Microgrid Hub

Ohio Hospital Association
UNITY IN ACTION
110TH ANNUAL MEETING & EDUCATIONAL SUMMIT

Reliable power systems and savings for healthcare facilities

Don Wingate
Vice President – Microgrid Solutions & Strategic Partnerships
Schneider Electric

May 20, 2025

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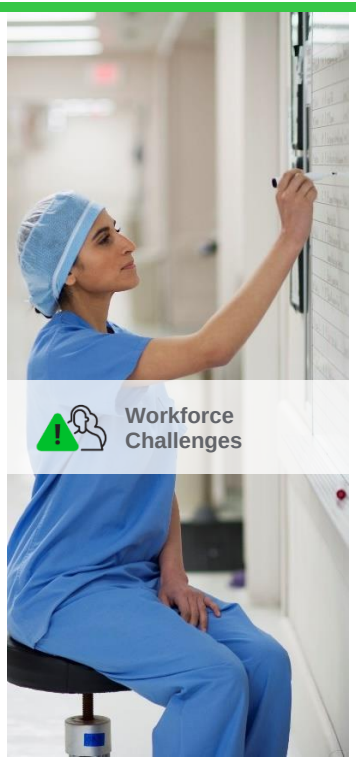
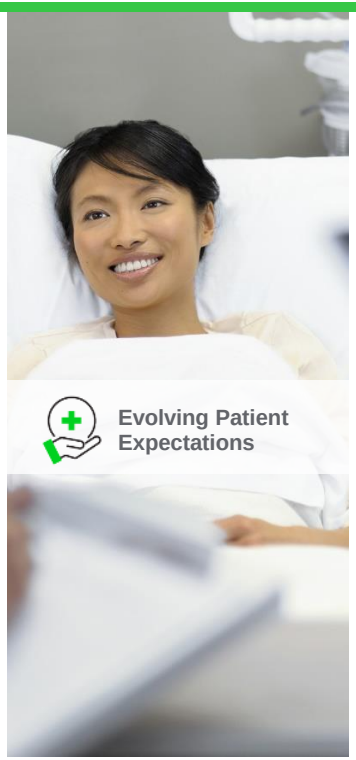
Trends driving the healthcare sector

Insufficient Infrastructure



Workforce Challenges

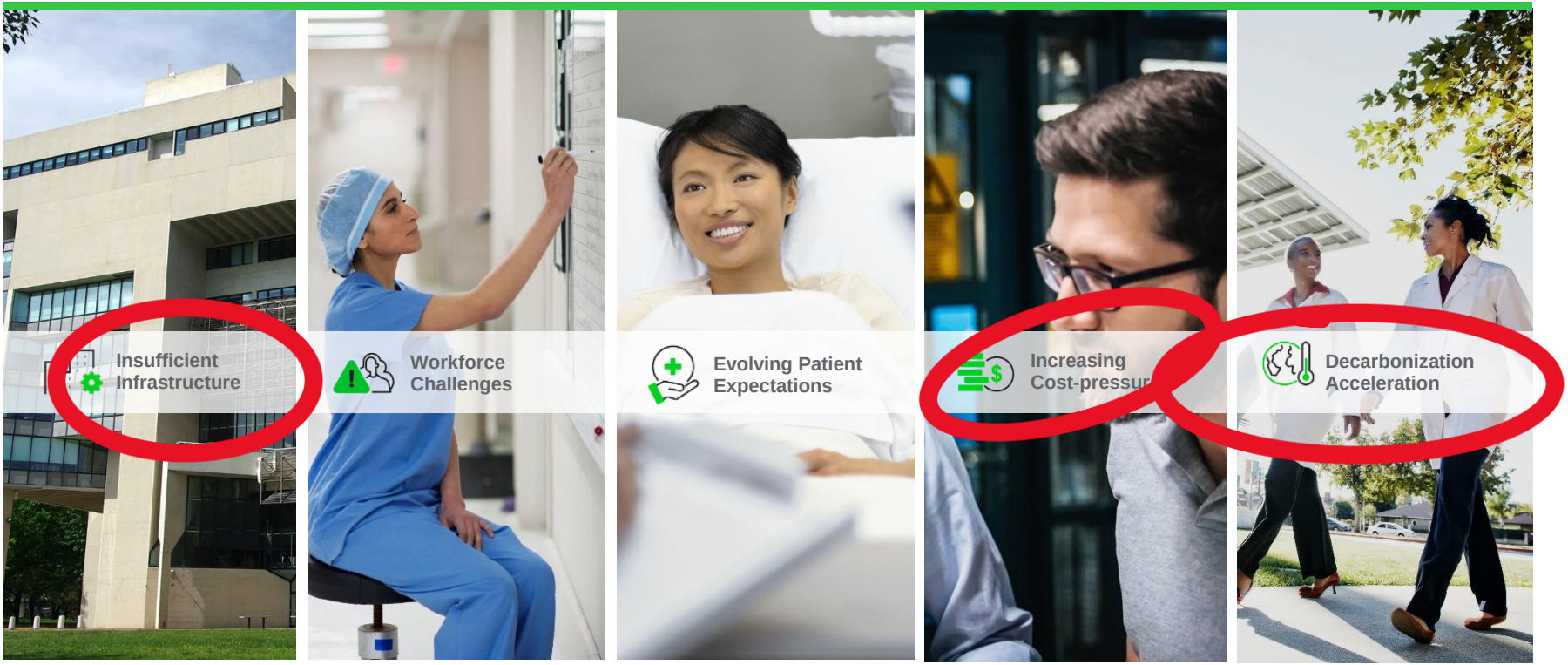


Evolving Patient Expectations

Increasing Cost-pressures

Decarbonization Acceleration

Trends driving the healthcare sector



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Two enablers critical to success

The **new all-digital, all-electric world** gives healthcare facilities the structure to **adapt** to **challenges** and enable **healthcare of the future.**

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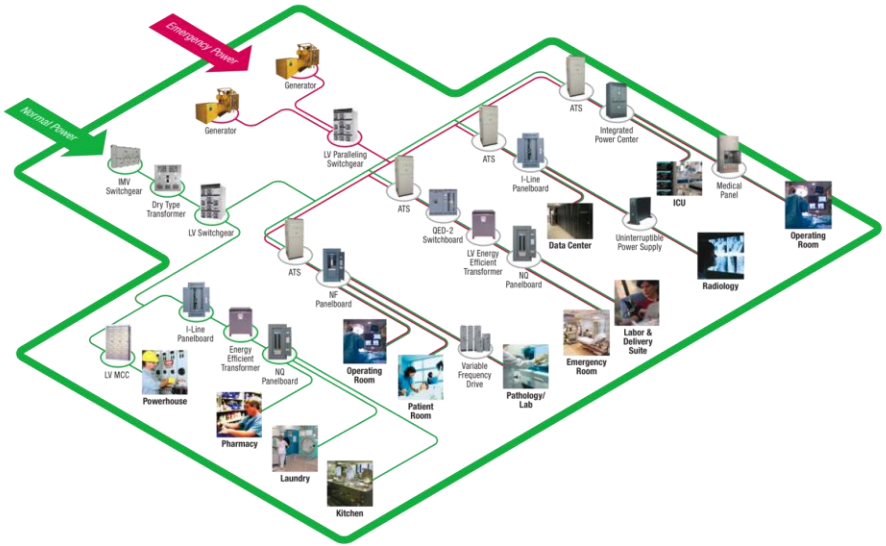
Hospital Power System Pain Points

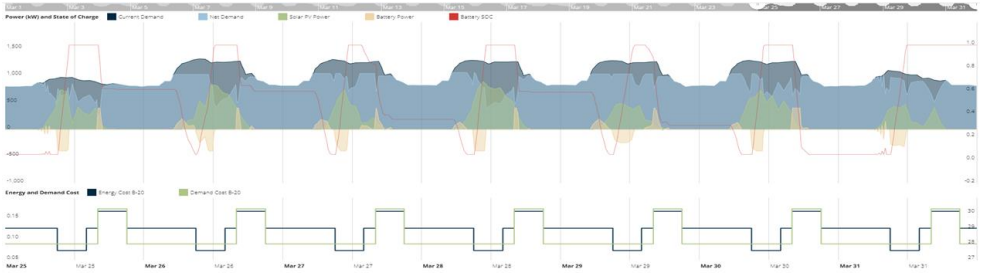


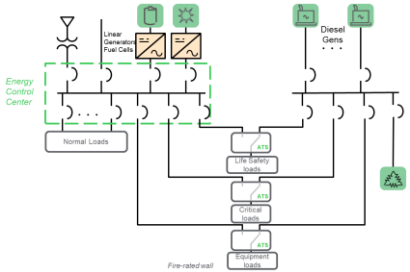
Utility provided Energy

1. High Energy Demand
2. Aging Infrastructure
3. Reliability and Resilience
4. Sustainability Goals
5. Regulatory Compliance
6. Cost Management
7. Technological Integration
8. Patient Comfort and Safety

In House Issues

How to Address Challenges – **Can Microgrids be a Solution?**





Microgrid? - Let's Define What It Is

Department of Energy

A microgrid is a group of interconnected loads and distributed energy resources (DERs) within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid.

Microgrid? - Let's Define What It Is

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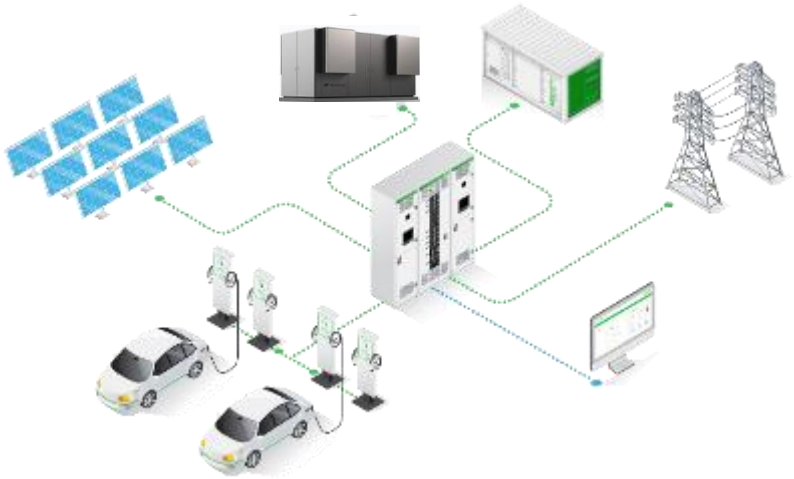
A microgrid is a group of interconnected loads and distributed energy resources (DERs) within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid.

- In short, microgrids are mini electric grids that can function with or without the central grid by leveraging onsite energy like solar, wind, batteries, generators, fuel cells, and intelligent software and controls.
- Microgrids are more than the sum of their technical features. Microgrids are a Swiss army knife tool for electricity consumers, and the list of their uses is long.

Microgrid Outcomes

Technologies that enable the New Energy Landscape



Microgrid*

A group of **interconnected loads** …

… and distributed **energy resources** within clearly defined electrical boundaries

acting as a **single controllable entity** with respect to the grid.

* *US Department of Energy definition*

- A microgrid provides a decentralized, digitized & decarbonized alternative…
- … delivering integrated outcomes

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Generation and Storage options currently available

Linear Generators

Fuel Cells

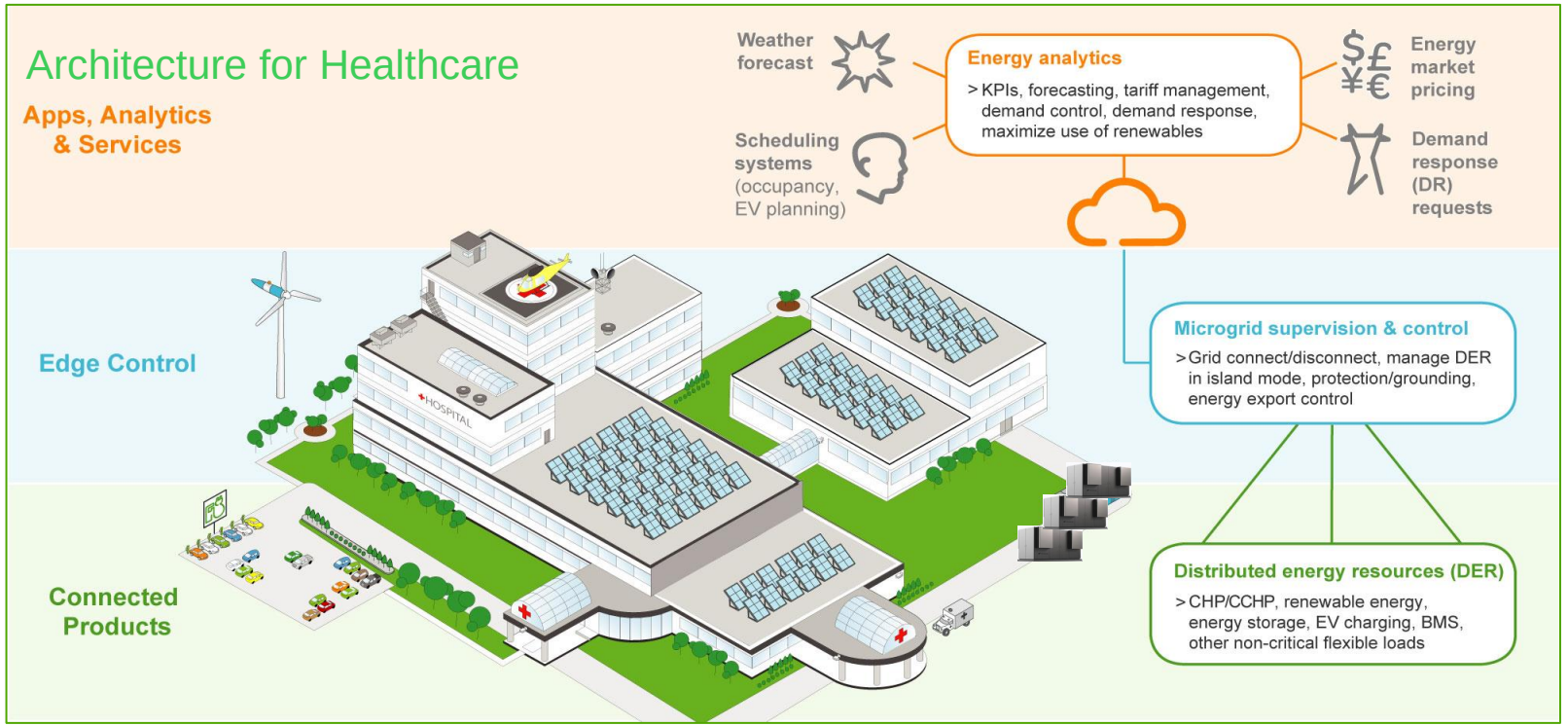
Micro-turbines

Engines

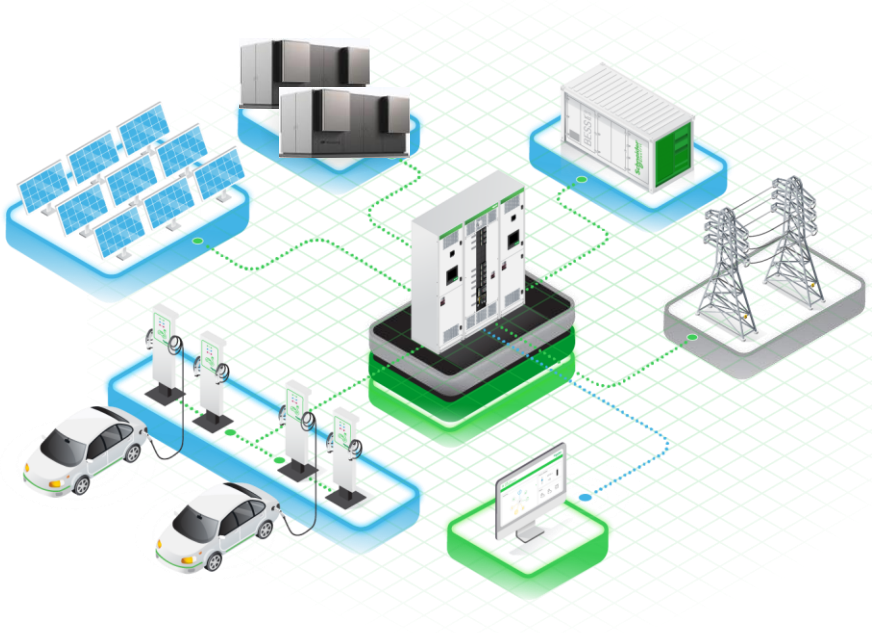
Solar

Batteries

Healthcare Microgrids



An Integrated Solution = Positive Business Outcomes



EMS
Energy Management System

Microgrid Advisor
Forecast and Optimize when to consume, produce, Store, or Sell Energy

PMS
Power Management System

Microgrid Operation
Helps ensure stability, safety and grid code compliance.

ED
Electrical Distribution

Power Meter, Circuit Breaker, Bus Bar, LV panel, MV etc.
Core offers of SE, ensure easy integration and management of DER

DER
Distributed Energy Resources

BESS, PV inverter, BMS, EV chargers, Generation Sources

Services

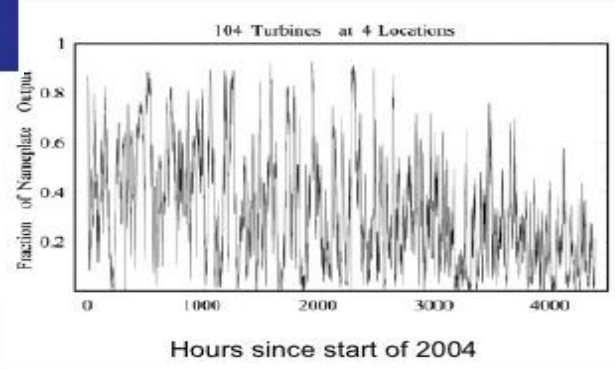
- DER sizing
- Power System Engineering
- Financing (EaaS)

Digital Tools

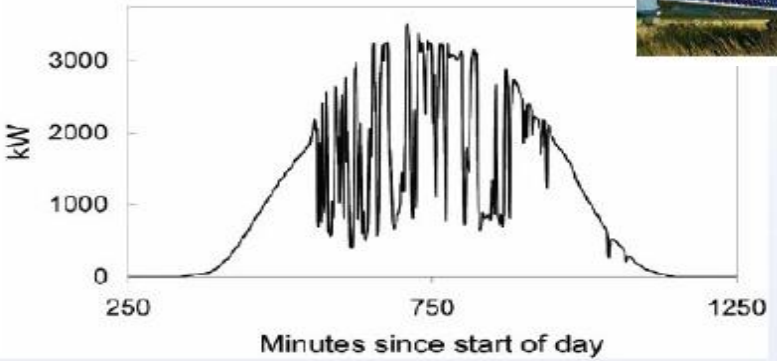
- Design
- Quote
- Build
- Install
- Commission
- Operate
- Maintain

“Wild” Distributed Energy Resources = Intermittent Production not reliable by themselves to provide reliable load support

Wind/Solar Intermittency

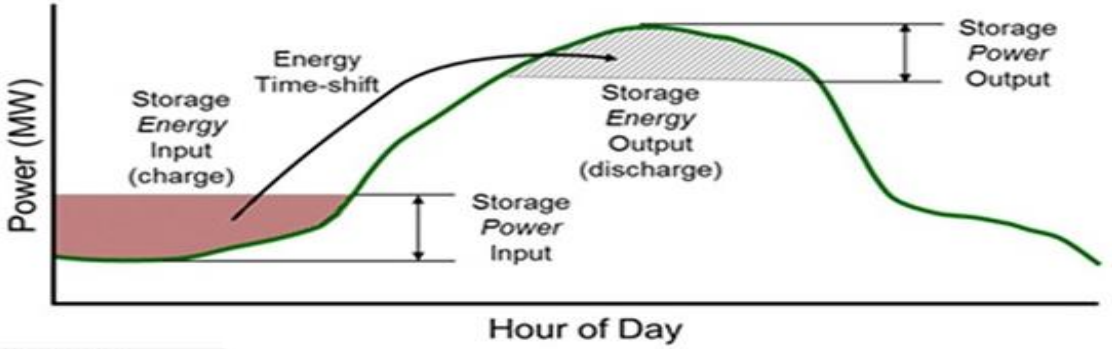


Wind Intermittency

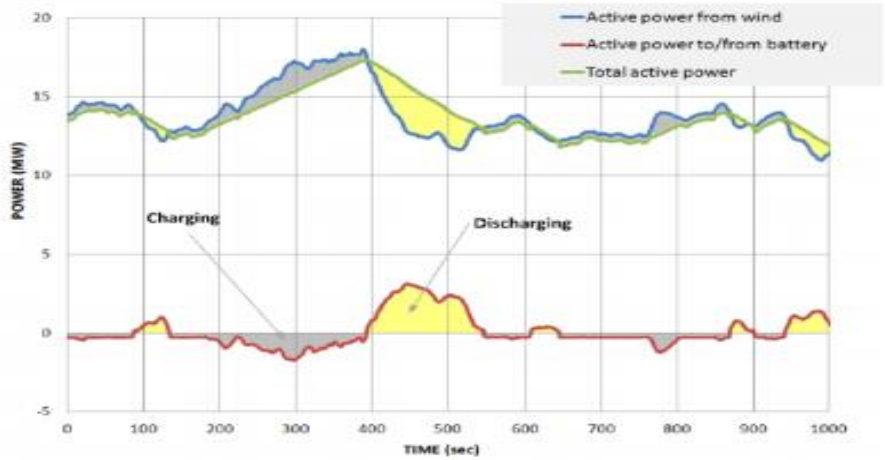


Solar Intermittency

“Wild” DER + Energy Storage = “Tamed” DER
Energy Storage can be a supply source or a load



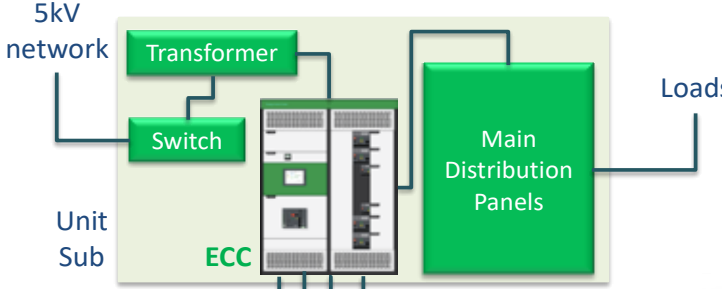
Source: E&I Consulting



“Tame” Distributed Energy Resources = predictable “baseload” power resources – Fuel Cells or Cogeneration (CHP), Linear Generators

Other Solar PV is remote from T1 / GTC and ties to the 5kV network.

Solar PV on T1 / GTC



Fuel Cell CHP Units

Electric Energy Storage

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Power Management System – aka “microgrid controller”

EMS
Energy Management System

PMS
Power Management System

NM
Network Management

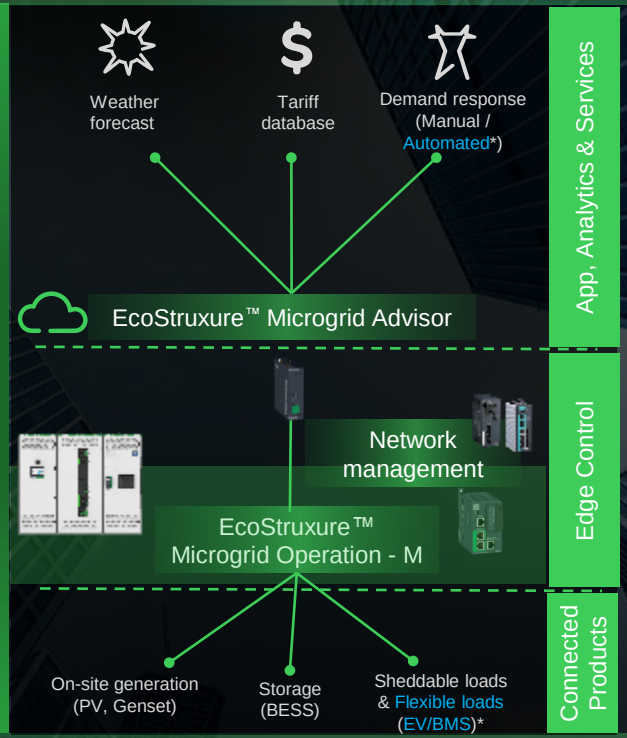
ED
Electrical Distribution

DER
Distributed Energy Resources

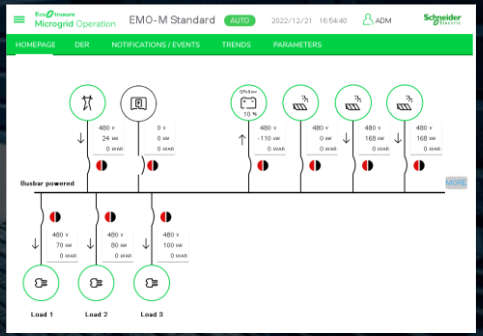
Software & Tools

EcoStruxure™ Microgrid Operation - Medium (EMO-M)

Ensures stability, reliability and real-time control



EMO-M Controller is dedicated to commercial and light industrial applications and is responsible for managing grid code compliance for Microgrids in Grid-Tied Mode and safely manages islanding on the loss of grid

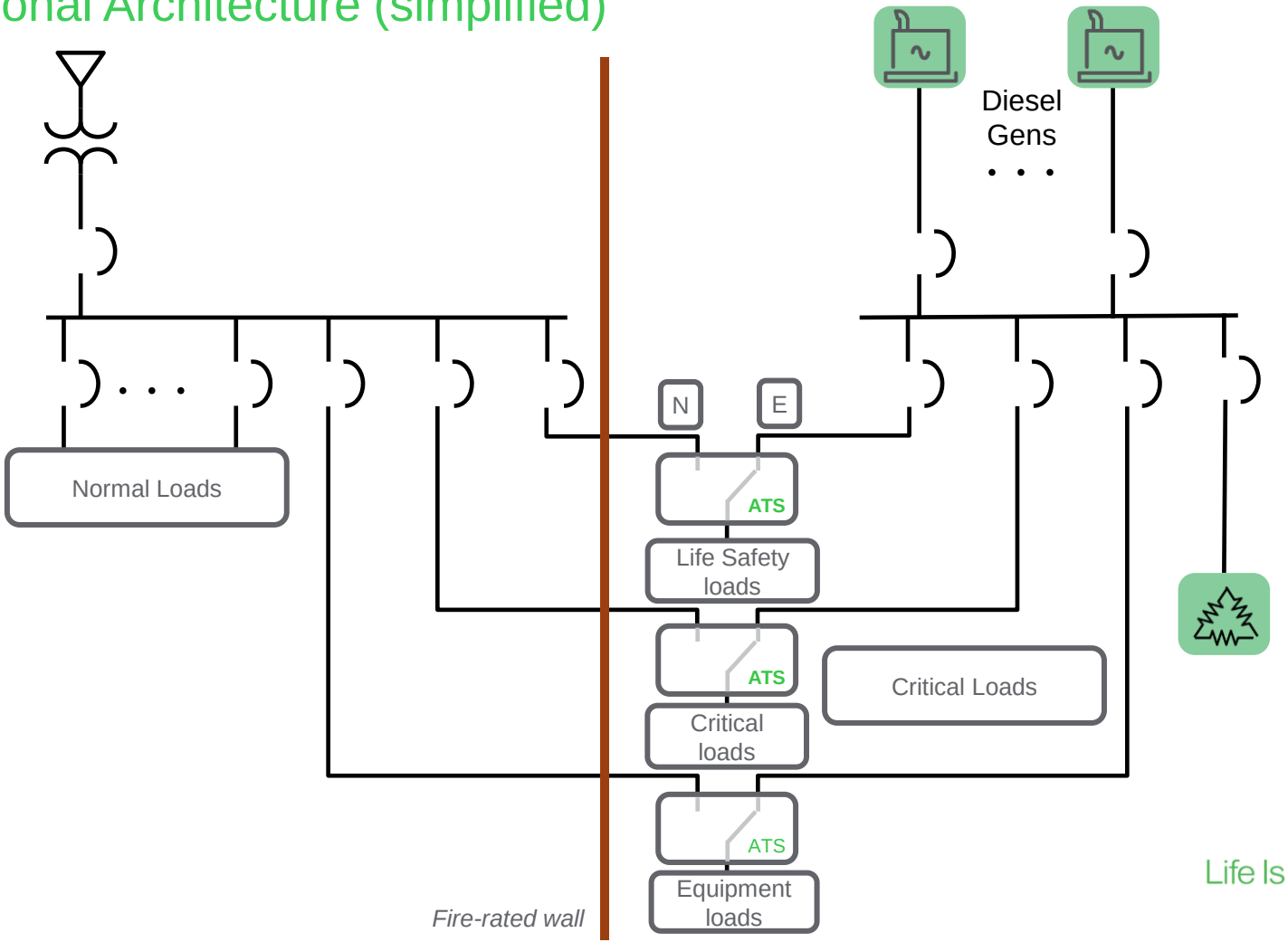


EMO-M Controller is dedicated to commercial and light industrial applications and is responsible for managing grid code compliance for Microgrids in Grid-Tied Mode and safely manages islanding on the loss of grid

Standardized and packaged solution, easy to configure via a web-configuration tool EcoStruxure Microgrid Build

*Coming Soon

Traditional Architecture (simplified)



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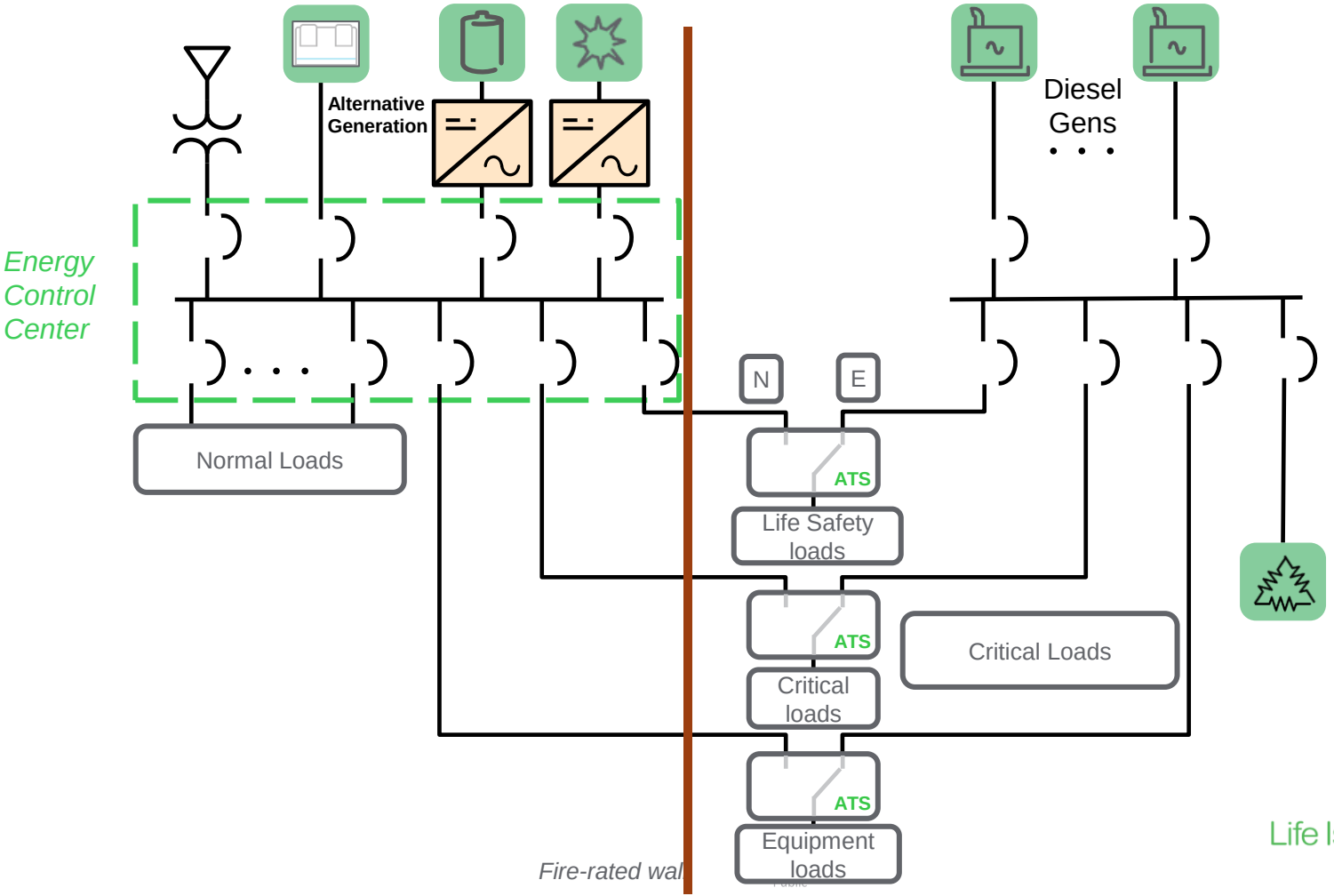
Microgrid added to Traditional Architecture



Erlanger Hospital

Chattanooga, Tennessee

Customer Challenge

- Ensure resilient power at a Level-One Trauma Center
- The interconnection of the generation to the substation needed to be redesigned
- No mechanism to connect to the grid

The Solution

Schneider Electric assisted White Harvest Energy on the interconnection of the Microgrid to the grid. This was essential to power mission-critical and support facilities in an event of an outage. The hospital has four 2MW units, total of 8MW of generation.

Expertise provided included:

- Knowledge base around Power Systems, relay protection
- Engineer connection into the utility grid
- Combined Heat and Power System and Generator used

Customer Benefits

- Improved resilience
- Lower reliance upon the energy grid
- Energy savings
- Cleaner and more sustainable generation compared to the electric grid
- Improvement in power factor

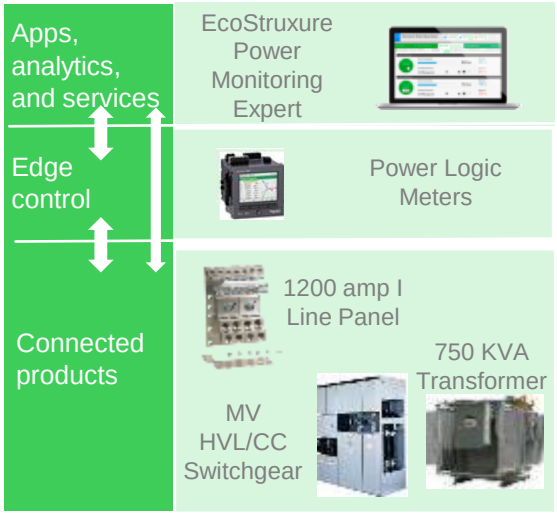
The Hospital now generates:

- 52,000 MWh electricity annually
- 12,000 lb/hr 115ºF steam
- 14,000 MBtu/hr hot water

www.schneider-electric.us/microgrid

New system to power **mission critical facilities** in an event of an outage

EcoStruxure™ Innovation At Every Level



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Daughters of Mary of the Immaculate Conception

Customer Challenge

- The facilities aim to provide assistive services for those with low income, the underserved population
- Add resiliency to 4 vulnerable sites including an outpatient hospital, women's shelter, elderly housing residential building, and administration building
- Utilization of $3.7 million government grant

The Solution

Schneider Electric, partnered with Eco-Solar, provided the equipment, software, engineering and long-term services

- Added four 100 kW / 250 kWh battery energy storage system to 4 existing solar PV systems
- Added natural gas generator with a nameplate rating of at least 225kW tied into the critical facility
- Platform integration for remote monitoring software

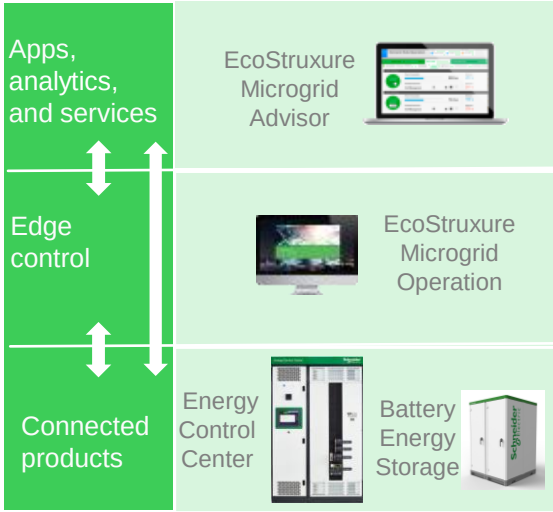
Customer Benefits

- First solar and storage microgrid in Connecticut
- Energy as a Service model allowed for additional DER to be procured
- Allows for permanent and reliable sheltering in place for residents
- An almost "fully renewables" microgrid, using no fossil fuels
- Additional utility bill savings with the integration of Ecostruxure Microgrid Advisor
- Resiliency against grid outages
- Indefinite island mode operation

www.schneider-electric.us/microgrid

First solar and storage microgrid in Connecticut

EcoStruxure™ Innovation At Every Level **for Education**



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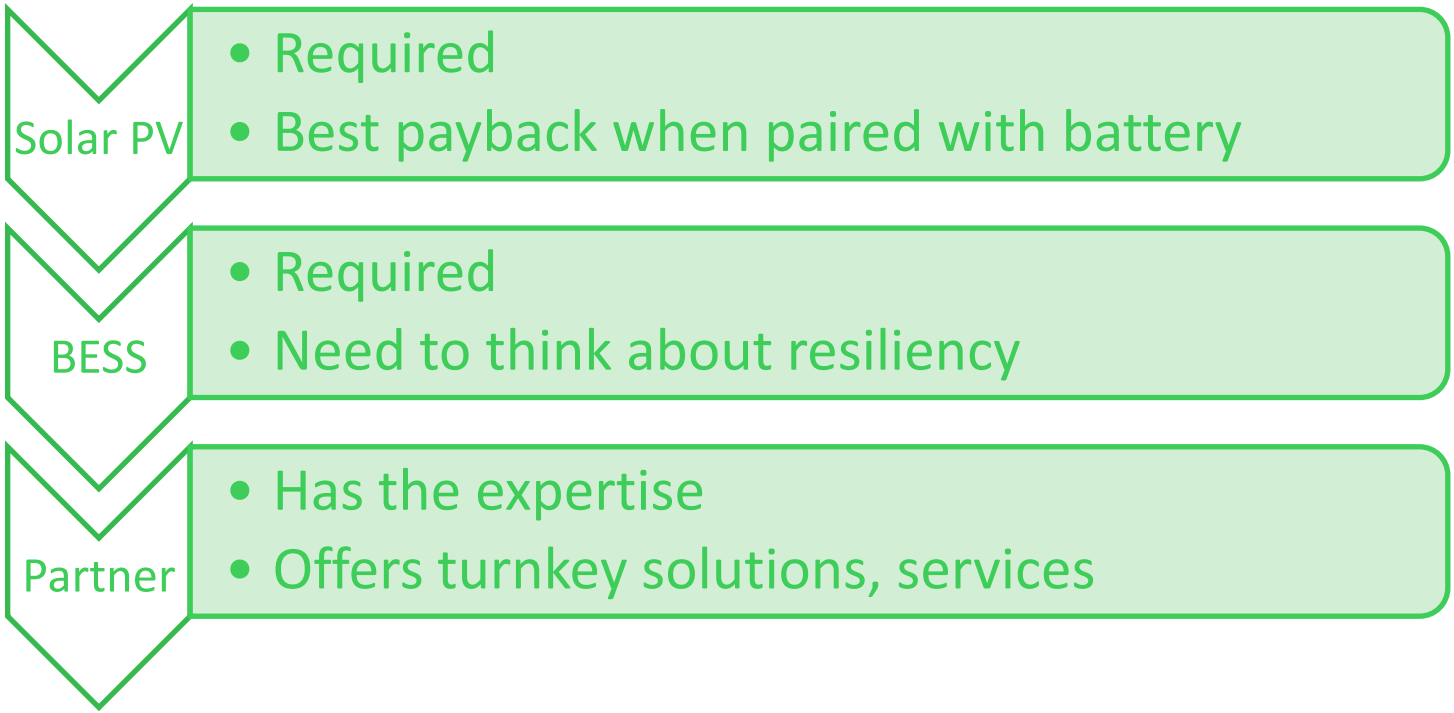
Three Key Takeaways – added to base load generation




Thank You!
Q&A
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Microgrid Load Center (Medium or Low Voltage – or mix of MV/LV)

EMS
Energy Management System

PMS
Power Management System

NM
Network Management

ED
Electrical Distribution

DER
Distributed Energy Resources

Software & Tools

Energy Control Center

Integrates electrical distribution and microgrid controls, as, part of a single, pre-wired & factory tested assembly, to deliver autonomous microgrid solution managing multiple energy sources and prioritized loads.

Simplifies the integration of Distributed Energy Resources into an intelligent, pre-engineered, and customizable switchboard packaging Microgrid Control system

STANDARD → **FAST** → **SMART**

Many different architectures possible, adapted to greenfield or brownfield project

- 3000A IMCB, 3000A i-line
- 1200A maximum ampacity for circuit breakers in i-line section
- 1 Genset, 1 BESS, 2 PV breakers
- Rest available space for controllable loads
- Protection relay as standard
- 65kA @480V
- NEMA 1/3R
- No utility entrance
- All circuit breakers with motor operators
- Transition:Grid to genset: Open transition, Genset to grid: Open/closed transition, No transition between DERs
- Anchor resource: Genset (BESS*)

*Coming Soon

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