**Highlights of June 23, 2020 Climate Adaptation Forum**

**Microgrids: Resilient Electricity for a Changing Climate**

**Rob Graff, DVRPC’s Manager of the Office of Energy and Climate Change**, kicked off the event, went over webinar logistics, introduced the panelists, and provided several questionnaires to engage the audience. The panel introduction portion of his recorded presentation is available to view [LINK TO *\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Recording\Compressed\1 - Panel intro.mp4*] (Length 2:10).

Panelist biographies are available to download [LINK TO: *\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Bios\All bios.pdf*].

**Baird Brown, Principal, eco(n)law LLC and co-council to the Microgrid Resources Coalition**

His recorded presentation is available to view *[\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Recording\Compressed\2 - Baird Brown.mp4*](Length 20:15) and his slides are available to download [*\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Slides\DVRPC Microgrids -- Baird Brown.pdf*] .

Baird shared a graphic showing where energy consumed in the US comes from by source (wind, natural gas, coal, etc.). Important takeaways:

* Significant percentage growth in the amount of energy derived from solar and wind (though it still accounts for a small percentage of energy overall)
* Increase in the amount of residual or “wasted” energy produced by the system, which has grown by 14 percent in the past decade.
* US energy consumption continues to increase year over year, with 2018 being the highest on record (data was not yet available for 2019 at the time the slide was produced).

What can we do to improve the situation?

* Increase energy efficiency
* Use cleaner energy (but be flexible and don’t pick technology winners and losers through policies - it’s an evolving and iterative process)
* Convert transportation sector to electricity
* More customers should be generating their own electricity (i.e., Microgrids!)

Baird’s next slide defined a Microgrid (see slide). It’s called a “grid” because it’s a control area that can balance itself, i.e., energy generation matches use. A microgrid can run by itself without being connected to the larger grid.

Benefits of microgrids:

* Microgrids can run when the power is down. Princeton kept their grid running during Superstorm Sandy.
* You can save money
* Reduce the carbon footprint
* You can sell power
* Incorporate renewables

Barriers to microgrids:

* 100-year old regulations favoring universal monopolies
* You can’t supply power to the public - you can only serve your own needs on your own (typically contiguous) property. For example, a commercial or residential landlord can serve their own tenants. However, if you own facilities at different locations, it’s still a problem.
* It might be possible to form co-ops to get around the regulatory restrictions
* There are different opportunities and barriers in PA and NJ.

The PA Guaranteed Energy Savings Act is a flexible mechanism for communities to finance microgrids

**Ben Parvey, CEO of Blue Sky Power**

His recorded presentation is available to view [*\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Recording\Compressed\3 - Ben Parvey.mp4*] (Length 17:29) and his slides are available to download [*\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Slides\DVRPC Microgrids -- Ben Parvey.pdf*].

Energy shouldn’t be a concern in times of uncertainty, but it can be, i.e., 1.3 million people were without power in the southeast in April during the height of the pandemic. The electricity grid is aging and archaic. Transmission wastes too much power.

Renewables, localized generation and microgrids can be a solution to this problem -- prices for these technologies are continuously coming down and there is now lots of capital available for these investments.

Local, off-grid power is now competitive with grid power.

You don’t waste as much energy when you generate power on-site. 3 options for on-site generation:

* Distributed generation - localized solar, fuel cell, etc.
* Grid-tied microgrid - combines multiple forms of generation (can operate in island mode independent of the grid)
* Community microgrid (operates completely independently of the grid) - military is leading the charge for this option

Project Financing - An Energy Service Agreement is standard for microgrid financing.

Project Process

* A year to 18 months from concept to full implementation
* Understand the loads of facilities and the overall power demand
* Cost estimating
* Create an energy model
* Create finance model
* Approval, contract review, funding commitments, final closing, permitting and construction

Question: Does a microgrid need to have connections to the larger grid?

* You can tie into a single meter - preferable - however, there are opportunities to connect multiple meters into a microgrid. Microgrids can operate independently of the grid if they want to.

Question: How is 70 percent of the power wasted?

* Most energy (approx. two-thirds) is lost to heating up the environment.

**Joe Sullivan, VP Energy Policy and Development, Concord Engineering**

His recorded presentation is available to view [*\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Recording\Compressed\4 - Joe Sullivan.mp4*] (Length 18:29) and his slides are available to download [*\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Slides\DVRPC Microgrids -- Joe Sullivan.pdf*].

Who owns a microgrid?

* Privately-owned campuses
* 3rd party-owned microgrid on a private campus
* Utility-owned microgrid on a contiguous or non-contiguous property
* Utility-private sector hybrids

Key definitions:

* A microgrid provides a significant amount of normal power on-site; it’s not back-up generation
* Joe’s slides also provided definitions for Combined Heat and Power, Distributed Generation, and Resiliency

Technologies are getting much better at providing generation at point of use. This is disrupting the 100-year old model of centralized generation.

Future electric grid includes many components. One is storage. One of the oldest forms of storage, pump storage, is one of the most efficient, but you need hilly terrain.

Microgrids are now as efficient as central power plants.

Different development or ownership options:

* Private (contiguous) Campus - traditional wires
	+ CHP is usually part of this
	+ Typically only covers 70 percent of peak load
* Private campus - private wires
	+ military is a leading example
* Non-contiguous properties - challenging with our current regulations - you’re only allowed to serve electricity on-site and to a limited extent across the street
* Community or urban microgrid

Microgrids allow you to use the best or next-best source of power. An advantage of microgrids is that they ARE connected to the grid - you can buy power off the grid when it’s cheaper during off-peak hours (nighttime, typically).

Current regulatory environment - PURPA - paved the way for deregulation and opened opportunities for CHP.

Obstacles to microgrids:

* Standby charges
* Microgrid Resources Coalition is looking for fairness and equity - right now, table is tilted toward the utilities
* Interconnection costs can be substantial
* Siting of power sources is a challenge, especially in urban areas
* Relationship with incumbent utilities can be positive or negative

Proposed Favorable Regulatory Approaches

* Clear rights and responsibilities
* Support unbundling of growth and diversity of services on the grid
* A level playing field
* Assign a value to resiliency
* Define under what conditions utilities can own, operate and partner on microgrids

**Highlights from Q&A**

A recording of the Q&A session is available to view [*\44-040-Energy-and-Climate-Change\OECCI Regional Projects\Climate Adaptation Forum\2020-06-23 -- Microgrids\Recording\Compressed\5 - Q & A plus Close.mp4*] (Length 14:53).

How can PA cooperatives create microgrids?

* PA has a broad-based, flexible cooperative statute - you can build the cooperative in different ways to serve different purposes

Can a microgrid serve an entire municipality?

* No, a microgrid does not serve an entire municipality like a municipal utility does - it typically serves a couple of facilities or buildings that are adjoined or adjacent.

Give a simple explanation of SPARK spread?

* It is the amount of electricity generated by a unit of fuel.

Can someone compare and contrast the ESA and GESA model?

* They’re the same, except that an ESA doesn’t have a guarantee. The guarantee is important because it allows more flexible procurement.

Two resources for additional information on microgrids:

Microgrid Knowledge [https://microgridknowledge.com](https://microgridknowledge.com/)

Microgrid Resources Coalition <http://www.microgridresources.com/>

Wrap-up slides from Rob provided info on obtaining continuing education credits, July 14th’s companion webinar - *Preparing the Electric Grid for a Changing Climate* [LINK TO THAT WEBINAR, ONCE IT IS SET UP].