



RESILIENT

Leveraging DER's with Prosumer Microgrids

FREEDM Systems Center Annual Research Symposium – April 10-12, 2019

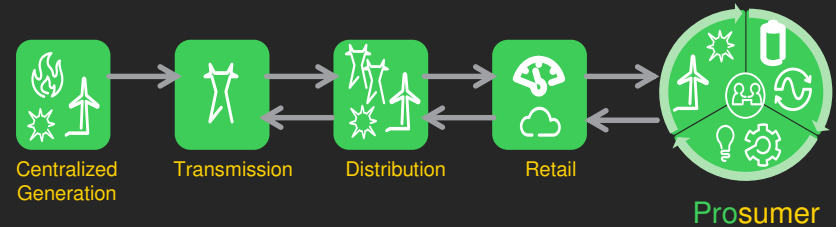
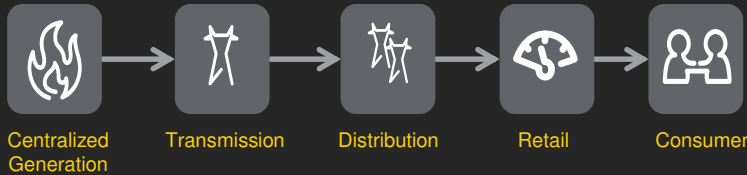
Andy Haun, Chief Technology Officer
Schneider Electric Microgrids Business

<http://www.schneider-electric.us/en/work/solutions/microgrid-solutions/>

We have an opportunity to co-create the future as *The New Energy Landscape* becomes...



Historical Energy Value Chain vs. “The New Energy Landscape”



...built around the Prosumer!

Prosumers come in many shapes and sizes

Microgrids are suitable for most every application, from industrial/commercial buildings to campuses

- Commercial Buildings
- Healthcare Facilities
- Data Centers
- Municipal Services
- Military Installations
- Transportation

Distributed energy resources are often already existing on site.



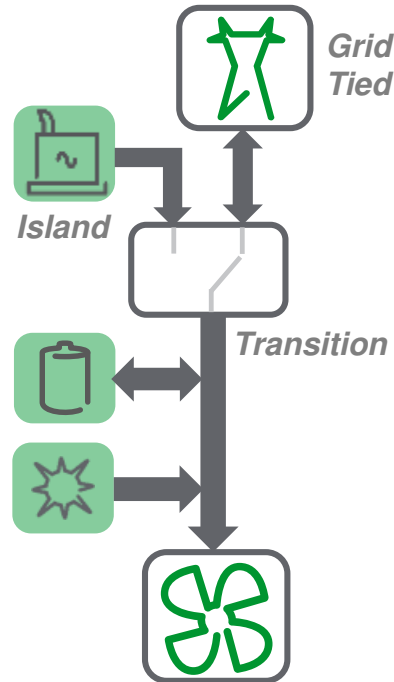
Prosumer Microgrids and the “Treble Triplets”

“Its about making wise choices at the intersection between energy smartly acquired, locally produced and efficiently consumed!”

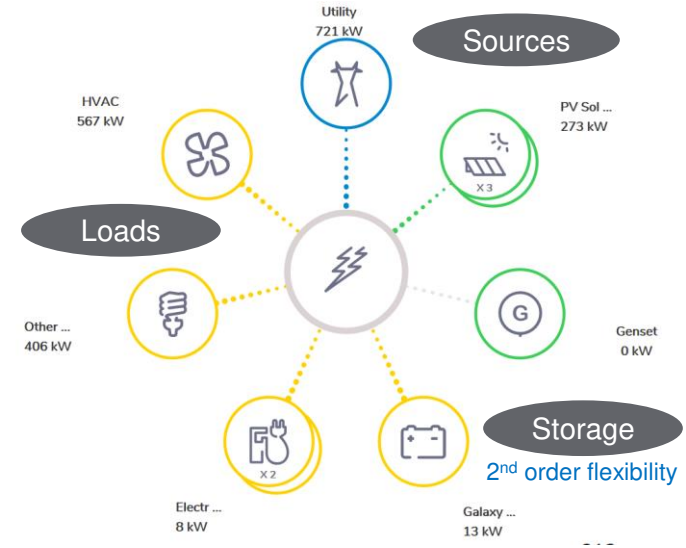
The “Prosumer”
Integrated Energy Outcomes



Power System Automation
Operating Modes & Architecture



Energy Management
Flexibilities & Optimization



Advances in Microgrid Control and DER integration are enabled by IT/OT Convergence

- ❖ Predictive DER management
- ❖ Interfaces with energy markets
- ❖ Integrate weather forecasts (DTN)
- ❖ Forecast when to produce & store
- ❖ Cloud based access anywhere

Energy Management Software

Client Constraints



Weather forecast (DTN)



Energy market pricing



Demand response requests



Microgrid Controller

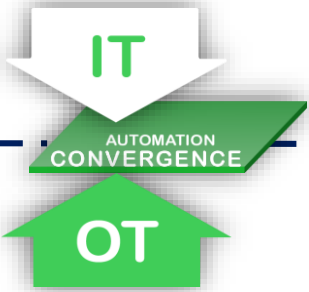
- ❖ Reactive DER management
- ❖ Ensures real time power stability & reliability
- ❖ Manage connect/disconnect from the grid
- ❖ Facilitate energy production & use



PCC

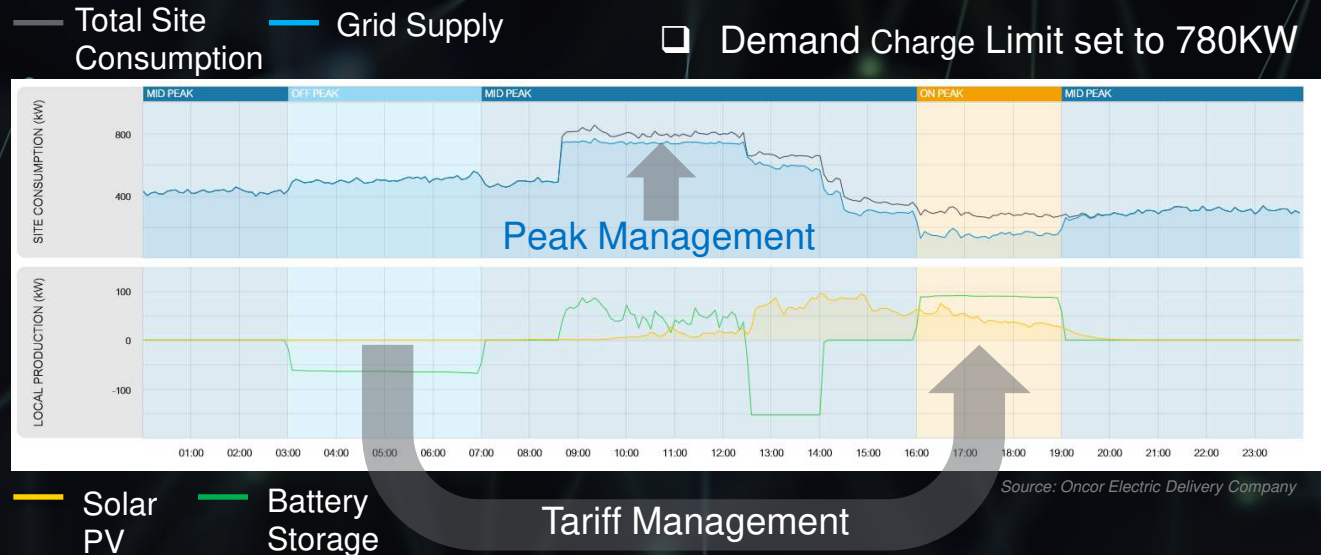


Cloud



Automated peak demand and tariff management

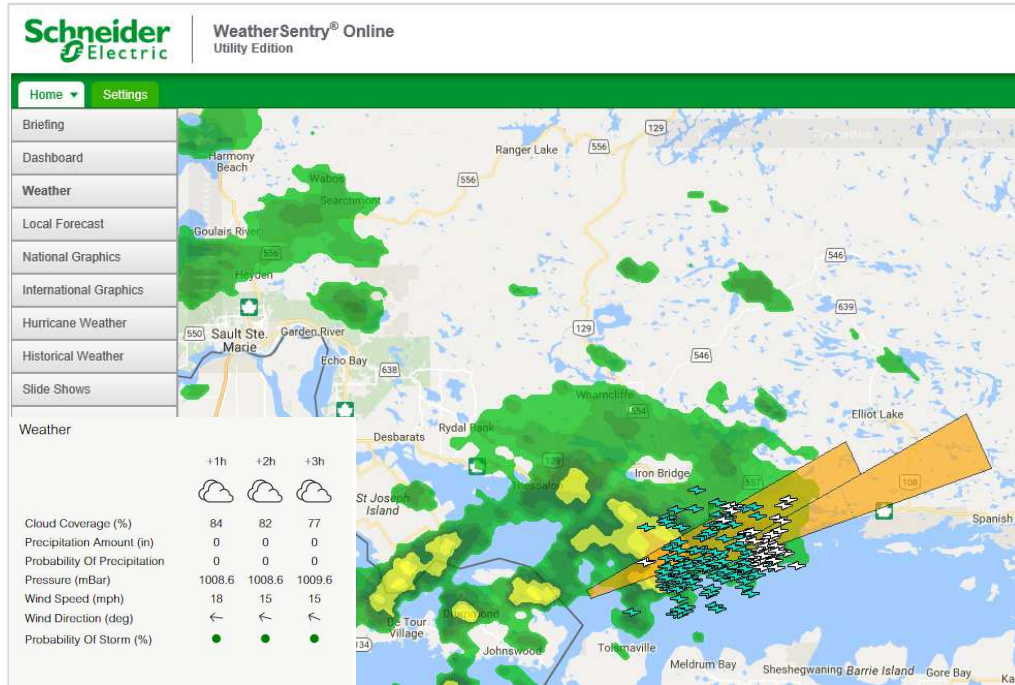
Avoid or minimize costs by shaving peak demand and leveraging off-peak pricing.



Schneider Electric's **BESS** coupled with **EcoStruxure Microgrid Advisor**

Microgrid Resiliency Benefits: *Storm Hardening*

Optimize DER's for resiliency when severe weather threatens site operations



Weather prediction and power quality monitoring can proactively trigger resiliency optimization measures including:

- Charge the battery to full capacity
- Warm and pre-lube emergency generation
- Adjust protective relay settings
- Proactively island the site
- Shed non essential load
- Electrically isolate sensitive equipment



Sponsor

Supporter

Important Dates

November 9, 2018 Deadline for digests
October 16, 2018

December 7, 2018 Notification of acceptance/rejection

March 10, 2019 Deadline for accepted full papers
February 28, 2019

What's New

February 21, 2019 [Program at a Glance](#) page is now available.
February 21, 2019 [Conference Information](#) page is updated.

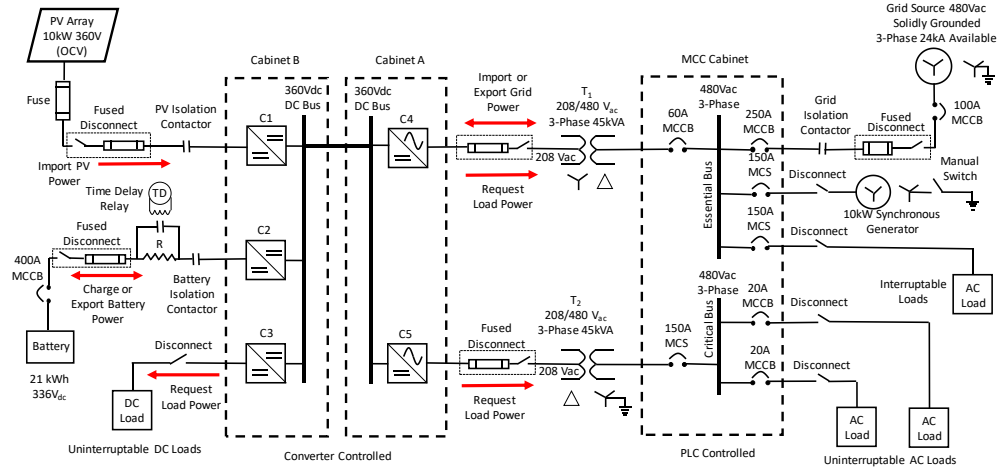
Platinum Patron

Gold Patron

Looking for

Silver Patron

Modular DC/AC Microgrid

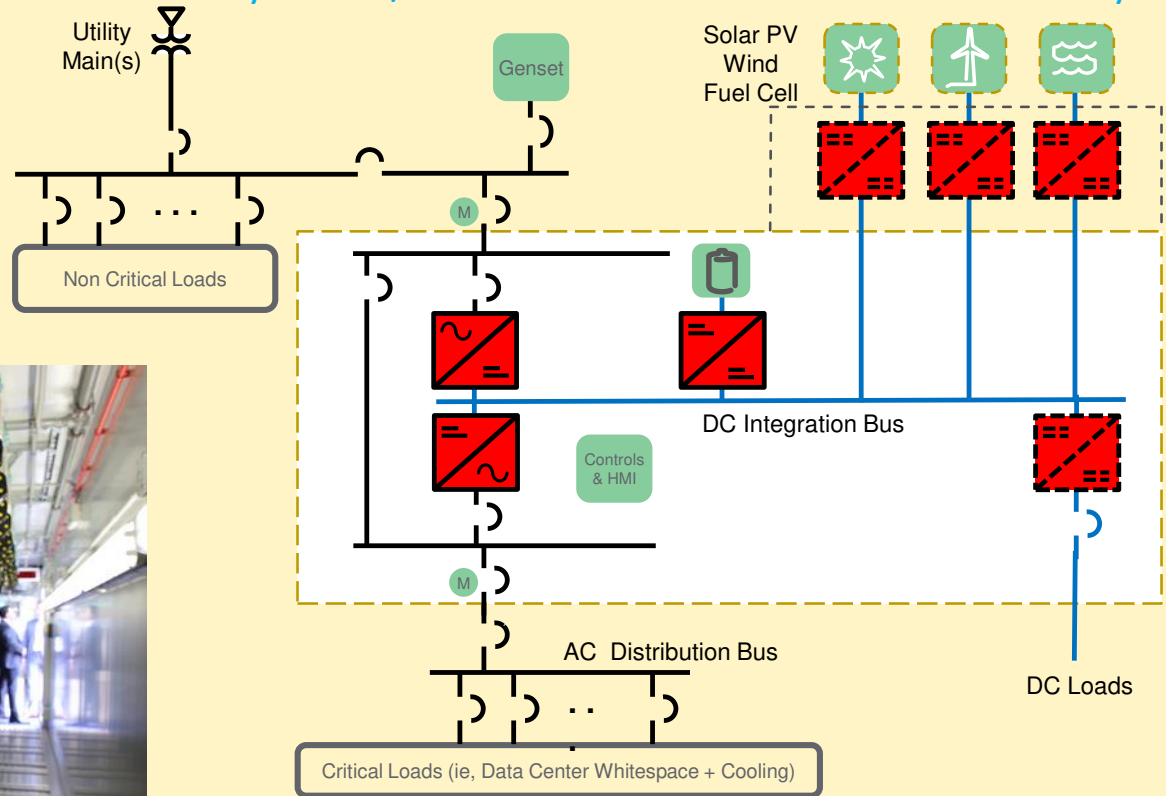


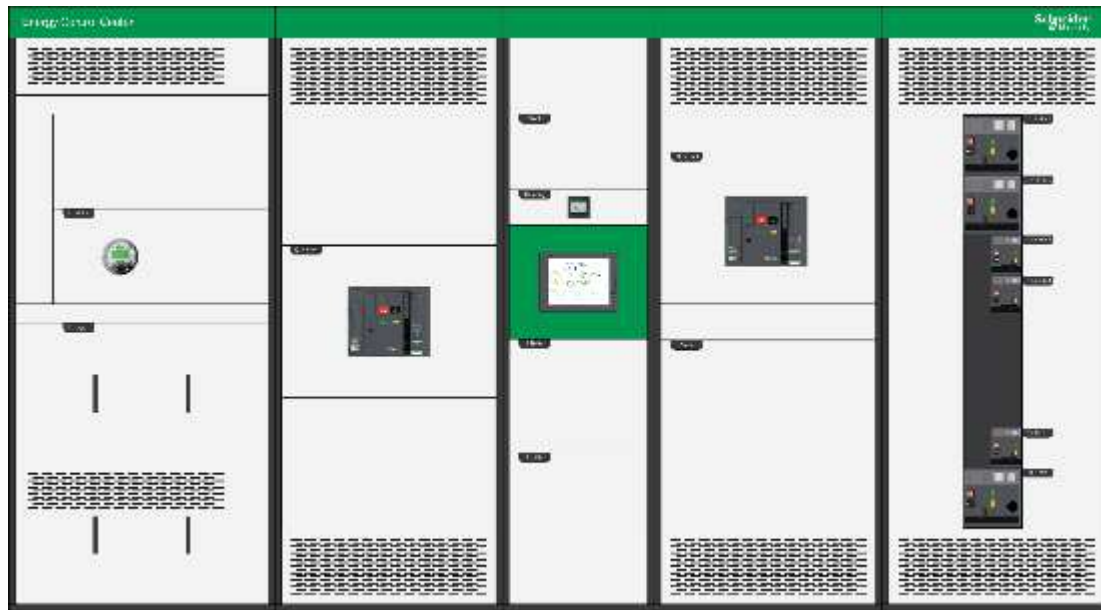
J.J. Shea, J. Hastings, V. Wagner, and J.M. Liptak, “**Modular DC/AC Microgrid,**” 3rd IEEE International Conference on DC Microgrids (ICDCM) Matsue, Japan 20th - 23rd May 2019.

* **FREEDM** Center Supported

Critical Power supported by DER Microgrid Solution

Hybrid AC/DC infrastructure enhances DER resiliency





“Microgrid in a Box”

Energy Control Center

Simplifying implementation of microgrids and integrating DER's

Battery Energy Storage System (BESS)

Schneider Electric's **BESS** hardware solution is best-in-class in terms of energy density, footprint and efficiency.

Coupled with Schneider Electric's intelligent and dynamic control system, **EcoStruxure Microgrid Advisor (EMA)**, Schneider Electric's storage solution and power distribution can meet all your storage needs for commercial and industrial applications.



250KW/500KWH

UPS with Peak Shaving Capability

High-performance uninterruptible power supply including li-Ion storage and dispatch flexibility



With the right UPS...

- Software adjusts UPS input power limit to maximize ROI
- Load power beyond input power limit is drawn from batteries
- Only a portion of battery capacity is used for peak shaving to ensure reserve for full backup time

Higher resiliency → Battery issues can be detected BEFORE backup needed

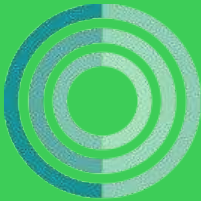
Save your CAPEX, Energy-as-a-Service!



Financing Partners can simplify these energy investments

Dynamic Energy Networks, backed by the *Carlyle Group*, is a global independent energy infrastructure platform that owns and operates microgrids and distributed energy resources (DER). We are leading the energy industry's revolutionary shift from one-way static power grids to two-way dynamic power infrastructure to deliver:

- Resilience- business continuity, community hub during natural disasters, and cyber security
- Cost efficiency- more predictable costs, flexibility, and ancillary services allowing companies the freedom to reinvest in their own business
- Sustainability- reduce carbon footprint, and enhance brand image
- Ability to scale- projects can start smaller then be added on and expanded as your company grows



ONE CARLYLE

Best-In-Class Alliances

"We are committed to forging long-term reliable partnerships to exceed our customers' objectives. Working with select industry leaders to ensure the most cost-effective, efficient, and resilient outcomes."





ARE YOU READY?

Schneider
Electric
MARATHON
OF PARIS
Sunday, April 14





Reference Cases Studies



Take our virtual tour to see how a microgrid works

Visit microgrids.schneider-electric.us



Life Is On



Schneider Electric Andover R&D Center



Customer Challenge

Schneider Electric's new headquarters experienced utility-related outages.

The Solution

Pre-configured microgrid solutions with site optimization platform owned and operated by third-party capital partners.

Customer Benefits

Greater electrical reliability, resiliency, demand-side efficiency, and sustainability at no upfront cost.

The Results: Life is On with...

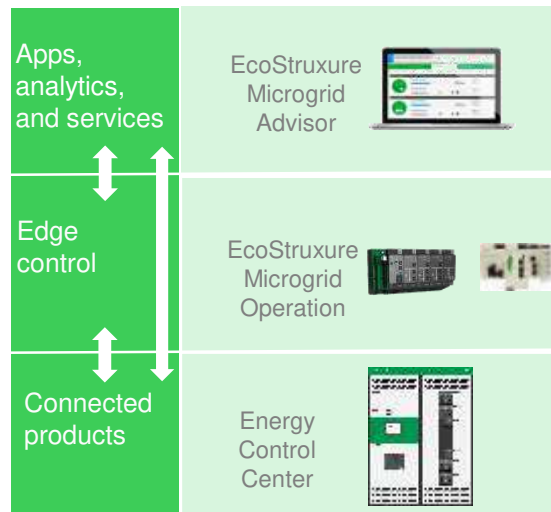
When we collaborate with partners to develop real-world solutions that enhance the electric reliability, boost use of clean energy, and manage energy economically—all while sparing customers from paying any upfront capital costs.

“The sustainability aspects of the microgrid create savings, and equipment upgrades can be funded by those savings.”

*Mark Feasel,
Vice President Smart Grid, Schneider Electric*

www.schneider-electric.us/microgrid

In **partnership** with Duke Energy Renewables and REC Solar, the Schneider Electric built a **microgrid to power critical operations.**



Life Is On



Montgomery County, Maryland (unveiling held on Oct 24th)



•Client Requirements:

- Deliver Two Advanced Microgrids
- Increase resiliency and sustainability at **Public Safety HQ** and **Correctional Facilities**
- Incorporate solar and high-efficiency combined heat and power into off-grid operation
- Deliver via innovative, public-private Microgrid-as-a-Service model eliminating host up-front costs

•Details:

- Include clean on-site power generation through solar energy systems and natural gas generators
- Schneider to play comprehensive role designing & implementing solution
- Project includes protection control & optimization, electrical equipment, DER management, electrical design services, cybersecurity and network design.

<https://www.youtube.com/watch?v=aCPjb4x3eGQ>



Customer Challenge

Integrate and easily manage multiple onsite distributed energy resources (DER) at the Bubolz Nature Preserve.

The Solution

The configurable equipment combined with the autonomous and dynamic platform provides real-time tariff management, demand response requests, peak shaving, CO2 tracking and storm hardening across numerous generation assets.

Customer Benefits

With microgrid solutions from Schneider Electric and installation support from Faith Technologies, the Bubolz Nature Center will easily optimize resources and maximize facility performance.

The Results: Life is On with...

The potential to have zero carbon emissions and to achieve 50 percent lifetime power savings. The microgrid will provide power to Bubolz's main facility, as well as the smaller buildings on the property, while achieving net-zero energy consumption

"This microgrid was designed and engineered by Faith's team of energy experts and utilizes specialized equipment and technology made possible through our collaboration with a very forward-thinking partner; Schneider Electric,"

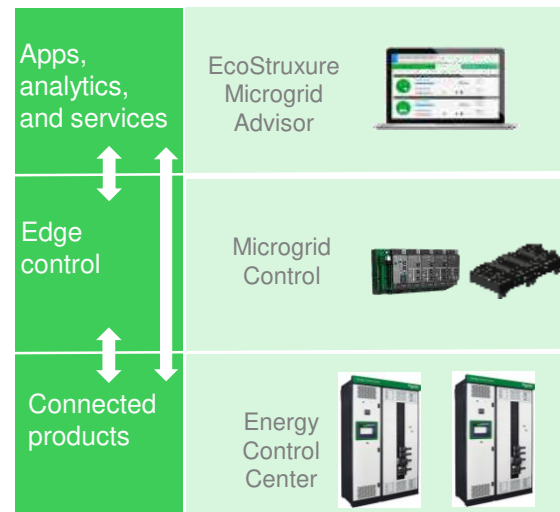
Mike Jansen, CEO of Faith Technologies



One of the largest, most advanced microgrid in the Midwest

Project won DER Project of the Year from POWER Magazine

	Revenue	
	Capex →	\$714k
	Opex →	\$3,600/yr
	GM →	28%



Life Is On



Schneider
Electric