

# **BLACKOUT WARFARE**

## **Weaponizing Weather To Attack The U.S. Electric Power Grid**



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## KEY JUDGMENTS

An attack on the U.S. electric power grid, with the objective of causing a regional or nationwide protracted blackout, is likely to exploit severe weather as a weapon. Hurricanes, heat waves, ice storms, tornadoes, summer temperature highs and winter lows, and other weather extremes, can stress electric grids and tax emergency resources, facilitating attacks by cyber, sabotage, and EMP to orchestrate a protracted blackout.

Exploiting severe weather to wage a “blackout war” offers numerous strategic, tactical, and operational advantages supporting a combined-arms cyber, sabotage, and EMP attack.

Storm-induced blackouts of the electric power grid are suggestive of the possible consequences of a “blackout war” such as could be waged against the United States by Russia, China, North Korea, Iran and/or international terrorists.

Electric power grid failure caused by storms cascade through other critical infrastructures—such as communications, transportation, emergency medical services, food and water supply systems. Storm-induced blackouts provide an objective basis for extrapolating judgments about the threat posed by “blackout warfare” to the civilian infrastructures that sustain economic, political, and social life.

“Blackout warfare” is likely to damage or disrupt electronics over a much wider geographic area than storm-induced blackouts—potentially over most of North America. Nor do storm-induced blackouts replicate the damage from a nuclear EMP attack that may occur in small-scale electronic systems such as computers, aircraft, and automobiles. Storms are merely suggestive of, and provide some basis for extrapolating, the greater destructive effects on critical infrastructures and social order by a “blackout war” employing cyber-attack, sabotage, and EMP.

Unlike “blackout warfare” hurricanes and other storms are familiar to the public and understood to be acts of nature, not the destructive agents of a foreign enemy. Public perceptions of and reactions to mass destruction differ markedly when the agent of destruction is a familiar natural event or accident, versus destruction by unfamiliar means inflicted by malignant actors.

“Blackout warfare” against U.S. electric grids and other life-sustaining critical infrastructures would attack not only the U.S. technological Achilles heel, but by sowing protracted chaos in the homeland, attacks America’s psychological Achilles heel.

The history of storm-induced electric power blackouts that collapse other critical infrastructures and sow societal chaos, and the long record of inadequate preparation and response by Federal and State governments and electric utilities, is for potential adversaries planning EMP and Cyber Warfare an intelligence treasure trove.

If the largest electric utilities in the United States cannot be trusted competently to perform such basic and simple public safety precautions as vegetation management and powerline protection from high-winds and ice storms—as in California (2019) and Texas (2021)—clearly they are incompetent to protect the grid from more complex and much bigger threats, like EMP and Cyber Warfare, that could kill millions.

# **BLACKOUT WARFARE: WEAPONIZING WEATHER TO ATTACK THE U.S. ELECTRIC POWER GRID**

## **Weaponizing the Weather**

An attack on the U.S. electric power grid, with the objective of causing a regional or nationwide protracted blackout, is likely to exploit severe weather as a weapon. Hurricanes, heat waves, ice storms, tornadoes, summer temperature highs and winter lows, and other weather extremes, can stress electric grids and tax emergency resources, facilitating attacks by cyber, sabotage, and EMP to orchestrate a protracted blackout.

Severe weather may not cooperate with an aggressor's plans to wage a "blackout war" against the U.S. during a fast-breaking international crisis, and is not a necessary condition for attacking electric grids. Indeed, cyber-attacks, sabotage, or EMP attack alone are each potentially capable of inflicting a nationwide blackout. Nonetheless, a conservative military planner is likely to exploit the synergistic effects of all these threat vectors in a combined-arms operation to maximize damage and prospects for paralyzing the U.S. through "blackout warfare"—including by exploiting severe weather.

Military history abounds with examples of "weaponizing" weather to prevail in war:

--480 BC the Battle of Salamis, ranked as one of the most important battles in world history, Athenian naval commander Themistocles used superior knowledge of local winds to defeat the Persian navy and thwart King Xerxes' attempt to conquer the free Greek city-states.

--1274 and 1284 AD typhoons, called Kamikaze "divine winds" by Japan, sank and scattered huge invasion fleets from Mongol Emperor Kublai Khan's China, enabling badly outnumbered samurai to defend Japan's independence.

--1588 the Spanish Armada's planned conquest of England is thwarted by superior British seamanship exploiting a "Protestant wind" that scatters Spain's fleet and makes invasion impossible.

--1776 after losing the Battle of Long Island, General George Washington saves his Continental Army and the American Revolution from annihilation by evacuating across the East River under cover of night and fog in "America's Dunkirk."

--1709, 1812, 1941 Russia exploits "general winter" to defeat invasions by Sweden's Charles XII, Napoleon, and Hitler.

--1945 cloudy skies over Kokura, Japan, spared the city from atomic bombing, but sealed the fate of secondary target, clear-skied Nagasaki.<sup>1</sup>

Today, exploiting severe weather to wage a "blackout war" offers numerous strategic, tactical, and operational advantages supporting a combined-arms cyber, sabotage, and EMP attack:

***Strategic Surprise:*** Political and military leaders in peacetime would be distracted, and might be distracted even if in the midst of an international crisis, by a hurricane or other severe weather that becomes a natural disaster and domestic crisis. Strategic surprise attack against the national electric grid would be easier to achieve.

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<sup>1</sup>Laura Lee, "10 Surprising Ways Weather Has Changed History" [www.livescience.com](http://www.livescience.com) (4 October 2006).

**Strategic Surprise:** During extreme severe weather that becomes a natural disaster, electric utilities are usually overwhelmed and must be helped by emergency crews and resources from utilities located in neighboring States, sometimes nationwide. Consequently, other States are stripped of emergency resources to cope with an attack against their electric grids.

**Strategic Surprise:** During extreme weather that becomes a natural disaster, electric utilities are often overwhelmed and must be helped by U.S. Government emergency resources, including from the Federal Emergency Management Agency, Department of Homeland Security, and Department of Defense. Consequently, Federal emergency resources would be less available or unavailable to cope with an attack on the electric grids of other States.

**Operational Surprise:** During severe weather electric utilities typically lower or drop cybersecurity safeguards to facilitate remote access to control systems in order to increase system nimbleness responding to the stresses of severe weather. Cyber-blackout becomes easier to achieve: *“Recent Texas power outages and the loss of both electricity and water across Texas demonstrate how vulnerable ERCOT and Texas are to natural disasters such as snowstorms and hurricanes but also manmade and malicious activities...it also demonstrates the vulnerability of the entire U.S. energy grid...Closer analysis shows the same effects created by natural disasters can also be triggered by adversaries able to create the same disruptions and cascading effects by exploiting control systems (e.g., SCADA systems, plant distributed control systems, controllers, relays, process instrumentation, etc.). Cyber vulnerabilities are often more exposed during natural disasters when the focus is elsewhere, while at the same time many security procedures and practices are suspended to be able to expeditiously restore operations and connectivity...Hurricanes Katrina and Harvey are earlier examples where cyber security considerations were intentionally ‘bypassed’ to expeditiously bring facilities back on-line...From a cyber security perspective what has changed over the years is the cyber capability of nation-state actors such as China and Russia to not only monitor but also affect the magnitude and recovery of events such as what happened in Texas. Think of what additional impacts could have occurred if there were hardware backdoors in Chinese-made transformers that were manipulated or if the SolarWinds cyber compromise were used to manipulate the Operational Technology (OT) networks and building control systems in power grid and natural gas control centers and plant control rooms.”*<sup>2</sup>

**Operational Surprise:** Severe weather, particularly cold weather, can improve the effectiveness of non-nuclear and nuclear EMP attack, according to an assessment done by Metatech for Oak Ridge National Laboratory, the Department of Defense, and the U.S. Federal Energy Regulatory Commission: *“...if it is an intentional attack and the enemy is sophisticated enough to develop a high capacity EMP device, then they would also be sophisticated enough to subscribe to ‘The Weather Channel’ and launch their attack under conditions which would greatly magnify the debilitating impacts of their assault on critical infrastructures. For example under very cold-weather conditions, breakers and equipment at substations and power plants can be enormously more difficult to re-energize when they become cold. This can translate into the possibility of significantly delayed restorations...Unfavorable weather conditions (particularly cold weather)*

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<sup>2</sup> Joe Weiss, “Texas Power Outages Demonstrate Grid Cyber Vulnerability And Inadequacy Of Existing Regulations” [www.controlglobal.com](http://www.controlglobal.com) (28 February 2021).

*should be assumed as an important complicating factor that would have potential to make restoration of all facilities and infrastructures more problematic.”<sup>3</sup>*

***Tactical Surprise:*** Severe weather stresses electric grids, that are usually operating near full capacity, on the verge of failure normally, facilitating grid collapse by cyber, sabotage, and EMP attack. Severe weather makes it easier to down the “first domino” causing a chain of cascading failures that can blackout electric grids regionally and nationally.

***Tactical Surprise:*** During severe weather, a cyber-attack, Non-Nuclear EMP (NNEMP) attack, or even nuclear EMP attack might be mistaken, at least initially, as damage inflicted due to severe weather inducing system generated overvoltages or causing aged equipment to fail or other failures mistakenly attributed to weather. Damage inflicted by cyber-attacks and NNEMP weapons can look like and easily be confused with system generated overvoltages or routine equipment failures. Surprise becomes easier to achieve and may be achieved longer during severe weather, so electric grid operators may not even know they are under attack, until too late.

The above assessments are supported by a survey and analysis of historical severe weather events. History of severe weather is also strongly indicative of vulnerabilities of all critical infrastructures to electric power grid blackout and its larger societal consequences.

### **Lessons from the Weather and the Weathermen**

Storm-induced blackouts of the electric power grid are suggestive of the possible consequences of a “blackout war” such as could be waged against the United States by Russia, China, North Korea, Iran and/or international terrorists. Electric power grid failure caused by storms cascade through other critical infrastructures—such as communications, transportation, emergency medical services, food and water supply systems. Storm-induced blackouts provide an objective basis for extrapolating judgments about the threat posed by “blackout warfare” to the civilian infrastructures that sustain economic, political, and social life.

The vulnerability of critical infrastructures to various forms of attack has been a growing concern over many years. Presidential attention perhaps began with President Bill Clinton’s Marsh Commission, receiving additional impetus after the terrorist attacks of September 11, 2001, that moved President George W. Bush to establish the Department of Homeland Security.

However, the science of analyzing critical infrastructures, their interdependencies, and their possible vulnerabilities is relatively new. Much effort and significant resources have been invested in an inductive approach to understanding the potential for cascading failures through the critical infrastructures that may result from failure of the power grid. The prevailing approach relies heavily on complex mathematical calculations, theoretical models, and computer simulations.

Analysis of storm-induced blackouts and their consequences offers an empirical approach that complements the predominant inductive approach to understanding infrastructure interdependence and vulnerability. Moreover, beyond the interdependence and potential vulnerability of critical

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<sup>3</sup> James Gilbert, John Kappenman, William Radasky, Edward Savage, *The Late-Time (E3) High-Altitude Electromagnetic Pulse (HEMP) and Its Impact on the U.S. Power Grid*, Meta-R-321 (January 2010) p. 5-2.

infrastructures, analysis of storm-induced blackouts provides some empirical basis for estimating the effects of infrastructure failure on social order.

Storm-induced blackouts are an imperfect analogy to cyber, sabotage, and EMP attacks. Taken at face value, storm-induced blackouts and their consequences grossly understate the threat posed by “blackout warfare.”

Storms are much more limited in geographic scope compared to cyber-attack and EMP, and even potentially compared to sabotage, which can also be geographically widespread. So power grid recovery from storms, compared to recovery from “blackout warfare” is likely to be much faster because of the “edge effect”—the capability of neighboring localities and States to provide recovery assistance.

Because “blackout warfare” is likely to damage or disrupt electronics over a much wider geographic area than storm-induced blackouts, rescuers from neighboring States and localities would face a much bigger job, and recovery would take a much longer time.

Nor do storm-induced blackouts replicate the damage from a nuclear EMP attack that may occur in small-scale electronic systems such as computers, aircraft, and automobiles. Compared to the worst storms, a nuclear EMP attack is likely to inflict, not only much more widespread damage geographically, but deeper damage, affecting a much broader spectrum of electronic equipment.

Storms are merely suggestive of, and provide some basis for extrapolating, the greater destructive effects on critical infrastructures and social order by a “blackout war” employing cyber-attack, sabotage, and EMP.

The worst and most severe hurricanes, like Katrina, Sandy and Harvey, their storm-induced blackouts and consequent physical damage to other critical infrastructures, may be equivalent to a small-scale cyber-attack, kinetic-attack, or EMP attack by non-nuclear weapons such as terrorists might be able to build. Storm-induced blackouts and their cascading physical effects on other critical infrastructures may be taken as representative of the lowest, and most benign, level of the “blackout warfare” threat spectrum.

However, although the most severe weather may approximate lowest-level “blackout warfare” in physical damage to the power grid and other critical infrastructures, the most severe storms, like the worst hurricanes, almost certainly fail to approximate even low-level “blackout warfare” in its psychological effects.

Unlike “blackout warfare” hurricanes and other storms are familiar to the public and understood to be acts of nature, not the destructive agents of a foreign enemy. Public perceptions of and reactions to mass destruction differ markedly when the agent of destruction is a familiar natural event or accident, versus destruction by unfamiliar means inflicted deliberately by malignant actors.

For example, the American people endure tornadoes and hurricanes without mass panic, and accept with equanimity 50,000 deaths yearly from automobile accidents. But the same number of deaths

inflicted over a decade by a foreign enemy was enough to cause a political and cultural revolution in the United States, and broke the will of the people and political elites who accepted defeat in the Vietnam War.

3,000 deaths and other destruction inflicted by the terrorist attacks of September 11, 2001, moved the United States, initially with wide popular support, to prosecute unsuccessful wars in Afghanistan and Iraq as part of a broader ongoing War on Terrorism. The United States Government and people supported this effort because, although U.S. society can survive the worst hurricane, the September 11 events forged a decade-long consensus that U.S. society, and civilization itself, may not be able to survive future terrorist attacks.

The Vietnam War and War on Terrorism were waged overseas, the latter from fear of mass destruction terror attacks on the U.S. homeland. The magnitude of the U.S. investment of military and economic resources waging the long War on Terrorism reflects the magnitude of American's fear of terror attacks on their homeland.

The Vietnam War and War on Terrorism were both lost at home, a fact surely not lost on potential adversaries planning for war against the United States.

Activism against the Vietnam War, that included a cultural revolution and domestic terrorism by such groups as the Weathermen, indicate that U.S. elites will surrender to levels of social chaos inflicted on the homeland far below the violence inflicted on U.S. troops serving overseas in Vietnam. Americans lost their enthusiasm for the War on Terrorism because of seemingly unwinnable “forever wars” and, after a decade, the apparent security of their homeland.

More recently, violent activism by Black Lives Matter and Antifa, indicate that U.S. elites will surrender to levels of social chaos inflicted on the homeland far below the violence inflicted on U.S. troops serving overseas in Vietnam or the War on Terrorism.

Thus, “blackout warfare” against U.S. electric grids and other life-sustaining critical infrastructures would attack not only the U.S. technological Achilles heel, but by sowing protracted chaos in the homeland, attacks America's psychological Achilles heel.

### **Life Without Electricity**

Psychologically benign though storms may be, compared to terrorist attacks that inflict lesser or greater physical destruction, even storms challenge social order. This survey has found that some storm-induced blackouts have caused crime waves and disintegrated organized communities into disorganized refugees.

Significantly, some observers of storm-induced blackouts—even when blackouts lasted only a day or two, as is commonly the case—were struck by the potential fragility of modern society and its near total dependence upon electricity.

For example, a January 1999 ice storm that blacked-out electricity in the Washington, D.C. area moved the Washington Post to note that “daily life was crippled, if not halted—dramatically

illustrating the fragile dependence of modern times on the flip of a switch.”<sup>4</sup> The Washington Post continued:

*“Automated teller machines were out, as were gasoline pumps at many service stations. WETA-TV (Channel 26) went black for more than 10 hours until employees found a diesel generator to put that station back on the air. The Montgomery County jail conducted bond hearings by flashlight. Families seeking refuge at Tysons Corner Center were booted out at 6 p.m. because of water problems at the mall...Up and down Metro’s Red Line, riders confronted with stalled elevators, inoperable farecard machines and even closed stations. Negotiating roads...was often no easier. Of more than 700 traffic signals in Montgomery, 430 were dead. Across the area, but especially in Montgomery, hotels filled to capacity with customers fleeing cold, dark homes. The 365-room Double Tree hotel on Rockville Pike was sold out by 8 a.m...Other residents, with pioneering spirit, decided to ride out the outage. More than two dozen people were waiting when the Home Depot in Germantown opened at 6 a.m. By 10 a.m. the store had sold every generator, log of firewood, candle, kerosene heater and any other supply that could warm hands and feet.”<sup>5</sup>*

Another dramatic example of the dependency of social order upon electricity occurred in October 2002, during the aftermath of Hurricane Lili that blacked-out much of coastal Louisiana. In some areas, the absence of street lights caused “looting and vandalism bad enough to require enforcement of a dusk-to-dawn curfew.”<sup>6</sup> Local police had to be reinforced by police from neighboring localities in order to cope with the crime wave. “The looting,” remarked Abbeville Mayor Mark Piazza, “Is not expected to go away until the lights come on.”<sup>7</sup>

Experts claim an EMP attack that collapses the national power grid would, in effect, return society to a pre-industrial condition. A February 1987 snowstorm that blacked-out the Washington, D.C. area suggested exactly this to many of its victims. According to press reports, people were reduced to using open fires for heat, cooking and, in some areas, melting snow for water. Homes with fireplaces became havens for multiple families seeking refuge from houses heated by electric, gas, or oil that no longer worked. As she “stoked a fire and began sterilizing water for her baby’s formula,” one woman told reporters, “It’s like the Colonial days.”<sup>8</sup>

Storm-induced blackouts are localized and last usually no more than a day or two. Yet they can momentarily return part of our society to technological primitivism and begin cracks in the social order.

Compared to storms, the consequences of a “blackout war” would be far graver. Compared to the worst storms, a “blackout war” would destroy critical infrastructures more completely within a region and over a much larger region—perhaps over the entire continental United States. “Blackout warfare” compared to the worst storms would certainly inflict more lasting damage—requiring months or years to repair, if repair is possible.

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<sup>4</sup> Susan Levine and Tom Jackman, “Region Iced Over and Blacked Out” Washington Post (16 January 1999) p. A1.

<sup>5</sup> Ibid.

<sup>6</sup> Leslie Williams, “One Town’s Battle” Times-Picayune (9 October 2002) p. 1.

<sup>7</sup> Ibid.

<sup>8</sup> John Lancaster and Chris Spolar, “Washington’s Wet Blanket” Washington Post (24 February 1987) p. 1.

Therefore, we can reasonably infer from the data on storm-induced blackouts and the known greater severity of cyber-attacks, sabotage, and EMP that the consequences of a “blackout war” on the United States’ critical infrastructures and society would be an unprecedented and first order catastrophe.

Some of the salient critical infrastructure and social consequences of storm-induced blackouts are listed below. Not all of the failures and effects described occurred during all storms. This survey was careful to select only failures and effects traceable to power grid failure. Failures and effects resulting from phenomenon other than electric power grid blackout (downed trees, flooding and etc.) are not assessed here. Storm- and weather-related blackouts examined in this survey include Hurricane Andrew (1992), Western Heat Wave (1996), the Great Ice Storm (1998), Washington Ice Storm (1999), Hurricane Floyd (1999), Hurricane Lili (2002), Hurricane Katrina (2005), Hurricane Sandy (2012), Hurricane Harvey (2017), California Wildfires (2019) and Texas Ice Storm (2021):

- **Social Order:** Looting requires dusk to dawn curfew. People become refugees as they flee powerless homes. Work force becomes differently employed at scavenging for basics, including water, food, and shelter.
- **Communications:** No TV, radio, or phone service.
- **Transportation:** Gas pumps inoperable. Failure of signal lights and street lights impedes traffic, stops traffic after dark. No mass transit metro service. Airlines stopped.
- **Water and Food:** No running water. Stoves and refrigerators inoperable. People melt snow, boil water, and cook over open fires. Local food supplies exhausted. Most stores close due to blackout.
- **Energy:** Oil and natural gas flows stop.
- **Emergency Medical:** Hospitals operate in dark. Patients on dialysis and other life support threatened. Medications administered and babies born by flashlight.
- **Death and Injury:** Casualties from exposure, carbon dioxide poisoning and house fires soar.
- **Edge Effect:** Recovery depends heavily on neighboring regions unaffected by blackout. For example, Louisiana rescued from Hurricane Lili blackout by 14,000 workers from 24 states.

### **Hurricane Andrew (August 1992)**

Hurricane Andrew struck southern Florida on August 24, 1992, and reached the coast of Louisiana on August 26, two days later. At the time, Andrew was described by some experts as the worst natural disaster in U.S. history.<sup>9</sup> Andrew laid waste to 165 square miles in South Florida, destroying some 100,000 homes in Florida and Louisiana, and leaving more than 3.3 million homes and businesses without electricity.<sup>10</sup>

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<sup>9</sup> “Mother Nature’s Angriest Child” Time (7 September 1992) p. 15.

<sup>10</sup> Tom Mathews, Peter Katel, Todd Barrett, Douglas Waller, Clara Bingham, Melinda Liu, Steven Waldman, and Ginny Carrol, “What Went Wrong” Newsweek (7 September 1992) p. 23.

Federal and state officials were at first unaware of the magnitude of the disaster and slow to react.

Three days into the crisis, Kate Hale, the Director of Dade County's Office of Emergency Management called a press conference to demand of State and Federal authorities, "Where the hell is the cavalry on this one? We need food. We need water. We need people. For God's sake, where are they?"<sup>11</sup>

By the end of the first week, President George Bush had ordered 14,400 troops into the Florida disaster area "with mobile kitchens, tents, electrical generators, water and blankets....Even those lucky enough to have homes may not have electricity for more than a month."<sup>12</sup>

Andrew's aftermath posed an immediate threat to life in South Florida because of damage to the infrastructures for water and food.

A widespread electrical blackout prevented pumps from working, so there was no running water.<sup>13</sup> Most grocery stores had been destroyed. Massive traffic jams, caused in part by non-functioning signal and street lights, prevented the surviving supermarkets from being re-supplied. To meet the crisis, the Army Corps of Engineers distributed more than 200,000 gallons of water and the Department of Agriculture gave out tons of surplus food.<sup>14</sup>

Nonetheless, two weeks after the hurricane, food was still not reaching many victims. On September 7, fifteen days after Andrew struck, reporters witnessed the following scene: "In the ruins, Charlie Myers, 65, stood holding a peach and a loaf of bread. "This is all I have left, he said. What plans did he have? 'Survive buddy.'"<sup>15</sup>

Andrew's blackout of the power grid made the crisis over water, food, and shelter worse by severing communications between relief workers and victims.

Without power, there was an almost complete collapse of communications—no phones, radio or television.<sup>16</sup> "Without electricity to power radio and television sets, mass communication remains difficult or impossible," according to authorities and press reports.<sup>17</sup> Consequently, people were unaware of relief efforts or of where to go for help.

For example, although the U.S. Marines erected "tent cities" able to accommodate thousands of homeless hurricane victims, many did not know of this refuge: "Many people in the vast storm-stricken area, even those who live within easy walking distance of the sprawling encampment, said

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<sup>11</sup> Ibid.

<sup>12</sup> "Mother Nature's Angriest Child" *Time* (7 September 1992) p. 16.

<sup>13</sup> William Booth and Mary Jordan, "Hurricane Rips Miami Area, Aims at Gulf States" *Washington Post* (25 August 1992) p. A7.

<sup>14</sup> Tom Mathews et al., "What Went Wrong" *Newsweek* (7 September 1992) p. 27.

<sup>15</sup> Ibid.

<sup>16</sup> One report indicates the phone system continued to operate or experienced only partial failure. See John Mintz, "Phones Withstand Hurricane's Fury" *Washington Post* (26 August 1992) p. F1. For a different view see William Booth and Mary Jordan, "Hurricane Rips Miami Area, Aims at Gulf States" *Washington Post* (25 August 1992) p. A7.

<sup>17</sup> Laurie Goodstein and William Booth, "Marines Ready Tent Cities in South Florida" *Washington Post* (1 September 1992) p. A1.

they were not aware of the tents' existence.”<sup>18</sup> Unable to communicate where victims could get water, relief workers stacked “pyramids of bottled water...on street corners, free for the taking.”<sup>19</sup>

The blackout of power and communications, according to press reports, imbued “South Florida with an end-of-the world aura”:

*“Hundreds of thousands of people found themselves in a Stone Age existence, left to pursue hunting and gathering, forced to forage for food and water. Because many people in the devastated areas had no radios or batteries, the location of food distribution sites has been a mystery....Each time word spread about establishment of a new relief outlet, people suddenly would swarm forward on foot, and National Guard troops often had to be summoned to keep order. The hurricane robbed steamy South Florida of the two amenities deemed essential to life here: air conditioning and ice cubes. ‘We can’t stand this heat any longer,’ said Rita Larraz, whose house in South Dade County was spared but who, like 750,000 customers here, still had no electricity, and therefore no air conditioning in the 90-plus degree heat and humidity... ‘The heat is killing us.’”<sup>20</sup>*

The blackout crippled the transportation infrastructure, further impeding relief efforts. “More than 5,000 traffic lights are on the blink...,” according to press reports. Consequently, “Traffic was snarled for miles. The simplest chore, indeed almost everything, seemed to take forever.”<sup>21</sup>

Andrew’s blackout of the power grid contributed significantly to societal anarchy in South Florida. With the blackout-induced collapse of communications there was no way for survivors of Andrew to report crimes in progress. An orgy of looting provoked vigilantism. Unable to rely on the police, individuals armed themselves to protect their homes and remaining possessions.

“Andrew had made one zone of society come unglued,” according to Newsweek, “Disasters penetrate like lasers, revealing weaknesses beneath the smooth surfaces of a community.”<sup>22</sup> Lack of streetlights encouraged “thieves...to take advantage of a general feeling of lawlessness, particularly before federal troops began arriving”:

*“At night, in darkened streets cordoned by National Guard troops enforcing a curfew, machine-gun fire has been heard. Spray-painted on the side of a house in Perrine was: ‘I’m armed and dangerous! Looters shot on sight!’ ‘Everyone is armed, everyone is walking around with guns,’ said Navy physician Sharon Wood, who worked at a mobile hospital in Homestead, where workers refused to dispense calming drugs such as valium for fear that word might get out and the hospital might be robbed. In Kendall, senior citizens sleep at night with revolvers by their sides....Miami*

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<sup>18</sup> Ibid.

<sup>19</sup> Ibid.

<sup>20</sup> William Booth, “Hurricane’s Fury Left 165 Square Miles Pounded Into the Ground” Washington Post (30 August 1992) p. A1.

<sup>21</sup> Laurie Goodstein and William Booth, “Marines Ready Tent Cities in South Florida” Washington Post (1 September 1992) p. A1.

<sup>22</sup> Tom Mathews et al., “What Went Wrong” Newsweek (7 September 1992) p. 24.

*and its surrounding municipalities, which have a long history of racial and ethnic tension, were considered a tinderbox.”*<sup>23</sup>

Some 3,300 National Guard troops enforced a dusk-to-dawn curfew, when looting was worst, under cover of darkness. More than 200 people were arrested for looting or violating the curfew.<sup>24</sup> However, some efforts to restore law and order impeded relief efforts:

*“Roadblocks set up to stop looters continued to hamper delivery of emergency food supplies. Truckers with emergency food aid were forced to wait for police escorts after reports that some drivers had been shot and beaten by thugs. State troopers thwarted the progress of some private help when they began stopping all trucks entering the state, demanding that the drivers show that they and their cargo had been officially requested and that they were from a recognizable organization.”*<sup>25</sup>

Ultimately, some 16,000 federal troops from every branch of the armed forces turned the lights back on and restored order to South Florida.<sup>26</sup>

### **Western Heat Wave (10 August 1996)**

A heat wave, with near record high temperatures, blacked out large parts of nine western states on a torrid Saturday afternoon, August 10<sup>th</sup>, 1996. Near-record high temperatures covered most of the West at the time: for example, over 100 degrees in eastern Oregon and the San Joaquin Valley, 113 degrees in Red Bluff, and 104 degrees in Boise, Idaho.<sup>27</sup>

Initial speculation that the blackout was sparked by a brushfire near Oregon was later discounted. According to Dulcy Mahar, spokeswoman for the Bonneville Power Administration, the blackout was caused by the heat wave:

*“Some of the lines sagged because of the heat. Some of those lines sagged down onto trees and then tripped off for safety reasons. The power that those lines were carrying was moved off to other lines and overloaded those, and then the safety devices tripped those lines off and you had the outages.”*<sup>28</sup>

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<sup>23</sup> William Booth, “Hurricane’s Fury Left 165 Square Miles Pounded Into the Ground” Washington Post (30 August 1992) p. A18.

<sup>24</sup> William Booth and Mary Jordan, “Painful Awakening in South Florida” Washington Post (26 August 1992) p. A27.

<sup>25</sup> Mary Jordan, “President Orders Military to Aid Florida” Washington Post (28 August 1992) p. A14.

<sup>26</sup> Rick Gore, “Andrew Aftermath” National Geographic (April 1993) p. 20.

<sup>27</sup> Rich Connell, “Massive Power Outage Hits Seven Western States” Los Angeles Times (11 August 1996) p. 1.

<sup>28</sup> Tim Golden, “2nd Power Failure in 6 Weeks Creates Havoc for the West” New York Times (12 August 1996) p. 13. See also Tina Griego, “Regulators Will Take Up Western Power Failures” Albuquerque Tribune (12 August 1996) p. A1.

Although the blackout lasted less than 24 hours, it was “one of the largest power outages on record.”<sup>29</sup> The blackout effected “an estimated 4 million people in nine states, trapping people in elevators, snarling traffic and generally causing widespread chaos.”<sup>30</sup>

The blackout caused problems that could have become a significant threat to life and society, had they been more protracted.

Water supplies were interrupted in some regions because electric pumps would not work. Arizona, New Mexico, Oregon, Nevada, Texas, and Idaho experienced blackout-induced disruption in water service during the heat wave. For example:

*“In Fresno, where most of the city receives water from wells powered by electric pumps, the city manager declared a local emergency. Only two of the city’s 16 fire stations had water sources and most of the fire hydrants were out. The county and Air National Guard rushed in tankers to boost the Fire Department’s capacity.”*<sup>31</sup>

Air and ground transportation systems experienced significant disruptions because of the blackout.

For example, at San Francisco International Airport, although an emergency generator powered the control tower; security systems, computers, elevators, and luggage carousels would not work. Jetways could not be positioned at airplane doors. An estimated 6,000 passengers were stranded.<sup>32</sup> Incoming flights had to be diverted to San Jose and Oakland. Airport Spokesman Bob Schneider announced, “We are pretty much out of business.”<sup>33</sup>

Signal lights failed, causing massive traffic jams in San Francisco and San Diego. “Traffic is a nightmare,” declared San Francisco Police Department spokesman Bruce Metdors, “They’re just backed up everywhere. It’s gridlock.”<sup>34</sup>

San Francisco mass transit—electric trollies and BART metro trains—were stalled by the blackout.<sup>35</sup> “We’re responding in what amounts to our earthquake mode,” said Orange County Fire Captain Dan Young, “We certainly had an increase in traffic collisions, since you’ve got thousands of signals with no control on them.”<sup>36</sup>

Gas pumps were out of order, stranding motorists who needed to refuel. “All the pumps run on electricity,” explained one station attendant, “When you think about it, everything runs on electricity.”<sup>37</sup>

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<sup>29</sup> Rich Connell, “Massive Power Outage Hits Seven Western States” Los Angeles Times (11 August 1996) p. 1.

<sup>30</sup> Robert Dintleman, “Western Power Failures Traced To Soaring Temperatures” All Things Considered, National Public Radio (11 August 1996) Transcript #2302-5.

<sup>31</sup> Rich Connell, “Massive Power Outage Hits Seven Western States” Los Angeles Times (11 August 1996) p. 1.

<sup>32</sup> Ray Delgado, “Huge Blackout Hits West Coast” San Francisco Examiner (11 August 1996) p. A1.

<sup>33</sup> Rich Connell, “Massive Power Outage Hits Seven Western States” Los Angeles Times (11 August 1996) p. 1.

<sup>34</sup> Ibid.

<sup>35</sup> Ray Delgado, “Huge Blackout Hits West Coast” San Francisco Examiner (11 August 1996) p. A1.

<sup>36</sup> Kim Boatman and Lori Aratani, “Millions Lose Power” San Jose Mercury News (11 August 1996) p. 1A.

<sup>37</sup> Marilyn Kalfus, Ana Menendez, and Julio Laboy, “Blackout Brings Much Of O.C. To A Halt” Orange County Register (11 August 1996) p. A1.

“Even a few hours without electricity caused chaos,” according to press reports:

*“Los Angeles police went on a citywide tactical alert as supervisors ordered some day shift officers to stay on duty into the night. Firefighters patrolled the city, responding to dozens of reports of stuck elevators. Department of Transportation crews checked on 4,000 intersections where the outage could have put traffic lights on the fritz. Blaring fire alarms and broken water lines added to the havoc.”*<sup>38</sup>

Communications were disrupted by the blackout.

“Radio stations reported power outages at locations throughout the midsection of California,” according to press reports, “In San Francisco, TV stations KPIX and KQED were off-line for some time due to the outage.”<sup>39</sup> Radio Station KNBR and the Canadian Broadcast Corporation went off the air.<sup>40</sup> Cable television networks crashed.<sup>41</sup>

Emergency medical services were disrupted by the blackout because “trauma rooms across the state [California] were cut off for hours from the radio that tells them an emergency is heading their way.”<sup>42</sup> Fire crews equipped with portable power generators were sent to doctors’ offices so the physicians could complete surgeries.<sup>43</sup> In Orange County, 200 fire units were dedicated to providing power to hospitals with emergency vehicles.<sup>44</sup>

The blackout disrupted control systems in some major industrial facilities.

For example, the Chevron refinery in Richmond, California, “was unable to control flues due to the outage,” releasing “huge clouds of black smoke.”<sup>45</sup> The blackout caused power plants throughout the west—“including nuclear plants near Central California’s Morro Bay and west of Phoenix”—to shut down.<sup>46</sup> The Diablo Canyon nuclear power plant, near San Luis Obispo, shut down, and required several days for technicians to complete safety checks before it could be started again.<sup>47</sup> The Bonneville Power Administration told the press, “All of the utilities are relying on each other, and it has a cascading effect when one part experiences a major failure.”<sup>48</sup>

### **The Great Ice Storm (January 1998)**

Starting on January 4<sup>th</sup> and for six days, until January 10, 1998, freezing rain fell across a 600-mile weather front that included parts of Ontario and Quebec in Canada and Maine and upstate New

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<sup>38</sup> Rich Connell, “Massive Power Outage Hits Seven Western States” Los Angeles Times (11 August 1996) p. 1.

<sup>39</sup> Ray Delgado, “Huge Blackout Hits West Coast” San Francisco Examiner (11 August 1996) p. A1.

<sup>40</sup> Kim Boatman and Lori Aratani, “Millions Lose Power” San Jose Mercury News (11 August 1996) p. 1A.

<sup>41</sup> Marilyn Kalfus et al., “Blackout Brings Much Of O.C. To A Halt” Orange County Register (11 August 1996) p. A1.

<sup>42</sup> Ibid.

<sup>43</sup> Douglas E. Beeman, “Hot West Goes Dim” The Press Enterprise (11 August 1996) p. A1.

<sup>44</sup> Jim Hill, “West Coast Power Outage Easing In Some Locations” CNN (10 August 1996) Transcript #1600-4.

<sup>45</sup> Ray Delgado, “Huge Blackout Hits West Coast” San Francisco Examiner (11 August 1996) p. A1.

<sup>46</sup> Douglas E. Beeman, “Hot West Goes Dim” The Press Enterprise (11 August 1996) p. A1.

<sup>47</sup> Tim Golden, “2nd Power Failure in 6 Weeks Creates Havoc for the West” New York Times (12 August 1996) p. 13.

<sup>48</sup> Ray Delgado, “Huge Blackout Hits West Coast” San Francisco Examiner (11 August 1996) p. A1.

York in the United States. Electric outages in the affected areas of Canada deprived 4.7 million people, or 16 percent of the Canadian population, of power, according to Emergency Preparedness Canada. In the United States, 546,000 people were without power (deprived of heat, light, and in many instances water) in the cold of mid-winter.<sup>49</sup>

Some of the 5.2 million people affected by the Great Ice Storm of 1998 went without power for five weeks. It was the greatest natural disaster in Canadian history, and generated more insurance claims than Hurricane Andrew, the costliest natural disaster in U.S. history.<sup>50</sup>

One historian of the Great Ice Storm notes that “the storm’s biggest impact was, in a sense, not weather-related: It was the loss of electricity”:

*“Ice accumulations caused the collapse of more than a thousand...transmission towers...More than 7,500 transformers stopped working....Some parts of Monteregie, a region of 1.3 million people southeast of Montreal, went without power for so long that the area became known as ‘the Dark Triangle.’”<sup>51</sup>*

The blackout caused an immediate and life-threatening emergency in Montreal’s water supply, that depended upon electricity for filtration and pumping. At 12:20 P.M. on January 9<sup>th</sup>, the two water filtration plants that served 1.5 million people in the Montreal region went down, leaving the area with only enough water to last 4 to 8 hours. Government officials kept the water crisis secret, fearing public knowledge would exacerbate the crisis by water hoarding. However:

*“Even as officials deliberated, water pipes in some households were already dry. As reports and rumors of a water shortage spread, consumption jumped by 10 percent anyway, and bottled water disappeared from stores.”<sup>52</sup>*

The Toronto Star, in an article entitled “Millions Shiver In Dark: How A Major City Is Being Crippled By Deadly Ice Storm,” reported that parts of Montreal had run out of water, “and those who still had it were warned not to drink tap water without boiling it first.”<sup>53</sup> But most people had no way of boiling water.

Officials feared not only a shortage of drinking water, but an inadequate supply of water for fighting fires. So desperate was the situation that Alain Michaud, Fire Chief of Montreal, prepared to fight fires with a demolition crane instead of water, hoping that “if a building caught fire, it might burn to the ground, but the crane would demolish neighboring structures to prevent the fire’s spread.”<sup>54</sup>

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<sup>49</sup> Eugene L. Lecomte, Alan W. Pang, and James W. Russell, *Ice Storm '98* (Institute for Business and Home Safety: December 1998) pp. 1-2.

<sup>50</sup> Jacques Leslie, “Powerless” *Wired* (April 1999) p. 120.

<sup>51</sup> *Ibid.*

<sup>52</sup> *Ibid.*, p. 176.

<sup>53</sup> Sandro Contenta, “Millions Shiver In Dark: How A Major City Is Being Crippled By Deadly Ice Storm” *Toronto Star* (10 January 1998) p. A1.

<sup>54</sup> Jacques Leslie, “Powerless” *Wired* (April 1999) p. 176.

By 9:30 P.M. on January 9<sup>th</sup>, one of Montreal's major reservoirs was nearly empty. Provincial officials considered evacuating the city. However, Hydro-Quebec, the government electric utility, managed to restore power to the filtration plants and restore water service.<sup>55</sup>

The blackout also threatened the food supply.

“Food poisoning has become a real threat as embattled Montrealers, unable to get to stores, eat food that has been kept too long in refrigerators that don't work.”<sup>56</sup> In upstate New York, the electric utility Niagra Mohawk announced that it was focusing restoration of electric power on more populated areas “so that supermarkets, gasoline stations and hotels could reopen, and people in the more rural areas could find food and shelter.”<sup>57</sup> New York State Electric and Gas helped customers get to shelters and distributed 200,000 pounds of dry ice for storing food.<sup>58</sup> One typical resident of Canada's “Dark Triangle” complained, “I've lost all my food...I melt ice for water. It's no way for a family to live.”<sup>59</sup>

Shelter, another basic necessity for survival, was also threatened by the mid-winter blackout.

“People without power discovered just how many facets of their lives depended on electricity. Their stoves, appliances, and heating didn't work.”<sup>60</sup> Many of Canada's newer, well-insulated homes relied on inexpensive electric heat.<sup>61</sup> Thousands of people fled their cold, dark homes to seek refuge in government and charitable shelters. The situation in Saint-Jean-sur-Richelieu, a working-class town of 36,000 was typical, where 3,600 people became shelter refugees, one-tenth of the population.<sup>62</sup> St. Hyacinthe in the “Dark Triangle” lost nearly half its residents, who mostly fled the city.<sup>63</sup> About 100,000 people took refuge in shelters.<sup>64</sup>

Communications, financial, and transportation infrastructures failed massively during the blackout.

In upstate New York, only French Canadian radio stations were still on the air. In Ontario, 50,000 telephones went dead, frustrating the electric utility from restoring power service, since it relied on customer phone calls to locate power failures. Credit cards and ATM machines became useless,

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<sup>55</sup> Ibid.

<sup>56</sup> Sandro Contenta, “Millions Shiver In Dark: How A Major City Is Being Crippled By Deadly Ice Storm” Toronto Star (10 January 1998) p. A1.

<sup>57</sup> “Monster Ice Storm Slays Transmission Facilities In Quebec, Upstate New York” Northeast Power Report (McGraw-Hill: 16 January 1998) p. 1.

<sup>58</sup> “Canada And New England Still Reeling” Electric Utility Week (19 January 1998) p. 1.

<sup>59</sup> Jack Beaudoin, “Quebec In Crisis” Portland Press Herald (8 February 1998) p. 45.

<sup>60</sup> Jacques Leslie, “Powerless” Wired (April 1999) p. 176.

<sup>61</sup> Jack Beaudoin, “Quebec In Crisis” Portland Press Herald (8 February 1998) p. 45.

<sup>62</sup> Jacques Leslie, “Powerless” Wired (April 1999) p. 178.

<sup>63</sup> Jack Beaudoin, “Quebec In Crisis” Portland Press Herald (8 February 1998) p. 45.

<sup>64</sup> Jacques Leslie, “Powerless” Wired (April 1999) p. 122.

so all financial transactions had to be in cash.<sup>65</sup> The blackout shut down Montreal's four subway lines for the first time in the system's 30-year history.<sup>66</sup>

Underscoring that the blackout, not the ice storm, was the real crisis, the Canadian Premier Lucien Bouchard declared that "the most urgent need" was for generators, and appealed to anyone in Canada with a generator to help.<sup>67</sup> Bouchard also appealed to the U.S. Federal Emergency Management Agency, "asking for beds and generators to provide shelters with heat and light."<sup>68</sup>

Hospitals in Canada and the United States were nearly overwhelmed with blackout victims. In Maine, where six out of ten residents lost power, a single hospital, in Lewiston, reported treating for carbon monoxide poisoning 120 people "who ran generators, kerosene heaters and even charcoal grills in their homes to keep warm."<sup>69</sup>

Hospital medical services underwent a crisis during the protracted blackout when their emergency generators failed. For example, at Montreal's LeMoyne Hospital:

*"The generators broke down on the sixth day, and the staff instantly switched to flashlights. For two hours until the generators were repaired, the hospital lost the use of its life-support and monitoring equipment: Nurses pumped air by hand into the lungs of patients on respirators and manually took each patient's pulse and blood pressure every 15 minutes. Instead of one nurse for each six patients, a ratio of at least one-to-one was needed."*<sup>70</sup>

The blackout indirectly caused hundreds of deaths in Canada and the U.S., according to Great Ice Storm historian Jacques Leslie. Leslie criticizes the official death toll figures as too low:

*"The official death toll was 45-28 fatalities in Canada, 17 in the U.S.—but those numbers understate the ice storm's effects. Hundreds of ill and elderly people, weakened by extended stays in shelters where flu became epidemic, died weeks or months later, succumbing to ailments they might otherwise have overcome."*<sup>71</sup>

Over a year after the Great Ice Storm ended, according to Jaques Leslie, "The people who experienced it remain aware of one overriding lesson: Their dependence on electricity makes them more vulnerable than they'd ever imagined."<sup>72</sup> Mark Abley, author of *The Ice Storm*, makes a similar observation:

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<sup>65</sup> Ibid, p. 176.

<sup>66</sup> Sandro Contenta, "Millions Shiver In Dark: How A Major City Is Being Crippled By Deadly Ice Storm" Toronto Star (10 January 1998) p. A1.

<sup>67</sup> Mark Dunn, "Ice Storm Holds Eastern Ontario In Its Beautiful But Deadly Grip" The Record (9 January 1998) p. A1.

<sup>68</sup> Sandro Contenta, "Millions Shiver In Dark: How A Major City Is Being Crippled By Deadly Ice Storm" Toronto Star (10 January 1998) p. A1.

<sup>69</sup> Peter Pochna and Abby Zimet, "Facing Down An Ice Storm" Portland Press Herald (18 January 1998), p. 1A.

<sup>70</sup> Jacques Leslie, "Powerless" Wired (April 1999) pp. 178, 180.

<sup>71</sup> Ibid, pp. 122-123.

<sup>72</sup> Ibid, p. 123.

*“Huddling in school gyms, church halls, shopping malls, and other shelters, the evacuees didn’t pray for a return of fine weather. They prayed for a return of power. The ice storm demonstrated not that we are prisoners of brutal weather, but that we are all now hostages to electricity.”*<sup>73</sup>

### **Ice Storm Washington, D.C. (14 January 1999)**

On January 14, 1999, an ice storm downed 250 high-voltage power lines in Washington D.C. and the neighboring suburbs in Maryland and Northern Virginia, causing what the Potomac Electric Power Company (PEPCO) described as “the worst power outage in the utility’s 102-year history.”<sup>74</sup> The blackout left 435,000 homes and businesses without power. Recovery took six days.<sup>75</sup>

Warm food, potentially a survival issue in the freezing winter conditions, was not available in most people’s homes because electric ovens and microwaves no longer worked. Most gas-powered ovens also would not work because those built since the mid-1980s have electronic ignition and cannot be lit with a match.<sup>76</sup> Some resorted to cooking on camp stoves. Preserving refrigerated foods was also a concern that PEPCO tried to help address by giving away 120,000 pounds of dry ice, all it had.<sup>77</sup> Dry ice became a precious commodity.<sup>78</sup>

The blackout crippled ground and rail transportation.

Gasoline pumps were rendered inoperable. Non-functioning traffic lights snarled traffic. Washington, D.C.’s Metro subway system was largely inoperable from stalled escalators and elevators, inoperable farecard machines, and closed subway stations. Arlington County motorcycle officers proved especially resourceful, borrowing portable generators from the public library system to help run traffic lights at four major intersections.<sup>79</sup>

A local television station, WETA-TV, went off the air for more than 10 hours because of the blackout.<sup>80</sup>

At least one hospital was blacked-out. Babies were born by flashlight.<sup>81</sup> Emergency medical services suffered to such an extent that patients requiring life support were put at risk, PEPCO admitted:

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<sup>73</sup> Ibid.

<sup>74</sup> Scott Wilson, “From Ice Storm To Firestorm” Washington Post (31 January 1999) p. A1. Manuel Perez-Rivas, “Six-Day Power Outage Is Over” Washington Post (21 January 1999) p. B1.

<sup>75</sup> Ibid.

<sup>76</sup> Phillip P. Pan and Spencer S. Hsu, “Without Power, Thousands Wait In Hotels, Malls And Cold Homes” Washington Post (17 January 1999) p. A1.

<sup>77</sup> Manuel Perez-Rivas, “Six-Day Power Outage Is Over” Washington Post (21 January 1999) p. B1.

<sup>78</sup> Scott Wilson, “From Ice Storm To Firestorm” Washington Post (31 January 1999) p. A1.

<sup>79</sup> Susan Levine and Tom Jackman, “Region Iced Over and Blacked Out” Washington Post (16 January 1999) p. A1.

<sup>80</sup> Ibid.

<sup>81</sup> Scott Wilson, “From Ice Storm To Firestorm” Washington Post (31 January 1999) p. A1.

*“The extent of damage caused by last week’s ice storm prevented PEPCO and other area utilities from giving priority to customers with serious medical conditions, including those on life-support systems or dialysis machines, company executives said yesterday.”*<sup>82</sup>

Ice storm-induced blackout in freezing conditions posed a threat to life. Hypothermia surged among the elderly, trapped in their unheated homes. People tried to stay warm by burning charcoal indoors, causing an increase in carbon monoxide poisoning and house fires:

*“At least a dozen houses...in Montgomery were damaged by fires caused by residents efforts to stay warm or cook...after burning charcoal indoors. More than a hundred people spent Friday night in emergency shelters...Hospitals reported an influx of elderly in their emergency rooms.”*<sup>83</sup>

In Maryland, the blackout moved Governor Parris Glendening to declare a state of emergency in six counties. The Governor activated the National Guard to assist firehouses.<sup>84</sup>

The power outage created a refugee population “of entire neighborhoods...searching for warmth and diversion at hotels, theaters, malls and even office towers.”<sup>85</sup> Thousands were “fleeing cold, dark homes,” according to press reports:

*“Across the area, but especially in Montgomery, hotels filled to capacity with customers fleeing cold, dark homes. The 365-room Doubletree Hotel on Rockville Pike was sold out by 8 a.m.. Residence Inn by Marriott, on Wisconsin Avenue in Bethesda, with 187 rooms, was sold out by noon.”*<sup>86</sup>

The blackout moved the Washington Post to observe that “daily life was crippled, if not halted—dramatically illustrating the fragile dependence of modern times on the flip of a switch.”<sup>87</sup>

### **Hurricane Floyd (September 1999)**

Expected to be a “killer storm” of rare power and destruction, when Hurricane Floyd made landfall near Cape Fear, North Carolina, on September 16, 1999, it had subsided into a tropical storm that inundated much of the east coast with heavy rainfall and flooding. But there was little of the destruction anticipated by Federal and State authorities that had prompted them to evacuate over 3 million people from the hurricane’s path.<sup>88</sup>

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<sup>82</sup> Scott Wilson, “Utilities Say Blackout Overwhelmed Medical Priorities” Washington Post (22 January 1999) p. B3.

<sup>83</sup> Phillip P. Pan and Spencer S. Hsu, “Without Power, Thousands Wait In Hotels, Malls And Cold Homes” Washington Post (17 January 1999) p. A1.

<sup>84</sup> Ibid

<sup>85</sup> Ibid.

<sup>86</sup> Ibid. Susan Levine and Tom Jackman, “Region Iced Over and Blacked Out” Washington Post (16 January 1999) p. A1.

<sup>87</sup> Ibid, Levine and Jackman.

<sup>88</sup> Brad Liston, Melissa August, Delphine Matthieussent, and Timothy Roche, “A Very Close Call” Time (27 September 1999) p. 34.

Floyd blacked-out electrical grids in many areas. However, the consequences of those blackouts for other infrastructures and for society are difficult to evaluate since blackouts tended to occur in areas where the population had already evacuated.

Blackouts interrupted phone service in North Carolina.<sup>89</sup> In Salisbury, North Carolina, more than 200 of 1,200 supermarkets were put out of operation by protracted blackouts, causing substantial food spoilage despite emergency efforts undertaken before the storm to preserve perishable goods in freezers.<sup>90</sup>

Most cable TV customers lost service in Baltimore due to blackout.

Floyd blackouts are notable for causing water treatment and sewage plants to fail in some Virginia localities and, most notably, in Baltimore. Blackout induced failure of Baltimore's Hampden sewage facility for several days raised concerns about a threat to public health. With its three pumps inoperable, Hampden spilled 24 million gallons of waste into Baltimore's Jones Falls waterway and the Inner Harbor.<sup>91</sup>

Perhaps Floyd's blackouts are most significant for complicating the largest evacuation and return of civilians in United States history. Electrical outages apparently prevented many from finding shelter—some traveled over 500 miles seeking accommodations, and found none. Blackout-induced failure of traffic signals contributed to some of the largest traffic jams in the nation's history as evacuees tried to return home. For example, one traffic jam on Interstate 10 from the Carolinas to Florida stretched 200 miles.<sup>92</sup>

### **Hurricane Lili (October 2002)**

Hurricane Lili struck the coast of Louisiana on October 3, 2002, coming ashore at Vermillion Bay, the eye of the storm centered on Abbeville about 90 minutes after landfall.<sup>93</sup> Lili knocked down 35 transmission lines and destroyed 53 electric power substations.<sup>94</sup> More than 500,000 people were without electric power at the height of the blackout, immediately after the storm.<sup>95</sup>

Three days later, on October 6, over 100,000 homes and businesses were still without power in coastal Louisiana, according to the state Office of Emergency Preparedness.<sup>96</sup> Six days after Lili, on October 9, in Abbeville and surrounding Vermillion Parish, an estimated 80 percent of the 20,000 homes and 50 percent of businesses were still without electricity.<sup>97</sup>

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<sup>89</sup> Amanda Milligan Hoffman and Sally Roberts, *Business Insurance* (Crain Communications: 1999).

<sup>90</sup> Ibid.

<sup>91</sup> Governors James Hunt and James Gilmore interviewed, "Hurricane Floyd Leaves Lingering Questions About Public Policy" CNN Crossfire (16 September 1999). Del Quentin Wilber, "Jones Falls Sewage Spill Lasts 2 Days" Baltimore Sun (19 September 1999) p. 1A.

<sup>92</sup> Brad Liston et al., "A Very Close Call" Time (27 September 1999) p. 34. Aaron Steckelberg, "Scenes From The Coast" Atlanta Constitution (16 September 1999) p. 10A.

<sup>93</sup> "Hurricane Lili" en.wikipedia.org.

<sup>94</sup> Angela Simoneaux, "Flooded, Battered La. Gets Busy Cleaning Up" Morning Advocate (5 October 2002) p. 1A.

<sup>95</sup> Angela Simoneaux, "Acadiana's Recovery" The Advocate (8 October 2002) p. 5B.

<sup>96</sup> Kevin McGill, "Rise Seen In Carbon Monoxide Poisoning Cases" The Advocate (7 October 2002) p. 2B.

<sup>97</sup> "Hurricane Lili" en.wikipedia.org. Leslie Williams, "One Town's Battle" Times-Picayune (9 October 2002) p. 1.

As a consequence of the blackout, water and food were unavailable through the normal means to thousands. With no electricity, water pumping stations no longer worked. In south Louisiana, 30 supermarkets would not open because the blackout prevented their cash registers from operating. Those grocery stores that did open were stripped of food within hours.

In Abbeville, the parking lots of shopping centers became watering and feeding stations run by churches and the state Office of Emergency Preparedness. Associated Grocers, that supplies food to supermarkets in Louisiana, Texas, and Mississippi, sent food and refrigerated trucks to the stricken area. The food emergency was reflected in a skyrocketing demand for dry ice to preserve food stuffs during the hot weather and to preserve refrigerated foods. Local supplies of dry ice were exhausted--one store selling 20,000 pounds of dry ice to hundreds of customers in two hours—and had to be supplemented with supplies from the Red Cross.<sup>98</sup>

The electrical outage deprived thousands of phone service for days after the Hurricane.<sup>99</sup> Television service was also blacked-out.<sup>100</sup>

Blackout interfered with transportation by rendering signal lights inoperable.<sup>101</sup> Street lights were also inoperable, making driving at night difficult even for long-time local residents, who could not see landmarks and became disoriented in the dark.<sup>102</sup>

Power grid collapse caused failure in other energy infrastructures. Without electricity, natural gas service could not be restored for several days after Lili.<sup>103</sup>

Hospitals were plunged into darkness during the blackout because they had no emergency generators or emergency power systems failed to work. There was no hot water for bathing patients or sterilization. “We have to give them medicines in the dark,” said one nurse, “We use a flashlight to make sure we don’t give them the wrong one.”<sup>104</sup>

Blackout caused indirectly some injuries and at least one death. Home generators used by people who lost power after Hurricane Lili led to more than 60 cases of carbon monoxide poisoning, including one fatality, according to Louisiana health officials.<sup>105</sup>

Officials and citizens considered the blackout the worst part of Hurricane Lili.

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<sup>98</sup> Angela Simoneaux, “Flooded, Battered La. Gets Busy Cleaning Up” *Morning Advocate* (5 October 2002) p. 1A. Angela Simoneaux, “Acadiana’s Recovery” *The Advocate* (8 October 2002) p. 5B. Suzan Manuel, “Lili Leaves Residents Powerless” *Daily Town Talk* (5 October 2002) p. 1A. Suzan Manuel, “Thousands Still Without Electricity Across Central La.” *Daily Town Talk* (6 October 2002) p. 8A.

<sup>99</sup> Kevin McGill, “Rise Seen In Carbon Monoxide Poisoning Cases” *The Advocate* (7 October 2002) p. 2B.

<sup>100</sup> Angela Simoneaux, “Acadiana’s Recovery” *The Advocate* (8 October 2002) p. 5B.

<sup>101</sup> Suzan Manuel, “Lili Leaves Residents Powerless” *Daily Town Talk* (5 October 2002) p. 1A.

<sup>102</sup> Leslie Williams, “One Town’s Battle” *Times-Picayune* (9 October 2002) p. 1.

<sup>103</sup> Kevin McGill, “Rise Seen In Carbon Monoxide Poisoning Cases” *The Advocate* (7 October 2002) p. 2B.

<sup>104</sup> Suzan Manuel, “Lili Leaves Residents Powerless” *Daily Town Talk* (5 October 2002) p. 1A.

<sup>105</sup> Kevin McGill, “Rise Seen In Carbon Monoxide Poisoning Cases” *The Advocate* (7 October 2002) p. 2B.

According to Mayor Chuck Butterfield, “We’ve taken electricity for granted and living without it for three or four days is devastating.”<sup>106</sup> Law enforcement officers blamed a surge of looting and vandalism on the blackout. The crime wave became bad enough to require the imposition of a dusk-to-dawn curfew and police reinforcements from neighboring areas unaffected by the storm. “The looting,” according to the Abbeville Sheriff’s Office, “Is not expected to go away until the lights come back on.”<sup>107</sup>

Recovery from the blackout, described by a CLECO electric utility spokesman as “the biggest customer outage event in our history,” depended heavily on outside assistance.<sup>108</sup> Some 14,000 electric utility workers from 24 states and the District of Columbia joined CLECO’s 3,000 workers to make recovery possible in about one week.<sup>109</sup>

### **Hurricane Katrina (August 2005)**

Hurricane Katrina was one of the deadliest hurricanes in U.S. history, causing over 1,800 deaths, and at the time was the costliest, inflicting \$125 billion in damages in August 2005, now tied in costly damage with Hurricane Harvey (2017). Katrina began as a tropical storm, strengthened into a hurricane when it impacted Florida on August 25, strengthened over the Gulf of Mexico into a Category 5, the most powerful class of hurricane, weakening to Category 3 when on August 29 it hit New Orleans and southeast Louisiana, Mississippi, and Alabama, turning these Gulf states into disaster areas.

Most of the deaths and damage from Hurricane Katrina resulted from immediate and protracted flooding:

*“Flooding, caused largely as a result of fatal engineering flaws in the flood protection system known as levees around the city of New Orleans, precipitated most of the loss of lives. Eventually, 80% of the city, as well as large tracts of neighboring parishes, were inundated for weeks. The flooding also destroyed most of New Orleans’ transportation and communication facilities, leaving tens of thousands of people who had not evacuated the city prior to landfall stranded with little access to food, shelter, or other basic necessities.”*<sup>110</sup>

Because flooding played such a dominant role inflicting deaths and damage on New Orleans and the Gulf States afflicted by Katrina, it is more difficult to assess the consequences of Katrina’s protracted blackout of electric power. However, since an EMP and cyber-attacks that collapse the electric grid would also blackout other life-sustaining critical infrastructures—including communications, transportation, and supply-chains for food and water—Katrina’s drowning of critical infrastructures still exemplifies the consequences to victim populations of critical infrastructure destruction, regardless of cause.

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<sup>106</sup> Suzan Manuel, “Lili Leaves Residents Powerless” Daily Town Talk (5 October 2002) p. 8A.

<sup>107</sup> Leslie Williams, “One Town’s Battle” Times-Picayune (9 October 2002) p. 1.

<sup>108</sup> Angela Simoneaux, “Flooded, Battered La. Gets Busy Cleaning Up” Morning Advocate (5 October 2002) p. 1A.

<sup>109</sup> Keith Darce, “Lights Blink Out All Over Louisiana,” Times-Picayune (4 October 2002), p. 1. “Lili Left Half A Million Without Power,” Associated Press (4 October 2002).

<sup>110</sup> “Hurricane Katrina” en.wikipedia.org.

Katrina blacked-out electric grids in Alabama, Florida, Louisiana, Mississippi, and Texas. Two weeks were required to restore electric power in Alabama and Florida. Much longer was required to restore electric power everywhere in Louisiana and Mississippi. Some localities remained in blackout for months.<sup>111</sup>

“By Sunday August 28, most of the infrastructure along the Gulf Coast had been shut down, including all freight and Amtrack rail service as well as the Waterford Nuclear Generating Station.”<sup>112</sup> After Katrina, restoration of electric power depended upon restoration of other critical infrastructures, such as communications, transportation, and emergency crew availability.<sup>113</sup> This would also be the case after an EMP or cyber-attack that blacks-out other critical infrastructures.<sup>114</sup>

The Katrina blackout was a major factor disrupting communications that had a debilitating effect on emergency rescue and recovery operations. Because of loss of electric power, according to a White House after-action report:

*“The storm debilitated 911 emergency call centers, disrupting local emergency services....Nearly 3 million customers lost telephone service. Broadcast communications, including 50 percent of area radio stations and 44 percent of area television stations, similarly were affected.”*<sup>115</sup>

“The complete devastation of the communications infrastructure left emergency responders and citizens without a reliable network across which they could coordinate,” according to the White House report.<sup>116</sup>

Katrina flooding in New Orleans drove thousands out of their homes, 12,000 initially seeking refuge in the Superdome and other Red Cross shelters, joined later by an additional 18,000 fleeing to the Superdome and 20,000 to the New Orleans Convention Center. None of these facilities had resources to support such numbers.<sup>117</sup> Likewise, an EMP or cyber-attack that blacks-out electric power to households would stop running water, appliances, heating and air conditioning, making homes uninhabitable, causing a refugee problem, as has been seen in other storm-induced blackouts.

The Katrina blackout certainly contributed to breakdown of law and order.

As soon as the lights went out, looting, robberies, rapes, and general anarchy engulfed New Orleans, even perhaps provoking lawless excessive violence by police. New Orleans Mayor, Ray

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<sup>111</sup>Department of Homeland Security, *Power Outage Incident Annex to the Response and Recovery Federal Interagency Operational Plans: Managing Cascading Impacts for a Long-Term Power Outage* (June 2017).

<sup>112</sup> “Hurricane Katrina” en.wikipedia.org.

<sup>113</sup> Ibid. Dorothy Reed, Mark Powell, and Julie Westerman, “Energy Supply System Performance for Hurricane Katrina” *Journal of Energy Engineering* (December 2010).

<sup>114</sup> EMP Commission, *Critical National Infrastructures* (2008).

<sup>115</sup> President George W. Bush, *Katrina Lessons Learned* (The White House) [www.georgewbush-whitehousearchives.gov](http://www.georgewbush-whitehousearchives.gov).

<sup>116</sup> Ibid.

<sup>117</sup> “Hurricane Katrina” en.wikipedia.org.

Nagin, ordered police: “Let’s stop the looting, let’s stop the lawlessness and let’s put our police officers on the streets so that our citizens are protected.”<sup>118</sup>

According to New Orleans Police Lieutenant David Benelli, the aftermath of Katrina was an unreal living nightmare: “We weren’t living in the real world, we were living in a holocaust. We were living in a situation that no other police department ever had to endure.”<sup>119</sup>

“They weren’t shooting looters. They were shooting at people who they thought were shooting at them...That is part of the information they had with respect to lawlessness in the city. People being shot and raped...The streets had been taken away by armed gangs,” according to Attorney Frank DeSalvo.<sup>120</sup>

Mass lawlessness continued in New Orleans after Katrina for about one month, until subdued by thousands of National Guard and Federal troops:

*“Some residents of New Orleans who remained in the city began looting stores. Many were in search of food and water that were not available to them through other means, as well as non-essential items. Additionally, there were reports of carjacking, murders, thefts, and rapes in New Orleans...Thousands of National Guard and federal troops were mobilized and sent to Louisiana, with 7,841 in the area on August 29, to a maximum of 46,838 on September 10.”*<sup>121</sup>

Louisiana Governor Kathleen Blanco warned criminals: “They have M16s and are locked and loaded. These troops know how to shoot and kill and I expect they will.” According to Congressman Bill Jefferson: “There was shooting going on. There was sniping going on. Over the first week of September, law and order were gradually restored to the city.”<sup>122</sup>

Lawlessness in New Orleans after Katrina was so widespread and extreme that controversy still rages today, including what may be “denial behavior” by some academics who blame police violence and justify law-breaking. Five years after Katrina, legal scholar Casey Faucon described one local example of anarchy in New Orleans that she attempts through complex legal and philosophical reasoning to justify:

*“New Orleans was in chaos. Media reports of people vandalizing and looting stores portrayed the image that the city had disintegrated into a state of anarchy. Looters ransacked the shops at Canal Place, burned parts of Saks Fifth Avenue, and took roughly \$250,000 of liquor, cigarettes and candy from three convenience stores.”*<sup>123</sup>

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<sup>118</sup> Sabrina Shankman et al., “After Katrina, New Orleans Cops Were Told They Could Shoot Looters” Propublica (July 24, 2012).

<sup>119</sup> Ibid.

<sup>120</sup> Ibid.

<sup>121</sup> “Hurricane Katrina” en.wikipedia.org.

<sup>122</sup> Ibid.

<sup>123</sup> Casey Faucon, “The Suspense Theory: Hurricane Katrina Looting, Property Rights, and Personhood” Louisiana Law Review (Summer 2010).

Recovery of New Orleans and the Gulf States took many months, significantly slowed by disruption of critical infrastructures including electric power. Ten years after Katrina, by August 2015, parts of the city were still unrecovered, and may never recover because of a massive refugee exodus to other States affecting “not only New Orleans but the entire country, rivaled only by the Great Migration of African Americans in the first half of the 20<sup>th</sup> Century and the mass migration of the 1930s as a result of the Great Depression...The effects of this migration are likely to endure for decades.”<sup>124</sup>

Despite massive aid from the U.S. Government and emergency workers from all 50 States to rescue and recover New Orleans and the Gulf region from Katrina, President George W. Bush, Louisiana Governor Kathleen Blanco, New Orleans Mayor Ray Nagin and others came under media and public criticism. FEMA Director Michael Brown was forced to resign.

Consequently, President Bush and the Congress enacted “Katrina Reforms” that recognized the centrality to disaster preparedness of protecting and recovering critical infrastructures. According to the White House report *Katrina Lessons Learned*:

*“The Department of Homeland Security, working collaboratively with the private sector, should revise the National Response Plan and finalize the Interim National Infrastructure Protection Plan to be able to rapidly assess the impact of a disaster on critical infrastructure. We must use this knowledge to inform Federal response and prioritization decisions and to support infrastructure restoration in order to save lives and mitigate the impact of the disaster on the Nation.”*<sup>125</sup>

But subsequent natural disasters from severe weather indicate that the lessons of Hurricane Katrina have not been learned, especially regarding protection and recovery of the electric power grid.

### **Hurricane Sandy (October 2012)**

Hurricane Sandy was the strongest, most destructive, and deadliest storm of 2012. Sandy wreaked \$70 billion in damage across eight countries from the Caribbean to Canada and killed 233 people in eight countries.<sup>126</sup> This analysis shall focus on the consequences of the storm-induced electric power blackout by Hurricane Sandy in the United States.

Sandy peaked as a Category 3 hurricane when it made landfall in Cuba, weakened to Category 2 when it arrived off the northeastern coast of the United States, weakening further to Category 1, the weakest class of hurricane, when on October 29 it hit New Jersey and New York. 24 States were impacted by Sandy, which destroyed thousands of homes, mostly in New York and New Jersey, killed 160 people in the U.S., and left over 6 million without electric power.<sup>127</sup>

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<sup>124</sup> “Hurricane Katrina” en.wikipedia.org.

<sup>125</sup> President George W. Bush, *Katrina Lessons Learned* (The White House) [www.georgewbush-whitehousearchives.gov](http://www.georgewbush-whitehousearchives.gov).

<sup>126</sup> “Hurricane Sandy” en.wikipedia.org. M. Diakakis et al., “Hurricane Sandy Mortality in the Caribbean and Continental North America” *Disaster Prevention and Management* (2015).

<sup>127</sup> Ibid.

As a result of the Katrina reforms in emergency preparedness, Federal and State emergency services and the electric utilities “attempted to head off long-term power failures Sandy might cause”:

*“Utilities and governments along the East Coast attempted to head off the long-term power failures Sandy might cause. Power companies from the Southeast to New England alerted independent contractors to be ready to help repair storm damaged equipment quickly and asked employees to cancel vacations and work longer hours....Through regional offices in Atlanta, Philadelphia, New York City, and Boston, the Federal Emergency Management Agency (FEMA) monitored Sandy...President Obama signed emergency declarations on October 28 for several states expected to be impacted by Sandy, allowing them to request federal aid and make additional preparations in advance of the storm...In addition, the National Guard and U.S. Air Force put as many as 45,000 personnel in at least seven states on alert for possible duty in response to the preparations and aftermath of Sandy.”<sup>128</sup>*

Moreover:

*“More than 1,500 FEMA personnel were along the East Coast working to support disaster preparedness and response operations, including search and rescue, situational awareness, communications and logistical support. In addition, 28 teams containing 294 FEMA Corps members were pre-staged to support Sandy responders. Three federal urban search and rescue task forces were positioned in the mid-Atlantic and ready to deploy as needed. Direct Relief provided medical supplies to community clinics, non-profit health centers, and other groups in areas affected by Hurricane Sandy, and mapped pharmacies, gas stations, and other facilities that remained in the New York City area despite power outages...the American Red Cross announced they had 4,000 disaster workers across storm-damaged areas.”<sup>129</sup>*

Emergency preparedness reforms enacted in response to Katrina, a Category 3 hurricane, do not appear to have made much difference in preventing and recovering from protracted blackout of electric power during and after Sandy, a much less powerful Category 1 hurricane. Unlike Katrina, where flooding was the chief destructive factor, while there was partial flooding of New York City subways and other flood damage, the most disruptive consequences of Sandy to critical infrastructures and social order can be directly attributed to protracted electric power blackout.

The Sandy electric power blackout affected 15 States and Washington, D.C.. States blacked-out worst were New Jersey (2,040,195), New York (1,933,147), Pennsylvania (852,458), and Connecticut (486,927).<sup>130</sup> System-generated overvoltages from downed powerlines destroyed some transformers, their spectacular electric explosions, visible for miles, recorded by frightened

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<sup>128</sup> “Hurricane Sandy” en.wikipedia.org. Jason Samenow, “Cause for Concern: The 7 Most Alarming Hurricane Sandy Images” Washington Post (28 October 2012). Lars Anderson, “Closely Monitoring Hurricane Sandy” Federal Emergency Management Agency (25 October 2012). “It’s Watch and Wait as Hurricane Sandy Approaches” News.Blog.CNN.Com (28 October 2012). Brian Sullivan and Dan Hart, “Hurricane Sandy Barrels Northward, May Hit New Jersey” Bloomberg (28 October 2012).

<sup>129</sup> “Hurricane Sandy” en.wikipedia.org. “Vicious Superstorm Sandy Smashes Northeast Cities” Newswire.com (30 October 2012). “Storm Aftermath: Live Updates” New York Times (2 November 2012). “Hurricane Sandy Relief” Direct Relief (5 April 2018).

<sup>130</sup> “Hurricane Sandy” en.wikipedia.org.

Sandy victims in New Jersey.<sup>131</sup> Blackouts were most protracted in New Jersey and New York, the power outages disrupting critical infrastructures and slowing recovery so that, months later, thousands were still refugees in homeless shelters.<sup>132</sup>

Sandy's cost in lost economic activity is estimated at \$30-50 billion due to "massive power outages, liquid fuel shortages, and a near shutdown of transportation" the latter two factors also attributable to "massive power outages":

*"The destruction of physical infrastructure as a result of Sandy cost impacted states, including New York and New Jersey, tens of billions of dollars. EQECAT, a risk-modeling company that focuses on catastrophes, approximated that impacted regions lost between \$30 billion to \$50 billion in economic activity. The economic loss was attributed to the massive power outages, liquid fuel shortages, and a near shutdown of the region's transportation system."*<sup>133</sup>

Hurricane Sandy's disruption of key critical infrastructures is briefly summarized below:

--*"Energy: Roughly 8.5 million customers were impacted due to power outages, including many businesses that were hard pressed to deliver products and services in a timely manner. Breaks in gas lines also caused fires in many locations, prompting explosions...Locating gas and diesel fuel proved difficult...which harmed transportation...The shortage of fuel held up first responders as well as other response and recovery officials. Therefore, portable generators remained unutilized, resulting in long lines at fueling stations while individuals were unable to differentiate between stations that did not [have] power from the gas stations that were operational."*

--*"Communications: Telecommunications infrastructure was heavily disrupted, impacting millions of people and thousands of businesses, destabilizing the economy of one of the biggest cities in the world. The Federal Communications Commission (FCC) found that roughly 25% of cell towers across 10 states were out of service at the height of the storm."*

--*"Transportation: Throughout the history of the country, the nation had not witnessed a worst disaster for public transit systems, including buses, subway, and commuter rail..."*

--*"Stormwater Management and Wastewater Treatment Systems: There was a massive failure in wastewater treatment facilities all around the mid-Atlantic coast due to floodwaters, large storm runoff, wind damage, and electricity loss. The region's waterways were hit with billions of gallons of raw and partially treated sewage, adversely affecting the health of the public...There was also a public health concern about the threat of contaminated water filling the pipes and wells that supplied potable water to large parts of the region. Large water utility companies experienced power outages, disrupting their ability to provide safe drinking water."*<sup>134</sup>

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<sup>131</sup> For example "Hurricane Sandy Jersey City Transformer Explosion" [www.youtube.com](http://www.youtube.com).

<sup>132</sup> "Tens Of Thousands Still Homeless Six Months After Hurricane Sandy As Some Areas Will Take Years To Fully Recover" U.K. Daily Mail (27 April 2013).

<sup>133</sup> "Hurricane Sandy" en.wikipedia.org. EQECAT, "Post-Landfall Loss Estimates—Hurricane Sandy" (1 November 2012).

<sup>134</sup> "Hurricane Sandy" en.wikipedia.org. *Tropical Cyclone Report: Hurricane Sandy* National Hurricane Center (12 February 2013). David Turetsky, "NENA 2013 Conference & Expo Charlotte" Federal Communications Commission

The aftermath of Hurricane Sandy resembles Hurricane Katrina in the breakdown of social order, struggle to find food and water, and lawlessness in many localities due to collapse of critical infrastructures caused chiefly by protracted blackout of electric power. Vignettes below from Long Island describe the crisis one week after Sandy:

--Headline: *“Residents say...lack of power and law enforcement means more looting and violent crime.”*

--Headline: *“Those in stricken areas stockpiling weapons like kitchen knives, machetes, and bats to protect themselves.”*

--Headline: *“Coney Island residents say they are forced to ‘scavenge for food like animals.’”*

--*“It is chaos, it is pandemonium out here. It seems like nobody has any answers. I feel like a victim of Hurricane Katrina. I never thought it could happen here in New York, but it’s happened.”*

--*“With little police presence on the storm-ravaged streets, many residents...have been forced to take protection in their own hands with guns, baseball bats and even bows and arrows to ward off thugs seeking to loot their homes.”*

--*“It’s like the Wild West.”*

--*“Along with mounting safety concerns, homeowners...face hunger, complaining that federal officials have left them to fend for themselves.”*

--There is *“anger and resentment over continued lack of power and gas...Crooks have been disguising themselves as Long Island Power Authority workers and coming by homes...in the middle of the night while real utility workers are nowhere to be found.”*<sup>135</sup>

City Councilman James Sanders warned that lawlessness and anarchy would worsen because of the failure of the Long Island Power Authority (LIPA) to recover from the blackout and restore electric power: *“We have an explosive mix here. People will take matters into their own hands...LIPA has failed the people.”*<sup>136</sup>

New York State Governor, Andrew Cuomo, on November 28, about one month after Sandy, called the storm *“more impactful”* than Hurricane Katrina.<sup>137</sup>

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(18 June 2013). Peter Rogoff, “Testimony before the Senate Banking, Housing, and Urban Affairs Committee, Subcommittee on Housing, Transportation, and Community Development” Federal Transit Association (20 December 2012). “Sewage Overflows From Hurricane Sandy” Climate Central (1 April 2018). “Christie Administration Advises Residents To Be Alert For Local Boil Water Advisories” State of New Jersey Environmental Protection Agency (31 October 2012).

<sup>135</sup> Rachel Rickard Straus and Snejana Faberov, “Misery For 2.5 Million Still Without Power After Six Days As Lawlessness And Fear Take Over New York’s Outer Boroughs” U.K. Daily Mail (3 November 2012).

<sup>136</sup> Ibid.

<sup>137</sup> “Hurricane Sandy” en.wikipedia.org. Thomas Kaplan and Raymond Hernandez, “Cuomo, In Aid Appeal, Cites Broad Reach Of Storm” New York Times (2 December 2012).

## Hurricane Harvey (August 2017)

Hurricane Harvey allegedly ties with Katrina as the most damaging hurricane measured in cost (\$125 billion), although expert opinion differs, some arguing that the estimated cost of Harvey is overstated relative to Katrina because of inflation. Harvey caused catastrophic flooding and 106 deaths in the United States.<sup>138</sup>

Hurricane Harvey hit Texas on August 25, 2017, at San Jose Island as a Category 4, weakening to a Category 3 after making a second landfall in Texas at Holiday Beach, then rapidly weakening to a tropical storm, stalling near the coast to dump record amounts of rain, before making a final landfall on August 29 in Louisiana. Harvey broke the record for the most rainfall of any tropical system to make landfall in the U.S. and was the deadliest storm to hit Texas since 1919.<sup>139</sup>

According to the U.S. Energy Information Administration:

*“Hurricane Harvey caused substantial electricity outages, as power plants and transmission infrastructures—particularly in south Texas and along the Gulf Coast—were affected by high winds and significant flooding. At its peak, more than 10,000 megawatts (MW) of electricity generating capacity in the Electric Reliability Council of Texas (ERCOT) grid and a substantial number of transmission and distribution lines experienced forced outages. At the same time, relatively cool temperatures across much of Texas also reduced electricity demand.”*<sup>140</sup>

Moreover:

*“Power plant outages were largely caused by rain or flooding affecting generator fuel supplies, outages of transmission infrastructure connecting generators to the grid, and personnel not being able to reach generating facilities. Hundreds of high-voltage transmission lines, including six 345 kilovolt (kV) lines and more than two hundred 69 (kV)-138 (kV) lines experienced storm-related forced outages. Most of these transmission facilities were located in the immediate area along the Gulf Coast of Texas where the hurricane made landfall, but some were in the Houston area, where transmission facilities were damaged by flooding.”*<sup>141</sup>

336,000 people in Texas had no electricity and many thousands were left homeless by storm damage, flooding, and the blackout, requiring rescue. Some 32,000 refugees from Harvey were relocated to emergency shelters. Over 210,000 victims registered with FEMA for disaster assistance.<sup>142</sup>

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<sup>138</sup> “Hurricane Harvey” en.wikipedia.org.

<sup>139</sup> Ibid. National Hurricane Center, *Tropical Cyclone Report—Hurricane Harvey* (National Oceanic and Atmospheric Administration and National Weather Service, 9 May 2018). “12 Exceptional Facts From Official Hurricane Harvey Report” [www.theweathernetwork.com](http://www.theweathernetwork.com).

<sup>140</sup> U.S. Energy Information Administration, “Hurricane Harvey Caused Electric System Outages and Affected Wind Generation in Texas” *Today In Energy* (13 September 2017).

<sup>141</sup> Ibid.

<sup>142</sup> “Hurricane Harvey” en.wikipedia.org.

Texas Governor Greg Abbott declared a state of emergency for 50 counties. Governor Abbott mobilized the entire 12,000 troops of the Texas National Guard, which was joined by National Guard units from many other States, including: Alaska, California, Connecticut, Florida, Kentucky, New York, Oregon, Utah, Nebraska, and North Carolina.<sup>143</sup>

Louisiana Governor John Bel Edwards declared a state-wide emergency, ordered mandatory evacuations, and mobilized the National Guard for rescue and recovery made necessary by flooding. By far the locus of Harvey's damage was in Texas.

In Texas, Houston Mayor, Sylvester Turner, ordered a curfew to prevent looting.<sup>144</sup>

Lawlessness and looting happened in the aftermath of Hurricane Harvey, as after other hurricanes and natural disasters. But Harvey may be notable as the first case where "political correctness" within the national press corps imposed a "news blackout" or had a chilling effect on reporting looting and lawlessness.

For example, an ABC News reporter was widely condemned, who accurately reported acts of looting and notified police, for allegedly promoting "racism." TV commentator Tucker Carlson was falsely accused of "racism" for accurately reporting on looting in the aftermath of Hurricane Harvey. The Washington Post ran a story claiming that looting and lawlessness are often exaggerated after natural disasters because of racial stereotypes. A "cottage industry" appears to have grown-up dedicated to denying acts of looting and lawlessness or justifying such behavior.<sup>145</sup>

According to the usually accurate Houston Press, Houston police arrested 200 for looting and arrested or cited 338 others for illegal behavior in the immediate aftermath of Hurricane Harvey.<sup>146</sup>

Perhaps the greatest significance of Hurricane Harvey from a national security perspective are the many examples of how a protracted electric power outage can cripple other critical infrastructures and threaten mass destruction. For example, as a consequence of the Texas blackout, drinking water was widely unavailable, oil refinery production was so reduced that fuel shortages arose and national gas prices spiked, and enormous chemical plant explosions threatened residents within a radius of 1.5 miles necessitating evacuations:

*--"Energy production in the Gulf of Mexico declined in the wake of Harvey by approximately 21%...Many energy-related ports and terminals closed...About 2.25 million bpd of refining capacity was offline for several days; that is about 12% of total U.S. capacity...Due to the shutdown in refineries, gas prices did see an increase nationwide...the spike brought the highest gas prices in two years."*

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<sup>143</sup> Ibid. Steve Marshall, "Guard Units From Other States Join Harvey Response in Texas" [www.defense.gov](http://www.defense.gov) (Department of Defense: 29 August 2017).

<sup>144</sup> "Hurricane Harvey" [en.wikipedia.org](http://en.wikipedia.org).

<sup>145</sup> Maxwell Tani, "ABC News Reporter Covering Hurricane Harvey Gets Slammed Online After Reporting Alleged Looters o Police" [www.businessinsider.com](http://www.businessinsider.com) (29 August 2017). Melanie Schmitz, "The History Behind the Racist 'Looting' Narrative" [archive.thinkprogress.org](http://archive.thinkprogress.org). W. Joseph Campbell, "How the Media Got Hurricane Harvey Right" [www.poynter.org](http://www.poynter.org). "Looting Rumors and Fear of Crime Often Exaggerated After Natural Disasters" Washington Post (2 September 2017).

<sup>146</sup> Stephen Paulson, "A Look At The Looting of Hurricane Harvey" [www.houstonpress.org](http://www.houstonpress.org) (23 October 2017).

--In Texas, “Hurricane Harvey created a fuel shortage. Panicked motorists waited in long lines. Consequently, gas stations through[out] the state were forced to close due to the rush.”

--“On August 30, the CEO of Arkema warned one of its chemical plants in Crosby, Texas, could explode or be subject to intense fire due to the loss of ‘critical refrigeration’ of materials. All workers at the facility and residents within 1.5 mi (2.4 km) were evacuated. Eight of the plant’s nine refrigeration units failed without power, enabling the stored chemicals to decompose and become combustible. Two explosions occurred around 2:00 AM on August 31; 21 emergency personnel were briefly hospitalized.”<sup>147</sup>

“During and after Hurricane Harvey, a chemical plant suffered repeated explosions. Because the power went out. Beaumont, Texas was without drinking water. Because the power went out. Gasoline prices across the nation have spiked, thanks to oil refineries going off line. Because the power went out...North Korea’s dictator Kim Jong Un, has explicitly threatened to destroy the rest of the U.S. electricity infrastructure with an electromagnetic pulse (EMP) attack...The conclusion made plain by such developments from the recent past and immediate future is that the most critical of all critical infrastructures—the nation’s bulk power distribution system, better known as the grid—is not resilient. Indeed, it is dangerously vulnerable to both naturally occurring disasters and deliberate enemy action.”—Secure the Grid Coalition.<sup>148</sup>

### **California Wildfires (2019) and Texas Ice Storm (2021)**

Severe weather in 2019 and 2021 spotlighted that major electric utilities are so neglectful of electric grid security and public safety that the nation’s electric utilities cannot be trusted to protect the American people from far more sophisticated and dangerous threats from foreign adversaries—like EMP and Cyber Warfare. Hundreds died in California wildfires and a Texas ice storm because of negligence by electric utilities and their Federal and State “regulators.”

#### ***California Wildfires***

California’s chief electric utilities— Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E)—failed to make basic commonsense upgrades to infrastructure, like replacing aged powerline towers that could collapse and cause fires. They failed to undertake obvious commonsense “vegetation management” safety precautions, like removing trees that could down powerlines and start fires.<sup>149</sup>

Regulators, including the U.S. Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Corporation (NERC), and the California Public Utilities Commission, are complicit in this lethal negligence.<sup>150</sup>

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<sup>147</sup> “Hurricane Harvey” en.wikipedia.org. “Harvey Aftershock: Chemical Plant Near Houston Could Explode, CEO Says” Fox News (30 August 2017). “Harvey Live Updates: In Crosby, Texas, Blasts at a Chemical Plant and More Are Feared” New York Times (31 August 2017).

<sup>148</sup> “The Blackout Next Time” securethegrid.com (12 September 2017).

<sup>149</sup> “2019 California Power Shutoffs” en.wikipedia.org.

<sup>150</sup> “The Lesson of California’s Wildfires” Washington Times (2 November 2019).

Consequently, when high-winds hit California, downing powerlines, electric arcing ignited massive forest fires (7,860 fires), burning 259,823 acres, destroying thousands of homes. California electric utilities deliberately engineered rolling blackouts as a “strategy” to reduce likelihood that powerlines downed by high winds would cause more fires, seeking to contain the wildfire crisis.<sup>151</sup>

During October-November 2019, California’s rolling blackouts affected 3 million, contributing to chaos caused by deadly wildfires consuming entire forests and neighborhoods. While millions of Californians endured periodic rolling blackouts, sometimes lasting days—inflicted on purpose by electric utilities—over 25 million were in “red flag” areas endangered by wildfires.<sup>152</sup>

The deliberately engineered rolling blackouts impeded first responders, and civilians trying to survive or escape, by stopping running water, degrading communications and fuel availability for vehicles, and causing other significant problems.

California Governor Gavin Newsom condemned PG&E for “greed and neglect.” People “can’t even access water or medical supplies.”<sup>153</sup>

But Newsom compelled utilities to invest billions in “green energy” to combat climate change—short-changing public safety. Nor did Newsom’s California Public Utilities Commission require electric utilities to protect the grid from high-winds and tree falls.

A San Jose Mercury News editorial rightly protested: “Northern California is not a third world country. It’s unacceptable that the region is being forced to endure this level of disruption as the long-term strategy for dealing with the threat of wildfires.”<sup>154</sup>

PG&E barricaded its San Francisco headquarters against angry customers.<sup>155</sup>

California electric utilities deserve condemnation, not only for the wildfire crisis, but for a long history of neglecting basic public safety before 2019. Six years earlier, a 2013 report to the California Public Utilities Commission warned: “Several aspects of the PG&E distribution system present significant safety issues.”<sup>156</sup>

In 2015, powerlines caused a fire in Butte that killed two.<sup>157</sup>

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<sup>151</sup> Ibid.

<sup>152</sup> Ibid. CNN Wire, “Over 25 Million People Are Under Red Flag Warnings in California as Fires Burn Across State” [pix11.com](http://pix11.com) (29 October 2019).

<sup>153</sup> Julie Makinen and Gabrielle Canon, “California Governor Slams PG&E, Saying ‘Greed,’ ‘Mismanagement’ Led To Widespread Power Cuts” USA Today (10 October 2019).

<sup>154</sup> “California Wildfire Spreads As Fears Mount Over Further Power Shutoffs” [www.theguardian.com](http://www.theguardian.com) (11 October 2019).

<sup>155</sup> Ibid.

<sup>156</sup> “California Power Company Caused Wildfire That Killed 85, Investigation Finds” [www.theguardian.com](http://www.theguardian.com) (15 May 2019).

<sup>157</sup> Ibid.

In 2017, a powerline tower built in the 1920s, long past safe service life, collapsed causing a wildfire that destroyed 5,000 homes in Santa Rosa and killed two dozen.<sup>158</sup>

In 2018, powerlines started a huge wildfire that consumed the town of Paradise and killed 85.<sup>159</sup>

PG&E's response to its worsening record of public safety was typical of the other utilities. Instead of stopping mismanagement and launching a crash program to fix grid infrastructure, PG&E filed for bankruptcy to escape liability for billions of dollars in damages inflicted on Californians.<sup>160</sup>

### ***Texas Ice Storm***

In February 2021, Winter Storm Uri swept across the Midwest, causing an ice storm over most of Texas, dumping 3-6 inches of snow on San Antonio on February 15, and plunging the State into unusually low temperatures. Electricity demand for heating soared, while about 25% of the State's electric power from windmills and solar went offline, crippled by the ice storm, as were some other sources of electric power unprepared for freezing weather.<sup>161</sup>

The Electric Reliability Council Of Texas (ERCOT) authorized rolling blackouts by utilities to prevent a disaster from becoming a prolonged catastrophic blackout, admitting: "Texas was seconds and minutes away from catastrophic months long blackout."<sup>162</sup>

Over one hundred froze to death and massive property damage resulted because FERC, NERC, and ERCOT failed to require electric utilities to take simple commonsense precautions, like insulation and heating of key grid equipment, to sustain operations during severe cold and winter conditions.

The Biden Administration claims the ice storm that crippled the Texas electric grid, causing state-wide rolling blackouts, depriving water and heat to millions, inflicting property damage and deaths, is a harbinger of catastrophic climate change.<sup>163</sup> If true, so-called "green energy" windmills and solar panels, alleged solutions to climate change, proved most vulnerable to the challenge of an unusual, but not unprecedented, Texas ice storm. Nuclear and coal-fired power plants were least affected.<sup>164</sup>

Climate change is not the cause of what may be remembered as the "great Texas blackout of 2021" which is really the result of politics.

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<sup>158</sup> Ibid.

<sup>159</sup> Ibid.

<sup>160</sup> "PG&E, Facing Massive Wildfire Liabilities, Seeks Bankruptcy Protection" [www.cbsnews.com](http://www.cbsnews.com) (14 January 2019).

<sup>161</sup> U.S. Energy Information Administration, "Texas (TEX) Region Electricity Generation By Energy Source (2/12/2021-2/19/2021). Bryan Preston, "Did Wind Power Fall Hard During the Great Texas Storm?" [pjmedia.com](http://pjmedia.com) (19 February 2021).

<sup>162</sup> Erin Douglas, "Texas Was 'Seconds and Minutes' Away From Catastrophic Months Long Blackouts, Officials Say" [Texas Tribune](http://TexasTribune.com) (18 February 2021).

<sup>163</sup> Joey Garrison, "'Climate Change Is Real': Biden Administration Says Texas Crisis Shows U.S. Unprepared for Extreme Weather" [azcentral.com](http://azcentral.com) (18 February 2021).

<sup>164</sup> U.S. Energy Information Administration, "Texas (TEX) Region Electricity Generation By Energy Source (2/12/2021-2/19/2021). Bryan Preston, "Did Wind Power Fall Hard During the Great Texas Storm?" [pjmedia.com](http://pjmedia.com) (19 February 2021).

In 2017 the EMP Commission warned: “Current institutional arrangements for protecting and improving the reliability of the electric grids...has proven to be ineffectual” because the “power industry is largely self-regulated.”<sup>165</sup>

An excellent study by Jeffrey Ball concludes: “Those in charge of Texas’s deregulated power sector were warned again and again that the electric grid was vulnerable.”<sup>166</sup> Moreover, while ERCOT and Texas utilities tried to blame their self-inflicted disaster on unusually severe winter weather, while unusual, the ice storm was not unprecedented. Ball notes that almost exactly 10 years earlier: “In February 2011, an ice storm struck the State, crippling power plants and forcing rolling blackouts.”<sup>167</sup>

On February 16, 2021, more than 4.5 million in Texas were without power, amidst freezing temperatures.<sup>168</sup>

Nationwide, Winter Storm Uri’s blackout of Texas and other States inflicted damage estimated at \$200 billion or higher, costing more than Hurricanes Harvey and Ike:

*“As winter storms swept across much of the country last week, they shuttered oil and gas production, food processing facilities and manufacturing plants while plunging millions of people into darkness for days on end. Now many homeowners are dealing with burst pipes and other property damage...The Perryman Group, a Texas-based economic research firm, projected that Winter Storm Uri could end up costing a total of \$195 billion on the low end and as much as \$295 billion. Those figures include lost income as well as long-term reduction in economic output.”<sup>169</sup>*

### **Intelligence Treasure Trove**

The history of storm-induced electric power blackouts that collapse other critical infrastructures and sow societal chaos, and the long record of inadequate preparation and response by Federal and State governments and electric utilities, is for potential adversaries planning EMP and Cyber Warfare an intelligence treasure trove:

- The record confirms that severe weather can cause disastrous blackouts of electric power grids that can be widened and worsened by EMP and Cyber Warfare.
- The record confirms that electric grid blackouts collapse other critical infrastructures and can cause societal breakdown, which can be widened and worsened by EMP and Cyber Warfare.
- Particulars of failures, mistakes, and systemic weaknesses in emergency planning and response by Federal and State governments and electric utilities (which faults never seem to get corrected)

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<sup>165</sup> EMP Commission, *Chairman’s Report* (2017).

<sup>166</sup> Jeffrey Ball, “The Texas Blackout Is The Story Of A Disaster Foretold” [www.texasmonthly.com](http://www.texasmonthly.com) (19 February 2021).

<sup>167</sup> *Ibid.*

<sup>168</sup> *Ibid.*

<sup>169</sup> Irina Ivanova, “Texas Winter Storm Costs Could Top \$200 Billion—More Than Hurricanes Harvey And Ike” [www.cbsnews.com](http://www.cbsnews.com) (25 February 2021).

are detailed after every major hurricane in unclassified reports by the U.S. Government Accountability Office.<sup>170</sup>

--The record proves that the U.S. Government strategy relying on the electric utilities to protect themselves from EMP and Cyber Warfare is doomed to fail.

This history of neglected public safety happened despite electric utilities being regulated by the U.S. Federal Energy Regulatory Commission (FERC) and North American Electric Reliability Corporation (NERC), the latter basically an industry lobby funded by utilities. Most recently, as described earlier, Federal and State “regulators” allowed electric utilities to cause deadly California wildfires in 2019 and an ice age in Texas in 2021, getting away with murder.

The EMP Commission *Chairman’s Report* warns:

*“The current largely self-regulatory structure of the U.S. Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Corporation (NERC), and the electric power industry was not designed to address U.S. survival under nuclear EMP or other hostile attack. The Commission assesses that the existing regulatory framework for safeguarding the security and reliability of the electric power grid, which is based upon a partnership between the U.S. FERC and the private NERC representing the utilities, is not able to protect the U.S. from hostile attack.”*<sup>171</sup>

Unwisely, the strategy concocted by the Department of Homeland Security (DHS) and the Department of Energy (DOE) to protect electric grids and other life-sustaining critical infrastructures from the existential threats posed by EMP and Cyber Warfare relies on “public-private partnerships” where the U.S. Government is the junior partner, essentially trusting the expertise and competence of the utilities.

The EMP Commission *Chairman’s Report* warns against this “doomed to fail” strategy:

*“Regulatory inadequacy over the electric power industry for national security is demonstrated, not only in the failure of industry to protect the grid, but in lobbying by NERC, EPRI, EEI and other industry groups to oppose initiatives by federal and state officials and private citizens to protect the grid from EMP...”*<sup>172</sup>

Russia, China, North Korea, and Iran surely find aid and comfort from activities by electric power industry lobbyists opposing protection for U.S. electric grids from EMP and Cyber Warfare. Texas State Senator Bob Hall speaks for many Americans frustrated by the electric power lobby’s frequently dishonest opposition:

*“As a Texas State Senator who tried in the 2015 legislative session to get a bill passed to harden the Texas grid against an EMP attack or nature’s GMD, I learned first-hand the strong control the electric power company lobby has on elected officials. We did manage to get a weak bill*

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<sup>170</sup> See for example: Dr. Peter Vincent Pry, *Electric Armageddon* (EMP Task Force: 2012) Chapter V “Design For Failure” and Chapter VI “The Hurricanes” passim.

<sup>171</sup> EMP Commission, *Chairman’s Report* (2017) p. 39.

<sup>172</sup> *Ibid*, p. 40.

*passed in the Senate but the power companies had it killed in the House. A very deceitful document which was carefully designed to mislead legislators was provided by the power company lobbyist at a critical moment in the process. The document was not just misleading, it actually contained false statements. The EMP/GMD threat is real and it is not 'if' but WHEN it will happen. The responsibility for the catastrophic destruction and widespread death of Americans which will occur will be on the hands of the executives of the power companies because they know what needs to be done and are refusing to do it. In my opinion power company executives, by refusing to work with the legislature to protect the electrical grid infrastructure are committing an egregious act that is equivalent to treason. I know and understand what I am saying. As a young U.S. Air Force Captain, with a degree in electrical engineering from The Citadel, I was the project officer who led the Air Force/contractor team which designed, developed, and installed the modification to 'harden' the Minuteman strategic missile to protect it from an EMP attack. The American people must demand that the power company executives that are hiding the truth stop deceiving the people and immediately begin protecting our electrical grid so that life as we know it today will not end when the terrorist EMP attack comes.*"<sup>173</sup>

Electric utilities and their lobbies—NERC, the Electric Power Research Institute (EPRI), and Edison Electric Institute (EEI)—lack expertise on EMP and Cyber Warfare and are not competent to protect the national grid from either threat.<sup>174</sup>

Despite wildfires and rolling blackouts roiling California, despite over one hundred dead in Texas, DHS and DOE are out-sourcing national security to the electric power industry, trusting proven negligent utilities like PG&E and ERCOT and their NERC and EPRI lobbyists, to safeguard electric grids and the American people from EMP and Cyber Warfare.

If the largest electric utilities in the United States cannot be trusted competently to perform such basic and simple public safety precautions as vegetation management and powerline protection from high-winds and ice storms—as in California (2019) and Texas (2021)—clearly they are incompetent to protect the grid from more complex and much bigger threats, like EMP and Cyber Warfare, that could kill millions.

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<sup>173</sup> Ibid, pp. 40-41.

<sup>174</sup> Ibid, pp. 39-42.

## DR. PETER VINCENT PRY

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 served as Chief of Staff of the congressional Commission to Assess the Threat to the United States from Electromagnetic Pulse (EMP) Attack (2001-2017); as Director of the United States Nuclear Strategy Forum, an advisory board to Congress on policies to counter Weapons of Mass Destruction; and 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); the House Armed Services Committee (1995-2001); and the CIA (1985-1995).

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. 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. 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.

Dr. Pry has written numerous books on national security issues, including: *Will America Be Protected? (Volumes I and II)*; *The Power And The Light: The Congressional EMP Commission's War To Save America*; *POSEIDON: Russia's New Doomsday Machine*; *The Long Sunday: Nuclear EMP Attack Scenarios*; *Blackout Wars*; *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.

DR. PETER PRY



*This recognizes Dr. Peter Pry for his outstanding accomplishments during his 10 years of service at the Central Intelligence Agency. A noted expert in his field, Dr. Pry conducted groundbreaking research that illuminated one of the most important issues of our time—the US-Soviet nuclear competition. On the vanguard of strategic intelligence analysis during the Cold War, he developed much of what the US Government knows about Soviet planning for nuclear war, including Soviet views of the character of war, perceptions of US intentions, assessment of the nuclear balance, and operational plans. In the post-Cold War period, his work has been central to the US Government's understanding of evolving Russian threat perceptions and military doctrine and the construction of new paradigms for strategic warning and stability assessments.*

*Dr. Pry can take pride in knowing that his work has contributed significantly to the security of the United States. He has been a pillar of the Intelligence Community and will be sorely missed. Without a doubt, his continued public service on Capitol Hill will reflect the same expertise, professionalism, and dedication that have characterized his exemplary career at the CIA.*

*We wish him much success in his new endeavor.*

A handwritten signature in cursive script, reading "Lawrence K. Gershwin".

Lawrence K. Gershwin

A handwritten signature in cursive script, reading "Charles E. Allen".

Charles E. Allen

A handwritten signature in cursive script, reading "John E. McLaughlin".

John E. McLaughlin