large areas due to various man-made and naturally occurring events.***[7] 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 and require 12-18 months to order, build and ship before needing additional months to transport over land and install. Additionally, the "Achilles heel" to the operation of both our power grid and our critical infrastructures is their almost complete dependence on computers and technology which rely on very delicate microchips and microprossesors.[8]

If you think the coronavirus or other potential pandemics are frightening, wait until a solar superstorm or a nuclear EMP attack blacks-out the national electric grid, collapses our economy and our critical infrastructures, and up to 9-out-of-10 Americans die within a year.

How long can we continue to be lucky?



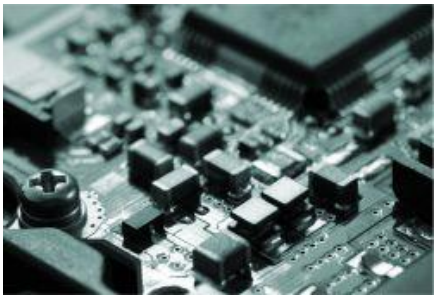
Geomagnetic Disturbance (GMD) from Extreme Solar Weather: According to NASA, a very large solar flare from our sun narrowly missed Earth by 9 days on July 23, 2012. It would have generated a geomagnetic super-storm, destroying many difficult-to-replace, unprotected high-voltage transformers and collapsing 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. (Note: 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 nuclear weapons 18 miles or higher in the sky above the atmosphere. The EMP effect would cover a much larger area than from 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. Moreover, a Super-EMP weapon might paralyze U.S. strategic forces and Command, Control, Communications & Intelligence (C3I), making retaliation impossible.[10]

Non-Nuclear EMP and Physical Attacks/Sabotage: *"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; these can be purchased on-line without licensing requirements or built from parts purchased from local electronics stores and instructions from the internet.[11]



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.[12]

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 physical attacks and cyber-attacks. This is a part of the military doctrine of each of these four countries, and they are all very aware of our nation's grid vulnerabilities.[13]

In comparison with the other threats described above, **nuclear EMP would cause significantly more damage to electronics with delicate microchips and microprocessors (e.g. computers, phones and radios) within direct line of sight of the blast, greatly compounding the problem**.[14] This is because nuclear EMP has all three damaging electro-magnetic waveforms: E1: the short-wavelength electromagnetic "shockwave" that would do the most damage to most electronics; E2: similar in effect to lightning, except it would be everywhere; and E3: the long-wavelength electromagnetic pulse both nuclear EMP and solar storms/GMD share, which effects long power lines and overwhelms transformers, among other effects. **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.

For decades, the Department of Defense (DOD) employed EMP simulators to test effects and to develop protection for military aircraft, missiles, communications, and other vital military systems. Since 1963, a scientific and strategic consensus among EMP experts moved Republican and Democrat administrations and congresses to invest billions of dollars to protect the most important U.S. Government and DOD assets.

Scientific and strategic consensus on the EMP threat can also be found in the joint DOD and Energy Research and Development Administration landmark book, *The Effects of Nuclear Weapons* (1977). *The Effects of Nuclear Weapons* declassified much research and warned EMP can inflict "severe damage" and the "consequences could be serious for any system that relies on…commercial electric power generation and distribution systems, telecommunications…radio, radar, television, telephone, and telegraph systems, and electronic computers." Unfortunately, with the end of the Cold War, very little has been done regarding EMP testing and hardening of our U.S. Government and DOD assets; and the EMP threat is much greater now than it was then.

An extended blackout of our power grid is on the short list of "Black Swan" [15] events that could effectively end the United States of America. Regarding a nationwide solar GMD event, or a nuclear EMP attack, or a massive physical and/or cyber-attack occurring in our current state of unpreparedness, Dr. Peter Vincent 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 Vincent 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 it by now? The White House and Congress clearly DO know about the EMP threat and have enacted major policies to protect the nation (further described on pages 8-9). *The problem is that deeply entrenched ("deep state") government bureaucrats, as well as lobbyists of the utilities industry, among others, have been working hard to down play this threat and to portray this issue as "alarmist fiction" because they are*

more concerned with "political correctness" and profit margins than with the safety of the American people. *Washington has been overrun with bureaucracy, and the pockets of the utilities industry's lobbyists are deep.*

Besides a few alarmed politicians and others both in and out of government pushing the issue, there has been very little pressure placed on our elected officials, regulators, or the utilities industry to actually solve this problem:

- most have either conflicting political interests or misguided trust of "junk science" and lies[16]
- OR they are more interested in their jobs or their re-elections[17]
- OR they are lulled into a false sense of complacency from the "normalcy bias"[18]
- 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", the issues have gone unattended for far too long.

A short summary of FERC and NERC:

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 1900+ 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.*

Because The Federal Energy Regulatory Commission (FERC) does not have lawful authority to require the utilities industry to harden the grid to realistic standards:

FERC's approved Standard for natural E3 EMP/GMD is far too low (merely 8 volts/kilometer), and should be at least three times higher (24-30 volts/kilometer). The EMP Commission recommended EMP/GMD Standard is over ten times higher (85 volts/kilometer), so the national grid would survive a worst-case solar storm or the long-wavelength threat (E3 EMP) from nuclear EMP attack.

There is still no FERC approved Standard for E1 EMP, the short-wavelength electromagnetic "shockwave" from a nuclear EMP attack that would do the most damage to most electronics. Protection against E1 EMP (at least 50-100 kilovolts/meter) would also mitigate lesser threats from non-nuclear EMP weapons and system-generated over-voltages from cyber-attacks, physical sabotage, and severe weather like hurricanes.

A short summary of the Congressional EMP Commission[19]: The Congressional EMP Commission, composed of senior statesman and nationally recognized EMP scientists and experts, selected on a bi-partisan basis, so that their findings would be respected by all regardless of party affiliation, was first established by the U.S. Congress in 2001 and served until 2008. Their mission was 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. EMP simulators were extensively used to perform the most comprehensive testing of effects on modern electronic systems vital to the operation of electric grids and

other life-sustaining critical infrastructures — including communications, transportation, banking and finance, food and water. This EMP testing proved modern microelectronics are significantly more vulnerable than the vacuum tubes and electronics prevalent in the early 1960s. Moreover, as modern electronics continues to improve after 2008, becoming ever smaller and more efficient, so too their vulnerability to EMP increases.

The 2004 and 2008 reports are unclassified and anyone, including our nation's enemies, are able to read them online at: www.empcommission.org. The findings and conclusions of the EMP Commission were conclusive. The first pages of this document came largely from information provided in their 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 2016-2017 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. Despite significant opposition from opponents within the Department of Defense and other organizations[20], the EMP Commission produced both classified reports as well as 10 unclassified reports; the unclassified reports are available online at: www.firstempcommission.org.

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 had all failed, primarily due to the well-funded efforts of special interest groups.[21]

Finally, on October 13, 2016, President Obama signed the **Executive Order, "Coordinating Efforts to Prepare the Nation for Space Weather Events"** [22] in his last days of office. On December 23, 2016, the "2017 National Defense Authorization Act" was also passed and included the complete language of the **Critical Infrastructure Protection Act (CIPA)** that had struggled for years to be approved. Credit for CIPA goes to Senator Ron Johnson (Chairman, Senate Homeland Security Committee). 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.

On March 26, 2019, President Trump issued the excellent **"Executive Order on Coordinating National Resilience to Electromagnetic Pulses"** (available online at: www.firstempcommission.org), responding to 18 years of warnings by the EMP Commission that solar superstorms, or manmade EMP from nuclear or non-nuclear weapons, poses an existential (i.e. – a country ending) threat to the United States. Credit goes to Senator Imhofe (Chairman Senate Armed Services Committee) for incorporating the EMP Executive Order into the FY2020 National Defense Authorization Act. This is a "whole of government" product involving coordination and concurrence by the Department of Defense, Department of Homeland Security, Department of Energy, Intelligence Community, and other relevant departments and agencies. It seeks to implement core recommendations of the Congressional EMP Commission on an accelerated basis. Among the best and strongest features of the EMP Executive Order is putting the White House in charge of national EMP preparedness, rather than relying on the Department of Energy (DOE) or the Department of Homeland Security (DHS) to lead. White House leadership on EMP preparedness is imperative: both Energy and Homeland Security have a long history of underestimating and under-prioritizing the EMP threat. Among its many strong features, President Trump's executive order combines EMP and cybersecurity. One of the

smartest features of the EMP Executive Order requires that vulnerability of critical infrastructure vital equipment be established through empirical testing in EMP simulators.

On May 1, 2020, President Trump additionally issued the **Executive Order "Securing the United States Bulk-Power System ",** dealing with the foreign economic and cyber threats to the electric power grid.

The passage of these Executive Orders and CIPA marked a milestone in legislation and proved 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 and uninformed of this threat. However, the passing of legislation doesn't mean anything is actually being done…

A Short Summary of the Opposition (from Dr. Peter Vincent Pry's book, *The Power and The Light*[23]):

—"*Nuclear EMP attack was a 'politically incorrect' threat during the Obama Administration (2008-2016). President Obama did not want to acknowledge that North Korea or Iran became nuclear existential threats to the American people during his watch."*[24]

—"Previous administration holdovers and Deep State bureaucrats who are EMP non-experts and have long opposed national EMP preparedness for reasons ideological, political, and personal, not least stupidity, are largely in charge of "implementing" President Trump's EMP Executive Order."

—"The deeply erroneous Obama-era EMP report by the Joint Atomic Energy Intelligence Committee (JAEIC) and the more recent so-called "Tri-Labs EMP Report", both written by a small number of non-experts parroting each other, continue to circulate, misinforming U.S. officials and damaging national security. Both reports are highly classified, apparently to protect them from scrutiny and criticism from real EMP experts, while being invoked to prevent mid-level officials (who lack the security clearances) from protecting their assets from EMP."[25]

—"The Department of Homeland Security (DHS) "National EMP Strategy", drafted at the direction of Senator Ron Johnson's excellent Critical Infrastructure Protection Act, underestimates the EMP threat and is deeply flawed."

—"Bogus analysis that grossly underestimates natural and nuclear EMP threats by the Electric Power Research Institute (EPRI), a lobby for the electric power industry masquerading as a think tank, is being funded by the Department of Energy (DOE) and wrongly treated by DHS as analytically sound, even though the EPRI Reports have been critiqued and proven erroneous by the EMP Commission and the USAF Electromagnetic Defense Task Force. *EPRI's preposterous bottom-line: Nuclear EMP attack will be no more consequential than other localized or regional blackouts with which utilities have experience* — contradicting legitimate EMP studies by real experts including the Congressional EMP Commission, the U.S. Air Force Electromagnetic Defense Task Force, the Congressional Strategic Posture Commission, the U.S. Federal Energy Regulatory Commission, the National Academy of Sciences, and every other major study by the Department of Defense and the U.S. Government over more than 50 years. EPRI's 'happy face' EMP reports are reminiscent of the cigarette industry's untrustworthy 'independent laboratory assessments', allegedly proving there is no causal linkage between smoking and lung cancer."

—"The rampant incompetence of DHS and DOE is manifest in that they give greater credibility to EPRI non-experts than to the EMP Commission and its Chairman, Dr. William Graham—the foremost EMP expert in the Free World. Chairman Graham also served as President Reagan's White House Science Advisor, ran NASA, was on the defense science team that discovered the EMP phenomenon, and has been protecting U.S. military systems from EMP since 1963."

—"President Trump's EMP Executive Order responds to the work and recommendations of the EMP Commission, yet the U.S. Government's implementation of the EMP Executive Order proceeds with almost no involvement or consultation with former EMP Commissioners and staff."

—"Dr. William Graham, and former CIA Director R. James Woolsey, warn that America faces an existential threat from EMP in part because of disinformation from the liberal mainstream media ('Prepare For The Worst' RealClearDefense.com, October 21, 2019): *'Not only has the EMP Commission faced a long uphill battle advancing national EMP preparedness against a resistant federal bureaucracy, but against an irresponsible press that often misinforms the public with absurd claims…'* For example, the Washington Post published 'Trump Issued An Executive Order To Prepare For An EMP Attack. What Is It And Should You Worry?' (March 29, 2019), written by four college students posing as 'instant EMP experts' that includes numerous errors of fact and omission. The latest soldier in the ignorant army of liberal reporters disinforming the public and belittling the EMP threat, is POLITICO's Sarah Cammarata in 'Is It Lights Out for Trump's EMP Push' (November 12, 2019)."

"The strategy of pretending to do something, but really doing nothing, and then throwing money at the threat when it happens, will get millions of Americans killed when there is an EMP."

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 must be prioritized and placed immediately on a "war footing":
-The recommendations of the 2017 EMP Commission need to be implemented (described on page 12).
-The 2019 Executive Order on Coordinating National Resilience to EMP" needs to be followed.
-These can best be accomplished through an EMP "Manhattan Project" (described on pages 13-14).

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. While there are over 3000 utility industry companies throughout the United States, this industry can be regulated for grid safety and security from all hazards, including nuclear EMP and solar GMD. As a comparison, there are many airline companies throughout our country and throughout the world, yet the airline industry is closely regulated for all aspects of aviation safety.

The utilities industry is not currently being required 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, so that real money doesn't actually have to be spent, are grossly inadequate to protect our electric grid and other critical infrastructures. This is the reason why key military and government installations have used both hardware based and procedural based solutions since 1963.

The EMP Commission Chairman's Report recommends that *"the President direct the Nuclear Regulatory Commission to launch a crash program to harden the active nuclear power reactors and all spent fuel storage facilities against nuclear EMP attack. Even if the reactors and storage facilities survive an initial EMP attack, they currently are not able to restart generating power if there is no electric power available on its grid, and they typically only have enough emergency power to cool reactors and spent fuel facilities for several days,*

after which they would 'go Fukushima' spreading radioactivity over adjacent areas." Moreover: *"The NRC has regulatory power to compel the nuclear power industry to incorporate nuclear reactor design features to make nuclear power safe…failure to…mandate protection from EMP…[risks] the safety of…people living in the vicinity of these reactors."*

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-meal" solutions.)*

Our most vulnerable, irreplaceable, high voltage transformers need to be hardened against "all hazards". The EMP Commission's 2008 Report estimated it would cost $2-4 billion to protect transformers, generators, and SCADAS[8] throughout the entire bulk power system. (Note: $2 billion dollars/year is what the U.S. used to give away to Pakistan every year in foreign aid). More robust plans for EMP hardening of our electric grid, from the Foundation for Resilient Societies (visit the "Research" tab at www.resilientsocieties.org), would cost between $10-30 billion, which equates to $6 to $18 per person per year for the next 5 years. The Federal government could easily pay for these costs from national security programs, which would greatly reduce the resistance by the utilities industry. *As of May 2020, the civilian electric grid has essentially **no** hardening.*

This paragraph is directed at the "techies" reading this document. A properly designed Faraday cage[26] 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.[27] 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.)[28]

According to EMP expert, Dr. George Baker: "Low cost stop-gap measures will be important, including hardened microgrid installations as a near-term solution for life-line infrastructures. As mentioned, *we are presently at a watershed moment due to the onset and rapid acceleration of microgrid installations. Federal EMP standards are desperately needed to inform and govern the protection of microgrids. Otherwise, microgrids will actually increase the vulnerability of the existing grid due to the added layer of complexity, including heavy reliance on microprocessor controls vulnerable to the E1 pulse.* While I commonly learn about efforts to protect commercial systems against EMP, I would be hard-pressed to give a good example of EMP-protected microgrids in the civilian infrastructure. Accordingly, I estimate that the microgrids now being developed and installed would fail under EMP attack conditions."[29]

According to Dr. Peter Vincent Pry: "As a comparison of costs: for the $2 trillion plus that will ultimately be spent on the coronavirus, of which 99.9+% of Americans are expected to survive (using the worst case current projection numbers, as of May 17, 2020), we could harden all of our critical infrastructures against EMP (and subsequently from all other threats); deploy space-based missile defense Brilliant Pebbles; modernize and EMP- proof the entire U.S. nuclear deterrent from top to bottom (including new missiles, bombers and submarines; new nuclear weapons; and a completely renovated nuclear scientific-industrial base) and still have over $1 trillion to spare."

For a different comparison of costs: for the $1-2 trillion suggested to be spent on upcoming, unspecified "infrastructure" such as roads and bridges, this is our best opportunity to include the necessary funds to harden *our most critical infrastructure,* i.e the electric grid.

FROM THE 2017 EMP COMMISSION REPORT - ASSESSING THE THREAT FROM ELECTROMAGNETIC PULSE (EMP) EXECUTIVE REPORT - CONCLUSIONS

The critical national infrastructure in the United States faces a present and continuing existential threat from combined-arms warfare, including cyber and manmade electromagnetic pulse (EMP) attack, as well as from natural EMP from a solar superstorm. During the Cold War, major efforts were undertaken by the Department of Defense to assure that the U.S. national command authority and U.S. strategic forces could survive and operate after an EMP attack. However, no major efforts were then thought necessary to protect critical national infrastructures, relying on nuclear deterrence to protect them. With the development of small nuclear arsenals and long-range missiles by new, radical U.S. adversaries, the threat of a nuclear EMP attack against the U.S. becomes one of the few ways that such a country could inflict devastating damage to the United States. It is critical, therefore, that the U.S. national leadership address the EMP threat as a critical and existential issue, and give a high priority to assuring the leadership is engaged and the necessary steps are taken to protect the country from EMP.

Protecting and defending the national electric grid and other critical infrastructures from cyber and EMP could be accomplished at reasonable cost and minimal disruption to the present systems that comprise U.S. critical infrastructure. The following six recommendations are offered to accomplish this goal.

Recommendation 1: *The Commission recommends the President establish an Executive Agent with the authority, accountability, and resources to manage U.S. national infrastructure protection and defense against the existential EMP threat.*

Recommendation 2: *The Commission strongly recommends that implementation of cybersecurity for the electric grid and other critical infrastructures include EMP protection.*

Recommendation 3: *The Commission encourages the President to work with Congressional leaders to establish a joint Presidential-Congressional Commission, with its members charged with supporting the Nation's leadership to achieve, on an accelerated basis, the protection of critical national infrastructures.*

Recommendation 4: *The Commission recommends that government agencies and industries adopt new standards to protect critical national infrastructures from damaging E3 EMP heave fields, with more realistic standards of 85 V/km.*

Recommendation 5: *The Commission recommends that the Department of Defense and the Department of Energy provide expedited threat-level, full-system testing of large power transformers in wide use within the bulk electric system and share key findings with the electric utility industry.*

Recommendation 6: *The Commission recommends the Director of National Intelligence circulate to all recipients of the 2014 JAEIC report the EMP Commission critique and direct a new assessment be prepared that supersedes the 2014 JAEIC EMP report.*

IN ORDER TO IMPLEMENT THE RECOMMENDATIONS ABOVE - AN EMP "MANHATTAN PROJECT" IS NEEDED

(This Entire Section from Dr. Peter Vincent Pry's book, *EMP Manhattan Project*[30]):

"President Franklin Roosevelt's Manhattan Project (1942-1945) was a crash emergency program to develop the atomic bomb before Nazi Germany could confront Western Civilization with an unanswerable existential threat.

Miraculously, in merely three years, the Manhattan Project organized an army of scientists and engineers, built nuclear industrial facilities and entire cities that never before existed, and achieved the seemingly impossible feat of translating arcane and problematical scientific theories into the reality of revolutionary new weapons that ended World War II and prevented the Cold War from becoming World War III.

Today the United States and the world faces another existential threat — from an electromagnetic pulse (EMP), that can be caused by Nature or Man, and topple the technological pillars of modern electronic civilization.

Why does the EMP threat warrant another Manhattan Project?

EMP Commission Chairman Dr. William Graham, warns: 'an EMP event causing **a nationwide blackout lasting one year could kill up to 90 percent of the American people and that such a catastrophe could,** figuratively and literally, turn out the lights across entire nations and be the advent of a new Dark Ages.'

Worth quoting at length is the Congressional EMP Commission's 2017 'Executive Summary Assessing the Threat from Electromagnetic Pulse':

- 'The United States — and modern civilization more generally — faces a present and continuing existential threat from naturally occurring and manmade electromagnetic pulse assault and related attacks on military and critical national infrastructures.'

- 'A nationwide blackout of the electric power grid and grid-dependent critical infrastructures—communications, transportation, sanitation, food and water supply—could plausibly last a year or longer. *A long-term outage owing to EMP could disable most critical supply chains, leaving the U.S. population living in conditions similar to centuries past, prior to the advent of electric power*. In the 1800s, the U.S. population was less than 60 million, and those people had many skills and assets necessary for survival without today's infrastructure.'

- The EMP Commission recommends protecting the national electric grid and other critical infrastructures utilizing an 'all hazards' strategy. Thus, protecting against the worst threat — nuclear EMP attack — can also mitigate all lesser threats, including natural EMP from solar super-storms, non-nuclear EMP weapons, cyber-attacks, sabotage, and severe weather like hurricanes.

- The challenge of protecting the nation's critical infrastructures from EMP is — from a scientific, technological, and financial perspective — modest compared to the original Manhattan Project:

    1. **Scientifically**. The original Manhattan Project began merely with a physics theory about atomic weapons, not knowing whether they would be possible or practical to build given the technology of the 1940s. In contrast, EMP is a proven scientific phenomenon demonstrated and well understood.

    2. **Technologically**. The original Manhattan Project had to invent not only the atomic bomb, but a wide array of new machines, new chemical and metallurgical industries, new electronics and instruments, to manufacture and refine weapons-grade uranium and plutonium. In contrast,

technologies for EMP protection already exist and have been used to protect military systems for over a half-century.

3. **Financially**. The original Manhattan Project cost about $20 billion in today's dollars, an enormous expense for the U.S. government in the midst of fighting World War II. In contrast, the Congressional EMP Commission estimates protecting the national electric grid would cost as little as few billion dollars, a relatively trivial expense today and just a small fraction of the monies allocated each year for infrastructure.

So why is an EMP Manhattan Project necessary?

The bureaucratic politics of EMP protection are so formidable, despite the best bipartisan efforts of Congress, no real progress has been achieved implementing the EMP Commission's recommendations made in 2008, over a decade ago. Despite a decade of educational and legislative effort, American civilization remains unprotected from EMP extinction.

Moreover, the U.S. government of the 21st century is not the same highly competent U.S. government of the Greatest Generation who successfully ran the Manhattan Project to invent the atomic bomb, won World War II, built the national highway system, and sent a man to the moon.

Today's U.S. government is generally so corrupt, incompetent, divided and obstructionist that it seems no longer capable of carrying out great enterprises, as it did in the past.

An EMP Manhattan Project is necessary because the bureaucratic politics of EMP protection are even more formidable than the scientific, technological, and financial obstacles that faced the original Manhattan Project's development of the atomic bomb."

(End of Section, from Dr. Peter Vincent Pry's book, *EMP Manhattan Project*[30])

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:

> *"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 J. Gaffney, Jr., Executive Chairman and Founder 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 and their communities against the possibility of a long term grid-down situation and to exert overwhelming political pressure at the state and national level. This political pressure should be focused on State Governor Executive Orders as well as supporting the existing Presidential Executive Orders and the Critical Infrastructure Protection Act (CIPA).

State orders and national emphasis should focus on: 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.

How this affects you directly and what you can do to better protect yourself and your loved ones:

1. **Do your own homework.** There are plenty of high quality references available in the footnotes and online. Make your own informed decision on whether or not you feel our electric power grid and our critical infrastructures are at risk. You, ultimately, are responsible for your own safety.

2. If you feel that "bad things could happen" and that the Government might not be able to be there immediately to help, then you should **take actions to better 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 and other emergency events available online, in books and videos, on You Tube, etc. Start with the assumption that help won't be coming, and if it did, it could be awhile. Clearly, 3 to 14 days of food won't be enough. You would also need stored water and/or 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 aren't well prepared (i.e. most everyone else). The good news about being better prepared individually and as a family: you're much more likely to be OK and not have to rely on initially limited Government resources in the vast majority of regional emergencies (such as a localized loss of the power grid, or an earthquake, flood, tornado, hurricane, etc.), where communication still exists and outside help is able to arrive within several days to several weeks to the whole of the affected area. The bad news: in a worst case GMD or nuclear EMP or other event affecting the entire country, this level of preparedness will not be sufficient. It would only be a matter of time before the vast majority of "prepared" family homes are overrun by those who are starving and desperate.

3. **A significant step up from the solo prepared person or family is a community of prepared individuals.** Two books on this topic are from Jonathan Hollerman, *Survival Theory: A Preparedness Guide*[31] and from Michael Mabee, *The Civil Defense Book*[32], both included in the footnotes and are excellent reading. *One Second After*, previously footnoted, is an excellent fictional accounting of a prepared community's struggles in the first year following a nationwide nuclear EMP event. The good news: you are much more likely to survive in a community of prepared individuals or a prepared small town than by going it alone; you would have a much better chance of being included within the small percentage of survivors following a nationwide EMP or GMD event. The bad news: if we haven't protected our grid from widespread damage and destruction **before** a nationwide EMP or GMD event, the majority of Americans would likely die within the first year.

4. **A significant step up from communities of prepared individuals is what this Call to Action is all about: protecting <u>in advance</u> our electric power grid and our critical infrastructures from all hazards.** If we are not satisfied with an America consisting of isolated pockets of prepared survival communities vs. roving armed gangs in the starvation and disease ridden, smoke and radiation filled aftermath of our once great country, then we have an overwhelming need to keep at a minimum, at least some of our electric power and critical infrastructures running, such as water, wastewater and communications. This would allow our population to "shelter in place", even in the big cities, while we restore remaining power and critical infrastructures as quickly as possible to affected areas and to save the greatest number of lives in any large scale or nationwide grid-down event. The effects of not protecting our electric grid will be 10,000+ times worse than the current COVID-19 situation we have in the United States. There is no responding ***after*** an EMP or massive Solar Flare/GMD event. You either prepare beforehand, or our country ceases to exist as we know it.

YOU CAN BE PART OF THE SOLUTION!

If this is important to you, here are some additional things you can do:

1. **Forward this information** to family, friends, co-workers, church members, and groups you know. The public has largely been kept in the dark. An ignorant public cannot effect change.
2. **Vote for politicians who take protecting our electric power and our critical infrastructures seriously and who are willing to take action.**
3. **Send this "Call to Action" to your elected government officials. Include a short cover letter with your own words. They work for us on the matters that are important to us. They need to hear from you and understand this is important.** This "Call to Action" 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. To find your Federal, State and Local elected officials, go to this website: **https://www.usa.gov/elected-officials.**
4. **Concern without action achieves little, but concern with action can be unstoppable.** There is much that can be done, but it needs to be done NOW. For more information, go to either or both of the organizations listed at the beginning. Donations are greatly appreciated and help us to reach broader audiences who need to be aware of this information. There are additional resources in the footnotes.

To Summarize: ***"We believe the citizens and the 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, and financial services - against any and all threats, including those from extreme solar weather, nuclear and non-nuclear electromagnetic pulse (EMP), physical and cyber-attacks. Together, we can save lives and protect America by taking action at the personal, state and national levels."***

"Hope has two beautiful daughters. Their names are Anger and Courage. Anger at the way things are, and Courage to see that they do not remain as they are."

-St. Augustine

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]Dr. Peter Vincent Pry is Executive Director of the EMP Task Force on National and Homeland Security, a Congressional Advisory Board dedicated to achieving protection of the United States from electromagnetic pulse (EMP), cyber attack, mass destruction terrorism and other threats to civilian critical infrastructures on an accelerated basis. Dr. Pry also is Director of the United States Nuclear Strategy Forum, an advisory board to Congress on policies to counter Weapons of Mass Destruction. Dr. Pry served on the staffs of the Congressional Commission on the Strategic Posture of the United States (2008-2009); the Commission on the New Strategic Posture of the United States (2006-2008); and the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack (2001-2017) as Chief of Staff.

Dr. Pry served as Professional Staff on the House Armed Services Committee (HASC) of the U.S. Congress, with portfolios in nuclear strategy, WMD, Russia, China, NATO, the Middle East, Intelligence, and Terrorism (1995-2001). While serving on the HASC, Dr. Pry was chief advisor to the Vice Chairman of the House Armed Services Committee and the Vice Chairman of the House Homeland Security Committee, and to the Chairman of the Terrorism Panel. Dr. Pry played a key role: running hearings in Congress that warned terrorists and rogue states could pose an EMP threat, establishing the Congressional EMP Commission, helping the Commission develop plans to protect the United States from EMP, and working closely with senior scientists who first discovered the nuclear EMP phenomenon.

Dr. Pry was an Intelligence Officer with the Central Intelligence Agency responsible for analyzing Soviet and Russian nuclear strategy, operational plans, military doctrine, threat perceptions, and developing U.S. paradigms for strategic warning (1985-1995). He also served as a Verification Analyst at the U.S. Arms Control and Disarmament Agency responsible for assessing Soviet compliance with strategic and military arms control treaties (1984-1985).

Dr. Pry has written numerous books on national security issues, including *The Power and the Light: The Congressional EMP Commission's War to Save America 2001-2020; EMP Manhattan Project: Organizing Survival Against An Electromagnetic Pulse Catastrophe; Nuclear EMP Attack Scenarios and Combined-Arms Cyber Warfare; Apocalypse Unknown: The Struggle To Protect America From An Electromagnetic Pulse Catastrophe*; *Electric Armageddon: Civil-Military Preparedness For An Electromagnetic Pulse Catastrophe*; *War Scare: Russia and America on the Nuclear Brink; Nuclear Wars: Exchanges and Outcomes*; *The Strategic Nuclear Balance: And Why It Matters*; and *Israel's Nuclear Arsenal*. Dr. Pry often appears on TV and radio as an expert on national security issues. The BBC made his book *War Scare* into a two-hour TV documentary *Soviet War Scare 1983* and his book *Electric Armageddon* was the basis for another TV documentary *Electronic Armageddon* made by the National Geographic.

[4]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.

[5]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.

[6]A number of high altitude nuclear tests were conducted by both the US and the USSR in the early 1960s:

Starfish Prime was a July 9, 1962, high-altitude nuclear test conducted by the United States, a joint effort of the Atomic Energy Commission (AEC) and the Defense Atomic Support Agency. It was launched from Johnston Atoll and was the largest nuclear test conducted in outer space and one of five conducted by the US in space. The actual weapon yield was in the range of 1.4 to 1.45 megatons and detonated at an altitude of 250 miles (400 km).

Starfish Prime *caused an electromagnetic pulse (EMP) that was far larger than expected*, so much larger that it drove much of the instrumentation off scale, causing great difficulty in getting accurate measurements. The Starfish Prime electromagnetic pulse also made those effects known to the public by causing electrical damage in Hawaii, about 898 miles (1,445 km) away from the detonation point, knocking out about 300 streetlights, setting off numerous burglar alarms, and damaging a telephone company microwave link. The EMP damage to the microwave link shut down telephone calls from Kauai to the other Hawaiian Islands. Starfish Prime. In Wikipedia. Retrieved May 5, 2020, from https://en.wikipedia.org/wiki/Starfish_Prime

The **Soviet Union's K project nuclear test series** was a group of 5 nuclear tests conducted in 1961-1962.

The K project nuclear testing series were all high altitude tests fired by missiles in Russia across central Kazakhstan. Two of the tests were 1.2 kiloton warheads tested in 1961. The remaining three tests were of 300 kiloton warheads in 1962.

The worst effects of a Soviet high altitude test were from the electromagnetic pulse of the nuclear test on 22 October 1962 (during the Cuban missile crisis). In that Operation K high altitude test, a 300 kiloton missile-warhead detonated at an altitude of 180 miles (290 km).

The Soviet scientists instrumented a 350 mile (570 km) section of telephone line in the area that they expected to be affected by the nuclear detonation in order to measure the electromagnetic pulse effects. The electromagnetic pulse (EMP) fused all of the monitored overhead telephone line with measured currents of 1500 to 3400 amperes. The monitored telephone line was divided into sub-lines of 25 to 50 miles (40 to 80 km) in length, separated by repeaters. Each sub-line was protected by fuses and by gas-filled overvoltage protectors. The EMP caused all of the fuses to blow and all of the overvoltage protectors to fire in all of the sub-lines of the 350 mile (570 km) telephone line. The EMP also caused the destruction of the Karaganda power plant, and shut down 620 miles (1,000 km) of shallow-buried power cables between Astana (then called Aqmola) and Almaty. Soviet Project K nuclear tests. In Wikipedia. Retrieved May 5, 2020, from https://en.wikipedia.org/wiki/Soviet_Project_K_nuclear_tests

Note: the damage from these high altitude nuclear tests occurred in 1961-1962 when vacuum tubes were in use, long before the advent of much more susceptible electronic equipment, such as personal computers, cell phones, etc.

The Partial Test Ban Treaty was passed the following year, ending atmospheric and exo-atmospheric nuclear tests.

[7]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.)

Frank J. Gaffney, Jr. is the Founder and Executive Chairman of the Center for Security Policy in Washington, D.C., a not-for-profit, non-partisan educational corporation established in 1988. Under Mr. Gaffney's leadership, the Center has been nationally and internationally recognized as a resource for timely, informed and penetrating analyses of foreign and defense policy matters. Mr. Gaffney is the host of Secure Freedom Radio, a nationally-syndicated radio program heard weeknights throughout the country.

[8]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.

[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]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.

[12]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.

[13]Pry, Dr. Peter Vincent, *Nuclear EMP Attack Scenarios and Combined-Arms Cyber Warfare.* Report to the Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack. July 2017. (Available on Amazon.)

[14]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)

[15]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

[16]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.

[17]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.

[18]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

[19]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 was 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 included 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.

[20] The 2017 Congressional EMP Commission was hampered from doing their job throughout all of 2016. In early 2017 with the beginning of the Trump Administration they were finally able to begin their work, but were further hampered with false allegations of corruption levied against them. These allegations were soundly disproven, but not without reputational damage being inflicted on the Commission. (Note: The EMP Commission members have worked without pay, essentially for the last 20 years, only having some of their out of pocket expenses provided for between 2000-2008 and in 2017.)

[21]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.

[22]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."

[23]Pry, Dr. Peter Vincent, *The Power and the Light: The Congressional EMP Commission's War To Save America 2001-2020.* EMP Task Force on National and Homeland Security, 2020. Mandated by the EMP Executive Order is a progress report to President Trump from the Department of Homeland Security (DHS), Department of Energy (DOE), and other relevant

parts of the U.S. Government due to the White House on March 26, 2020. This book is Dr. Pry's progress report to the American people on implementation of EMP national preparedness. (Available on Amazon.)

[24]From Dr. Peter Vincent Pry's *The Power and the Light (pages 177-178)*: "President Obama's DoD knew the nuclear EMP threat was real and took it seriously enough to spend $700 million further hardening NORAD against EMP attack from North Korea. And President Obama deserves credit for being the first President to include natural EMP from solar storms as among the threats of concern for the Dept. of Homeland Security. However, President Obama's public focus was on the alleged existential threat from 'climate change', not on the more realistic and imminent threat from nuclear EMP attack by North Korea or Iran. Nor did President Obama move to protect the electric grid or other civilian critical infrastructures from EMP, which of course would have required public explanation that nuclear EMP attack is an existential threat perhaps eclipsing 'climate change'."

[25]The EMP Commission wrote a classified rebuttal and recommended the recall of these reports, including in letters to Director of National Intelligence (DNI) Dan Coates and DNI Joseph Maguire, which recommendations have been ignored, to the grave harm of our nation.

[26]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.

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

[28]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.

[29]Baker, Dr. George H., Testimony of Dr. George H. Baker before the Senate Committee on Homeland Security and Government Affairs, February 27, 2019.

[30]Pry, Dr. Peter Vincent, *EMP Manhattan Project: Organizing Survival Against An Electromagnetic Pulse Catastrophe.* EMP Task Force on National and Homeland Security, 2018. (Amazon.com). This book advocates for another "Manhattan Project" to protect the U.S. electric grid and other life-sustaining critical infrastructures.

[31]Hollerman, Jonathan, *Survival Theory: A Preparedness Guide, How to Survive the End of the World on a Budget*. Pennsylvania: APOC Publishing, 2016. Jonathan Hollerman's well researched, honest and uncompromising book sheds light on what would be required to survive an extended national blackout and how most lone-wolf individuals, even those who have prepared for disaster, would likely still die in the lawless aftermath. Survival would take prepared communities.

[32]Michael Mabee, *The Civil Defense Book, Emergency Preparedness for a Rural or Suburban Community*. South Carolina: CreateSpace Independent Publishing Platform, 2017. Michael Mabee's excellent book discusses in great detail "community prepping": also known as "civil defense". It describes what it would take to properly protect and sustain a community as large as a town.