EMP THREATS & SOLUTIONS

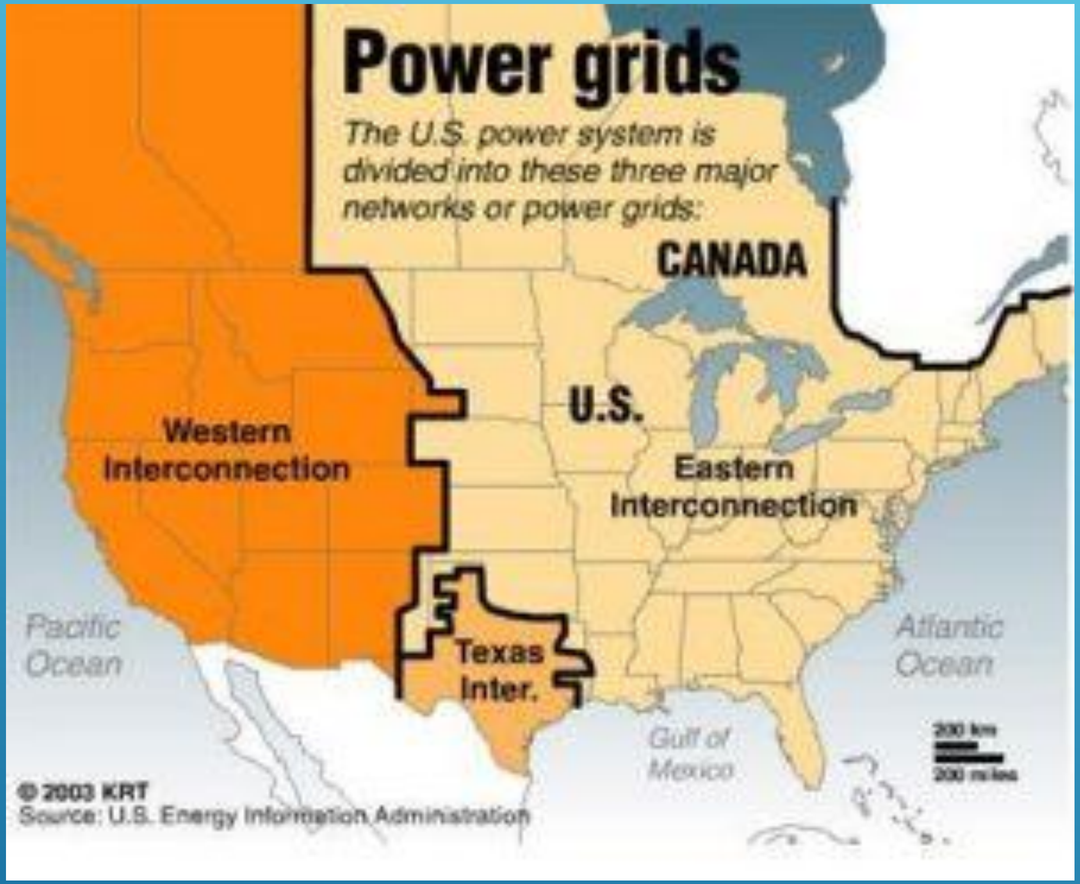
Harden the US & Utah Electric Grids

Former USAF Major Bob McEntee

- 1988 USAFA Graduate, BS US Military History, Minor in German Language
- SAC Alert Force KC-135 Instructor Navigator 1990-1991
- Single Integrated Operations Plan (SIOP) Instructor & Planner
- Received the SAC 1994 Omaha Trophy on behalf of 43rd ARW
- Briefed 4-Star US CINCSTRAT (Commander in Chief US Strategic Command) on SIOP Training
- USAF Squadron Officer School Graduate
- Combat Air Tactics Training Graduate
- Red Flag Planner & Flying Graduate
- USAF Contingency Wartime Planning Course Graduate
- Recipient of 3 Air Medals for Combat Support/Missions in 5 Continents
- Over 5,000 Flying Hours
- HQ AMC (Air Mobility Command) Aircrew Planner & Dispatcher
- KC-135 Tactics Simulator Instructor
- FAA Certified Pilot & Dispatcher at Air Mobility Command HQ
- F-15E Mission Training Center (Simulator) Deputy Director & Top Secret Clearance
- Deputy Director & SME: https://www.facebook.com/EMPTaskForceUtah/

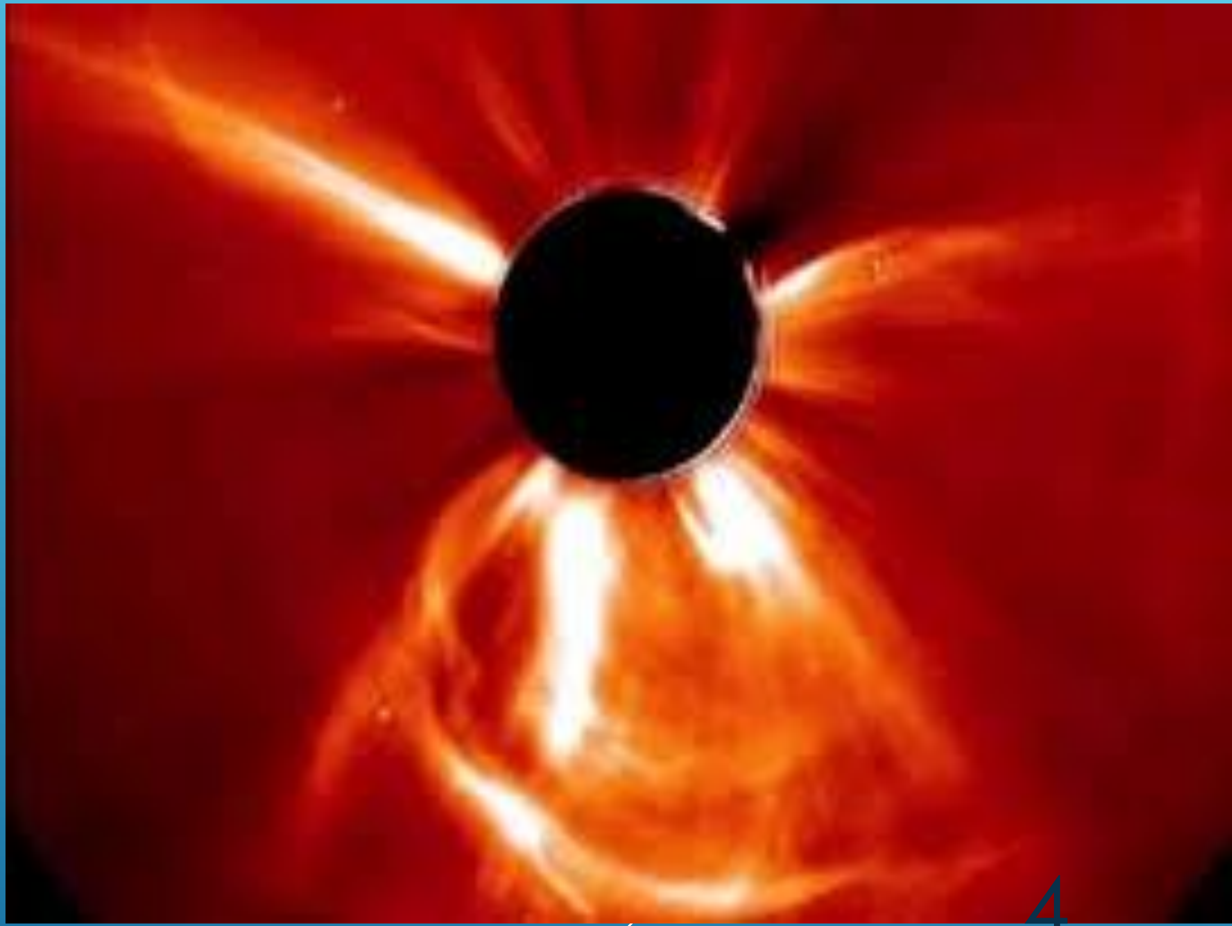
BACKGROUND & BONA FIDES

THE TARGET


Power grids
The U.S. power system is divided into these three major networks or power grids:
CANADA
U.S.
Western Interconnection
Eastern Interconnection
Texas Inter.
Pacific Ocean
Atlantic Ocean
Gulf of Mexico
© 2003 KRT
Source: U.S. Energy Information Administration

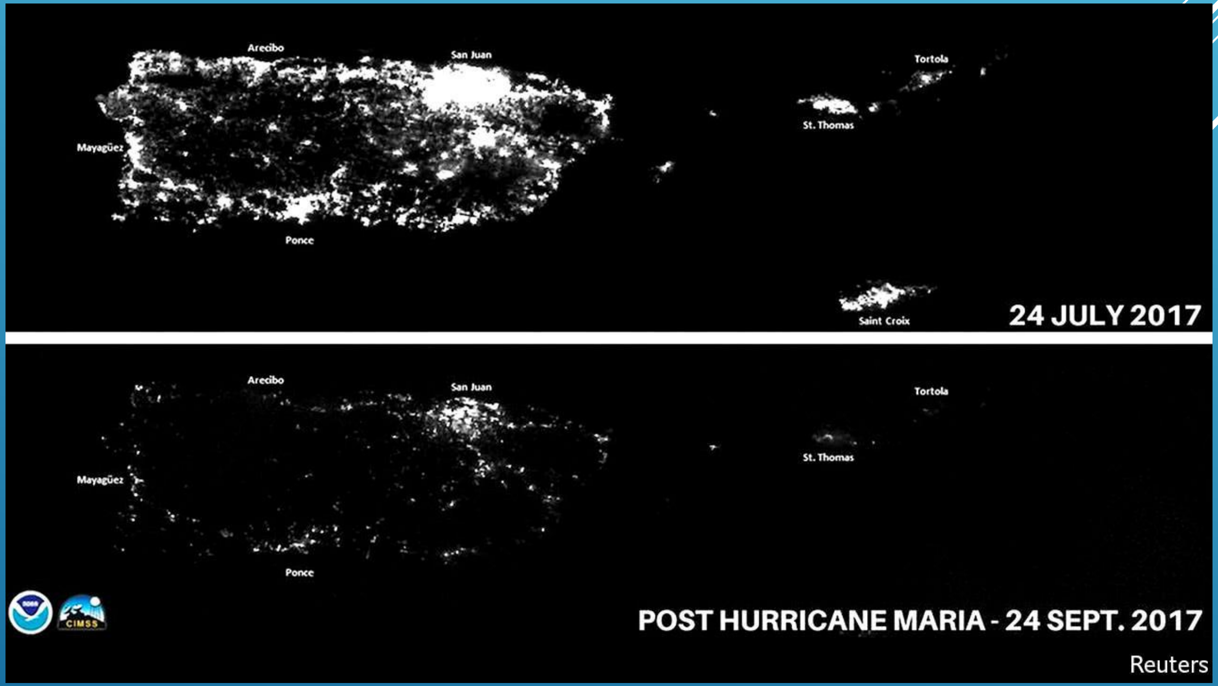
PROVEN THREATS: THE SUN & WEATHER

- April 1859: The Carrington Event—11 Hours Notice
- 1921: The Railroad Storm (10x power of Quebec Storm)
- March 1989: Montreal Grid Blackout from Geomagnetic Storm
- Same storm melted a NJ EHV (Extra High Voltage) Transformer, Damaged MA EHV Transformer
- August 2003: Northeast Blackout (heat wave) affects 50M



PROVEN THREATS: THE SUN & WEATHER

- August 29th 2005: Hurricane Katrina
- July 23rd 2012: The Really Close Call –the Event Pictured, a Coronal Mass Ejection (CME)
- October 29th 2012: Hurricane Sandy
- August 2017: Hurricane Maria slams Puerto Rico—Grid Down

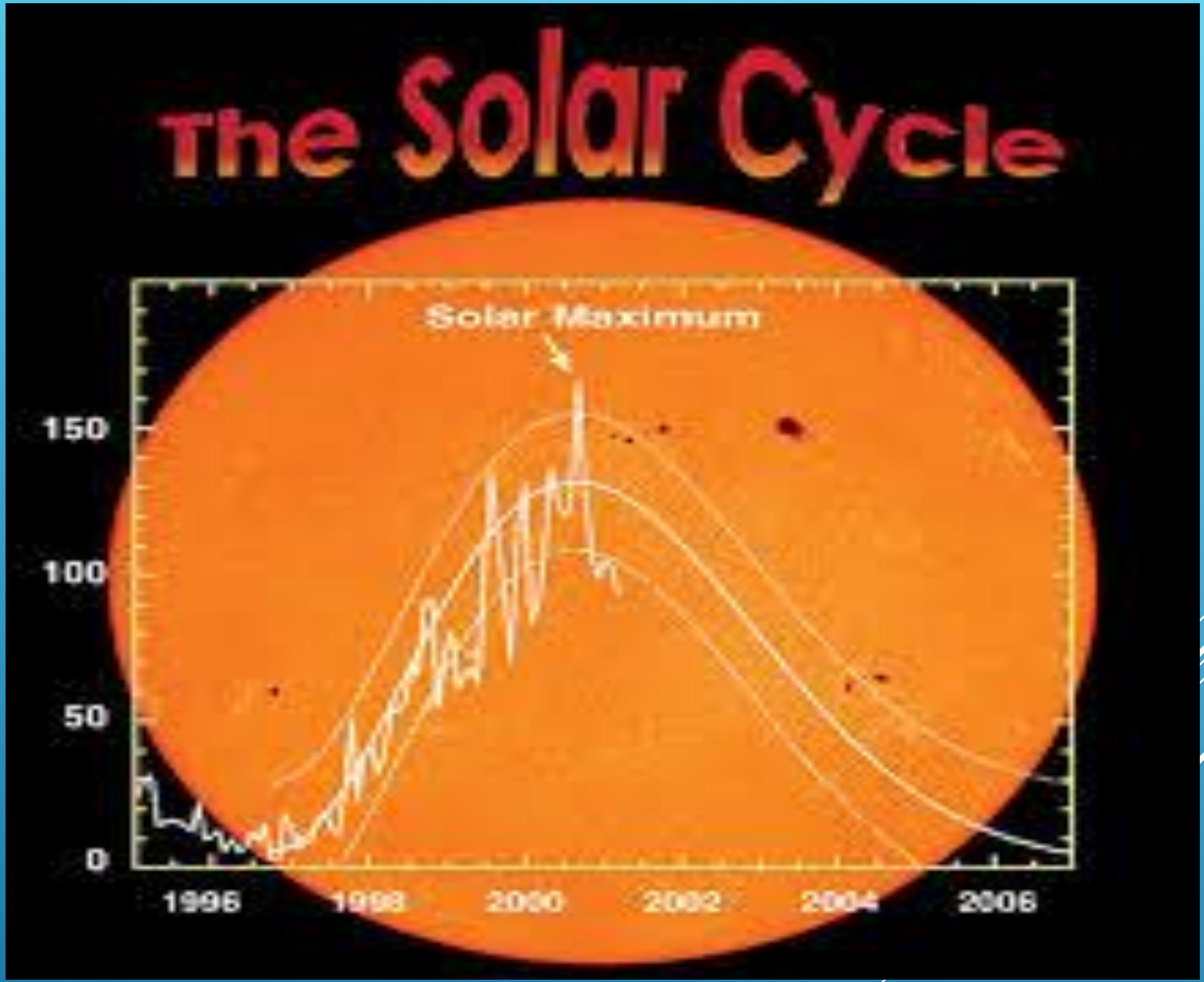


➢11 Year Solar Cycle: Minimum to Maximum—2018: NASA report sun "cooling" as it enters a new solar minimum cycle

➢The Sun runs "hot" with extra sunspots and solar flares (like an EMP) when it comes out of it's minimum cycle. 2023-24 critical years.

➢The deeper the minimum, the higher the maximum (similar to our stock markets)

➢NASA: 1/8 Chance of Geomagnetic Superstorm Every Decade



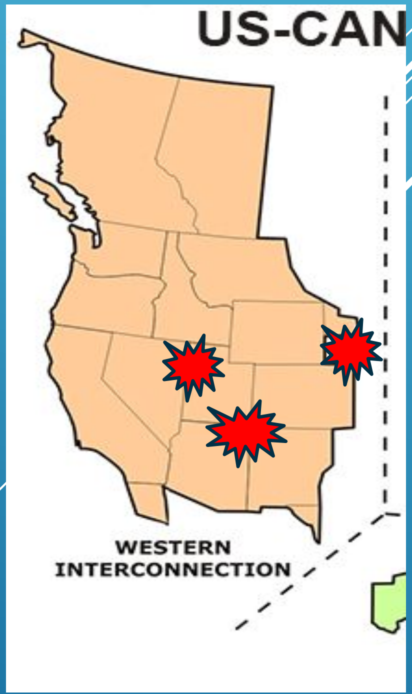
SOLAR THREAT: 11 YEAR CYCLE & SOLAR FLARES OR CORONAL MASS EJECTIONS

DOMESTIC THREATS: PHYSICAL ATTACK

- **October 2013: Knights Templar Drug Cartel Blacks out Entire Mexican State—executions at will**
- **April 16th, 2013: The Metcalf Attack on PG&E Substation near San Jose, CA. Pro hit, dry run**
- **August 2014: Metcalf substation security equipment taken (cameras, sensors)**
- **Jan 2015: Terrorists blackout 80% of Pakistan (nuclear weapons nation) for days**

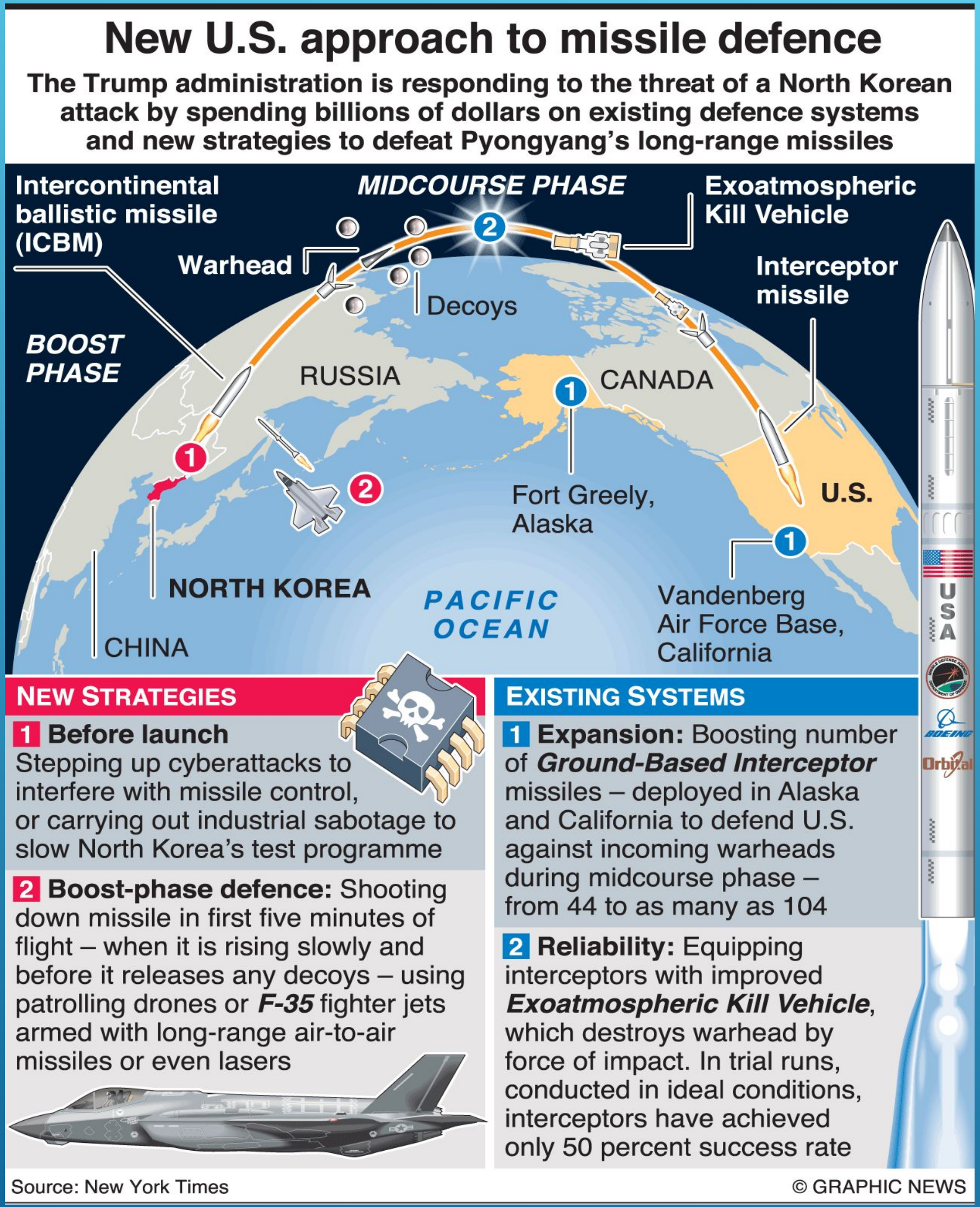
DOMESTIC THREATS (CONT.)

- **Daily 2018: Cyber attacks/threats**
- **Dec. 2018 Age/Overload on NYC EHV Transformer leads to explosion, blue sky & blackout. Transformers last 30-40 years, if properly built (18 mo. build time)**
- **2014 FERC (Federal Energy Regulatory Commission) leaked analysis determines <u>taking out 3 transformer substations</u> in the Western Power Grid could take out power to 11 States (CA, UT…)**
- **Taking out just 9 of appx. 3,000 EHV Transformers to black out entire US. Spares are very limited and not universal**
- **Future: Sleeper agents on soft targets, virus, nuke from satellite or Russian Bombers based in Venezuela**



FOREIGN THREATS

- North Korea's best bet
- Iran's Revenge: Practicing for High Altitude Space Burst 20 Missiles
- Russia's Ace in the Hole or Threat
- China's Final Play
- 1960's MAD Doctrine is Weakened
  - Could be done from a submarine, cargo ship or secluded island
  - Terrorist Dream
  - YouTube: North Korean Ship Panama Canal (Missiles from Cuba, 1962)
  - Why destroy and radiate when you can wait and occupy at will



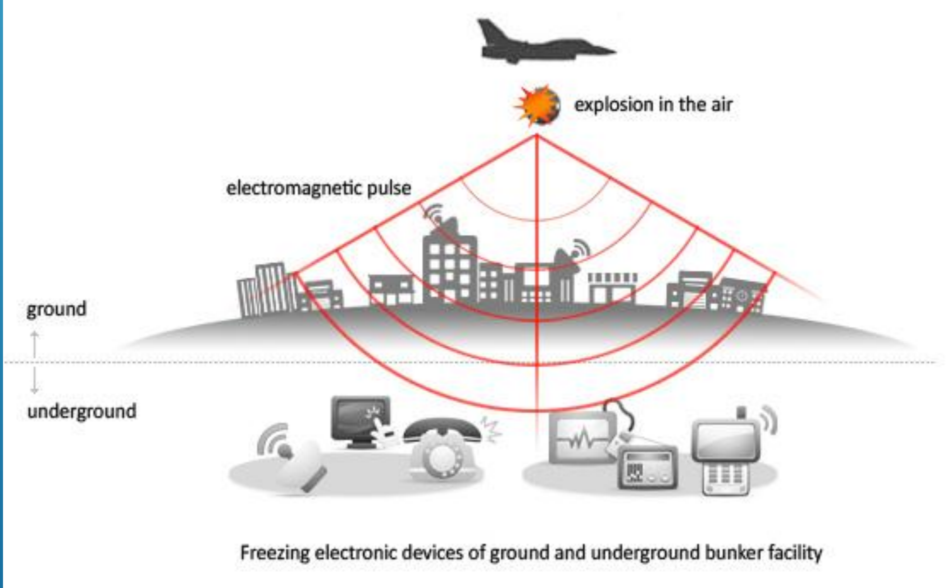
CURRENT MISSILE DEFENSE: INADEQUATE

B-52 & 747 DURING EMP TESTING:
<u>THREAT VERIFIED</u>

Soviet Union's K project series tests and detonations

Name [note 1]	Date time (UT)	Local time zone [note 2][8]	Location [note 3]	Elevation + height [note 4]	Delivery, [note 5] Purpose [note 6]	Device [note 7]	Yield [note 8]	Fallout [note 9]	References	Notes
184 K3 (Joe 157)	22 October 1962 03:40:45	ALMT (6 hrs)	Launch from Kapustin Yar, Astrakhan 48.56956°N 45.90346°E, elv: 0 + 0 m (0 + 0 ft); Detonation over Karagandy, Kazakhstan 47.76469°N 63.95136°E	N/A + 290 kilometres (180 mi)	space rocket (> 80 km), weapon effect		300 kt		[1][11][12][13][14][15]	Exploded short of target above Sary Shagan, west of Dzhezkazgan (or Zhezqazghan). EMP ran to thousands of amps, damaged at least 570 km of telephone lines, 1000 km of buried power lines, and caused the destruction of the Karaganda power plant.

THREAT DOCUMENTED: RUSSIAN LIVE TESTS OCT 1962. K-PROJECT, KAZAKHSTAN. *RUSSIA'S GRID IS HARDENED*



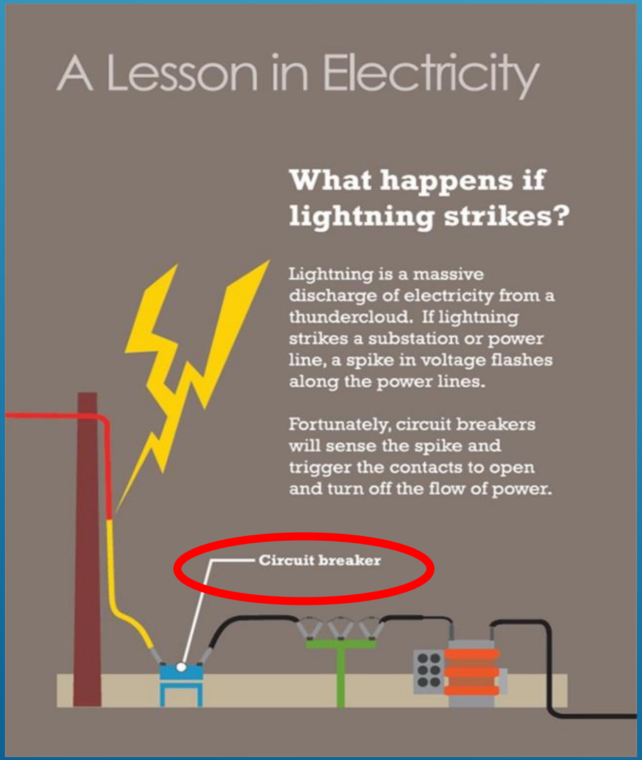
THESE* WILL NOT SAVE YOU

FROM ANY OF THESE

THESE WILL:

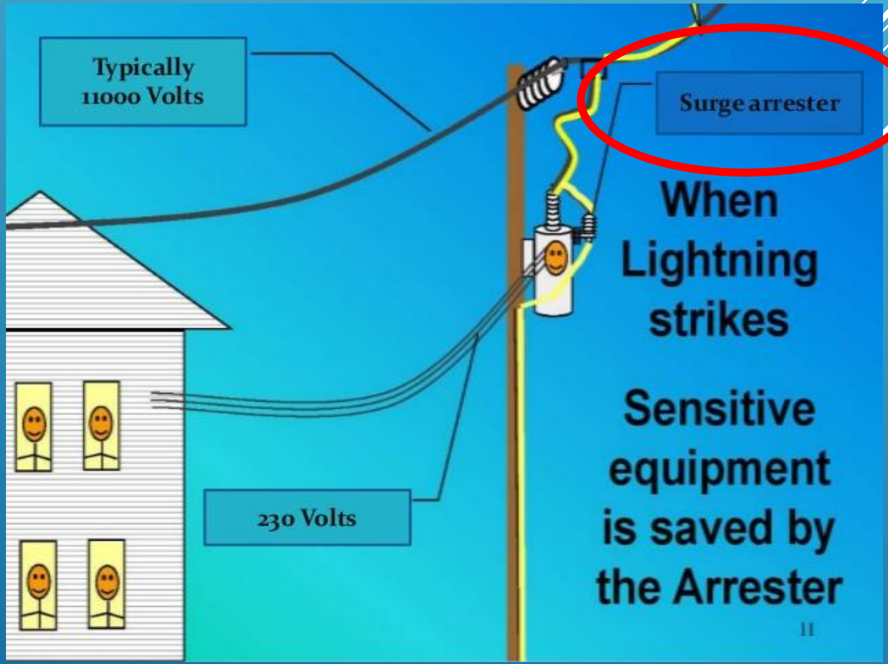
FARADAY CAGE

Shielded, Buried Power Transmission (+Healthier)

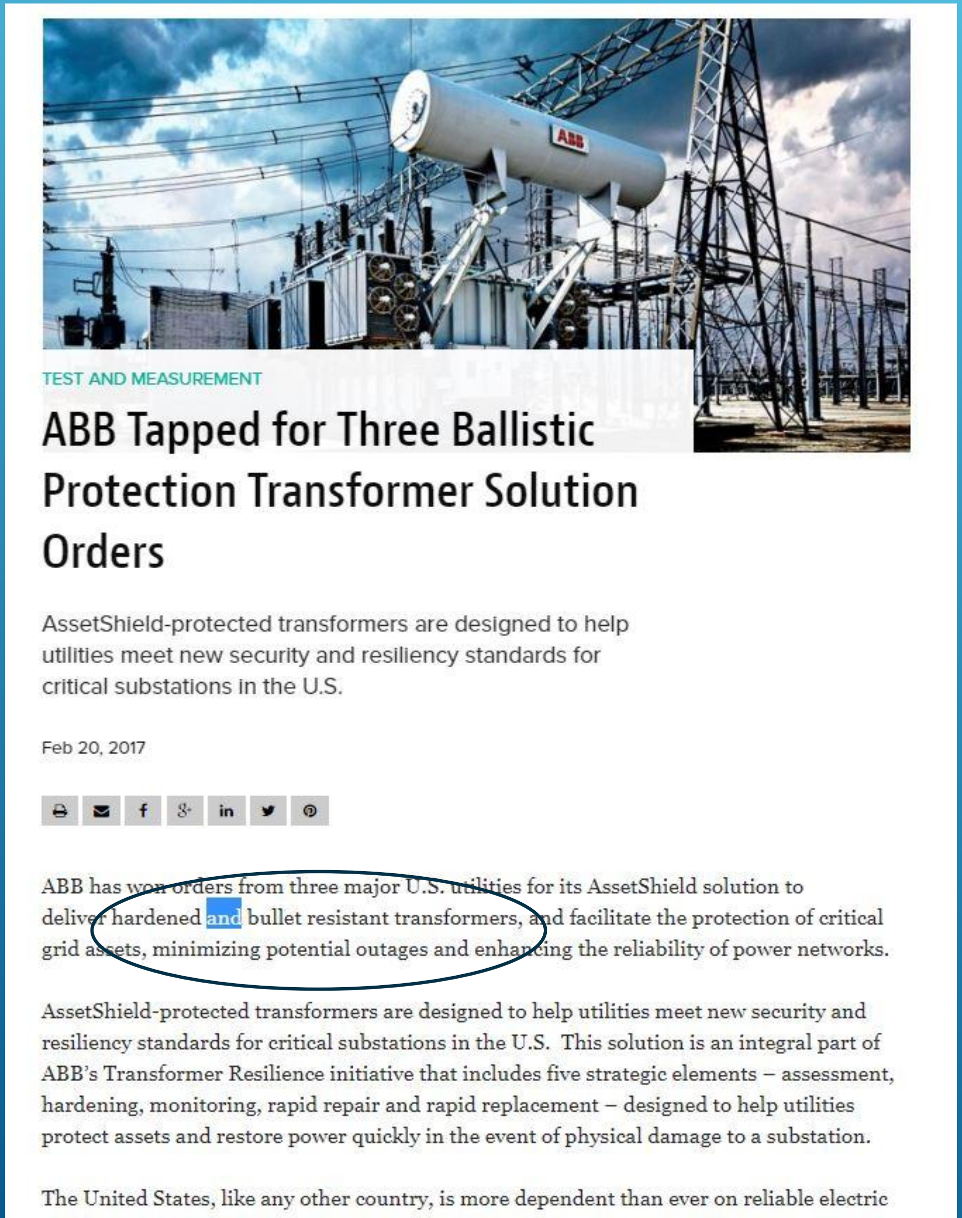


Circuit Breakers

Surge Arresters



MORE GOOD NEWS:



TEST AND MEASUREMENT

ABB Tapped for Three Ballistic Protection Transformer Solution Orders

AssetShield-protected transformers are designed to help utilities meet new security and resiliency standards for critical substations in the U.S.

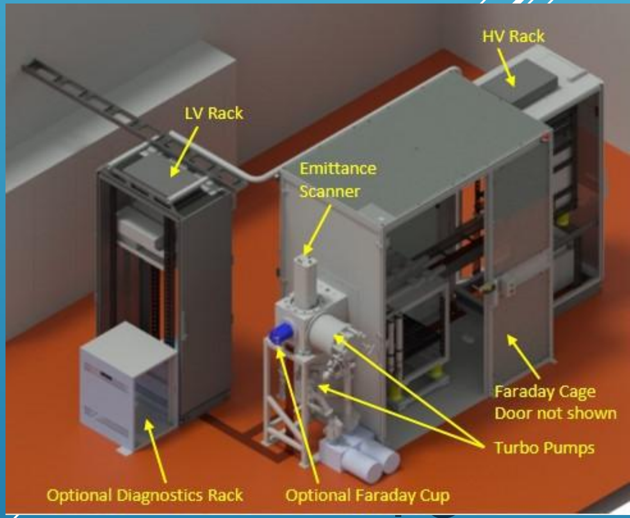
Feb 20, 2017

ABB has won orders from three major U.S. utilities for its AssetShield solution to deliver hardened and bullet resistant transformers, and facilitate the protection of critical grid assets, minimizing potential outages and enhancing the reliability of power networks.

AssetShield-protected transformers are designed to help utilities meet new security and resiliency standards for critical substations in the U.S. This solution is an integral part of ABB's Transformer Resilience initiative that includes five strategic elements – assessment, hardening, monitoring, rapid repair and rapid replacement – designed to help utilities protect assets and restore power quickly in the event of physical damage to a substation.

The United States, like any other country, is more dependent than ever on reliable electric

Lightning = 11,000 Volts
EMP = 1,000,000 Volts/Meter



FARADAY CAGES = Protection

- Protecting the Grid and other key components (SCADAS, military) makes an EMP attack less likely because the impact would be less
- EMP attacks and recovery were in the Summer 2018 Russian-Chinese Joint exercises. Russia practiced replacing transformers and power lines.
- Russia has developed weapons/methods designed to defeat the US Nuclear Triad (Land missiles, bombers, submarines)
- Just as **Blitzkrieg** was new in WWII and almost won the war for NAZIs, the new Nuclear War is an EMP attack coordinated with Grid hacking & physical attack. Makes a big power small/blind fast.

RUSSIA PREPARED TO DEFEAT US TRIAD

THE SOLUTION: *HARDEN THE GRID*

- Cost is approximately $2-4 Billion for Basic Grid Protection (US). 1% of that for UT
- Brass Standard: Surge Arrestors, Faraday Cages, Air Breakers, Harden Computers.
- Silver Standard Upgrade: Bury Transmission Lines. Gold: Protect Buildings
- $30M +/- $10M for Utah. Utah Nat'l Guard *or* Dept. of Public Safety Oversees
- Cost is a few hours of US Spending. Shovel ready jobs?
- Costs less than foreign aid to some countries.
- Utah 2019: **$100M for Clean Air.** FB Poll overwhelming support to divert $30M.
- 2018 Farm Aid: $12 Billion to offset tariff costs to farmers
- $20-$40 Per US *Electric Customer*, or the same for Utah Electric Customers. Utah's cost is <3% of its projected surplus in 2019
- Rates going down by ***MORE*** than that in 2019 due to Trump Tax Cuts. No net increase to customers, or Utah pays from surplus to protect citizens
- There will still be blackouts, but society can be restarted
- Constitutional: Provide for the Common Defense & General Welfare

- Alternative: No clean water, sewer service, farming, banking, pharmaceuticals, stocks or chocolate

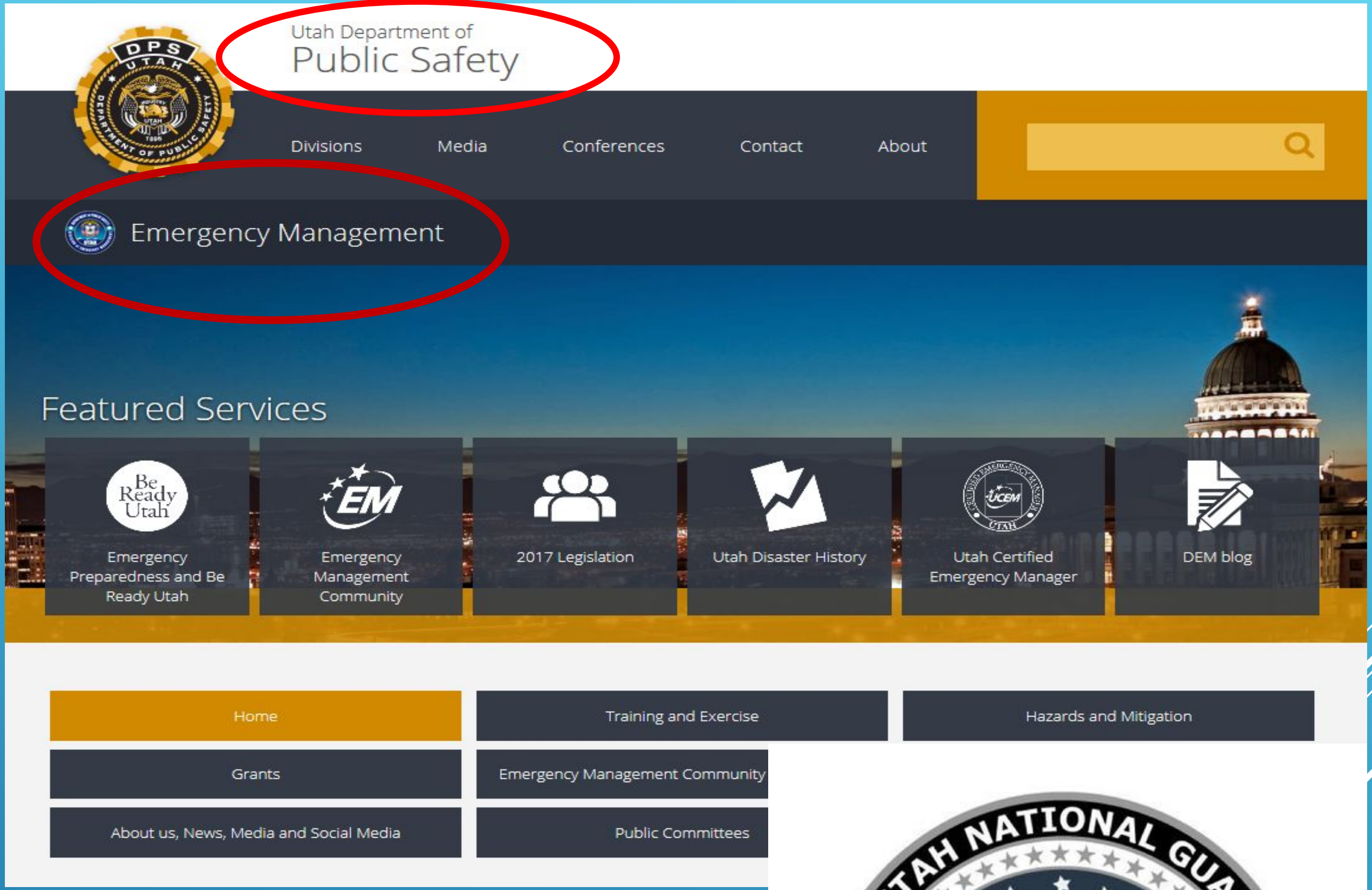
- 2004 Congressional EMP Commission Recommends hardening the Grid against EMP threat (study began in 2001, defunded 2017)
- August 2010 US House *Unanimously* passes the GRID Act by a voice vote. This would harden 300 EHV transformers, partially protecting the heart of the grid
- October 2010 Senate Energy Committee Sen. Lisa Murkowski ("R"-AK, ranking Republican) & Sen. Jeff Bingamon (D-NM) Chair, kill the GRID Act. Sen. Murkowski stated this was because of a perceived lack of support by Pres. Obama & she substituted more Obama-friendly clean energy
- August 2016 Republican National Committee (RNC) adds platform plank supporting the urgent need to harden the US Grid
- 2017 (circa) Pres. Trump becomes the 1st President to support hardening the Grid
- August 2018 Utah Republican Party (SCC) passes a Resolution supporting the US/Utah harden the Grid and allow Utah to separate from the Grid. Co-sponsors included, Speaker Greg Hughes & several County Chairs
- September 2018 Davis County Utah Republican Party passes a Resolution supporting hardening the US/Utah Grids. I will send you one for your County!

http://davisgop.org/wp-content/uploads/DCRP-Resolution-to-Harden-the-Utah-and-US-Grids.pdf

- Next: That's up to you and me. Call/email/text your Representatives, it matters!

LEGISLATIVE HISTORY

- Utah Governor and/or Legislature:
- Direct a department to oversee: (1) Adequate hardening of our power grid, support infrastructure and power production plants to withstand EMP attacks*
- (2) Add disconnect ability at or near the state borders
- (3) Utilities must keep enough spare electrical equipment to recover after a solar or EMP event



+ Should inspire other states or Federal government to do likewise

*Protecting against EMP also protects against all other threats

SPECIFIC SOLUTIONS FOR UTAH

QUESTIONS & DISCUSSION