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EMP 101

<https://www.youtube.com/watch?v=bwAh3Z0shsE> = fission and fusion.

Electromagnetic Pulse Attack: Understanding the Threat

“ You can recover from 9/11, you can recover from Pearl Harbor. This is really different.

Former Speaker of the House Newt Gingrich, 2013

We protect our homes. We protect our families. Our land. Our finances.

But almost all 325 million Americans are completely defenseless against an attack on our power grid.

In an instant, our comfortable lives could be plunged into darkness and chaos.

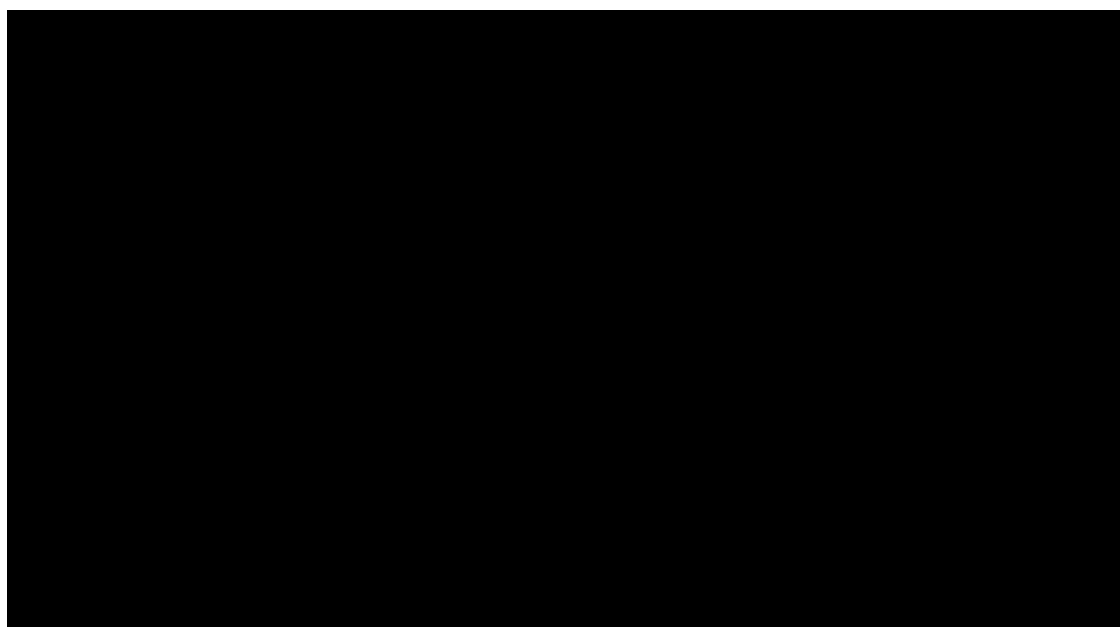
Maybe this sounds unthinkable. But government investigations have concluded that our infrastructure is vulnerable to being taken out, whether by rare solar events or an enemy attack.

In fact, when it comes to an EMP event happening, author Arthur T. Bradley, Ph.D, remarks “It is only the *when* that remains in question”.

There are several ways our power grid could fail on such a massive scale. But experts are especially worried about one devastating threat: an **electromagnetic pulse attack**.

What Is An Electromagnetic Pulse?

An electromagnetic pulse (EMP) is a sudden burst of electromagnetic radiation that could overwhelm and destroy our electrical grid.



An electromagnetic field from one source can disrupt electricity from another source.

On a small scale, you might see one electronic device disrupt another if they're placed too close.

On a massive scale, a powerful burst of electromagnetic radiation could sweep through the United States mainland and cause a total meltdown of the electric grid.

What Could Cause An EMP Event?

In theory, anything that releases an intense wave of electromagnetic activity could wreak havoc.

Weather events, specialized weapons, and nuclear explosions can all cause EMP events. An attack from a hostile nation or terrorist group is the most concerning to national security. But it's worth noting that EMP events can and do occur due to natural phenomena.

EMP Events Caused By Solar Storms

Solar events that disrupt electrical grids on Earth are not common, but they are certain to occur. A few different types of solar activity are important here:

- Solar flares
- Coronal mass ejections (CMEs)
- High speed solar wind

Solar flares are blasts of electromagnetic energy that originate from the Sun's surface. They come in the form of electromagnetic waves traveling near the speed of light, and they can affect Earth's surface without warning.

Coronal mass ejections are large cloud-like magnetic fields that often coincide with solar flares. CMEs only affect electronic systems on Earth if they occur in our direction. The [Carrington Event](#) of 1859 is a famous example of a disruptive CME.

What was the Carrington Event? On September 1st and 2nd of 1859, a solar storm sent a wave of geomagnetic energy into Earth's atmosphere. As a result, telegraph lines in North American and Europe shut down. This was the largest solar event to affect Earth to date. The event was documented in detail by astronomers Richard Carrington and Richard Hodgson.

High speed solar winds are another type of geomagnetic storm that are similar in effect to CMEs, but are more common at the opposite point of the solar cycle. If they reach the sphere of electromagnetic activity surrounding Earth (the "magnetosphere"), they can cause abnormal electrical currents.

The main concern in geomagnetic storms reaching Earth's magnetosphere are that they could affect space weather, either by introducing solar energetic particles which pose radiation hazards to spacecraft and crew, or inducing electromagnetic currents that affect Earth's electrical systems.

EMP events caused by weather alone should be concerning enough make us prepare our electrical grids. But perhaps the most alarming EMP threat is from

manmade weapons.

EMP Weapon Attacks

Over the last several decades, EMP events caused by weapons have become a legitimate threat to civilians.

Localized EMP attacks are meant to disrupt electric systems within a small radius. The targeted area can be a few miles around, such as a military compound.

Specialized weapons made specifically to cause localized EMPs are typically used. Such weapons may include supercharged microwaves that emit waves of electromagnetic energy, pre-charged E-bombs, flux compression generators, or virtual cathode oscillators.

Depending on the weapon used, local EMP blasts can disrupt both small electronic devices and large electric grids.

Nuclear weapons can also cause an electromagnetic pulse in a local area if they are detonated at low altitude. These low-altitude nuclear bursts can obviously cause massive destruction to more than just electrical grids. But it should be noted that such an attack would also have result in an EMP blast, though the area of effect would be much smaller than if the nuclear detonation occurred at high altitude.

Large-scale EMP attacks are meant to disrupt power grids and electronics across a large area of land. They can affect areas of up to 1000 miles radius.

Since our electrical infrastructure is so tightly interconnected, an attack on such

a large area could, in effect, disrupt electricity for an entire continent.

There is only one weapon capable of inflicting a large-scale EMP attack: a high-altitude nuclear explosion.

High-Altitude Nuclear Explosions: A nuclear bomb detonated between 25-250 miles above sea level can cause an EMP blast affecting a radius of up to 1000 miles. If deployed in a strategic location, an EMP bomb could theoretically shut down electricity for an entire continent.

An event of this kind would be disastrous. A national power failure would effect critical aspects of our lives, including law enforcement and access food and medicine. Nearly every single United States citizen's survival depends on our electric grid.

Because a high-altitude EMP has the potential to shut down the power grid of an entire country or continent, it is considered an asymmetric weapon.

A high-altitude electromagnetic pulse blast is considered an **asymmetric weapon**. An EMP can destroy critical infrastructure and severely weaken a nation's military, all without engaging in conventional military combat.

What Happens in an EMP Attack

We know an EMP event poses a danger to modern power grids, both in the

U.S. and around the world. But there are still some lingering questions. It's important to know a bit more about the nature of this threat so you can be fully prepared.

In this section we'll focus on what exactly happens *during* an EMP attack. We'll discuss the resulting aftermath later.

Most of our discussion will be about EMP attacks due to high-altitude nuclear detonation. But we will also touch on electromagnetic pulses resulting from solar weather and localized EMP weapons.

What Does An EMP Damage?

An electromagnetic pulse primarily destroys electronics.

The electromagnetic energy released by the blast overwhelms electric circuits with currents or voltages much beyond what they are made to handle. The excess energy causes these electronic systems to physically breakdown.

High-frequency pulses are most damaging to electronics that use modern integrated circuits (which encompasses most electronics), whereas low-frequency pulses pose a threat to large electronic systems, such as the U.S. commercial power grid. Nuclear EMP blasts emit both.

How Does An EMP Affect a Car?

An high-altitude nuclear EMP has the potential to significantly damage the electronics within a car. However, there are several factors that influence how much damage is done. These include:

- the altitude of the EMP blast

- the amount of gamma rays the blast emits
- where the car is located (e.g. a conductive metal garage? or open road?)
- the direction the car is facing

Simulated tests have shown mixed results. The U.S. Government's EMP Commission performed limited testing in 2002, but the simulated conditions likely did not match the strength of a true EMP blast.

Of course, if an EMP blast shuts down the power grid and fuel supply stops, even fully functional automobiles might be rendered worthless.

EMP Effects On The Power Grid

The scariest effects of a nuclear EMP event are on large-scale power grids.

Nuclear EMP blasts emit a certain type of electromagnetic wave that can overwhelm and shut down long power lines.

This is not the case with EMP events due to solar flares, which only emit high-frequency waveforms that damage small electronics.

According to the **U.S. EMP Commission**, a high-altitude nuclear detonation could cause a rapid but long-term destruction of the United States commercial power grid. Although military infrastructure may have adequate protection, federal agencies have failed to protect the electrical grids used ordinary citizens.

How Would An EMP Affect Humans?

The waves emitted in an electromagnetic pulse attack would not directly harm human bodies. Humans can tolerate electromagnetic waves traveling at speeds faster than the waves emitted by a high-altitude nuclear detonation.

Some on the internet say an EMP blast could destroy cardiac pacemakers. Yet the U.S. Military [tested this in 1991](#) and concluded that EMP attacks are unlikely to disrupt pacemakers.

Of course, the large scale damage caused by an EMP event could jeopardize the health of many, as food shortage, lack of medical care, and inadequate sanitation would soon follow.

Surviving An EMP Attack

A high-altitude nuclear EMP attack poses an existential threat to industrial nations.

Large-scale loss of electricity alone would plunge the United States into chaos. And the downstream effects could be even more devastating.

No electricity would mean:

- no running water
- no public sanitation
- no grocery stores
- no internet
- no emergency care
- no standard currency

This would likely cause further societal breakdown, as law enforcement would

no longer perform their duties without compensation.

Indeed, an EMP attack would truly be a TEOTWAWKI event.

TEOTWAWKI is an acronym for **The End Of The World As We Know It**. TEOTWAKI describes any event that plunges an organized society into a new order of survival and self-sufficiency.

EMP Preparedness

An EMP is a frightening possibility, but there are ways to prepare in order to increase your chance of surviving.

On a **national level**, governments should take steps to protect all critical infrastructure from an EMP. This protection can be done at a relatively small cost, though it is rarely politically favorable to advocate spending public funds on a seemingly remote possibility.

Personal preparedness – protecting you and your family – is also possible.

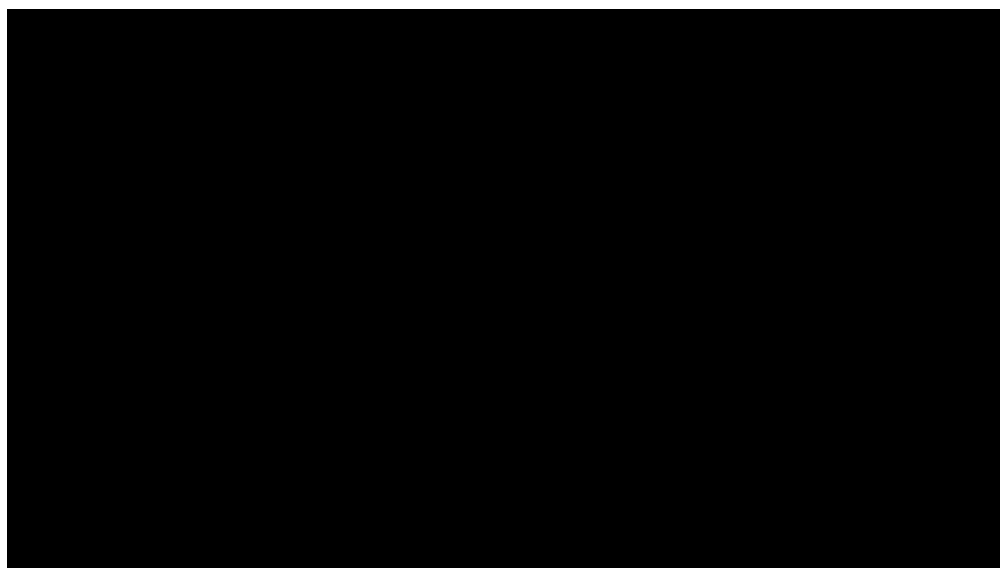
For an EMP event, your preparation efforts are best focused on surviving **1)** the event itself, and **2)** the initial aftermath. In time, any surviving humans may form a new societal structure, but it's pointless to consider this phase if you don't cover 1 and 2.

EMP Protection

The government might not bother to protect your community from an EMP, but you can still take steps to protect your own home and vehicle.

A **Faraday cage** is critical here. A Faraday cage is a container that is conductive and blocks electrical signals and waves, including those emitted by a high-altitude EMP blast.

You can buy Faraday cages, or make them at home from inexpensive parts.



Home EMP Protection

It's probably not feasible to enclose your entire home in a Faraday cage. But it's possible to [protect important electronics](#) in a smaller Faraday enclosure.

You could stow important electronics in a Faraday cage-protected room in your home, or even a secure Faraday box. Of course, if your items are protected by the cage, they will be unable to send signals and will likely be functionally useless.

An alternative approach would be to keep duplicates of your most important electronic devices – the ones you'd like to be able to use following an EMP event – in a secure Faraday enclosure.

Protecting your home's entire power grid would prove more difficult. And after an EMP, the power supplied to your home may no longer be available, making any effort to protect your grid a waste of time and money.

Powering your home after an EMP will prove difficult. Sustainable, stand-alone power sources such as solar panels may be the most effective strategy.

If your home is connected to a commercial power grid (as most are), you will need to prepare alternative ways to generate power in case the power grid fails to function.

How Likely Is An EMP Event?

Many experts argue that an EMP event is almost certain to occur. It's only a matter of *when*.

Solar storms have occurred throughout history. Even though weather experts can't predict precisely *when* or *where* they will occur, there is unanimous agreement that they will continue on into the future.

An EMP attack by a high-altitude nuclear explosion is also a realistic possibility, though not certain. All that's needed is a single nuclear warhead – one that doesn't even require the capability to re-enter Earth's atmosphere.

For some perspective, Dr. Arthur T. Bradley points out that there are over 128,000 nuclear warheads in existence, some of which are unaccounted for. And there are over 10,000 missiles around the world that can carry a nuclear warhead into the atmosphere for a high-altitude detonation.

All it takes is one rogue nation or terrorist organization to launch one missile. The likelihood of this happening seems to change according to the geopolitical climate, but as long as these weapons exist, the threat exists too.

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