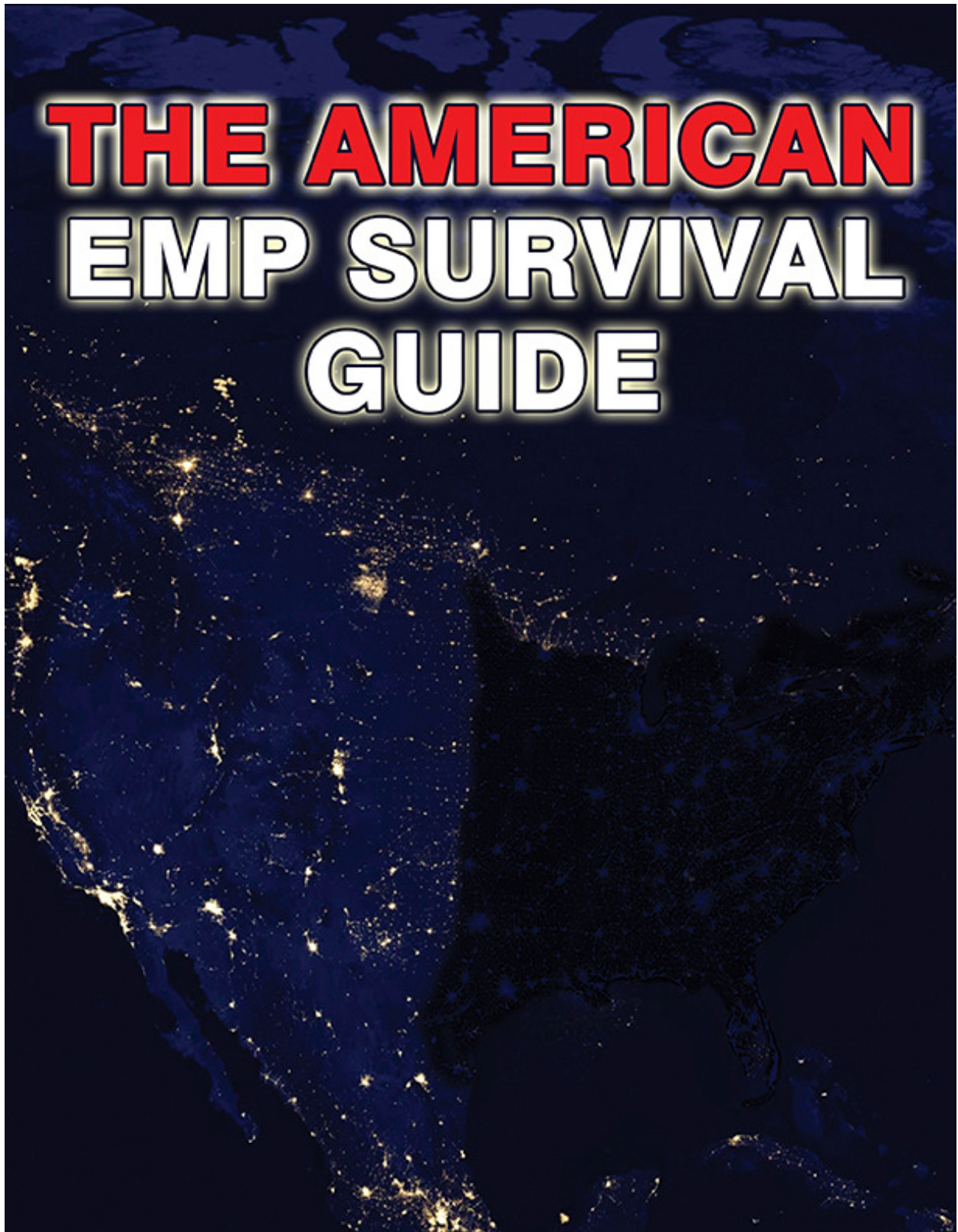


THE AMERICAN EMP SURVIVAL GUIDE



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Surviving an EMP Attack on the USA

On November 9th, 1989, the Berlin Wall came down, starting the reunification of Germany and the process that led to the collapse of the Soviet Union in 1991. Thus ended 44 years of Cold War, with the constant threat of nuclear annihilation. The atomic bomb, which had been invented during World War II and dropped on the cities of Nagasaki and Hiroshima in Japan, was no longer a threat... or so we thought.

In reality, there are still thousands of atomic weapons in the world, even after more than two decades of reducing their number. While most of these are owned by the United States and Russia, seven other nations are known own them as well.

President Vladimir Putin recently reminded the United States government that his country still has nuclear warheads. While there was no direct threat of nuclear attack, he sent a clear message that the United States didn't want to go to war with Russia or interfere with her military operations. If we were to do so, Russia could strike out with nuclear arms, with impunity.

I say they could do so with impunity based upon Barack Obama's known aversion to using military force. While he hemmed and hawed about a retaliatory strike, Russian missiles would be streaking for American targets. It is doubtful that Obama would be able to make up his mind in the 30 minutes he'd have. After that, it would be too late.

It is doubtful that the United States and the Russian Federation will stoop so low as to destroy the world with global thermonuclear war. But that doesn't mean that the threat of nuclear war or of a "surgical" nuclear strike doesn't exist. There are other countries, with less stable leadership, which might choose to use nuclear weapons.

Rumors have floated around for years about atomic bombs going missing during the breakup of the Soviet Union. Personally, I don't think there is anything to those rumors, as we've survived more than 20 years, without anyone setting one off. Pretty much any terrorist organization would love to get their hands on a real nuclear bomb; and if they did, they'd either set it off in Israel or here in the United States.

In 2006, North Korea, a nation known for its animosity towards the United States, joined the ranks of this most exclusive club of nations, with their first nuclear test. While they are only suspected of having six to eight nuclear warheads in their inventory, the instability of their government makes those few warheads the most dangerous weapons on the face of the Earth.

North Korea also has missiles they can mount their warheads on. While the exact capabilities of these missiles is unknown to us, it is doubtful that they could hit us with an intercontinental

strike. However, North Korean ships have visited Mexico and Cuba. It would be fairly easy to develop the capability to launch those missiles from the ocean, eliminating the need for intercontinental missiles. A short-range ballistic missile would be enough.

It is a known fact that there are several other countries which are currently working on developing nuclear technology; including Japan and Germany. Iran is also in the race to develop its own nuclear capability; and with President Obama's signed agreement in hand, it appears that they are going forward at full-steam to continue with their program, regardless of what the world says about it.

Iran also has missiles, hidden in silos in the desert. Once again, we don't know the capability of their latest generation missiles, but from the overhead imagery we do have, it is clear that they are much larger and more capable than anything they've had before. These missiles might actually have intercontinental capability, which when mated with nuclear warheads, could make Iran the most dangerous country on the face of the Earth.

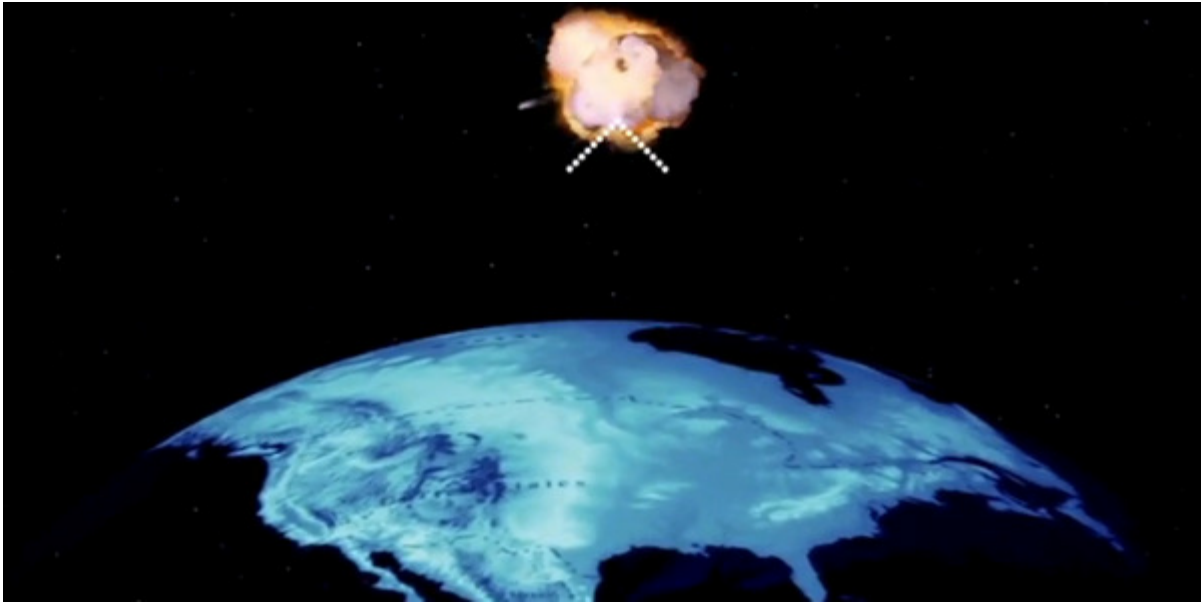
That's especially true when you consider that it was Iran that invented the chant, "Death to America!" It was also Iran who first called the United States, "The great Satan." This same country declared war on us back in the 1970s, even though they have never attacked us directly.

One intercontinental missile with a nuclear warhead could take out Washington, DC, New York City, Chicago, Philadelphia or any of a number of other major cities. While that would not win a war, it would be a major blow against us. The current Ayatollah of Iran has stated that destruction of his own country would be an acceptable price to pay for being able to inflict serious damage on our own.

But the most effective attack against the United States would not be a direct nuclear attack, destroying one of our cities. While that could kill millions of people, the impact would still be limited. No, that same nuclear warhead could create much more damage by using it for a high-altitude burst, attacking the United States with an electro-magnetic pulse, or EMP.

EMP is a by-product of nuclear explosions. It was first discovered when the very first nuclear bomb was detonated on July 16, 1945. This was a test explosion, called Trinity, conducted by the United States Army at the White Sands Proving Ground, as part of the Manhattan Project.

At that time, EMP was unimportant. The electronics of the day were robust tube-type electronics that were not damaged by it. Little did the scientists of the Manhattan Project know that solid-state electronics would someday make EMP one of the many dangerous components of a nuclear explosion.



Today, EMP is the most serious realistic threat our nation faces. I say realistic, because there are a number of other serious threats that we face. But I'm not so sure how realistic those are, or perhaps I should say that I'm not so sure how realistic they are in our lifetime.

Our enemies know that they have a very narrow window of time to use if they want to attack us by EMP. If they wait too long, our country will finally wake up and spend the necessary resources to protect ourselves from this attack. In fact, we're already starting to wake up to it. The only thing that leaves the window open at this time is the enormity of the task before us. They have to take advantage of the window of opportunity or they will lose it.

What Exactly is EMP?

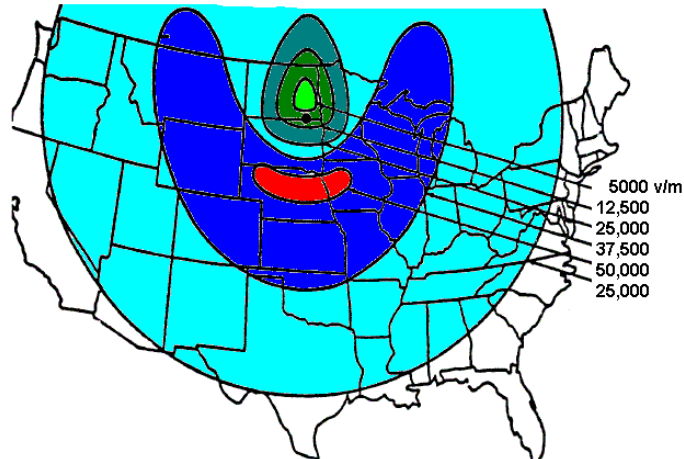
The EMP from that first nuclear explosion was negligible, compared to what we know of EMP today. Because it was a ground-burst, the total amount of the EMP was rather low. However, a nuclear explosion above the Earth's atmosphere or even in the upper reaches of the Earth's atmosphere is much more serious and has a much greater effect.

An EMP takes place in three phases, called E1, E2, and E3. E1 is a very fast pulse, lasting mere nanoseconds. This is the pulse that creates the greatest amount of damage. E1 is produced not so much by the nuclear explosion itself, but by what the gamma rays from the explosion do when they pass through the upper atmosphere. Called the Compton effect, these gamma rays, moving at the speed of light, strip electrons from atoms, creating a very large, but very brief electromagnetic pulse.

This pulse is at a high enough voltage level that it exceeds the electrical breakdown voltage of solid-state devices, destroying them at a component level. Surge protectors rarely help, as the

pulse is moving faster than most surge protectors can react; as it moves at 90% of the speed of light.

The effect of this pulse is not equal, as it is affected by the Earth's magnetic field. For a nuclear device set off over the United States, the magnetic field is strongest in the central part of the country. So, an arc of area to the south of the detonation point is hit the hardest, while everything up to the visible horizon is struck with a lesser pulse that is still lethal to electronic equipment.



The E2 pulse follows immediately after the E1. It is more like lightning in its nature, making it easier to defend from. However, arriving so quickly on the heels of the E1, the equipment that would normally protect our electronics will probably already be inoperable. So, while that equipment would normally be able to survive lightning or the E2 pulse, it will probably be damaged, if it isn't already destroyed.

Finally, there is the E3 component, which is much different than the other two and lasts much longer. Whereas the E1 lasted nanoseconds and the E2 lasted microseconds, the E3 could last up to tens of hundreds of seconds. While that may not seem like much time to us, to our electronics it's a lifetime.

This third pulse affects the Earth's magnetic field, much like a solar flare would. In the long run, it is actually this pulse that will ring the death knell for our electrical grid, as the geomagnetic currents it induces in long electrical transmission lines will reach power line transformers, burning them out.

These transformers, of which there are many, are the most vulnerable part of the electrical grid. Out in the open, usually only protected by a chain-link fence, they are not only susceptible to attacks by EMP, but by terrorists. On April 16th of 2013, a group of suspected terrorists took out a substation near San Jose, California, by shooting the transformers and draining their

cooling fluid. These transformers, which are the same ones that E3 destroys, are all custom made and typically take a year to build. So, it would take more than a year for the damage created by E3 could be repaired.

When we look at these three together, we can see that the vast majority of our electrical equipment will be destroyed, and at the same time our electrical grid will be destroyed. Of the two, that's actually the more serious. Without the electrical grid to power our equipment, nothing will work.

While there is a such a thing as EMP that doesn't come from a high-altitude nuclear detonation, the generators to produce it are very small. More than anything, they are used to test equipment, in order to gain a better understanding of how EMP affects various pieces of equipment and how to shield or harden equipment against it.

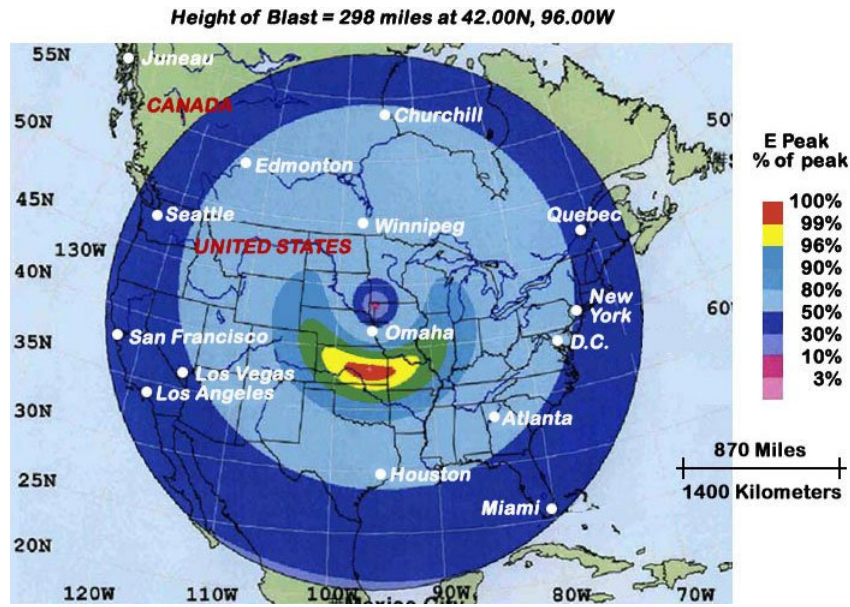
How Could Our Enemies Attack us with EMP?

This may seem like more than our enemies could manage, but it really isn't. In fact, such an attack is really rather easy to accomplish, requiring a much lower level of technology than one would expect. Testing conducted in the early 1960s determined that an EMP can be created with a relatively low yield nuclear device. But that's really not much of an issue, as the size or yield of nuclear devices has increased over time.

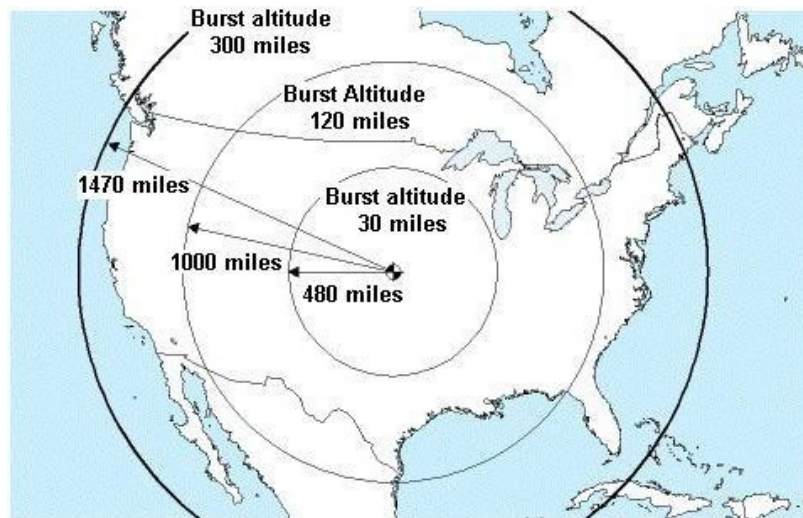
While that test was conducted 250 miles above Johnson Island, it caused considerable damage in Hawaii, over 800 miles away. This damage included hundreds of burnt-out streetlights and a microwave relay station that was destroyed. Today, the effects would be much more serious, as in 1962, most electronics still used vacuum tubes, rather than solid-state electronics.

Any enemy who would want to attack the United States with an EMP would have to get the nuclear device over the United States, at a high enough altitude to create the desired damage. That means having both nuclear technology and missile technology. While you and I might not have that capability in our backyards or garages, the ability to make nuclear bombs and missiles has existed since the latter days of World War II

EMP is purely line-of-sight; so, in order to take out the entire United States with one EMP, the blast would have to happen over the North-Central United States, at an altitude of at least 298 miles. This may seem like a lot, but today's intercontinental missiles are more than capable of reaching that height.



But it doesn't take a missile as complicated as an ICBM to cause a considerable amount of damage with an EMP. The SCUD missile, which is available all over the place, is a fairly simple missile; yet it has the capability of reaching an altitude of 94 miles. Even at that altitude, one missile could take out half of the Continental United States. Two EMPs, from two missiles exploded at the same time, could take out the entire country, coast to coast.



It is known that ISIS is currently looking to acquire nuclear bombs for this very purpose. But they aren't the only people out there who have threatened to attack the United States in this manner. Rumblings have come out of both North Korea and Iran about their leaders' desire to attack the United States with an EMP.

All it would take would be to load two SCUD missiles, with nuclear devices attached to them, in a container ship and sail it into the Gulf of Mexico. From there, both missiles could reach their

programmed detonation point in a manner of minutes. Since our Navy doesn't regularly patrol the Gulf of Mexico, our only chance of stopping them would be early detection and taking the ship out with aircraft. If it was a civilian vessel, that would be an expensive decision to make, perhaps giving them enough time to set off their missiles before we attacked their ship.

This is only one scenario; there are many other possibilities. Missiles could also be launched from both the Atlantic and Pacific oceans, attacking the eastern and western halves of the country. By dividing the attack in half like that, the aggressors would have a better chance to succeed with at least part of their plan, even if we managed to stop one ship.

The point is, it's really not all that hard to use an EMP as a weapon against us. Our country is not ready for this sort of attack. Other than a few military assets, we have very little in government or in the private sector that is actually protected against an EMP. That's what would make it so effective.

So, How Would an EMP Affect us?

While the public is just now starting to hear about the threat of an EMP, the government has known of it for years. Some testing of the effects of a high-altitude EMP (HEMP) attack was conducted in the 1960s. Much of what we know about EMP and HEMP is based upon this testing. While somewhat outdated, in many cases, it is the best we have to go with.

However, that's actually not the only testing that has been done, nor the only information which we have. EMP can be created by other means than a nuclear explosion and there are in fact EMP test sites which have been used extensively.

In the fiscal year 2001, the EMP commission was created to assess the United State's vulnerability to an EMP attack by our enemies. This commission was charged with looking into four areas:

- The threats of a HEMP over the next 15 years (until 2016)
- The vulnerability of the U.S. military and civilian systems to EMP attack, with special attention to the civilian infrastructure
- The U.S. capability of repair and recovering from a HEMP attack
- The feasibility and costs of hardening select military and civilian systems against EMP

Were an EMP attack to occur, the effects would be sudden and extreme, but we would hardly notice. Unless the attack were carried out at night, few people would see the explosion, 100 miles or more above the Earth's surface. In daylight, it probably wouldn't even be visible, and at night it would look like an exploding star. Within seconds, everything we own that runs by electricity would shut down.

At first, it would seem like nothing more than a power outage. Few people would even realize what was happening. We've all experienced power outages before, sometimes explainable to bad weather and sometimes not. We'd all wait for the power to come back on, but it wouldn't.

Some people would try to call family and friends, only to find out that the phones were out. Today's phone systems are all computerized, so even with all the safety measures they have built into the typical phone system, the EMP would probably still get in and take out the computerized switches that run the system, shutting it down. About the only exception would be phone hubs that are in EMP hardened facilities. I don't know for sure, but I don't think there are too many like that.

It will probably take a day or two for people to realize that the power isn't going to turn back on and that they're going to have to learn how to live without it. That's when the panic will start setting in. People will look at their refrigerators and pantries and rush to the store to stock up, finding that everyone else had the same idea and the store has turned into a madhouse.

Everyone who talks about the effects of an EMP pretty much agrees that the stores will turn into mob scenes, with people fighting over whatever they can get and everyone joining in to loot the stores together. With electronic cash registers out of order as well as bank ATM machines, people won't be able to get to their money. So in their panic and desperation they will steal whatever they can. Any store employees who try to stop the looters will probably get literally run over and quite possibly hurt.

From grocery stores and department stores the mob will move on to pharmacies, liquor stores and hardware stores, as people try to stock up on whatever they think will be useful. Once again, most of the people will be looting, not caring whether it is legal or not.



All this will be a result of the very real panic that people are feeling. Many of them will regret their actions later, but by then it will be too late. Not only will the looting be done, but without cash, it will be impossible to go back later to pay for what was stolen. Even to try would be an admission of guilt, with the possibility of getting thrown in jail.

From the moment of the EMP, life and society will be taken back to a point in time before the industrial revolution. Other than things looking modern, it will be just as if we had stepped out of a time machine, 150 years ago. There's only one problem; we aren't accustomed to living in that time period; so we no longer know how to do the things our great-grandparents did.

Everything in our modern society depends on electrical power. Even most mechanical devices have electronic controls. Without those controls and the electricity to operate them, things will no longer work. Commerce will come to an immediate halt, as the computers which are so essential to creating and tracking transactions would no longer work.

The majority of the money that people had would evaporate overnight. About the only exception would be whatever cash people have on hand and cash that's in the system. Here in the United States, we have about 267 billion dollars in Federal Reserve Notes, with another 370 billion overseas. So, there would still be an economy, but the money that people have in banks would no longer exist.

Without the ability to order products, store shelves would empty out. The average grocery store only has about three days worth of packaged food on its shelves, and only about a day's worth of fresh foods. That would all disappear within hours, as people tried to stock up.

Even if stores could find some way of placing orders, the trucking industry would be at a standstill. Without electricity, gas pumps couldn't bring up gas from underground tanks, refineries couldn't distill gas and diesel and whatever gas they had in storage tanks would be stuck there until someone came up with a way of loading it into trucks for delivery. While I'm sure that something would be worked out, it would take time.

Most farmers keep a tank of diesel on their farms, so there's a possibility that they could still harvest their crops, if those tanks were above ground. But even if they could take it to the grain silos and wholesale distributors, without electricity, it couldn't be unloaded. Nor could the companies pay them for that produce. Food processing plants couldn't operate, so the entire food distribution network would come to a standstill. While farmers might be able to provide people locally, that would be it.

Considering that the majority of farms today are mega-farms, with acres and acres of fields producing the same thing, especially grains, few farmers would have much of anything that could help people survive. Vegetables, grown mostly on smaller farms, would still be grown for a while, but couldn't be distributed beyond a local level.

Businesses in general would be unable to continue. Manufacturing plants depend on electricity to operate, order parts and distribute their products. The vast majority of the service industries require electricity as well. Without electricity, few of them would be able to do a thing.

Communities would go back to operating on a local level, especially for commerce. This would be better for people who lived in smaller communities, as they are usually closer and people know each other. Some of those small communities would work together to survive, if they had strong leadership to pull the people together. But the big cities would be in trouble. Lack of cohesiveness and resources would turn the cities into human jungles within days.

Few people would have any sort of job left, other than just trying to survive. I ran a list recently of the top 100 most common jobs in America. Of those, a little over half would clearly be without work. The rest fall into two categories; those that will definitely be needed and those where some people may still be working to bring some order out of the chaos.

People who will definitely be needed will include such professions as law enforcement, fire, the medical professions and education. The problem for these people won't be in whether or not they have a job, but whether or not it will be possible to pay them. Few will be willing to abandon their families to their fate, if the community can't recompense them in some way as to make it possible for their families to survive.

Farmers will continue to work for some time, as long as they can, but the smart ones will turn their efforts towards growing vegetables, so that they can help feed their communities. Mega-farming, as it is known today, will quickly become a thing of the past, simply because of lack of fuel and distribution.



Then there will be those people who are working to try and restore something, anything, to make survival possible. This latter group will include a wide variety of people, ranging from telephone linesmen, to mechanics; from warehouse managers to engineers. In each and every case, the individual will be someone who has a vision, much like an entrepreneur, of digging our country out of the ashes of destruction.

These people are the ones one whom our country's hope rests. They will be in a race against time, trying to replace, restore or rebuild the systems our society needs to survive. Some will do so for profit, while others will be driven by a desire to help. But all will share a common interest in seeing our country survive the catastrophe that has befallen it.

Everyone else will be busy full-time just trying to survive. Without the infrastructure that we are accustomed to having around us, everything will have to be done manually. People will need to relearn many skills that our ancestors had, which we've allowed to go by the wayside. Just trying to keep enough food on the table will become the biggest challenge that the average American will face.

According to the report by the EMP commission, 90 percent of Americans would die within one year of the EMP attack. Illegal aliens who are in the country would actually be better off going back home, than staying here, as they are more accustomed to living without our modern conveniences in their home countries than we are here in the United States.

There will be three basic waves of people dying off. The first will be people who depend on medicines to stay alive. Tens of thousands or even hundreds of thousands of people today take medications daily to help control everything from high blood pressure to mental problems. Without their daily medications, many of these people will start dying off; diabetics, psychotics, people with high blood pressure and others will begin to die, as their bodies are unable to maintain a healthy balance without medicine.

The second wave of people who die off will be due to epidemic disease. Lack of basic sanitation will cause rampant disease to spread. This is common in places without a good sanitary sewer system and a clean water supply. Without electrical power, these services will begin to break down. People will urinate and defecate in the open and bacteria will spread from their waste into food and water supplies, to be consumed by others.

Finally, the third wave of people dying will begin. This will take several months to start in most places, but will actually begin with the elderly, the weak, the sick and children in big cities. This wave will be the largest and consist of people who starve to death. The lack of adequate food supplies will account for more than half the population dying off.

Those who have the greatest chances of survival are those who live in outlying areas, small communities and rural communities. Cities, especially the larger ones, will become death traps, with people fighting for the small amount of resources available.

City dwellers who have resources will need to go undercover to hide what they have or risk brutal attack by desperate people who want to take it from them. But even without attack, their resources will only last so long, especially water. The human body can only live for about three days without water, so without a constant supply of water, all the food in the world isn't going to do someone any good if they are trapped in their apartment.

It will be best for city dwellers to flee the cities, the faster the better, and try to find someplace else to go. The problem is that there really won't be anywhere for them to go. Rural communities won't want to accept them, as they will have their own problems surviving. Unless those city dwellers have a plan and a place to go, their chances of survival will be minimal.

How Will People React?

How people react to the EMP will depend a lot on their personality, their training and how prepared they are to face it. We can't really lump everyone into one group and say that they will all react the same, simply because people aren't all the same. But I think that there will be several common reactions which will be seen in those times. We can put most people into one of those groups.

At first, pretty much everyone will react with disbelief as they come to grips with the idea that the electrical power is down and is going to stay down for the foreseeable future. How long it will take for people to accept the idea that we are no longer living in a modern, industrialized, connected society will vary, but most will realize it in a day or two. It may take them a few weeks to fully accept that idea, but they'll realize it fairly quickly.

That's when training and preparedness will kick in. Those who have prepared for the event will put their survival plans into effect, either getting out of Dodge or hunkering down in their homes to survive. But this will account for only about one percent of the population. The rest won't be prepared for what happened, so won't really know what to do.

There will be those who try and make the best of the situation, doing what they can at the last minute to prepare. These people will probably be the ones who manage to get the most food from the grocery store and stash it away in their basements, without their neighbors knowing about it. They will make hurried plans to take care of themselves, perhaps inviting other family members to move in with them, so that they have a bigger team to work and survive together.

Another whole group will be advocating survival together as a community. Perhaps I should say that there will be two groups advocating this. One will be responsible citizens who try to bring the community together, to work and survive together. The other sub-group will be those who are totally unprepared and advocate redistribution of the wealth, so that they can have some of what others have stored away. While both groups may sound like they have the same message, their motivation will be quite different.

Then there will be the predators. These people will decide that their best chance for survival will be to gang up on those who have and take what they have away from them. Some will already be gang members of one sort or another, who turn their focus towards survival. Some will be criminals who simply continue being criminals. But there will be others who gather together out of desperation; normally good citizens, who are driven by the circumstances to prey upon their fellow man.

These predators will perform every atrocity known to mankind, including cannibalism, in order to survive. Rape and abuse will become commonplace, as well as women forced into selling their bodies for a morsel of food. Some will kidnap women and rape them until they are tired of that sport and then kill them for food.

Protecting oneself from these predators must become part of everyone's survival plan. They will not be operating alone, but like coyotes, will hunt in groups. Therefore, defensive plans must take in the whole community or neighborhood, as people band together in self-defense. There will be no place for rehabilitation, but like rabid dogs, they will have to be exterminated.

This may sound cruel, but the post-EMP world will be a cruel place. Capturing such two-legged predators and rehabilitating them will require having the resources to restrain them, guard them and feed them, as well as taking care of their other needs. When you have a choice of feeding your children or feeding someone who wanted to kill them, who will you feed?

While there really aren't plans in place, I am sure that salvage, rebuilding and repair efforts will start immediately. The question will end up being, how successful the efforts will turn out to be. It will require herculean effort to put the country's critical infrastructure back together, even if everything necessary to repair systems were to be on hand.

The biggest problem will be in restoring our electrical power and generation capability. Although I can't find any information to back it up, from my background as an electrical engineer, I am fairly certain that a lot of our electrical generating capability will remain intact. The problem won't be generating the electricity, but controlling the generation process. A

nuclear power plant is hard to damage, but it is very easy to damage the controls for that power plant.

Older, simpler power plants and the newest of the new will actually be the easiest ones to bring back online. Coal-fired power plants are rather simple, and some are old enough that they probably still use vacuum tube electronics to control their operation. If that's the case, they may not be damaged at all.

At the other end of the spectrum, modern wind turbines and solar farms will probably survive with minimal damage. There will be a need to replace some control electronics, but that's about it. Nuclear power plants may be the best of all, as they are most likely to be shielded in a way that will protect the control electronics. If not, we can expect some serious problems as reactors cook off or melt down.



The biggest problem won't be power generation, but rather power distribution. Most power plants produce electricity at a much higher voltage than what we use in our homes. That is done because there is less line loss in transmitting higher voltage electricity, than there is at lower voltages. Since cable size is determined by the amperage flowing through it, smaller cables can be used to transmit this higher voltage power. The high voltage power is then sent to a sub-station, where transformers step it down to distribution levels. Local transformers then step it down to house current.

The damage done to the sub-stations will require building new transformers. These are custom built and typically take about a year to make. There isn't enough capacity worldwide to manufacture all the replacements needed. So, getting electrical power to the people who survive will take years.

Like the transformers, the control systems which route power through the grid will be destroyed. Once again, this is custom-built equipment, which can't be replaced by off-the-shelf electronics. Even if rebuilding starts immediately, it will take a considerable amount of time to find the necessary components and complete the rebuilding process, especially without a working supply chain in place.

Power companies will probably start working on providing local service to those who live close to the power plants. That will get power to some people within a couple of months. But how much of a difference that makes is open for debate. A lot will depend on which power plants survive, how quickly they can get back online, whether they have fuel sources available and how many people live close enough for local supply to work.

What Will Survive?

Before talking about what we will need to do to survive, we need to take a look at what will survive the EMP. While much we depend on will be destroyed, there are some things that will actually survive, some of them quite surprisingly. We will need to use every bit of that to help us make it through the months that follow.

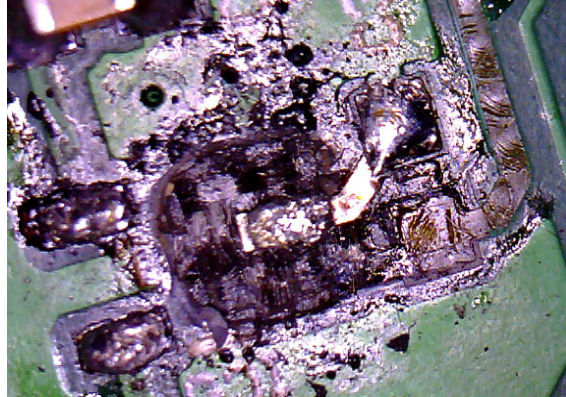
Electronics took a major turn in the 1960s, with the invention and commercialization of the transistor. This was the beginning of what has been known as solid-state electronics. Transistors and diodes performed the same function as vacuum tubes did, but did so in much less space and consuming much less power. This allowed electronic equipment to become portable in a way that had never been possible before.

The next major leap in electronic technology came in the development of the integrated circuit (IC). The basic difference between an IC and a transistor, is that the IC has a bunch of transistors and diodes connected together, forming a circuit, inside of one compact package. Electronic portability took another leap upwards, while power consumption took another leap downwards.

While the first integrated circuits were analog devices, digital electronics was entering the field. ICs were found to be a perfect way of packaging digital circuits, which needed very little power and low voltage as well. The use of digital electronics in IC packages rapidly increased, with designers working overtime to pack more and more digital circuits in an IC package.

This gave us such things as the modern computer, cell phones, tablets and all our other computerized devices. The only drawback to all this is that our modern electronics, being so small, are much more susceptible to EMP than even those first solid-state radios were. Today, an EMP would wipe out most modern electronics.

Before I talk about what will survive, I need to talk a little more about how the EMP destroys electronics. We talked about E1, E2, and E3, but we didn't talk about what they do when they get to the electronics themselves. For this part of the discussion, I want to concentrate on E1, although what I'm going to say happens to some extent with E2 and the second part actually happens the most with E3. But for the moment, which pulse it is isn't important, how it gets to the equipment is.



The first way that an EMP gets to the delicate components in our modern electronics is by direct radiation. The EMP pulse itself is traveling towards the Earth's surface as an electromagnetic wave, essentially a very powerful radio wave. It has to obey the same laws of physics that a radio wave does, even though it is much more powerful.

Those laws of physics say that radio waves are absorbed by metal, especially metal that is grounded (attached to an earth ground). So, radio waves can be stopped by a sheet of metal, such as a metal roof. Being underground helps as well, as there is a lot of metal in soil, which will also absorb electrons.

But let's say that we're above ground in a typical structure, such as a home. The radio waves will come through the roof and strike whatever is within the home; furniture, people, dogs, the fish tank and electronics. People, dogs and fish probably won't notice what's happening and the furniture won't care; but the electronic devices, which are designed to use that traveling electricity will absorb it, overloading and burning out. If you've ever seen a fuse when it burns out, that will be the effect.

Items that are metal encased will have some protection from the direct attack of the EMP coming through the roof, in some cases. But a lot will depend on the device, whether the top of it is metal encased and how many wires are connected to it.

The second way that damage happens is what I call the antenna affect. Wires attached to electronic devices will attract those radio waves, just like an antenna, absorbing them and drawing them into the case. But these electrical levels will be much higher than those that the devices are designed to receive. This will directly affect many home electronics, like computers and entertainment centers, which both tend to have a lot of wires attached to them.

Finally, the third way that the EMP will find its way into electronic equipment to damage it will be via the power lines. Our country is crisscrossed with high tension lines, carrying electricity from power plants to sub-stations, then from sub-stations to businesses and homes. These

wires will act like giant antennas for the EMP, absorbing it and carrying it to whatever electronic devices are connected to power.

Normal surge protectors won't be much help for this third attack from the EMP, simply because it will be faster and of higher magnitude than most surge protectors are designed to handle. They are designed with lightning in mind, but an EMP is at least an order of magnitude faster than lightning. Nor will metal buildings be much protection from this surge, as the power lines will pierce the building. So, while the equipment may not be damaged in the first or second manner, it will be by the third, if it's connected to the building's power.

Now that we've got a little better understanding of exactly how the EMP damages the sensitive electronics that we depend on in our daily lives, let's look at some categories of electronic equipment which are actually likely to survive the EMP.

Equipment Stored in a Faraday Cage

The Faraday Cage was invented in the 1800s as a way of isolating electronic equipment for experiments. It works amazingly well, mostly because airborne electrical charges, mostly radio waves, don't pass through the outer surface of the cage. Regardless of whether it is made of wire mesh or solid metal, the radio waves see it as solid and are attracted to it, ultimately being absorbed by the metal.

This causes the Faraday Cage to have the effect of causing the radio waves to pass around it, much like putting something in a running stream of water causes the water to flow around it. As long as the cage itself is intact and whatever is inside is insulated from the cage, the contents won't be affected at all.

If those contents are electronic devices, the radio waves or other airborne electronic charge, like an EMP, won't affect them. This is easily tested by putting a simple transistor radio inside a Faraday Cage. Although the radio may have worked perfectly well outside the cage, within it doesn't receive enough radio waves to process the information and play the music that is being broadcast.

This is why cell phones perform so poorly in some commercial structures, especially metal buildings. The building itself is functioning as a Faraday Cage, blocking the radio waves from the tower, before they can get to the antenna concealed inside the phone. Therefore, the cell phone can't communicate well.

Shielded Electronics

It is possible to shield electronic devices from EMP, manufacturing them in such a way that an EMP can't affect them. This requires built-in shielding, as well as special circuitry for the inputs and outputs to protect them from the EMP. Some military electronics are built with this in mind, protecting them from any problems caused by EMP.

However, the percentage of electronics in use by the military, let alone the rest of the government, is actually rather low. Nevertheless, some military and some government electronics will survive. That's good, as the military may have to protect us from a follow-up attack, after an EMP.

Vintage Electronics

Electronics which were manufactured before the rise of the transistor used vacuum tubes to perform various functions. While vacuum tubes have several disadvantages, when compared to transistors, they do have one major advantage. They are essentially immune to EMP.



Basically, vacuum tubes operate at much higher voltage and current levels than solid-state electronics do. So, when the EMP comes along, there is less of a difference between what they can normally sustain and what the EMP requires them to sustain. The key junctions inside of a vacuum tube are thousands of times larger than those in an IC, so they can carry much more current.

This means that most vintage electronics, manufactured before the time of the transistor will still work, even after an EMP. Of course, we're only talking about a limited number of different electronic devices, such as radios, but they will still work. If you have an old radio sitting around, which still functions, hang onto it, it might be your best way of getting information after an EMP.

Appliances

This one is a bit iffy. Most home appliances, whether large or small, don't use solid-state electronics. Those that don't have a pretty good chance of surviving, especially if they are turned off when the EMP hits. Any which are disconnected at the time are almost guaranteed to survive.

The greatest danger to these devices is the E3 pulse and the surge that it generates in the power lines. It is widely recognized by experts that the E3 is what is going to demolish the grid, by taking out the transformers in substations. That large a surge could fuse some motors, destroying the devices. The actual results will probably have a lot to do with where the home that the appliances is in is located, specifically how close it is to major power trunks that receive the surge.

If the appliances have touch screens or other solid-state controls, the controls will be fried, rendering the electronics inoperable, regardless of whether the motors survive the EMP. Of course, without those controls, it will be hard to tell if the motors survived.

Cell Phones

Believe it or not, cell phones are likely to survive an EMP, according to the report of the EMP commission. The major reason for this is their small size. The antenna affect, which I mentioned earlier will be non-existent for cell phones, eliminating that source of damage. The small overall size means that they will not absorb much of the EMP itself, especially if the cell phone is oriented in such a way as to be edge on to the axis of the pulse's travel.

Of course, this doesn't mean that the cell phone will be able to talk to anyone else, just that it will survive. However, even without the ability to communicate with others or download information off of the internet, today's smart phones are extremely useful survival tools. They can store a huge number of books, maps and other references which can be used to help you survive.

The thing to do is to make sure that any information you need for survival, as well as any apps you might use for survival, are locally hosted on your smartphone, not on the cloud. By having it locally hosted, you'll have access to it after the EMP, as long as your phone is still operational.

The other thing you're going to need is a way of recharging your smartphone, so that you can continue using it for the local apps. Most smartphones use a 3.7 volt battery, which will recharge easily off of 5 volts. So, if you have a five volt power source, such as that provided by

the USB adapters, you will be able to recharge it. By the way, those chargers will probably survive as well, as long as they aren't connected to anything when the EMP hits. So, buy a few spares and hide them away.

Cars and Trucks

One of the most commonly accepted "facts" about an EMP is that all cars and trucks will be destroyed by it. The exception to this is pre-1970s cars, which don't have computers to monitor the engine. Yet, the report by the EMP commission says the opposite. They did extensive testing of a wide range of autos, with both pre and post 1970 manufacturing dates, to determine the effect of an EMP on automobiles. Surprisingly, other than a few cars stalling (which readily restarted), there was no effect.

A car is a near-perfect Faraday Cage. Not only is the body of the car made of metal, but the electronics within are insulated from the body. The car's body and structure sit on rubber tires, which insulate the car from earth ground. The vast majority of the sensitive electronics are under the hood, where they are protected by the metal.



Let me put a disclaimer on that previous statement. If you happen to have a kit car, with a fiberglass body, I doubt it will survive an EMP. The fiberglass doesn't do a thing as a Faraday Cage, so the EMP will pass right through it and hit the car's computer, causing it to fail.

However, we will still have a major problem with cars and trucks, that of fuel. What fuel stocks exist and are accessible will be quickly depleted. Other stocks, in underground tanks, will be inaccessible until someone comes up with a manually operated pump to bring the fuel up to the surface. Oil pumps for crude oil and refineries will come to a standstill in a moment, eliminating the production of any more fuel until electrical power can be restored.

People who have a reserve stock of fuel might be able to continue using their vehicles, as long as their fuel lasts. But that's it. Even then, their fuel will have to be stored in above-ground tanks to make it accessible, or they will need some sort of pump that doesn't require electricity to operate.

Airplanes

Like cars, airplanes are near-perfect Faraday Cages. They also have the distinct advantage of being far enough above the ground, so that electricity won't be able to pass from the airplane to the ground.

Airplanes are regularly struck by lightning, especially when flying through storms. But this lightning has no effect on the plane. It strikes the skin and goes around the airplane, just as I described when talking about Faraday Cages. Since it only touches the skin of the airplane, and not the delicate electronics inside, the plane will be able to continue flying to its destination.



The big problem for pilots will be the loss of any outside information. Modern pilots are accustomed to flying with the aid of the air traffic control system. Controllers provide them with information about weather, traffic and routing. Instead of this, they will have to be flying by means of the Mach-1 eyeball, just as pilots did a century ago. The major difference will be that they will be flying much bigger planes, with many more passengers.

There is a pretty strong likelihood that there will be some mid-air collisions between airplanes, especially as they vie for space in the landing pattern. One plane on a lower glide slope could

literally be set down upon by another that is coming in for an emergency landing at a steep glide slope. The pilot of the second plane wouldn't be able to see the first through the body of their own plane, up until the moment of impact.

Solar Panels

Another surprising survivor of an EMP is solar panels. This is perhaps the only solid-state electronic device which will survive. That's probably due to the large surface area, which will spread out the surge from the EMP. However, the typical solar panel will sustain some damage, reducing its output by 5 to 10 percent.

The bigger problem for solar panels is the damage that will be sustained by the rest of the system, not the panels themselves. Specifically, this means the solar charge controllers or charge optimizers and the voltage inverter. These two devices (sometimes multiple ones in a system) convert the power output of the solar panels to useable house current (120 volts AC).

Depending on the design of the system, the charge optimizers can be located individually on the back of the solar panels or in a central location, usually nearby the breaker box. The voltage inverter will always be mounted in a central location, usually near the breaker box. These solid-state devices are in no way protected from EMP.

New Equipment in Warehouses

Finally, there is one category of equipment which I am fairly sure will survive any HEMP attack; but nobody talks about it. That's new equipment sitting in warehouses and stores. Most warehouses and stores today are metal buildings. That means that the buildings themselves can serve as a Faraday Cage, as long as they have a metal roof as well. The inventory stored inside is normally in boxes, which often have Styrofoam inserts to hold the device in place.

All of this means that the majority of this equipment should survive the EMP attack. While much of it will be useless to us, some will be essential for the rebuilding of society. Radio and television transmitters could be used to restore communications in a matter of days, if the radio and television stations have diesel generators to provide power (assuming their fuel doesn't run out).

Another place where this inventory will be invaluable will be in the restoration of telephone systems. While there is probably not enough equipment in warehouses to rebuild the entire phone system, at least some communications could be restored.

Of all the necessary equipment that will be in these warehouses, the least represented will probably be medical equipment. Hospitals and clinics will be hollering for replacement equipment, but little will be found. The medical device industry works mostly on an on-order basis, rather than building stock and selling from that stock. Most of the equipment is too expensive to stock in quantity.

Building a Faraday Cage

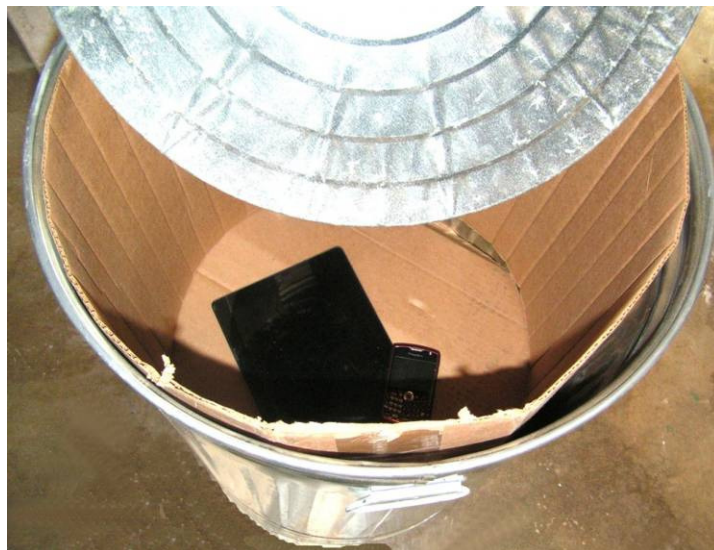
Building a Faraday Cage is extremely simple. As I stated earlier, you can use one to protect any electronic devices that you have. But first you have to build one.

Essentially any closed metal container can become a Faraday Cage. That means you can use a metal filing cabinet, a junk car you have sitting in your yard, a metal trash can or a metal storage cabinet. The only requirement is that it be complete and closable.

Some people make Faraday Cages out of wire mesh, either metal screening or something akin to chicken wire. That will work too, but I'm not so sure how well a mesh will work with the expected levels of electrical energy that are part of an EMP attack. It would probably be better to use something solid, rather than a mesh, just to be sure.

I like the idea of a metal garbage can, just because it's simple and easy to work with. I use these for feed bins as well, so one more trash can, for use as a Faraday Cage, doesn't affect my garage all that much.

It is essential that the items to be put in the Faraday Cage are electrically insulated from it. So you need to line the trash can with either corrugated cardboard or Styrofoam. You can buy sheets of Styrofoam sheathing material, either 1/2" or 1" thick at most building supply centers. This is easy to work with and provides excellent electrical insulation.



Cut pieces of your insulating material for the bottom and to go around the sides of the trash can, on the inside. It is not absolutely necessary, but it's a good idea to tape or glue them in

place, so that they cannot fall and allow the electronics stored inside to come into contact with the metal can itself. If you are going to fill it all the way, cut a piece to go inside the lid as well.

Stocking Your Faraday Cage for Post-EMP

Your Faraday Cage should be filled with spare electronics to be used after the EMP. Some items you might want to include in it are:

- A spare smartphone (programmed)
- A laptop computer (with backup copies of everything)
- A small computer printer
- Solar charge controller
- Voltage inverter
- Walkie-talkies
- Short-wave radio receiver
- Ham radio
- Computer brain for your car
- Well pump (if you have a well)
- Air pump for your fish pond or tank (if you have a fish pond or tank)
- Pumps for your aquaponics system (if you are using aquaponics)
- Spare electro-medical equipment, especially if you have a family member that depends on them, such as someone with diabetes
- Parts for repairing any other electronic equipment you consider critical to your survival

Preparing to Survive the EMP

Surviving the EMP itself is going to be extremely easy. As I said earlier, we probably won't notice it. What we will notice will be the loss of electric power; but since that can happen at any time, it could take us as much as a day or two to figure out what is happening.

The real difficulty won't be in surviving the attack, but the aftermath. We will instantly be put back over 100 years, technology wise. There will be a race to rebuild systems before people die off, but considering that the transformers take a year or more to build and that 90% of the population will die off in that year, it's doubtful that full rebuilding and recovery will even be possible. Most people will be left to fend for themselves, trying to survive against the odds.

If power plants manage to get local service reinstituted, some of these people might be better off relocating, abandoning their home and moving to one that is close to the power plant. Of course, that would require knowing about it and being able to transport whatever supplies they had to the area that has power.

Preparing to survive an EMP is really about preparing to survive the aftermath. To live in a new world, without any electricity, other than what you can produce yourself. While that might be enough to take care of some things, it's doubtful that you'll be able to produce enough electricity to take care of all your needs; rather, you'll only be producing enough to take care of your critical systems.

I recently got a bid for converting my home to solar power. The bid was based upon my average month's electrical consumption and came to \$59,000. Granted, I have a big house at 2,800 square feet, but according to home building statistics, that's really just a touch above average. Now, here's the bad news, I live in the south and that 59 grand won't provide me with enough electricity to run both of my air conditioners in the summertime. It's based on yearly averages, with the assumption that I can buy up the difference I need in the summertime and sell the excess to the power company in the wintertime.



So even if I spend that much money, I won't have enough solar power to meet my family's needs. I don't have an exact figure, but based on their quote, it would cost me about another \$27,000 to produce enough electricity to fully power my home in the summertime. Then I'd need to add an extensive battery backup system, so that I'd have electricity at night. That would be another \$10,000 to \$15,000. So, we're looking at a total of at least \$96,000, which is actually more than I paid for the house.

I mention all that simply to show how unrealistic it is to assume that we can just switch over to alternate power and be okay. We can switch over to alternative "green energy" options for producing enough electricity to operate our critical systems, but that's about it. There's no way that most of us can generate enough electricity to fully power our homes in the event of an EMP.

Using a combination of solar and wind power will get you closer to producing enough power for your needs, assuming you live in an area where there is enough wind to make wind power profitable. Generally speaking, wind power gives you more bang for the buck, even though you are limited in some areas by building codes. Check on local requirements, before looking seriously at a wind generator.

One other important little detail, for those who are going to go solar in order to have some electrical power to use after an EMP, you need to be able to disconnect your home from the grid. That means having what's known as a "whole house switch" installed. This switch, which is installed between the meter and the breaker box, allows the home's electrical system to be totally disconnected from the grid. Otherwise, all the electricity you produce will end up disappearing off into the grid and won't do you a bit of good.

Whole house switches come in two flavors; automatic and manual. The automatic ones are usually used in conjunction with whole house generators. They sense when the power cuts out, disconnect the house and start the generator, all in a matter of seconds. The manual ones

require you to realize what is happening and throw the switch. That's not really a problem, unless you're either asleep or not home.

Replacing Electricity as an Energy Source

While I don't want to dissuade you from the idea of generating your own electricity, the difficulty in generating enough means that you're going to have to find alternate ways of doing things. Whatever electricity you can generate is going to be in high demand around your house, so you want to make sure that you can do as many things as possible without electricity.

So, what does that mean in a real sense? We use electricity for darn near everything, so there are a lot of different things we need to look at options for. These include:

- Heating
- Cooling
- Refrigeration
- Hot water
- Cooking
- Light
- Appliances

For the moment, I'm going to work under the assumption that communications, entertainment and computers are out of the picture. You probably won't have any of those working. But if you do, none of those are big power consumers. So, you'll be able to run them at least sometimes, off of any electrical generation you have.

The seven I mentioned are the biggies. These are the places where the average family consumes the biggest amount of electrical power. For families who have electric heating and hot water heat, the total electrical power consumption is higher than for families that use gas heat and hot water heating; but that really doesn't make any difference. The loss of electric power means that natural gas won't be flowing either.

Okay, so let's look at what we can do for each of those areas, based on the assumption that we'll have some electrical generating capability, but not much.

Heating

All modern heating systems use some electricity, if for nothing else, than for the controls. Something like 97% of new homes in America use forced-air heat, mostly because that allows both heating and air conditioning in the same system. The blowers in those systems use a fair

amount of electrical power, enough that generating your own is probably unrealistic. Besides, the electric heat coil uses a lot of electrical power, in those homes which use electric heat.

The best solution for most people is to use a fireplace or wood-burning stove to heat their home. That won't really heat the whole house, only the room that it is in and perhaps some adjacent rooms to some extent. So, you'll probably have to alter your lifestyle during the cold months, with people either bundling up extra good to sleep or sleeping in the room where the stove is.



Wood-burning stoves are easier to install and more efficient than fireplaces. They can even be installed temporarily, by running the chimney pipe thorough a window, if you don't get it installed before the power goes out. If you buy the kind that uses standard firewood, rather than pellets, you can cut your own wood, making that a sustainable solution. Just remember that you'll need a lot of firewood to make it through the winter. Cutting wood is something that starts in the spring and lasts past the first snowfall.

There are other options, such as kerosene heaters, which some people choose. The problem will end up being the lack of a reliable source for kerosene, once the power goes out. If you have a way of stockpiling huge amounts of kerosene or accessing such supplies, you may want to consider going with kerosene heaters, either in place of or in addition to a wood-burning stove or fireplace.

Cooling

People who live in the south end up spending more on cooling their homes than they do on heating them. Unfortunately, there really isn't any such thing as solar cooling, although researchers keep trying. However, there are things that can be done to make the average home cooler.

High ceilings are one of the oldest means of dealing with heat. Of course, if your home is already built, that may be hard to accomplish. But if you can manage to raise the ceiling in any of the rooms, converting them to cathedral ceilings, that will be a great help. Cathedral ceilings allow heat to rise, leaving the living space below cooler.

Shade helps keep your home cooler. If you have trees planted along the south and west of your home, it will go a long way towards helping maintain it cooler. Of course, cooler is a relative term, but the shade will help keep it from getting hotter. Another way to add shade to a home is to plant vines on trellises along the wall. If the trellis is out from the wall, even a few inches, it will create an air gap between the vine and the wall, keeping the wall from absorbing heat.

Airflow is an important part of cooling as well. While wind isn't really cooler than still air, it does help with evaporation, nature's cooling system. Open up the windows and doors of the home, allowing as much air to flow through as possible.

Speaking of evaporation, you can go a step farther than just opening doors and windows. Hanging wet cloths in those openings, especially an open-weave cloth, such as burlap, allows the air to flow through, evaporating the water in the process. That absorbs a lot of the heat out of the air, cooling it. While it may not make a huge difference, five or ten degrees will feel a whole lot better.

Refrigeration

This is one of those areas which you might want to consider powering off of your home power generation capability, if you have enough power generation to power your fridge. A working refrigerator and freezer will go a long way towards reducing food waste, allowing you to both freeze food and keep leftovers fresh.

If you can't you're going to have to find ways of getting by without refrigeration. There are some options available, even options that don't require electricity.

The first of these is a Zeer pot. This simple invention has been used in Africa for centuries. It consists of two unglazed, but fired, ceramic pots, one inside the other. The space between them is filled with sand and then water is poured in the sand. The water will soak through the unglazed pot, soaking it as well too. Once it reaches the outside, the water starts evaporating, cooling the pot and its contents.



As long as there is a constant supply of water to evaporate, the inside of the Zeer pot will stay at about 50°F, even in hot weather. It helps to lay a wet cloth over the opening to help keep the contents cool. Produce stored in a Zeer pot can keep fresh about four times as long as stored in the open.

Another option is to put in a root cellar. This was what our ancestors used, here in the United States, before people had iceboxes. Anything that is underground stays naturally cooler than above ground. So, that means caves are cooler than the surface land above them. Well, a root cellar is nothing more than a man-made cave, specifically designed for storing vegetables. Like the Zeer pot, it will keep food considerably cooler than keeping it in the home.

There are many ways of building a root cellar, but perhaps the easiest is to bury a non-working refrigerator in the ground. The fridge works well to keep pests out that want to eat your produce and by being buried in the ground, it will stay cool (although not as cool as it originally did). To help the cooling, bury it somewhere where it will have shade, so that the sunlight can't cause it to heat up.

Hot water

Hot water is probably the easiest problem to solve, without electricity. All you need is a big pot and a fire. That will allow you to heat enough water for washing and bathing. You're actually going to have a bigger problem with getting water, than you are with heating it.

The other option you may want to consider is building a solar hot water heater. This is nothing more than a copper pipe in a glass-fronted box. Sunlight coming through the glass heats the inside of the box, heating the copper pipe in the process. Painting everything inside the box black helps with this process. Water run slowly through the pipe will heat, even to the point of boiling.

Cooking

Cooking is another fairly easy problem to solve, as most people already have some sort of alternate cooking arrangement at their home. If nothing else, you can always use a barbecue grille, cooking with wood when you run out of charcoal. You can even use wood in a gas-burning barbecue grille, although it will mess up the gas burner.

Another easy option is cooking in your fireplace or on your wood-burning stove that you are using for heating your home. It's possible to cook on the top of pretty much all old wood-burning stoves, although modern ones are usually too well insulated to do that.

Your final option is to cook over an open fire. If you have a fire pit in your backyard or on your deck, buy a grille to use on it. That turns it into a perfectly good cooking area. This was mankind's first kitchen and it works as well today, as it did back then.

Light

Lighting is another thing you might want to run off of your local power generation. While incandescent lights use a lot of power, the new LED lights use very little. You can buy LED lights that are designed for use in a recreational vehicle; that means they will run off of 12 volts DC. If you have a battery backup system for your power generation, then you'll be able to run your RV lights directly off of the batteries, eliminating the normal loss through the voltage inverter.

Of course, you could go with low-tech options too, such as using candles or oil-burning lamps. Either of these is easy to manage, but the oil-burning lamps are better. They can literally use any flammable liquid or oil as a fuel. You might want to stock up on extra wicks, so that your lamps will last for a long time.

Appliances

I already mentioned that some appliances will survive the EMP. However, they might not be the most efficient use of your home-generated electricity. While you could use them, you might need that electrical power for other things that are more important.

The good news is that everything we do with modern appliances was done manually beforehand. So, there is a good chance that you can find ways of doing these things, where you don't need to use electricity. Of course, that means having to use human muscle power, but it will make for a good family exercise program.

You're Going to Need Water

If the electric power is out, most likely the city water will be too. While some municipal water systems are able to operate totally off of gravity feed, those are few and far between. Almost all of them require pumps to draw the water out of the ground, out of lakes or out of rivers. They also need pumps to push the water through the filters and into the water towers that create the water pressure we need. So, it's unlikely that you will have a continuing source of water.

We need to think sustainability here. Just having a lot of water stored isn't enough. You need water sources that you can use for the rest of your life. That either means a natural source of water, such as a river or stream, or your own source, such as a well. If you live in an area where there is a lot of rain, you might want to consider rainwater capture too.

The average American uses about 100 gallons of water per day. Of that, about half is used for maintaining our lawns and gardens. So, we can cut our usage in half, just by stopping watering our lawns. Eliminating water-wasting appliances will further reduce our water consumption, as well as changing our bathing and toilet use. But there are still things we're going to need water for. At an absolute minimum, you're going to need water for:

- Bathing (I'm assuming a water-saving sponge bath, not a full bathtub or shower)
- Washing dishes (in a basin, not running water)
- Washing clothes
- Drinking
- Cooking
- General cleaning
- Watering your vegetable garden

Most survival experts say that you need a gallon of water per person per day for drinking and cooking. But in reality, you need much more water than that. Personal hygiene is important for health, so you have to bathe, wash your clothes and wash your dishes. A dirty home attracts cockroaches and other bugs, so you have to keep your home clean. Finally, you are going to have to grow food to eat, so you need water for that.

Taking all that into account, you're going to need somewhere between ten and twenty gallons of water per family member, per day, no matter how carefully you use it. If you have an extensive garden, you might even need more. So, your sustainable water supply will have to be able to provide all that water, even if you don't have to purify it all.

You can further reduce your water usage by grey water recycling. The water that you use for washing, whether clothes, dishes or bodies, can be reused for flushing toilet and watering your

vegetable garden. This will reduce your overall water needs somewhat, also reducing the work required for gathering that water.

If you have a well, the well pump would be a top priority for connecting to your home power generation system. It would be a good idea to have a tank of some sort, which the pump could fill with water, to ensure that you always had water, even if you ran out of power for the pump. Water could either be drawn from that tank for use or the water used directly from the well, keeping what is in the tank as a reserve.

Either way, you're going to want to keep your water storage filled at all times. That way, if something goes wrong with your water system, you have some water to use, while you are repairing it. Make sure that you have a spare pump or at least spare parts in your Faraday Cage, so that you can keep your pump operating even in the worst of conditions.

Sustainable Stockpiling

We're all used to stockpiling as a major part of preparedness. That's where most preppers start, stockpiling food. But there's a problem with that. No matter how much food you stockpile, in the case of an EMP, it's not going to be enough. You're going to need more.

Planning for an EMP requires some different thinking, when it comes to stockpiling. I used the term "sustainable supply" when I was talking about water. In prepping for an EMP, you're going to have to think of everything in your stockpile that way. What do I mean by that? I mean developing your stockpile in such a way as to make it easy for you to have a continuous source of everything you need, whether that comes about through reaping it from nature, scavenging it, or raising it yourself.

Take food, for example. Many preppers stockpile a year's worth of food, thinking that will be enough to get them through most disasters. But in the case of an EMP, all that year's worth of food will do is get them through the first year. After that, they'll still need more food. I suppose it would be possible to stockpile ten years worth of food, but you'd still reach the end of even that stockpile.

Rather than try to stockpile more food, you're better off stockpiling the equipment and supplies you'll need to have in order to produce your own food. By stockpiling heirloom seeds, some fertilizers and a few other things, you provide yourself what you need to have to start growing your own food.



Taking that a step further, start a vegetable garden today, so that you can learn how to grow vegetables and have food to eat. Add a chicken coop, a fish tank and maybe even some goats, if you're allowed to have livestock where you live. While you may not grow enough now to live on, you can learn the necessary skills and have an operation in place that you can expand upon when the time comes. That will make it much easier for you to grow enough food to live off of after the EMP.

Each area of your stockpile needs to be treated the same way. Yes, stockpile enough to get you through the first year, but then also figure out what you'll need to have, so that you can go beyond that point and keep your family alive indefinitely.

Some things, like wood for your fire, are renewable resources that you can harvest from nature. But if you're going to be cutting firewood for the rest of your life, you're going to need to have quality tools to cut it with, a means of hauling it to your home and a good means of splitting wood. Put together, those items will give you sustainable heating for your home.

Scavenging

Once people start dying off, you will be able to turn to scavenging to help you survive. This may sound gruesome, but survival can often be that way. The dead won't begrudge you what you need; they won't care anymore.

If 90% of the population dies off in the first year after the EMP attack, that's going to leave a lot of resources sitting around. There won't be food lying around, and there probably won't be a

lot of other important things. After all, those who die probably won't have been stockpiling for the disaster. But they will probably still leave some useful things behind.

What sorts of things can you scavenge from these people's homes? The first thing that comes to mind will be clothing. If you have children, they'll outgrow the clothing they have and the clothes you have stockpiled for them. So, they'll need clothes in larger sizes. Someone in the area will probably have a closet full of the right size, which they will no longer need.

Of course, your family will probably lose weight during this time, even if you are growing your own food, so the clothes you find may have to be altered to fit. That means having a sewing machine that doesn't need electricity; an old-fashioned treadle operated one. While that may not seem elegant, it will work.

You can also assume that they will have some trees on their property, which can be cut for firewood. Be careful and selective about this, so that you don't kill off useful trees. But there will be a good chance that you'll be able to find trees that have branches which need trimming, as well as wood fences that start falling down and other sources of wood that nobody needs.

Sustainable Tools

One major need will be tools that allow you to do what you need, without electrical power. Most of us are used to doing everything with power tools, whether we're talking about an electric drill or a kitchen appliance. You'll need to replace those modern conveniences with manually powered ways of doing things, even if you have some form of electrical power production.

The thing is, unless you have a massive solar power or wind power system, you're not going to have enough electrical power for everything you need. What power you do have will not be totally reliable, as both wind power and solar power are subject to the weather. You might not receive as much power from those systems as you expect to, even if they aren't damaged by the EMP.

Therefore, you're going to have to do as much manually as you can. If you have an alternate way for doing everything; you can be selective about what you use your electrical power for. That gives you options that few people will have in that time.

I mentioned a treadle sewing machine a minute ago. That's only one of many items that our ancestors used, which we will actually need in a post-EMP world. Fortunately, it's something you can still find, and often in working condition. While these aren't exactly available at junk store prices, they are still rather reasonable. I just recently looked for antique power tools, such

as treadle operated drill presses and scroll saws. They are much rarer than sewing machines and considerably more expensive.

Fortunately, there are still manual tools around for most tasks. All kitchen appliances have manual counterparts, and all woodworking tools also have manual counterparts. In some cases, like saws, those counterparts are readily available, but in others, they are only available through a few specialty companies like Lehman's.com, an Amish hardware store that still stocks a lot of the old-fashioned tools and home appliances that were used in pioneering days.

Many of these devices are made by Amish companies, as their community still uses them. While they are not cheap, they are high quality items, which will probably last the rest of your life, without problem.

Vintage Electronics

It may seem strange to stockpile vintage electronics, rather than the latest and greatest. But in the event of an EMP attack, those vintage electronics will probably still work, when nothing else does. Take telephones, for example. Modern telephones are solid-state, so they won't survive. But the old dial phones have no solid-state electronics in them. An old, manually operated switchboard would also survive. So, if you had a number of old phones and a switchboard, you could put in some communications for your community.

Granted, you probably wouldn't have enough to take care of the whole town, but even if you had enough to wire up the key government offices, you would be in a position to make a huge impact on the restoration of your community.

The same thing could be said about radio equipment. What about a tube-type AM or FM transmitter, with a number of tube-type radios? If you had that, you could establish a community news and announcement service.

I'm not trying to say that you or I have a responsibility to provide these things to our communities, merely giving you some food for thought. Should you run across the opportunity to pick these items up cheap and have the space to store them, you might want to consider it. But you also want to look for items that could help you and your family, not just the community.

One such item might be a collection of vinyl records and a record player. That would give you recorded music to listen to, in a time when nobody else has it. If you are interested in photography, you might want to put in a darkroom and buy a film camera. I realize that most

things have gone digital now, but after the EMP those digital cameras won't work. Being one of the few people around who can chronicle the aftermath in pictures might be just your thing.



Restoring Your Life in a Post-EMP World

As I said earlier, there will be people who will be trying to restore some level of the infrastructure and the life we've all known, right from the beginning. How successful they will be is anyone's guess. There are way too many variables to be able to make any sort of accurate prediction about what might be restored and how quickly it might be restored.

The big problem is that people will be dying off, while they are rebuilding the infrastructure. Some of those people will probably be the very ones who are trying to rebuild. But even if they don't, the high death rates will cause other problems. Dealing with the large number of dead will be a problem, in and of itself; and it will be a high-priority problem to deal with. Failure to bury the dead could easily lead to an increase in disease, predators (who will lose their fear of man once they start eating dead bodies) and pests such as rats.

Your best option for survival is to assume that restoration won't happen fast enough and depend on yourself to meet your needs, rather than depending on others to provide them. More than anything, that means becoming self-sufficient in all your basic needs.

While we have to operate under the assumption that pretty much everything will grind to a standstill, it probably won't be quite that bad. People are looking at this issue and trying to come up with solutions. Not enough people are and so not enough effort is going into EMP preparedness, but at least some is.

One example of that is that most Wall-mart stores have their own power generators behind the store, in what looks to be EMP protected enclosures. I have no idea of how much fuel they have or how long that fuel will last, but our country's largest retailer is at least trying to do something. If someone can get fuel to them and products to sell, they might even manage to stay open for a while.

Another sign of people preparing for an EMP on a large scale is an effort towards making natural gas pumping stations totally self-sufficient. Already many of them produce their own electrical power. The idea is to have the pumps and everything run totally off of power produced by natural gas, as well as shielding the controls from EMP. That way, if an EMP attack comes, natural gas will still flow to people's homes and businesses.

But the major issue is the electrical grid. Other than a measure that is currently before the Texas Legislature to harden the Texas power grid against EMP (Texas has their own grid), there is no effort that I can find to prepare the grid for an EMP. The biggest problem is that the task would cost somewhere north of one trillion dollars, according to the report of the EMP

commission. The many power companies who produce and distribute our electrical power don't have the money to do that and neither does the government.

So, it's up to you and I to prepare ourselves. We must develop the capacity to become fully self-sustaining, should an EMP attack occur. Fortunately, this is possible.

I'm sure you've seen the articles written from time to time about families that grow all their own food in their backyards. Well, if they can do it, so can you and I. All we need to do is develop a big enough garden to grow enough food.



That will probably take quite a bit of time. I seriously doubt any of those people started out their first year of gardening with their entire backyard converted to a garden. They probably started with a small garden and added to it bit by bit. Like building a stockpile, going step by step would allow them the ability to spread the cost over a longer period of time, as well as the opportunity to learn how to garden that big a space efficiently.

But once a garden gets to that point, it produces an enormous amount of food. With the information I've seen from people who have done that, there's no reason to believe that you can't grow enough food to feed your family, unless you have an extremely small backyard. If that's the case, then I'd recommend doing some vertical container gardening.

Of course, that big a garden is going to require quite a bit of water, so unless you have some sort of a secure water source, you'll want to put a well in. If you can't afford a deep well, at least put in a shallow well, with a manual pump. That way, you'll at least have some water for your family and your garden.



It is possible to put in a shallow well fairly easily, unless you have very hard ground (lots of clay and rocks). The easiest way to do this is a driven well. This consists of driving a "well point" into the ground with either a sledge hammer or a fence post driver. The well point is attached to a piece of steel pipe, threaded at the end to allow you to attach additional pieces. This method can go down 20 to 25 feet, which is enough to provide some water, albeit not the best water, in a lot of places.

Obviously, you'll be better off if you start on your garden now, before the EMP hits. Experienced gardeners say that it takes at least a year to get the soil good in a garden, and the soil is the most important part. If you don't start early, you may not be able to produce enough food to live off of. That means you'll have to be living off your stockpile. Better that you can live mostly off of your garden, only supplementing it as needed from your stockpile.

That's why I have a large vegetable garden in my backyard and I'm putting in a pen for a chicken coop and a bee hive over the winter. I do as many outdoors projects like that as I can during the winter, because I live in the south. As far as I'm concerned, working outdoors in the summertime is something to be avoided as much as possible.

With a well and a garden, you're far along the road towards self-sufficiency. The next thing you will need to concern yourself with is an ongoing source of firewood. Hopefully you already have enough firewood stockpiled to get you through the first winter. But what about after that; what are you going to do then? Obviously, you'll need to continue cutting wood. So, you'll need the tools to continue cutting wood.

Building a New Life

With those three areas covered, you'll be able to survive. You've probably got a whole lot more than that already covered in your stockpile, including things like medical supplies and clothes. But you may not have prepared to repair the things that have been damaged by the EMP.

With so much electronic equipment being damaged, it would be a good idea to stockpile the parts to repair things you have in your home, or at least the ones that you need. These should be stored in your Faraday Cage, protecting them through the EMP.

- Charge controller for your solar power system
- Voltage inverter for your solar power system
- Computer brain for your car
- Electronic sensors for your car
- Electronic controls for your refrigerator (if it has them)
- Electronic controls for other appliances
- A kindle or tablet with kindle on it, stocked with your books, especially survival and how-to books
- Radios - shortwave, Ham and local walkie-talkies
- Assorted switches for repairing equipment and appliances
- Spare pump for your well
- A multi-meter

You have to realize that your post-EMP life will probably never be the same as your pre-EMP life. To start with, you're going to spend a fair amount of time just trying to survive. Growing your own food, pumping your own water and cutting your own firewood takes time; time that you didn't have to spend before.

On top of that, there's the problem of your former profession. Chances are, there will be no need for your former job in the post-EMP world. Instead, you'll have to take an inventory of your skills, and look to see what you can do, which will be useful to the people living around you. Repair skills of all sorts will be in high demand, almost as high as survival skills. Medical skills will be needed too. But most people will spend a good portion of their time growing food.

But you will want to go beyond just surviving. In some way or other, society will have to be rebuilt. It may not look like the pre-EMP society, but there will be a need for people to work together, in order to raise their lives above mere sustenance level. That's the foundation of society; working together to do more than just merely survive.

Big business will be gone and people will have to go back to cottage industries. Building something in your home, garage or backyard that others can use, will be a start towards creating localized commerce. At first, you may end up bartering those items, rather than selling them for cash. Still, it will be a beginning and will encourage others to look at what they can do as a cottage industry as well.

Take a look at the skills you have now, with an eye towards what you could do in a post-EMP world. If you have skills that would easily transition into a post-EMP cottage industry, then it would be a good idea to stockpile the necessary tools and supplies to use in getting that business started. Granted, you probably can't stockpile enough to last, but at least enough to get started. Look around for suppliers as well, so you know where to go in the aftermath of the EMP, to look for more materials.



That may mean scavenging those materials, but by the time you get to that point, the people who originally owned those materials may very well be dead. A large part of rebuilding society will end up being done with scavenged materials, until society gets to the point where industry can be reinstated.

It will probably take a few generations for the United States to get back to a fully-industrialized society. We will lose the race against time, with people dying off before the electrical grid can become restored. Some pockets may remain more modern, due to being close to a power plant, and those will serve as the nuclei to rebuild modern society. For the rest of us, we'll need to operate our cottage industries and rebuild local commerce, while we are waiting for electricity and industrialization to catch up with us.

Repairs and Restoration

Repairs and rebuilding will start on an individual level and then move up to a community level. People will need to be able to rebuild their own lives, before they are able to pull together to help out others. While some communities will do better than others in working cooperatively, these will be small, isolated communities which have the capability to pool existing resources.

The parts you stock in your Faraday Cage should allow you to repair at least some of your home's electronics. The priority will be getting your off-grid power operational, so that you have something to power things with. Once that is functional, you'll want to move on to repairing your car and appliances, as needed.

In most cases, appliances can be repaired by replacing controls with switches. If you look at the schematic diagram for these devices (often included in the owner's manual or on the back panel), you'll see the symbols for motors, switches and a box with lines running out of it that is the "brain," if the appliance is sophisticated enough to have more of a control panel than a few switches. But all this controller or brain does is switch things on and off. So, it can be replaced by switches.

Take a washing machine, as an example. A modern washing machine with a touch panel control really isn't any more sophisticated than older models. It has a motor, transmission and valves to allow water in and out. If you had to, you could put individual switches on each function, toggling them yourself to operate the washing machine. Maybe it wouldn't be as convenient as it was before, but it will still be a whole lot more convenient than doing the wash by hand.

Education

One of the most important things we can do in that time is to work to preserve knowledge. Rebuilding a modern, industrialized society means that people will need to know how to live and work in that society. If we allow our educational level to drop back to that of the 1800s, our children or grandchildren won't be ready when that society catches up with them.

That means that we're going to have to teach our children how to live in two different centuries at the same time. They will be living in a 1800s type society, so we'll have to teach them how to live and work in that society. But a 21st century society will be working to catch up with them. When it arrives, they'll need to know how to operate in that society. So, we'll need to teach them that as well, even though we won't have the working equipment to teach them how to use.

Taking that idea a step further, parents should teach their pre-EMP professions to their children, as much as possible. Once again, we can't afford to lose that knowledge. Considering the vast reduction in population, there will be no way of knowing how many people survive with that skill set. If a parent doesn't teach their child, those skills could be lost forever.

Rebuilding Society's Infrastructure

Once we get to the point where we are all surviving and starting to rebuild our lives, the next step will be to start rebuilding society's infrastructure. This will start with simpler things, such as some hard-wired local phone service and reopening municipal water supplies. While this might actually be accomplished by the people who worked in those industries, we can't count on that. We will all probably have to pitch in and participate in rebuilding whatever we can.

If you have stored things that will help society to rebuild, even on a local level, it will give you a position of importance in the new society. Take radios for example. If you are the only one who has radios in the community, you'll automatically become the community's prime communicator.

Once again, we'll find that people with repair skills will be in high demand. Mechanics, mechanical engineers, electrical engineers, linemen, people in the building trades and general repair people will be the ones that the rest of society counts on to do the bulk of this rebuilding process. If you have those skills, you will be an important part of rebuilding.

But before this can happen, local agriculture will have to grow to the point where it is possible to produce enough food for everyone to eat, without everyone working to grow food. The people who are rebuilding society will need food to eat as well, just as everyone else will. So, others will have to grow their food, so that they can concentrate on rebuilding the infrastructure.

Food will probably become the money of this time period of rebuilding. In every country where there is a financial collapse, food becomes the basis of the barter economy which rises up. Why would it be any different, especially when you consider that food will be the most commonly needed item.