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Comments for Case No: CEPR-IN-2017-0002: Microgrids - Scott Sklar, Adj Prof, GWU & President, the Stella Group, Ltd.

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Mon, Nov 20, 2017 at 4:14 PM

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TO: Commonwealth of Puerto Rico Energy Commission
By e-mail: comentarios@energia.pr.gov

FR: Scott Sklar, Adjunct Professor, The George Washington University,
And President, The Stella Group, Ltd.

RE: Comments for Case No: CEPR-IN-2017-0002

I am writing you by someone who teaches distributed energy at The George Washington University (GWU) in Washington, DC, has seminars at the Industrial War College (ICAF) at Fort McNair, and whose business has coordinated over 32 microgrid projects all over the world.

Puerto Rico should not rebuild the same type of grid, just sturdier. Advancements and new technologies including hardware and software make the older grids pale by comparison in reliability, resiliency, and efficiency, which means lower costs to ratepayers. My views on this were published in “The Hill” on October 4, 2017 on Puerto Rico’s grid: <http://thehill.com/opinion/energy-environment/353869-puerto-rico-needs-microgrids-and-private-buy-in-for-reliable> and a longer article in the December issue of Solar Today magazine published by the professional association: the American Solar Energy Society (www.ases.org).

In the article I note that in August 2016, GTM now forecasts that U.S. microgrid capacity will reach 4.3 GW by 2020, up from the research firm’s estimate last quarter of 3.71 GW. The U.S. currently has about 160 microgrids with 1,649 MW of capacity. (<https://microgridknowledge.com/us-microgrid-market-gtm/>).

I elaborate further that, “Rather than re-establishing the old improved grid version, let’s allow the local governments and the private sector to develop a far more resilient, multi-technology network that mimics our resilient networks – by segmenting the electric grid (which could be an upgrade of existing wires and

transformers within the segments), and then divide the segments into their own operational microgrids.

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When problems occur the regional segments can isolate quickly and passively from each other (via smart sensors and controls), and the same could be true for the microgrids and community grids within each regional segment – meaning not everything needs to go down when the grid is harmed.

Of the three main components of the microgrid generation infrastructure automation and control — the microgrid controller is usually the smallest part of the overall project budget. The cost will vary based on the microgrid controller’s sophistication and project complexity, according to Microgrid Knowledge. They quote experts, “Sources we’ve interviewed cite project proposals as low as \$250,000 to as high as \$100 million. Generation typically accounts for most of the cost.” This is true, in my experience. By developing smaller microgrids within a segmented grid, each microgrid can be financed based on the character of its end users – institutional such as local governments and hospitals, commercial and industrial, rural customers possibly under a cooperative format, and then traditional residential and small commercial customers possibly under a community solar approach used throughout the mainland USA. Please see GWU Community Solar Handbook, released in October 2017, of which I am a coauthor.

<https://sustainabilitycollaborative.gwu.edu/sites/sustainabilitycollaborative.gwu.edu/files/image/Community%20Solar%20Handbook%20for%20Municipalities%20-%20Oct%202017.pdf>

There are very many ways to analyze costs and benefits, but all my projects have been cost effective to the customer, obviating needs to back up generators, O&M, testing, trade-out of fuels, and absolute reliability along with resiliency. Here are some sources for economic analysis and benefits that are noteworthy:

Analyzing Costs and Benefits of Microgrids (NYS) March 2015

https://benefitcostanalysis.org/sites/default/files/public/D4.1_Morrison%20-%20Microgrids_0.pdf

NREL – Developing, Testing and Deployment of Microgrids

<https://www.nrel.gov/grid/microgrids.html>

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LBL – Framework for the Evaluation of the Cost and Benefits of Microgrids
2011 (cost data is old but framework holds)

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.228.9670&rep=rep1&type=pdf>

Optimization of Power Production and Costs in Microgrids

March 2017 Springer

<https://link.springer.com/article/10.1007/s11590-016-1010-z>

Evaluating the Business Model for Microgrids: Interactions of Technology and Policy April 2017 Elsevier

<http://www.sciencedirect.com/science/article/pii/S0301421517300101>

I also wish to make clear that a host of US universities* are ready to assist Puerto Rico in guiding the regulations, specifications on the technologies, assistance with private sector and philanthropic financing, for a cost-effective, more reliable and resilient grid. The expertise exists, the technologies exist, and hopefully the will power exists to make this important step as we have done in the past to upgrade and establish self-healing grids in our communications, and now our information datacenter networks.

Respectfully submitted,

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The Stella Group, Ltd. is a strategic technology optimization and policy firm for clean energy users and companies, with a focus on system standardization, modularity, and web-enabled diagnostics. Scott Sklar is an Adjunct Professor at The George Washington University teaching two unique interdisciplinary sustainable energy courses, and an Affiliated Professor with CATIE, an international graduate university in Costa Rica offering graduate degrees on sustainability. Sklar chairs the Steering Committee of the Sustainable Energy Coalition. On June 19, 2014, Scott Sklar was awarded the prestigious The Charles Greely Abbot Award by the American Solar Energy Society (ASES) and on April 26, 2014 was awarded the Green Patriot Award by George Mason University in Virginia. Sklar was re-appointed to the US Department of Commerce Renewable Energy and Energy Efficiency Advisory Committee (RE&EEAC), where he served as its Chair, (ending in June 2016) and re-appointed onto DOC RE&EEAC and serves as Vice Chair through June 2018.

His peer-reviewed paper on zero-energy buildings was published on zero energy buildings in 2013, "Perspective on multi-scale assets for clean energy technologies in buildings" and is available as 'Online First' on Springer Link <http://www.springerlink.com/openurl.asp?genre=article&id=doi:10.1007/s10669-013-9475-0>

"The Future of Personal Energy Use " presented by Scott Sklar ... - [TEDxTalkstedxtalks.ted.com/video/The-Future-of-Personal-Energy-Use](https://www.ted.com/video/The-Future-of-Personal-Energy-Use) Apr 7, 2015 ... The **convergence** of personal power with personal security, personal transportation, personal communication, and personal networking.

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