

**Growing threats of Solar Flares and the collapse
of earth's protective magnetic field: A look at why
citizens & lawmakers are slow to “Protect the Grid”**

–Proposed Solutions–

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Original Submission for the online journal, *Academia Letters*, 800–1,600 words, sans references

WORD-COUNT: 1,597 words

For: ACADEMIA.EDU. Not already published elsewhere in peer-reviewed literature

Due date/ Deadline: None—submissions are accepted/published continuously

Growing threats of Solar Flares and the collapse of earth's protective magnetic field: A look at why citizens & lawmakers are slow to “Protect the Grid”

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Published research and mainstream news media, are replete with documented proof of the growing threats that Solar Flares and Solar Super Storms pose to our power, cell phone, satellite, and telecommunications infrastructure aka “grid” –and which appear to be a growing threat for two reasons:

- 1) Increased reliance on modern electronic technology, the foundation of our “grid”; and,
- 2) The slow, but eventual, collapse of earth's protective magnetic field –which shields our planet from both cosmic radiation as well as high energy bursts from solar flares.

These threats are even more alarming due to lack of awareness, inaction, and apathy of the general public and governmental policy-makers, chiefly (but not solely) Federal Lawmakers.

When the infamous “Carrington Event” occurred in September 1859, it was, then, the largest recorded solar geomagnetic event since accurate records were made (with estimated Dst readings of -850nT to -900nT). Besides producing brilliant polar aurorae, this solar super storm caused widespread failures to contemporary telegraph systems, inducing such fierce magnetic flux into telegraph pylons that they sparked violently, giving some telegraph operators electric shocks. There have been similar recent “solar events” that caused widespread disruption:

- 1) The infamous solar storm of March 1989 inflicted major damage to Quebec, Canada's power grid, causing a 9-hour blackout when transformers were overloaded and failed, leaving

more than 6 million Canadians without power, and crashing computer hard-drives later that year (August 1989), resulting in halted trading in the Toronto stock market.

2) Another solar storm hit Canada and northeast United States in August 2003, causing wide-spread blackouts, jamming short-wave radio frequencies used by commercial pilots, prompting contemporary observers to speculate the Kremlin was jamming radio signals. The SOHO (Solar and Heliospheric Observatory) satellite failed temporarily, and the Advanced Composition Explorer (ACE) was also damaged by this solar storm.

3) The “Solar Storm of 2012,” a Carrington-class event, widely-believed to be even larger than the largest recorded solar storm in recorded history, almost made a “direct hit” on earth, narrowly missing only because earth had moved about nine (9) days in solar orbit from its trajectory, and almost a “direct hit,” because 9 days in a $365\frac{1}{4}$ -day Solar Year represent only 2.46% change in earth's orbit, a close call. This is alarming because of what would happen should we experience a “direct hit”: Economic damage would be on the order of “Pandemic Economy,” easily running into Trillions of dollars, wreaking havoc upon our fragile grid. For readers who doubt, please recall the Carrington Event only had Dst readings of -850nT to -900nT , while the Solar Superstorm of 2012, would've had a Dst-reading of up to $-1,200\text{nT}$, had it hit earth, making it much worse. In fact, Space Weather reported (Baker, 2013) it's peak Dst value as $-1,182\text{nT}$.

This begs the question: Why haven't lawmakers and other policy-makers made necessary investments to upgrade & protect our grid when we all know that mere Billions of dollars needed for necessary upgrades are much smaller than the Trillions in damages should we not act? Moreover: Why hasn't there been outcry from the public—especially given ease of access we now have to news and scientific research to verify these claims? One might also ask a similar

question: Why did White Star Line (WSL) shipping, which owned/operated the R.M.S. TITANIC passenger ship, with a crew manifest of 2,208 passengers the day it went down, and a "maximum capacity" for 3,547 passengers, stubbornly refuse to provide any more than twenty (20) lifeboats, which, in sum-total, could only accommodate 1,178 persons? And, why didn't passengers, local experts, or the general public make similar demands for needed safety upgrades to the TITANIC?

The undersigned author of this paper has previously published a paper on Solar Flares (Watts, 2019), which reevaluated the statistical probability of another Carrington-class geomagnetic event, proposing solutions for citizens and lawmakers. However, this author has also had involvement in several high-profile “political” matters, once almost winning the legendary Terri Schiavo “feeding tube” case in the FLORIDA SUPREME COURT, all by himself, doing better than the other litigants –combined– who were also petitioning the court for orders that would ensure she be given needed medical treatment, food, water, etc. Thus, it's not surprising that this author would take an opportunity to address a growing threat that has both “scientific” and “political” elements.

First, we must learn why citizens and lawmakers are slow or reluctant to make needed upgrades to our vulnerable grid. Then, we must propose solutions—and pursue them. While it's tempting to blame “lack of knowledge” or “suppression of news coverage” (as some oppressive governments do), we can't claim this as a cause of inaction, *here*. Rather, this author proposes two chief causes for slowness & reluctance to act:

1) INERTIA aka THE “BYSTANDER EFFECT”: First, it's human nature to “not act,” e.g., “inertia” in human behaviour: A “body at rest” tends to “stay at rest.” The refusal of bystanders to act during the public murder of NY resident, Catherine “Kitty” Genovese, in 1964,

is an example of this phenomenon.

2) “ELITE” BIAS: Secondly, even when people demand their government (lawmakers, The President, etc.) act, oft-times, lawmakers refuse to side with “popular” or “majority” opinion, if it happens to “go against” powerful & elite interests –be they political, economic, or otherwise. The research (Gilens & Page, 2014) confirms this phenomenon.

First, historians vividly recall how, in the early morning hours of March 13, 1964, Catherine “Kitty” Genovese, a 28-year-old New York bartender, was stabbed to death right outside her apartment dwelling. The *New York Times* reports that thirty-seven (37) people who witnessed this stabbing murder refused to call the police. While the precise number is uncertain, it is accepted fact, nonetheless, that a large number of “good and upright” citizens refused to so much as call the police, out of some combination of apathy and/or fear of getting involved in a private “lover's quarrel,” thus needlessly costing this young woman's life. Likewise, we see “good & upright” Americans refuse to loudly demand lawmakers upgrade our crumbling & fragile power & telecommunications infrastructure—even though political scientists (and citizens) know full-well that “infrastructure” is one of the few things on which Democrats and Republicans can find bipartisan agreement. While it seems unlikely that citizens are “afraid to get involved,” in calling on lawmakers, it is not unreasonable to infer laziness & apathy: We're busy with daily business—don't bother us to hold our lawmakers accountable if it requires any time, energy, or effort.

Secondly, Gilens & Page confirm this: Even when a large majority favour some policy (for example: needed upgrades to our power & satellite grid, or upgrades to prevent hacking & cyber-attacks to government computers), it's possible that “elites” who might find this inconvenient would oppose this (or simply refuse to vocally demand action), thus causing

lawmakers to decline to act. They write in their paper that “...economic elites and organized groups representing business interests have substantial independent impacts on U.S. government policy, while average citizens and mass-based interest groups have little or no independent influence.” They go on to write “in fact, that the preferences of average citizens are positively and fairly highly correlated, across issues, with the preferences of economic elites (refer to table 2). Rather often, average citizens and affluent citizens (our proxy for economic elites) want the same things from government.” This suggests that if “economic elites” got motivated, it could make up for silence or inaction by average citizens, but –perhaps– “economic elites” are similarly affected by the “apathy” phenomenon described above, which would help explain why the numerous “grid” upgrade bills in past and present sessions of U.S. Congress fail to gain enough votes to pass into law.

SOLUTIONS: The solutions, perhaps time-consuming and difficult to actually finish, are indeed very easy for all parties to begin and attempt: This author calls upon all readers (citizens, scientists, news media, & lawmakers/policymakers) to demand that Federal, State, & local lawmakers enact the various bills listed in the references section of this paper—and, for individual citizens, this author's original paper (Watts, 2019) has numerous tips & suggestions on how citizens can “be prepared” by such measures as backup power, stored non–perishable food & drink, and other key recommendations, which, for the sake of brevity, will not be repeated in this brief report on key “orphaned” or previously “overlooked” findings that have practical impact on our lives. Additionally, this author's flagship project, “CONTRACT WITH AMERICA: PART II,” has tips and recommendations for citizens seeking action from Federal and State lawmakers.

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(I.e., References with full quotes and links to both source AND ARCHIVE URL's)

Editor's Note: The submission, proper, has "abridged" references due to "word count" issues.

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SELECTED EXPIRED LEGISLATION FROM PAST CONGRESSIONAL SESSIONS

· H.R.668 - Secure High-voltage Infrastructure for Electricity from Lethal Damage Act [112th Congress (2011-2012)] – aka: “SHIELD Act” – Sponsor: Rep. Franks, Trent [R-AZ-2],

Cosponsors – 41 total, 37 Republican, 4 Democrat

CRS Summary: Secure High-voltage Infrastructure for Electricity from Lethal Damage Act or

SHIELD Act - Amends the Federal Power Act to authorize the Federal Energy Regulatory

Commission (FERC), with or without notice, hearing, or report, to order emergency measures to

protect the reliability of either the bulk-power system or the defense critical electric

infrastructure whenever the President issues a written directive or determination identifying an

imminent grid security threat.

<https://www.Congress.gov/bill/112th-congress/house-bill/668>

· H.R.6221 - Identifying Cybersecurity Risks to Critical Infrastructure Act of 2012 [112th Congress (2011-2012)] – Sponsor: Rep. Clarke, Yvette D. [D-NY-11] (Introduced 07/26/2012), Cosponsors: 4 total, 3 Democrat, 1 Republican

CRS Summary: Identifying Cybersecurity Risks to Critical Infrastructure Act of 2012 - Amends the Homeland Security Act of 2002 to require the Secretary of Homeland Security (DHS) to conduct continuous, sector-by-sector research, identification, and evaluation of cybersecurity risks to critical infrastructure in coordination with: (1) the heads of sector-specific agencies, (2) owners and operators of critical infrastructure, and (3) any private sector entity engaged in ensuring the security or resilience of critical infrastructure. [] Directs the Secretary to ensure that information relating to such risks is: (1) disseminated, to the maximum extent possible, in an unclassified version, to owners and operators of critical infrastructure within each such sector; or (2) if the information in whole or in part should be classified, share such information with owners and operators who possess the appropriate security clearances. [] Requires the Secretary to report to Congress at least semiannually on cybersecurity risks to critical infrastructure.

<https://www.Congress.gov/bill/112th-congress/house-bill/6221>

· H.Res.762 - Expressing the sense of the House of Representatives regarding community-based civil defense and power generation. [112th Congress (2011-2012)] – Sponsor: Rep. Bartlett, Roscoe G. [RMD- 6] (Introduced 08/02/2012), Cosponsors listed: (all original cosponsors) Rep. Franks, Trent [R-AZ-2], Rep. Clarke, Yvette D. [D-NY-11], Rep. Johnson, Henry C. "Hank," Jr. [D-GA-4]

CRS Summary: Encourages: (1) every community to work with citizens, leaders, and institutions

ranging from local fire halls and schools to faith-based organizations to develop its own civil defense program to create sustainable local infrastructure and planning capacity for tranquil times and disaster scenarios; (2) every citizen to develop an individual emergency plan to prepare for the absence of government assistance for extended periods; (3) each local community to foster the capability of providing at least 20% of its own critical needs, such as local power generation, food, and water, while protecting local infrastructure whenever possible from threats to centralized infrastructure; and (4) state governments and federal agencies to support the ability of local communities to become stronger, self-reliant, and better able to assist neighboring communities in times of great need.

<https://www.Congress.gov/bill/112th-congress/house-resolution/762>

· H.R.3410 - Critical Infrastructure Protection Act [113th Congress (2013-2014)] – aka: CIPA – Sponsor: Rep. Franks, Trent [R-AZ-8] (Introduced 10/30/2013), Cosponsors: 21 total, 19 Republican, 2 Democrat

CRS Summary: Critical Infrastructure Protection Act or CIPA - Amends the Homeland Security Act of 2002 to require the Secretary of Homeland Security (DHS) to: (1) include in national planning scenarios the threat of electromagnetic pulse (EMP) events; and (2) conduct outreach to educate owners and operators of critical infrastructure, emergency planners, and emergency responders at all levels of government of the threat of EMP events.

<https://www.Congress.gov/bill/113th-congress/house-bill/3410>

· S.1846 - Critical Infrastructure Protection Act of 2016 [114th Congress (2015-2016)] – aka: CIPA – Sponsor: Sen. Johnson, Ron [R-WI] (Introduced 07/23/2015), Cosponsor: Sen. Ted Cruz [R-TX]

CRS Summary: (Sec. 2) This bill amends the Homeland Security Act of 2002 to add as

responsibilities of the Secretary of Homeland Security (DHS) relating to intelligence and analysis and infrastructure protection: (1) conducting an intelligence-based review and comparison of the risk and consequences to critical infrastructures of threats and hazards, including a geomagnetic disturbance (GMD) caused by a solar storm or another naturally occurring phenomenon and an electromagnetic pulse (EMP) caused by a nuclear device or non-nuclear device, including such a pulse caused by an act of terrorism; and (2) submitting and biennially updating a recommended strategy to protect and prepare the critical infrastructure of the American homeland against such threats. [] The strategy: (1) shall be developed in consultation with the relevant federal sector-specific agencies and coordinating councils for critical infrastructures, and (2) may be incorporated into a broader DHS recommendation to help protect and prepare critical infrastructure from terrorism, cyber attacks, and other threats and hazards.

<https://www.Congress.gov/bill/114th-congress/senate-bill/1846>

· S.2232 - Next Generation GRID Act [115th Congress (2017-2018)] – Sponsor: Sen. King, Angus S., Jr. [I-ME]

CRS Summary: This bill amends the Public Utility Regulatory Policies Act of 1978 to (1) establish a right of interconnection for distributed energy resources, (2) require each electric utility to develop an electricity distribution resource plan, (3) require each state to consider non-wire alternatives for allowing an electric utility to recover costs associated with an electricity transmission and distribution project, (4) require the Department of Energy to establish a pilot program for a distribution system operator, and (5) require each state to consider the use of performance-based incentive mechanisms to achieve its public interest goals.

<https://www.Congress.gov/bill/115th-congress/senate-bill/2232>

· H.R.2962 - SMART Grid Study Act of 2013 [113th Congress (2013-2014)] – Sponsor: Rep. Payne, Donald M., Jr. [D-NJ-10] (Introduced 08/01/2013), Cosponsors: 37 total, 32 Democrat, 5 Republican

CRS Summary: Saving More American Resources Today Grid Study Act of 2013 or SMART Grid Study Act of 2013 - Directs the Secretary of Homeland Security (DHS), and the heads of other federal departments and agencies, as necessary, to enter into an agreement with the National Research Council to research the future resilience and reliability of the nation's electric power transmission and distribution system. [] Names such research the "Saving More American Resources Today Study" or "SMART Study."

<https://www.Congress.gov/bill/113th-congress/house-bill>

CURRENT LEGISLATION IN THIS SESSION: 117TH CONGRESS, 2021-2022

· S.704 - Disaster Safe Power Grid Act of 2021 [117th Congress (2021-2022)] – Sponsor: Sen. Wyden, Ron [D-OR] (Introduced 03/11/2021), Cosponsor: Sen. Merkley, Jeff [D-OR]
CRS Summary: A summary is in progress. Stay tuned.

<https://www.Congress.gov/bill/117th-congress/senate-bill/704>

· H.R.1514 - To amend the Federal Power Act to increase transmission capacity for clean energy, reduce congestion, and increase grid resilience. [117th Congress (2021-2022)] – Sponsor: Rep. Peters, Scott H. [D-CA-52] (Introduced 03/02/2021)

CRS Summary: A legislative analyst in the Congressional Research Service will begin analyzing this legislation after text becomes available, according to Congress.gov's official website. Stay tuned.

As of 04/13/2021 text has not been received for H.R.1514 - To amend the Federal Power Act to increase transmission capacity for clean energy, reduce congestion, and increase grid resilience.

Bills are generally sent to the Library of Congress from GPO, the Government Publishing Office, a day or two after they are introduced on the floor of the House or Senate. Delays can occur when there are a large number of bills to prepare or when a very large bill has to be printed.

<https://www.Congress.gov/bill/117th-congress/house-bill/1514>

· H.R.1119 - Stopping Chinese Communist Involvement in the Power Grid Act [117th Congress (2021-2022)] – Sponsor: Rep. Duncan, Jeff [R-SC-3] (Introduced 02/18/2021), Cosponsors: Rep. Mann, Tracey [R-KS-1] and Rep. Gaetz, Matt [R-FL-1]

CRS Summary: A summary is in progress.

<https://www.Congress.gov/bill/117th-congress/house-bill/1119>