



IDEA2019
The Energy for More Resilient Cities

RESILIENT

Microgrid Workshop

Managing a Complex Energy Landscape with New Technologies

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Schneider Electric Microgrids Business

Objectives of Presentation

Explain the relationship between our existing grid and the new energy solutions arriving at the grid edge.

Clarify how prosumers are actively managing their energy outcomes and what systems they are deploying to solve their challenges

Examine approaches to simplifying energy at the edge that can be deployed by many more users.



MacroGrid or “The Grid”

- large interconnected regional energy system supporting our Modern Energy Economy

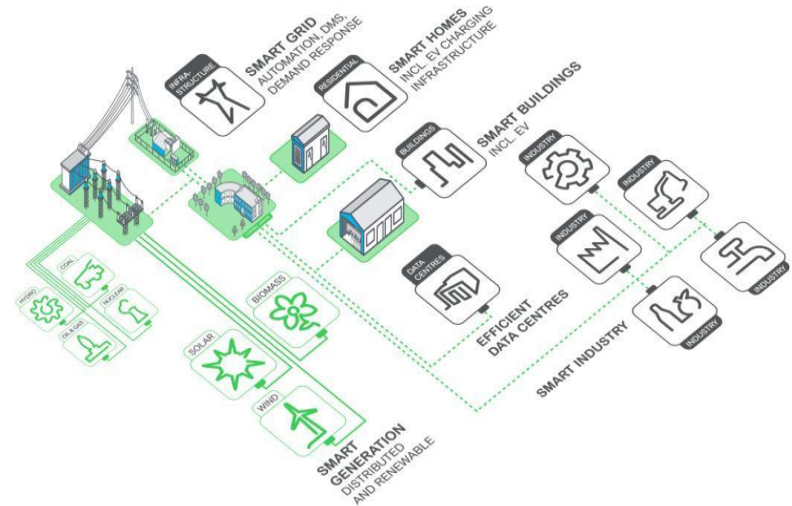
Mini Grid

- small “off-grid” system usually found on islands or remote locations without Macrogrid interconnection.

MicroGrid

- interactive with the Macrogrid, a localized energy system supporting campuses, buildings or subdivisions

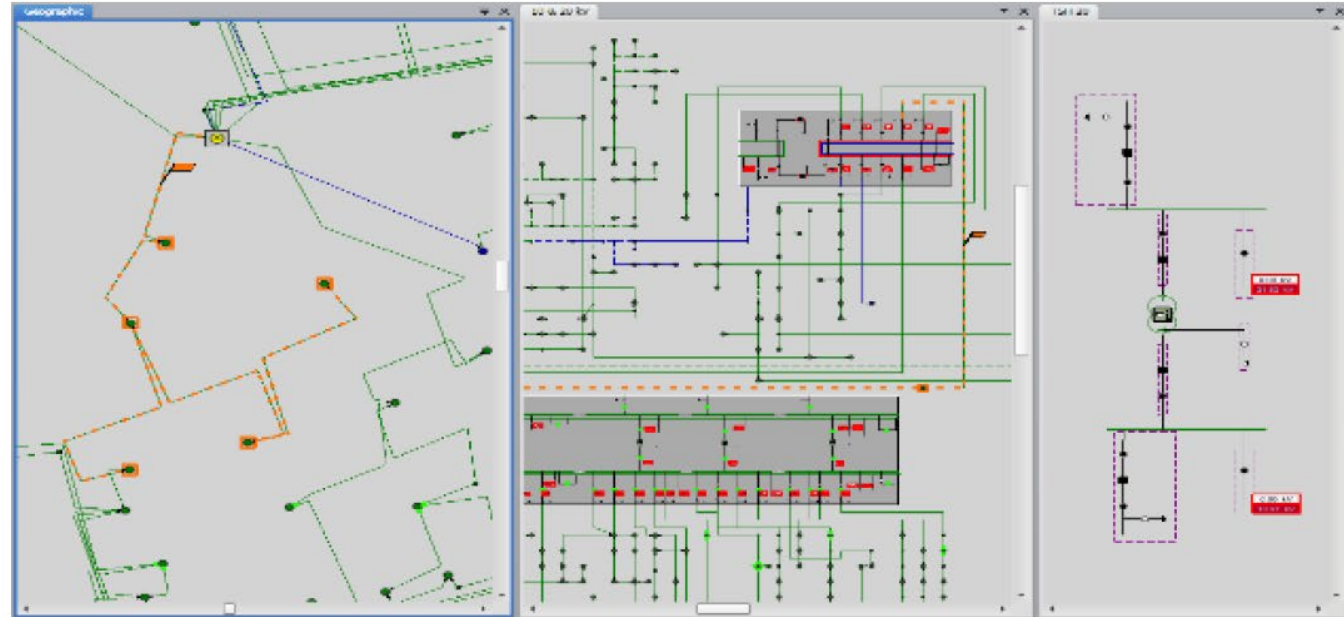
Macrogrid vs Microgrid,
can be thought of similar to
Macroeconomics vs Microeconomics



The *Smarter* Grid is much more aware of network function

Distribution utilities understand their network conditions and respond to secure its behavior

- Network visualization
- Realtime and offline
- Power forecasting
- Simulation scenarios
- Historical analysis
- Dashboard reporting

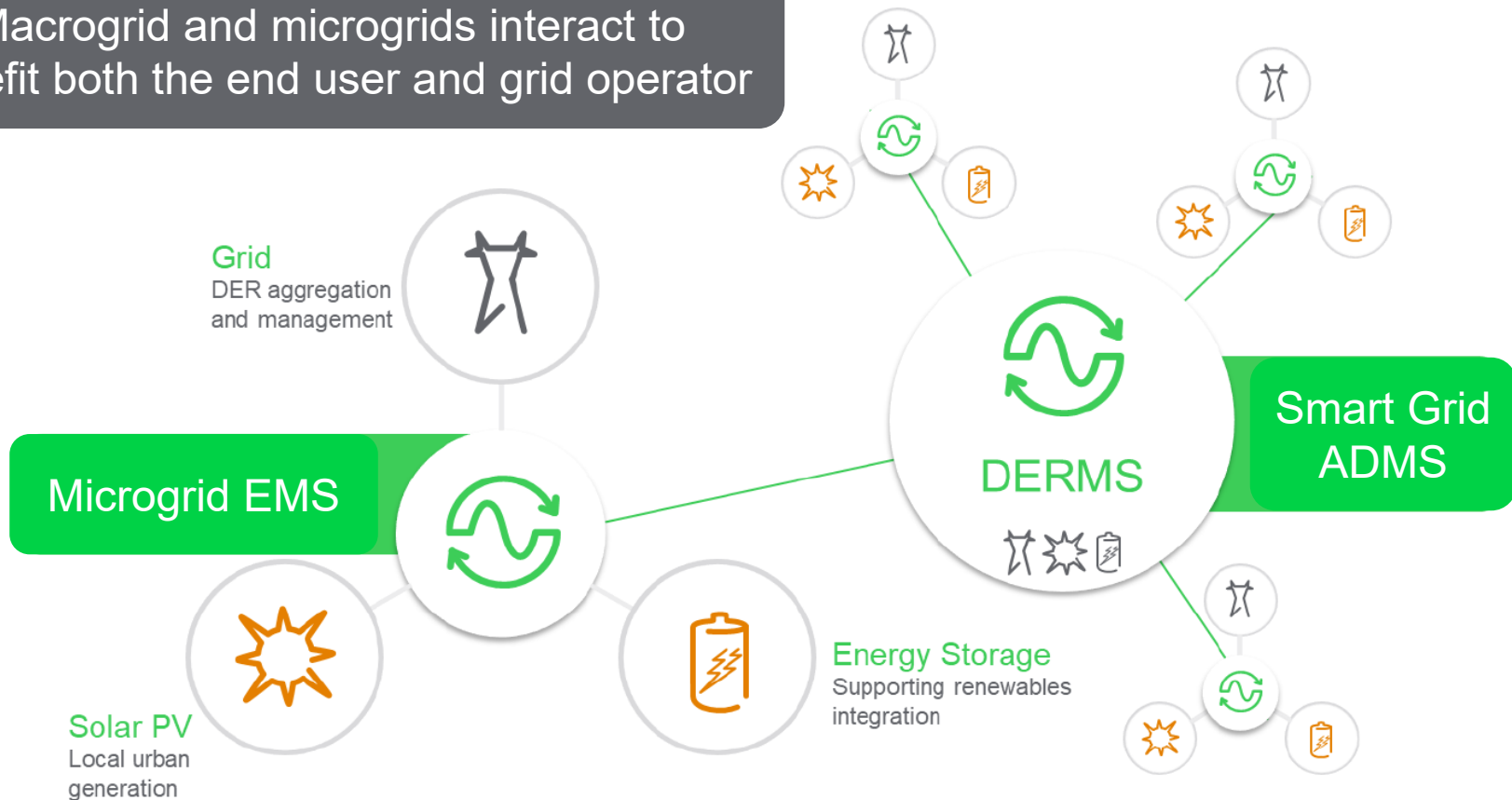


Geographic View

Schematic View

Station View

Macrogrid and microgrids interact to benefit both the end user and grid operator

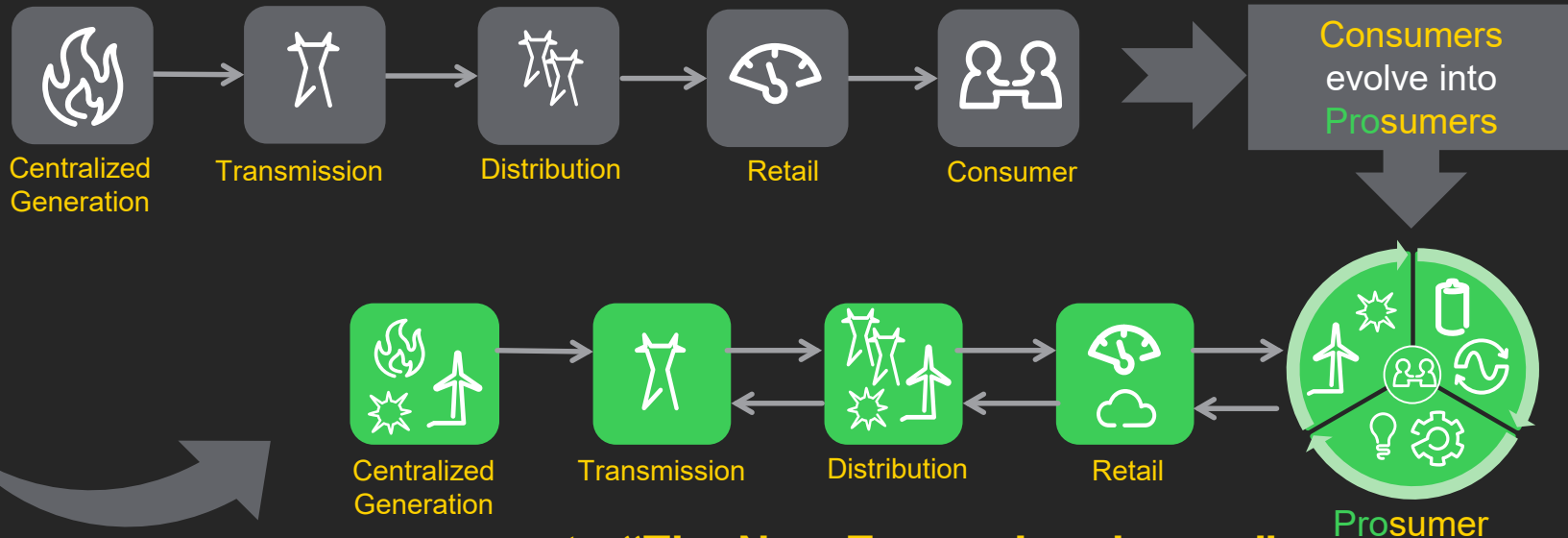


Life Is On

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

Historical Energy Value Chain transitions ...



... to “The New Energy Landscape”

...built for the **Prosumer!**

Prosumers come in many shapes and sizes

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

Montgomery County, Maryland

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

Note: Distributed energy resources are often already existing on site.



2 Microgrids:

- Solar PV
- Combined Heat and Power
- Energy as a Service

Project includes:

- Power control
- Energy Optimization
- Cybersecurity

Public Safety Headquarters and Correctional Facility

<https://www.localdvm.com/news/i-270/energy-saving-microgrids-activated/1547414187>

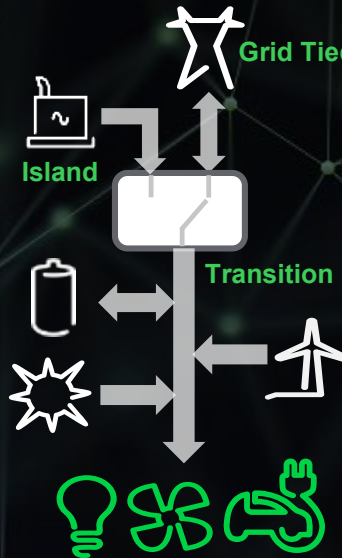
Prosumer microgrids “treble triplet”

It's about making wise choices at the intersection between energy smartly acquired, locally produced, and efficiently consumed!

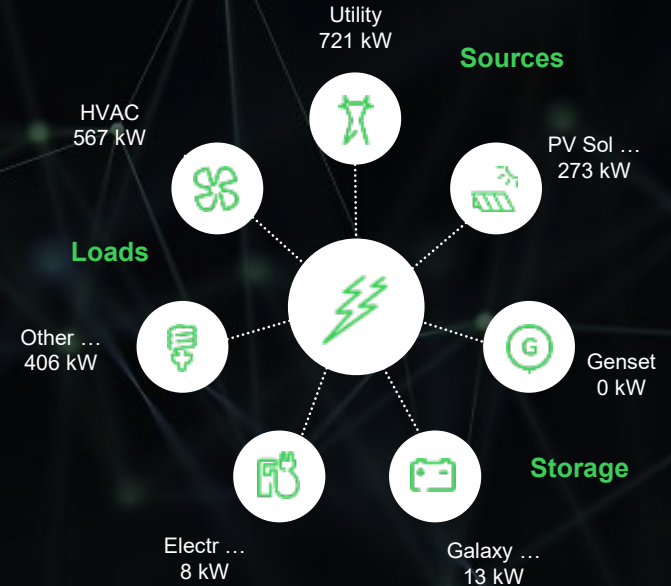
Integrated Outcomes Design



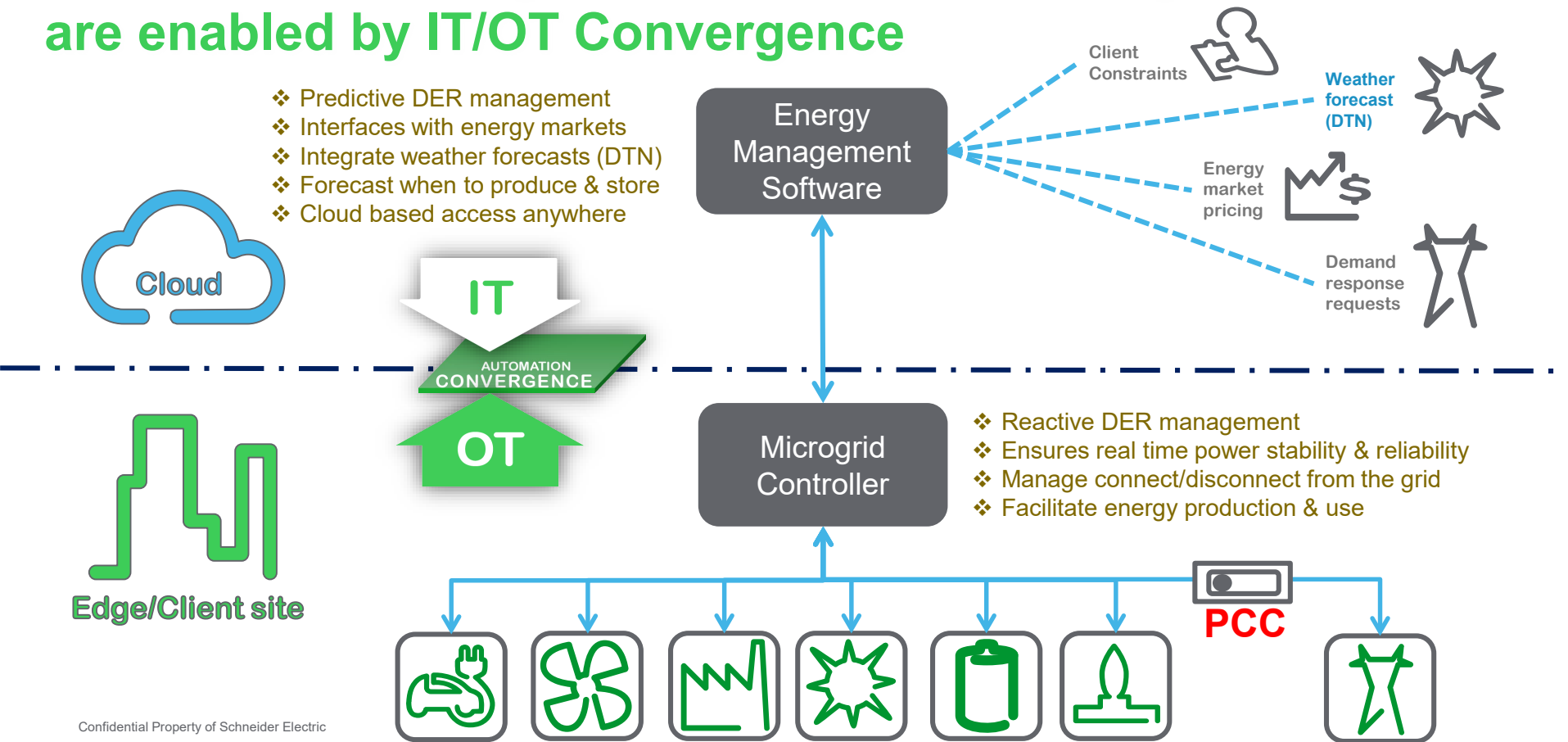
Power System Automation



Energy Flexibilities Optimization

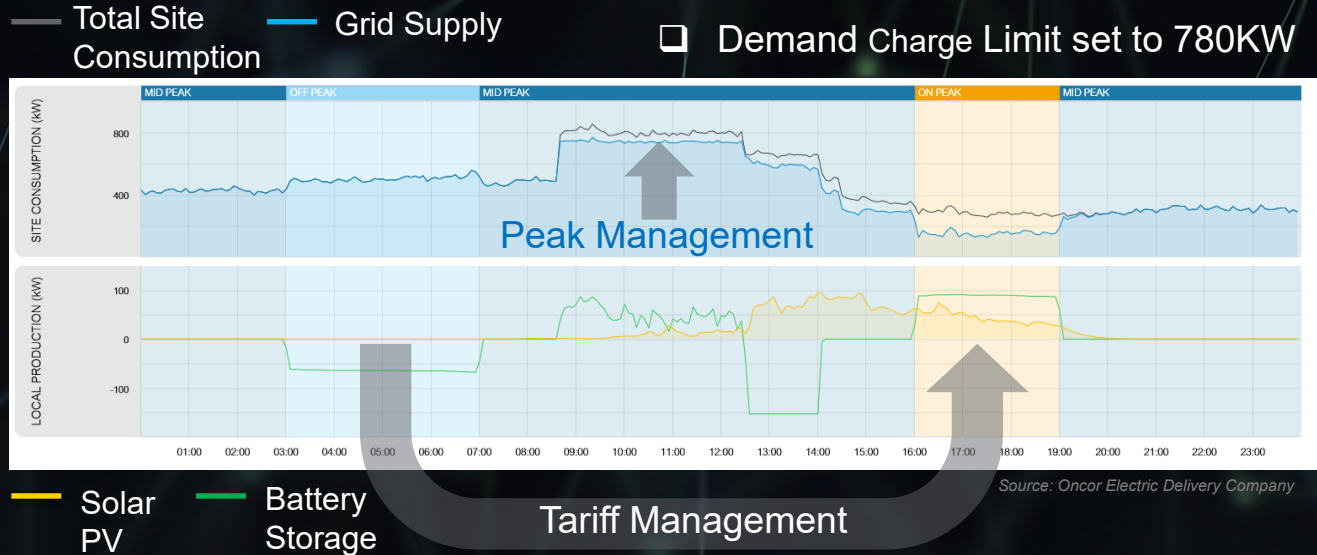


Advances in Microgrid Control and DER integration are enabled by IT/OT Convergence



Automated peak demand and tariff management

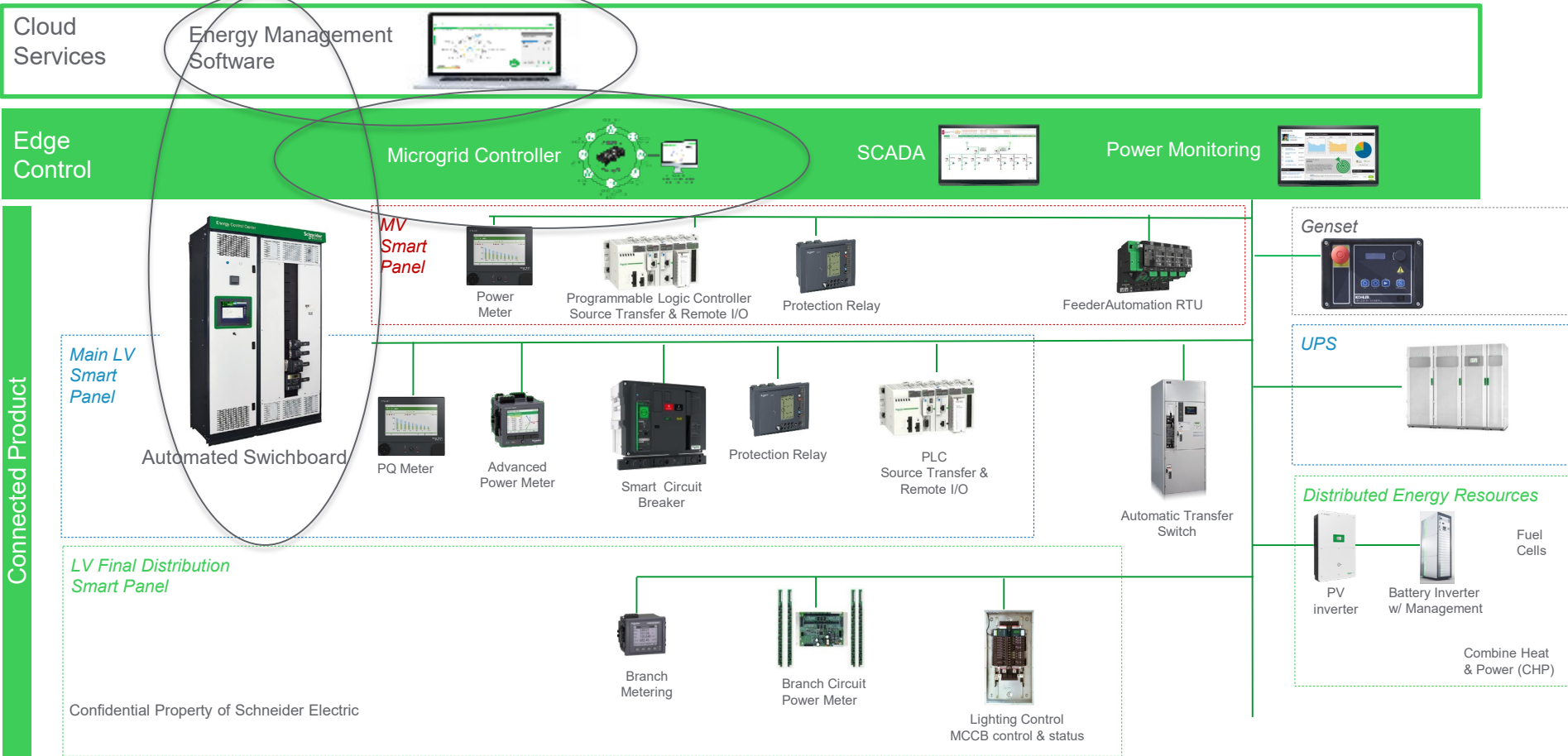
Avoid or minimize costs by shaving peak demand and leveraging off-peak pricing.



250KW/500KWH BESS coupled with
Energy Management Software

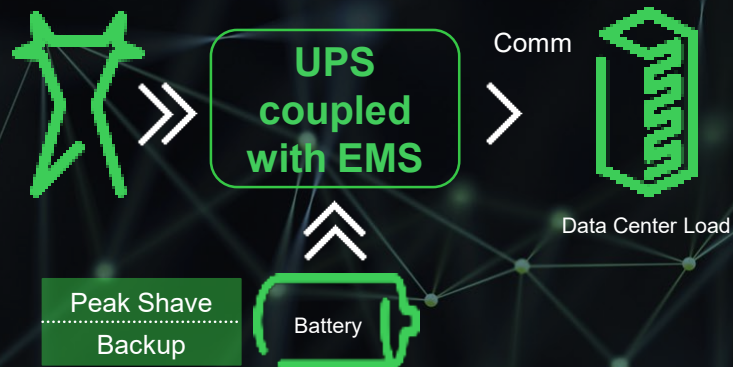
Integration of protection and controls to simplify grid edge systems deployment

Grid & onsite production integrated management for energy savings & uptime



UPS with Peak Shaving Capability

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

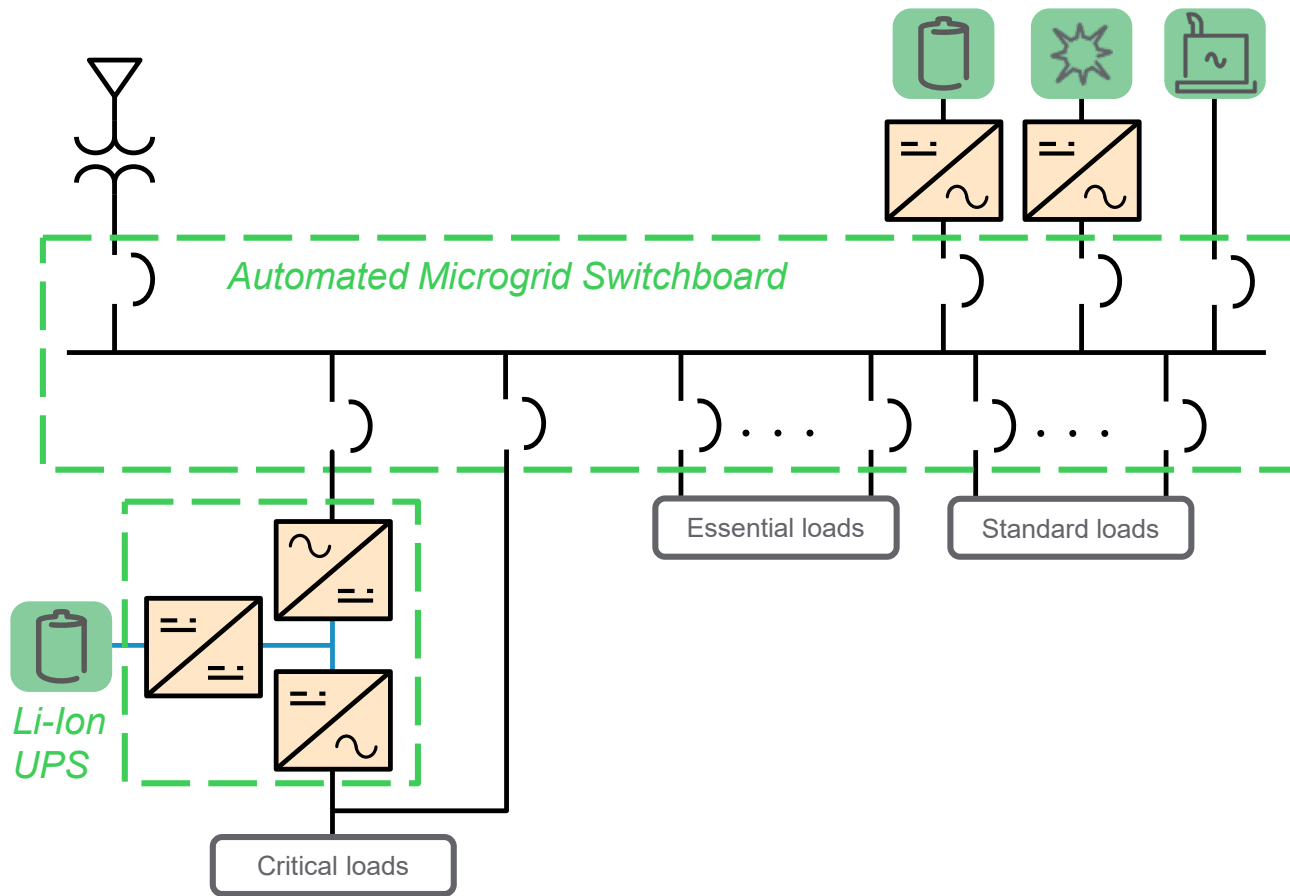


With the right UPS...

- Energy Management 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

Microgrid w/ Dispatchable Uninterruptible Power Supply (UPS)



Note: circuit breakers are typically smart and electrically operated

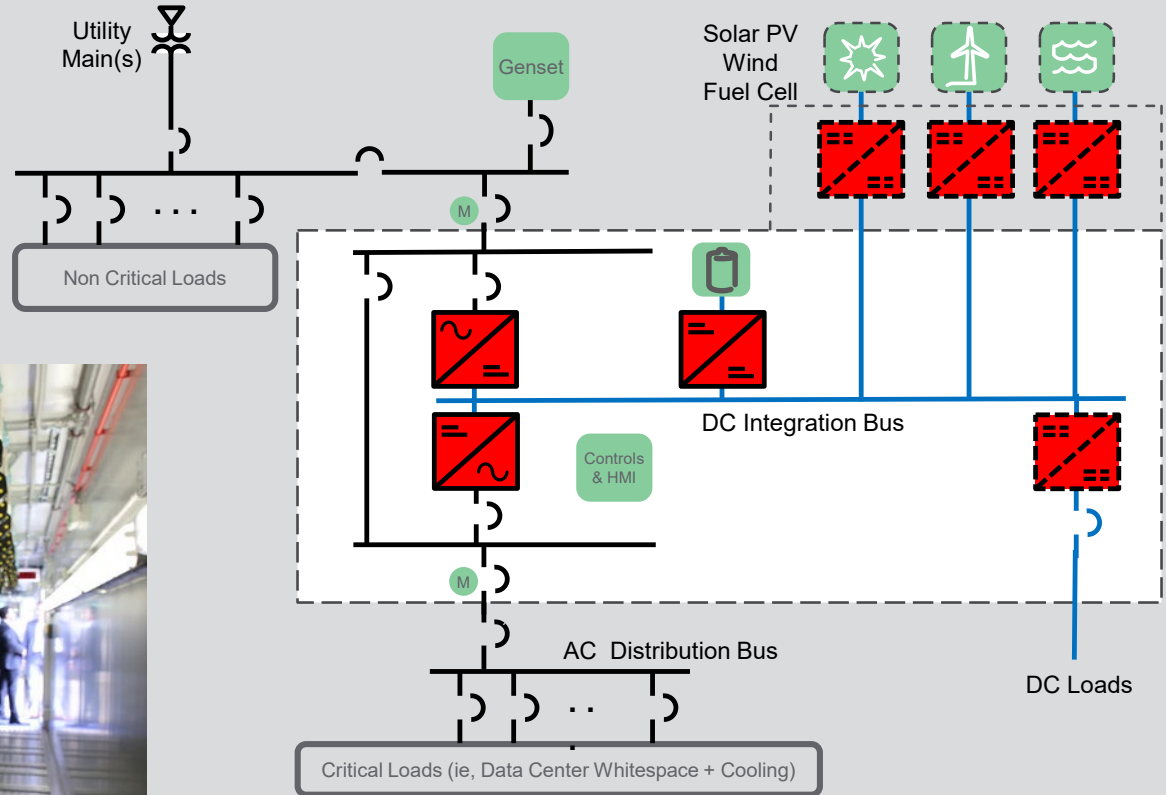


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Critical Power supported by DC Integrated Microgrid

Hybrid AC/DC infrastructure enhances DER resiliency



Save your CAPEX... utilize Energy as a Service!

Financing Partners can simplify these energy investments allowing off-takers to achieve:

- Resilience – secure business and services continuity and offer community hub during natural disasters
- Cost efficiency - more predictable costs, flexibility, and services allowing companies the freedom to reinvest in their own business
- Sustainability - reduced carbon footprint and enhanced brand image
- Ability to scale - projects can start smaller and then be expanded as your company grows and needs evolve.

Many investors are ready to support credit worthy microgrid projects with funds that target renewable generation. The end-user commits to an OPEX based Power Purchase Agreement (PPA) that meets the return goals of the investor while allowing off-takers to retain and focus their capital on their primary business objectives.



Case Studies



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.

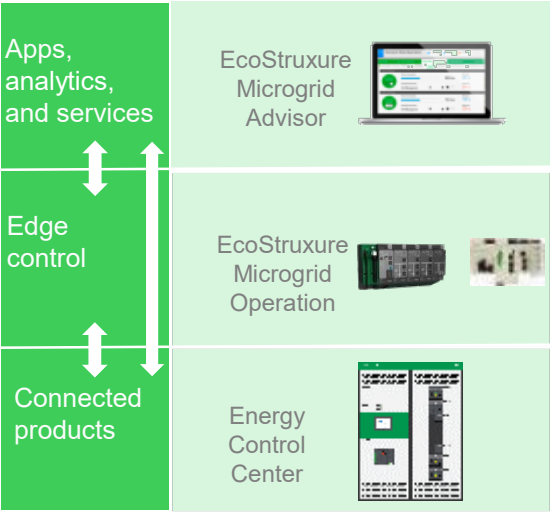
The Results: Life is On with...

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*

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





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**

EcoStruxure™
Innovation At Every Level

Revenue

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

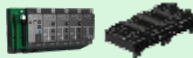
Apps,
analytics,
and services

EcoStruxure
Microgrid
Advisor



Edge
control

Microgrid
Control



Connected
products

Energy
Control
Center



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