

RESISTANCE

BY STEVE HUNTOON

Microgrid Kool-Aid and National Security

The microgrid Kool-Aid keeps gushing out of the firehose. I wrote a while back about why microgrids are an irrational throw-back to the utility islands of the late 19th century.¹



In a nutshell, microgrids cannot improve on the efficiency of centralized, least-cost dispatch. And in terms of adding reliability, authoritative case studies by the New York State Energy Research and Development Authority found that microgrids would make sense only if annual customer outage time was measured in weeks, rather than the reality of a couple hours.

Yet microgrid proposals continue to proliferate. Especially where subsidized with Other People's Money.²

This column focuses on a microgrid study involving our military bases.³ This is important not only because taxpayer money is involved, but because our national security is involved.

This study, by a consultancy called Noblis, with assistance from ICF, concludes that replacing backup diesel generators at individual military buildings (the status quo) with diesel/natural gas microgrids at military bases would save money. Their concept is shown in the study's Figures 4 and 5.

The study includes an incredible amount of modeling and data, no doubt costing its sponsor, Pew Charitable Trusts, a ton of money.

Yet the study is *profoundly wrong*. The profound error is shown by this "Ownership of infrastructure" pie chart from a Government Accountability Office study,⁴ showing who owns the infrastructure responsible for significant outages.

You can see that 87% of outages on military facilities arise on the military's own distribution systems. Microgrid generation would be dependent on these distribution systems to deliver electricity to individual buildings. Thus, microgrids would cause individual buildings to lose backup for 87% of outages — *eliminating the vast bulk of backup*.

How could such a profound error be made? The study wrongly assumed that distribu-

tion system outages aren't significant, saying: "Although inside-the-fence problems account for some (unknown) share of all outages, on-base problems can generally be solved through improved maintenance of the base and straightforward investments (e.g., keeping trees trimmed and putting wires underground)."

Instead, on-base problems account for 87% of all outages.⁵ And if they were easily avoided, they would be.

In Rumsfeldian parlance, on-base problems are not a "known unknown," but instead are a "known known." The study's profound error was not recognizing this known known.

And another important national security consideration: cybersecurity. The Noblis study talks a lot about cybersecurity, but nowhere does it acknowledge that for microgrids to function as intended, they must have communications links with the greater grid, exposing them to the same cyber risks as the rest of the grid. Backup generators at individual buildings do not need any communication link outside the building.⁶

Beyond these two vital national security considerations, please note one other glaring oversight in the study. This one involves the estimated cost of microgrids.

The study goes through a lot of hypothetical numbers to come up with a capital cost of \$17.4 million for a hypothetical microgrid of 24 MW, which works out to \$725/kW.

Problem: The Defense Department's most recent microgrid project at Marine Corps Air Station Miramar in San Diego cost \$20 million for 7 MW.⁷ That works out to \$2,857/kW, which is about 400% of the study's cost estimate. The study mentions the Miramar microgrid but somehow doesn't connect the dots to its project cost.

An ounce of fact is worth a pound of hypothetical.

And speaking of fact, the nation's "flagship" microgrid at the University of California, San Diego flunked its acid test in the Southwest Blackout of 2011. The campus shut down with the rest of San Diego.⁸

You can't make this stuff up.

In Rumsfeldian parlance, on-base problems are not a "known unknown," but instead are a "known known." The study's profound error was not recognizing this known known.

Steve Huntoon is a former president of the Energy Bar Association, with 30 years of experience advising and representing energy companies and institutions. He received a B.A. in economics and a J.D. from the University of Virginia. He is the principal in [Energy Counsel LLP](http://www.energy-counsel.com).

¹<http://energy-counsel.com/docs/Microgrids-Wheres-the-Beef-Fortnightly-November2015.pdf>.

²Not all the news is bad. Pennsylvania's consumer advocates got PECO Energy to abandon a \$35 million microgrid dalliance, and it appears hundreds of millions for Commonwealth Edison microgrids got cut from the Illinois Future Energy Jobs Act, approved in December, which provides zero-emission credits for Exelon's nuclear generators.

³<http://noblis.org/media/b6a465e0-4200-42d8-9377-5f20251e52c0/docs/Environment/Power%20Begins%20at%20Home-%20Noblis%20Website%20Version.pdf>.

⁴<http://www.gao.gov/assets/680/671583.pdf>. Figure 3: Disruptions lasting eight hours or longer in fiscal years 2012-14 as reported to GAO by 18 Defense Department installations inside and outside the continental U.S. The data include wastewater and potable water disruptions, but the vast majority of the disruptions are electric.

⁵This is consistent with outage causation outside of military facilities. About 90% are attributed to the distribution system, as opposed to the higher voltage transmission system. See <http://www.eei.org/issuesandpolicy/electricreliability/undergrounding/documents/undergroundreport.pdf>, Figure 3.3. (Compare the customer interruptions on the combined transmission/distribution system to interruptions on the distribution system alone). One driver of this is that the transmission system is designed with redundancy, so that if one element (a transmission line, a transformer, etc.) fails, there is no loss of service. The distribution system generally is not designed with such redundancy.

⁶Individual backup generators also would seem less vulnerable to electromagnetic pulses (EMPs) because they are simpler, not connected to the grid, and do not operate unless there is an outage. Noblis says that EMPs are "beyond the scope of this report" (footnote 10), which begs the question: "Why?"

⁷<https://microgridknowledge.com/military-microgrid-projects/>.

⁸<http://www.eenews.net/stories/1059996047> ("The university's two 13.5-MW Trident turbines were running full-bore when power from the utility abruptly went dead. With no time to shed their load, the turbines also shut down, and the campus lost electricity.")