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## **Hardening of Systems, Microgrids, Energy Storage and Battery Components**

California Energy Commission -- testimony provided by Charles L. Manto of Instant Access Networks, LLC (chuckLmanto@gmail.com; (410) 991-1469) (slightly edited version of the earlier document for better reading)

The DOE-funded study published by NREL in November 2020 entitled, "Research Roadmap for Grid-Forming Inverters" focuses on widespread and long-term electric power grid disruption and damage that will be created more frequently by the emerging interfaces of the bulk electric power system with intermittent renewable energy sources. The nature of these disruptions is described in sections 3.4-3.6 as electromagnetic transients that act as accidental electromagnetic attacks on the grid and its customer facilities and equipment by the grid itself. The report calls on the industry to be able to black-start the grid from the bottom up using "grid-forming" as opposed to "grid-following" inverters. The US Department of Defense declared in 2015-2016 that they are no longer able to count on commercial power grids to serve military bases and the infrastructure they need such as hospitals, communications networks, and water utilities because of the lack of protection from various electromagnetic threats. (See [www.InstantAccessNetworks.com](http://www.InstantAccessNetworks.com) section on News quoting the press release from DOD.) Now it has become apparent from the NREL report of 2020 that one of the most important electromagnetic threats that will grow more frequent and dangerous will come from the accidental electromagnetic threats generated by the combination of the bulk electric power system and new renewable energy and distributed energy systems such as electric vehicle charging systems. Therefore, there is an urgent need to 1) protect all grid infrastructure and the facilities and equipment using power grids from electromagnetic threats (especially but not limited to accidental ones) to the extent understood by pertinent military standards such as MIL STD 188-125, and, 2) create electromagnetic protected local energy systems including power generation, storage, control, and usage as outlined by the response of Instant Access Networks in its Resilient Adaptive Modular Microgrids approach in its Phase I SBIR report to DTRA as part of its SBIR contract #HDTRA1-16-P-0025 in 2016 and subsequent Phase III reports to the Wyoming Military Department in 2019.

As a result, Instant Access Networks, LLC (IAN) recommends that the state of California include incentives for stakeholders to create resilient local energy systems to provide a meaningful portion of critical energy needs that will continue to work when larger, centralized power systems fail. Ideally, these systems would work both as grid-connected energy resources and continue to operate in island mode as grid resources become the root of damaging electromagnetic transients or grid collapse.

IAN further recommends power utilities be incentivized to facilitate the sale of user-

generated energy into markets in such a way that early adoption of local energy systems can become self-funded sooner. This allows quicker deployment and adoption of safe and environmentally sound local energy systems in a widespread and equitable manner. This model also protects the revenue generated to the benefit of the investors of the local energy systems whether owned by the users, utilities, or third parties.

IAN looks forward to answering questions as to how this might be done and how private-sector investment can be leveraged to expedite the noble goals of the California Energy Commission.

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*Additional submitted attachment is included below.*

California Energy Commission -- testimony provided by Charles L. Manto of Instant Access Networks, LLC ([chuckLmanto@gmail.com](mailto:chuckLmanto@gmail.com)); (410) 991-1469)

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