

**Five pages of the recent Solar and EMP discussion in April of 2018 – below –**

H Newton <figgure@yahoo.com To: Charles Babbitt, Chad Burrell, Dave Bachtel, Sonny Smith, michael.p.velez@gmail.com, Apr 27 at 2:31 PM -- To the Data reduction team.

See the **several technical conversations below on emergency power via solar panels** and EMP. Jerry Emanuelson in Colorado has an excellent web site devoted to EMP and related issues. I have **attached** a relevant PDF from his site **that has within it 5 good references**. I got the reference from Jim's recent answer to the questions at hand.

see [www.futurescience.com](http://www.futurescience.com), I note that Charles Babbitt indicates he is close to placing the EMP data from Dave Bachtel into his new math program. Henry –

--- Forwarded Message -----

**From:** Jerry Emanuelson <emp@futurescience.com

**To:** H Newton <figgure@yahoo.com

**Cc:** "f.b.grosz@ieee.org" <f.b.grosz@ieee.org ; "team@lagridcoalition.org" <team@lagridcoalition.org ; Dave Phelps <dave@phelps.net

**Sent:** Friday, April 27, 2018, 2:11:40 AM CDT

**Subject:** Re: Nuclear EMP Simulations & Research & Solar Panels

Some of the following may have already been mentioned; but even if it has, it deserves repeating.

(1) The Swiss Federal Government has done a recent report on EMP and solar panels. They found that monocrystalline and polycrystalline silicon solar panels survived simulated EMP of up to the 150,000 volts/meter limit of their simulator. They did not test any of the newer thin-film solar panels. It is also possible that changes in manufacturing methods in silicon solar panels could change their EMP sensitivity. That November 2016 report can be found at:

<http://ece-research.unm.edu/summa/notes/SDAN/SDAN0047.pdf>, =

Un of New Mexico that has a huge collection of information

To completely protect the panels, a two-dollar TVS diode is necessary at the output of each panel to protect against voltage transients coming in through the external wiring. (A 25-cent TVS diode would probably be adequate, but it is better to have a larger one.)

(2) The conventional idea of connecting home solar panel systems up using so-called "net metering" is the worst new idea developed in electrical engineering in more than 100 years.

A secondary industry has sprung up offering products and services to undo the "net-metering" hookups and to re-connect the solar panel system in a useful way. At least three national companies are involved in this industry. Whenever the local bulk power grid goes out, and people find out that their solar panel system will not function at all with the power grid down, this secondary industry gets a surge of new customers.

Unfortunately, the secondary industry involved with replacing the net-metering hookups is not yet doing any EMP-hardening.

(3) It is quite feasible to have two different electrical systems in a house as long as the two systems share a common ground, are otherwise wired to electrical codes, and the two

systems are synchronized (phase-locked) together. The phase-lock connection is only a voltage reference point and, since there is a negligible power transfer between the local inverter and the power grid, this connection is rather easy to EMP-harden. The two systems cannot be directly connected together. Each power system must supply power to different items. The common ground at the main circuit breaker panel is critical, though.

Some people put critical items on the local solar power systems and let non-critical items run on the power grid. Manual transfer switches are usually installed in case the local solar power system fails. This sort of connection has been done for years in homes and other buildings with standby generators that are not large enough to always power the entire facility. There are standard circuit breaker panels for this sort of thing.

In spite of popular opinion, manual power transfer switches without any electronics are still very common items and are still widely used. Many people still prefer fancy automatic power transfer switches operated by micro-electronics. A common cause of local power grid failure is lightning strikes. An electronics board inside of an automatic transfer switch that has just taken a direct lightning hit looks just like you imagine it would look. (A homeowner who has been sitting in the cold and dark for three days because his fancy electronic transfer switch was burned out by the same lightning strike that took out his local power grid also looks just like you imagine he would look.)

(4) Storage roughly doubles the cost of a solar power system. There is little that can be done about this right now at the individual level. At the national level, though, the NOAA Earth System Research Laboratory has come up with a plan to eliminate the need for storage while powering the nation mostly on wind and solar (with some natural gas generation).

The NOAA plan would also EMP-harden the nationwide power grid (although there would undoubtedly still be some local outages after an EMP event). George Washington University hosted a seminar on this proposal last November, and 4 comprehensive presentations, totaling about an hour of viewing time, are now available on YouTube. See: <https://www.youtube.com/watch?v=Xz4zeHHQ1gg>  
<https://www.youtube.com/watch?v=RQCIFQ9qVE4>  
<https://www.youtube.com/watch?v=A-sUoEUcLW8>  
<https://www.youtube.com/watch?v=ryV2B9876IA>

Jerry Emanuelson

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 On Thu, 26 Apr 2018 15:22:43 +0000 (UTC), H Newton <[figgure@yahoo.com](mailto:figgure@yahoo.com)>  
 wrote: To: Dave and all concerned about Solar Panels/EMP

The conversation below is valuable to all members and folks on the distribution. This discussion is a valuable method of spreading the word and a way of contributing to the discussion. We need more of these Q&A sessions on a random basis. Please add to this conversation on EMP and Solar Panels. Attend "BSides

NOLA- 2018" on May 26th all day Saturday at the Roosevelt Hotel - Cost \$15.00 --  
 Henry Newton P.E

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On Thursday, April 26, 2018, 9:27:28 AM CDT,  
**Dave Phelps** wrote: Thank you for your valuable comments Henry and Francis!

I'm aware that Solar Energy is really only competitive against gas and other conventional power supplies when it's subsidized and connected to the Grid. In my area, the electric supply companies will not allow you to 'sell' power to them on a net basis, just to use them to 'smooth out' the supply/demand ie use them as a battery/power storage. This still makes the solar option viable.

To operate off-grid and dependent on expensive-to-buy-and-replace batteries means the economics are unfavorable. It seems to me that low-cost battery-development is proceeding very slowly. Lead-acid is still a contender!!! Other energy storage technologies - pumping water, gas compression, powering rail-cars up a hill, are still expensive. Companies touting grid independence usually ignore this...

As far as I am aware, to have a truly independent micro-grid you have to be physically disconnected from the National Grid - until breakers able to operate in Nano-seconds are available. Thus you have to swallow the capital/operating costs for the benefit of being independent.

Independent Micro-grids are intrinsically hard against Solar E3 since they use short transmission/Distribution lines. Although theoretically immune to man-made EMP E3, this is irrelevant since man-made EMP is always (?) preceded by E1. Micro-grids are as vulnerable to E1 as the National-grid - a reality usually ignored by Micro-grid advocates... Please correct me if I'm wrong here!

This comes back to the need for truly intrinsically-hard Solar Panels. Hardened against conducted and radiated E1. I'm assuming that the rest of the system can be hardened using faraday cages etc. - at a price.

We badly need Solar Panel test results - witnessed and certified against agreed National Standards. That raises another issue – current standards, as far as I am aware, require resistance to 50 kV/m while our adversaries contend they can produce 200 kV/m.

I would truly value your further thoughts and especially corrections. During my many years in industry, including new product development, **I learned that bouncing ideas off each other is the best (in some cases the only) way to victory!**

Dave Phelps

-----Original Message-----

From: Francis Grosz [mailto:[f.b.grosz@ieee.org](mailto:f.b.grosz@ieee.org)] [1]

Sent: Wednesday, April 25, 2018 1:21 PM To: H Newton

Cc: Dave Phelps; H Newton; Jim LeBlanc; Nathan Wallace; Francis Grosz

Subject: Re: Nuclear Mathematical EMP Simulations when the solar panels are providing excess energy that is put onto the grid (causing the meter to "run backwards" and reduce the bill), and at night or on a cloudy day they take power from the grid. They

require a 60 Hz. grid supply to function and shut down if this is absent.

The reason for all this is to avoid the cost, expense, and maintenance headaches of a large storage battery system. They avoid this by using the grid as the storage medium. (Which creates a whole host of other problems for the grid, but that's another story.)

Re-newables will really become effective if and when we develop an efficient storage mechanism. But absent such a storage system, solar, wind, etc. are ineffective as an emergency power supply. This is something a lot of people miss.

Francis Grosz

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On Wed, April 25, 2018 11:58 am, H Newton wrote:

Dave: Thanks for your comments below. I tend to agree on your solar panel comments although I have not put any serious study on that hardware. I do need more sources so I have copied Nathan, Francis and Jim to see what they may have for resources.

Also I am looking for more documents describing Gas Boosting on 3rd and 4th generation Nuclear weapons in order to do some "guess" estimating of the newer reactions within the weapon. This in turn may provide a few equations or factors of influence on obtaining a 50k V/M on any antenna. BTW ... the Louisiana Grid Coalition had a good team meeting on EMP

yesterday. - Henry Newton

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On Tuesday, April 24, 2018, 8:42:54 AM CDT, Dave Phelps wrote:

Thank you for copying me on you communications Henry. I was struck by the report on Solar Panel testing. It seems that the panels are generally intrinsically hard against high EMP field strengths. The by-pass diodes need some work to resist conducted effects " but the challenge seems manageable.

Are you aware of any other Solar Panel/System testing going on or planned? I agree with the comment in the article that Solar could offer true local emergency readiness capability against a major grid outage. I don't know of any other source of energy that offers this capability. Wind/geothermal/tide/wave/hydro are very site-specific and not a universal solution. Fossil fuel-based emergency generators demand storage and can only offer weeks or possibly month's operation. Nuclear Micro generators (SMR's) are interesting but realistically are still in development. So, Solar seems to be the only realistic option!

- Dave -

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From: H Newton [mailto:[figgure@yahoo.com](mailto:figgure@yahoo.com)] Sent: Wednesday, April 18, 2018 11:31 AM -- To: [team@lagridcoalition.org](mailto:team@lagridcoalition.org) [4] Cc: [jerry@x5dna.com](mailto:jerry@x5dna.com) ; Dave Phelps; H Newton -- Subject: Nuclear Mathematical EMP Simulations Ongoing Research  
To all members of the Louisiana Grid Coalition:  
As you all know the Louisiana Grid Coalition has very slowly but very deliberately has been moving at a snail's pace to verify the graphs, assumptions, logic, and COMPLETENESS of the Thesis by Terry Chapman (1973). The pace has been dictated

by available volunteer labor of younger non-retired technical people for this particular stage of work.

A major milestone was met in the verification of Thesis Figure 5 that showed a curve and the target volt/meter (6,448) value. Our 3 PhD's also came up with a different set of solutions that have been listed for months in this drop box. - <https://goo.gl/7aJqj4> .

The current first mailing of EMP documents in April ( attached ) represents the necessary **basic knowledge required** to verify the remaining Thesis goal. e.g. 50,000 V/M with a reasonable basis. The Air Force document does not show any proof of this 50K number, but shows the anticipated curves of what can be attained. All work done in the Chapman Thesis is the basis of the widely quoted Thesis by Capt. Louis Seiler.

The data reduction team is using the documents in this April mailing to propose calculations that MAY offer a reasonable explanation of how to obtain the new target value. This new effort probably will take some weeks or months to figure out. Gas Boosting is the secret to solving the problem. Gas boosting was never mentioned in the Thesis but HAS TO be considered from an Engineering point of view. Gas Boosting documents and related EMP items are attached.

On April 24th our presentation to the LA Grid Coalition meeting will indicate a proposed new math tool that we think will help our efforts significantly.

Henry Newton - Professional Engineer & MBA - A Coach for the Team.  
 Founding President of InfraGard in New Orleans Note: Looking for young technical folks that like a challenge !!!