



RESILIENT

Schneider Electric: *New Energy Landscape*

Presentation to NYSERDA – June 2019

Don Wingate, Vice President – Microgrid Solutions & Strategic Alliances
Schneider Electric Microgrids Business



Industry leading MG Controls

Electrical Infrastructure – via 
by Schneider Electric

Leading Business Model – P3

Seeking Channels and Alliances

Targeting NE Region



Life Is On

Schneider
Electric

Schneider Electric, leading the digital transformation of Energy Management and Automation

€25.7 billion

FY 2018 revenues

~5%

of FY revenues devoted to R&D

145,000+

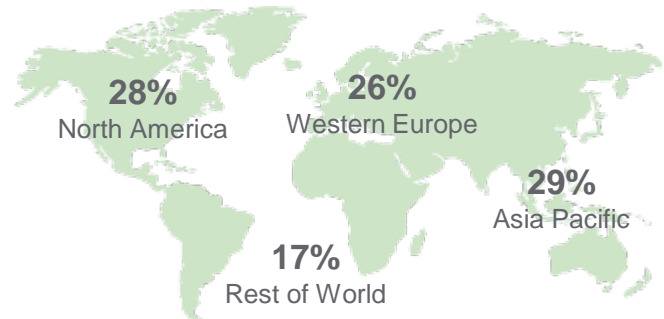
people in 100+ countries

Our Products & Solutions

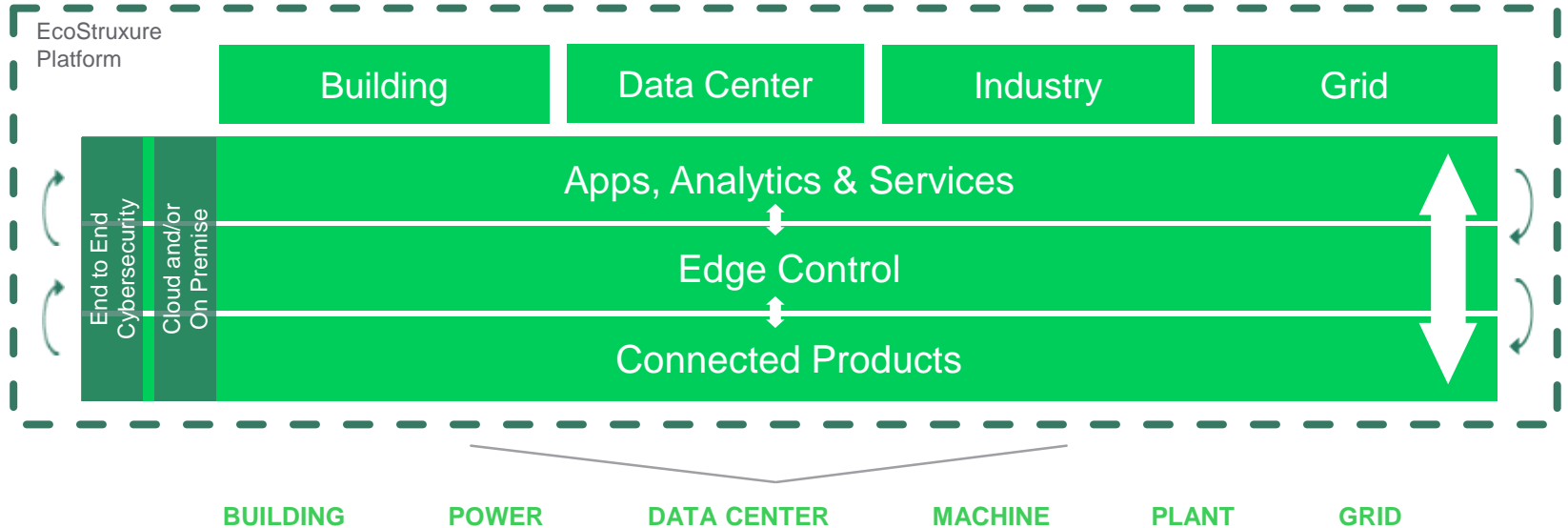
– FY 2018 revenues



Balanced geographies – FY 2018 revenues



EcoStruxure: 3 Innovation Layers, 4 End Markets, 6 Architectures



MacroGrid or Regional Grid

- large interconnected energy system, supports our Modern Energy Economy

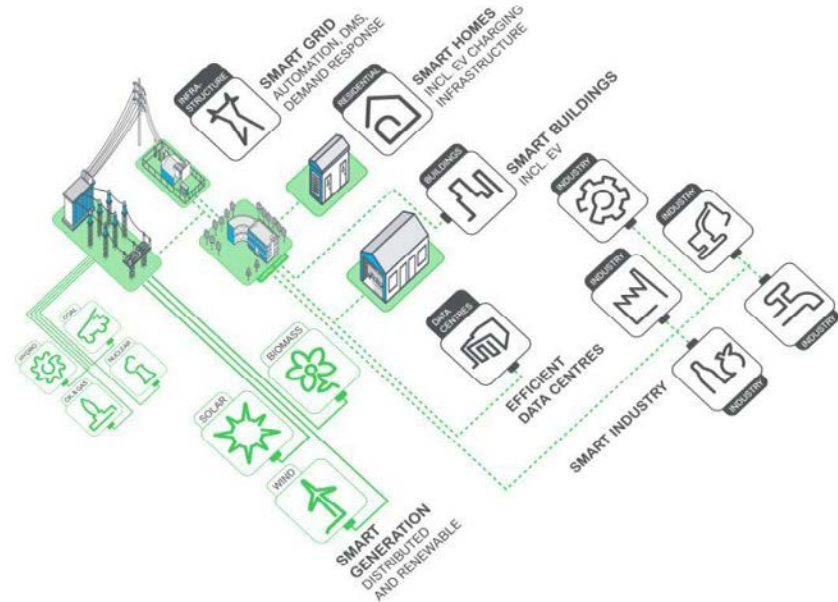
Mini Grid

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

MicroGrid – Focus

- Interactive with the macrogrid, a localized energy system supporting campuses, buildings or subdivisions

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



New Energy Landscape in 2018 – “Size and Scale”



JFK Airport Terminal One Redevelopment, will leverage Schneider Electric's solutions to improve the sustainability of the terminal and enhance the reliability of the airport's energy supply through a state-of-the-art microgrid.

BOWERY FARMING WILL USE SOLAR MICROGRID TO SUPPORT UNINTERRUPTED FARMING



Schneider Electric Building Microgrid at Port of Long Beach

Schneider Electric announced Wednesday that it has a \$5.2 million contract to design, engineer and build a new microgrid at the Port of Long Beach in southern California. The port also is going to get ...



Lone Star Ports Harbor Island Crude Export Terminal – SE providing prime power and sustainable energy in a unique public private partnership



Successful microgrid activation showcases innovation; supports reliable, efficient, clean energy at Montgomery County, Md., critical facilities

Video's goes here



INNOVATION: The stationary battery energy storage system is DC-coupled which reduces power loss from traditional DC-to-AC inversion, eliminates some equipment costs, and provides the opportunity to feed future DC loads. A bi-directional inverter allows the battery to accept electrons from both the solar panels and the grid.

Mobile-BESS
250kW / 500kWh

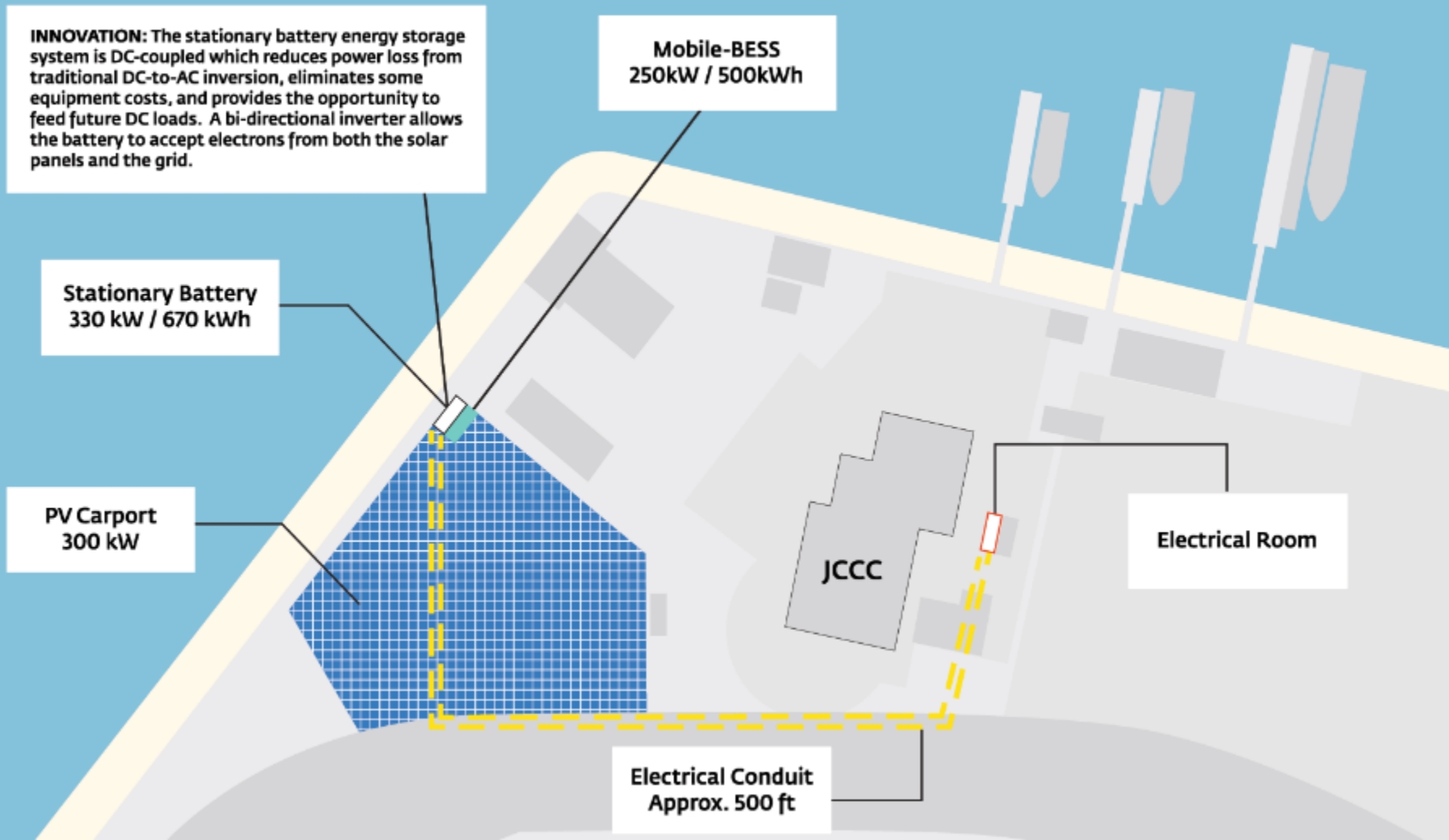
Stationary Battery
330 kW / 670 kWh

PV Carport
300 kW

JCCC

Electrical Room

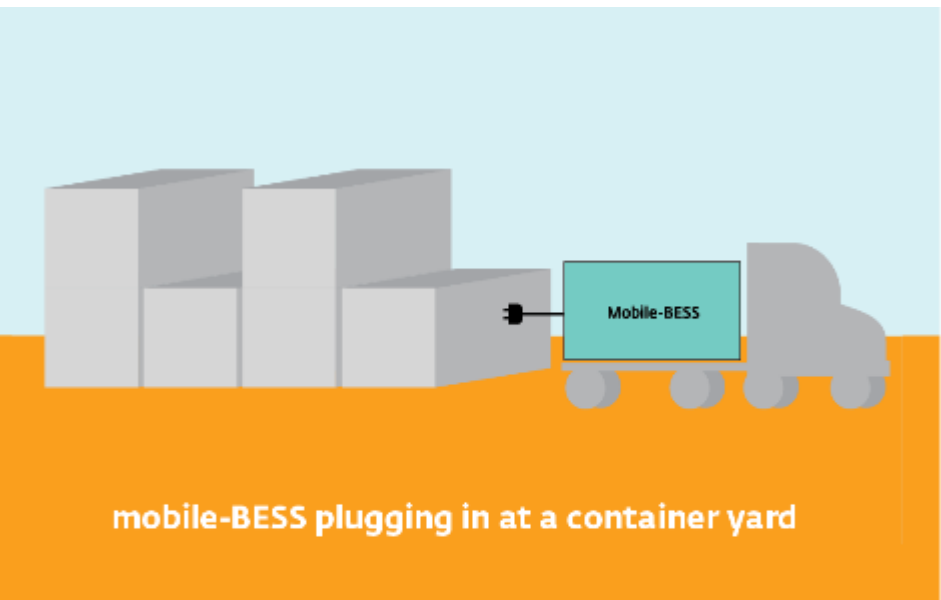
Electrical Conduit
Approx. 500 ft



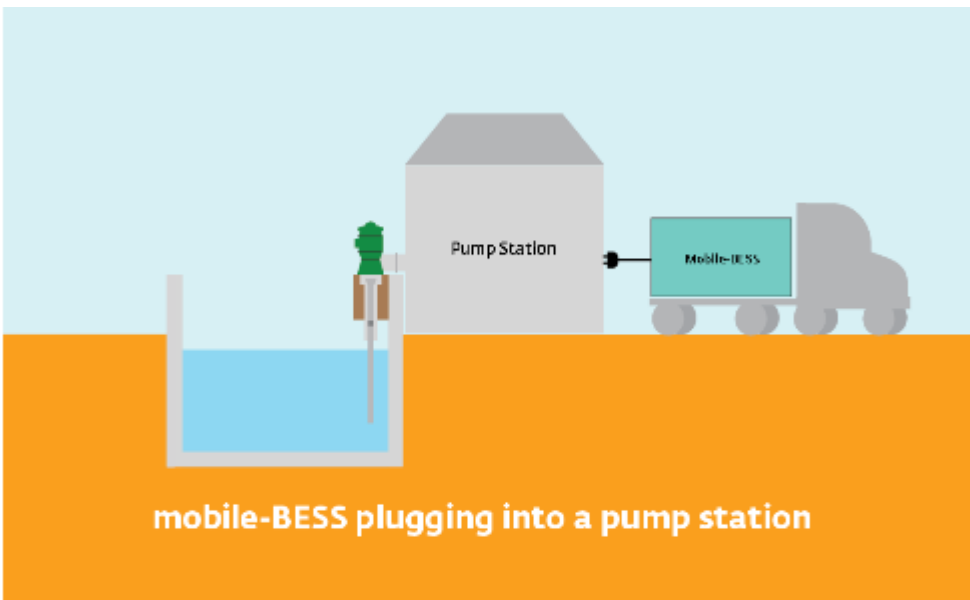
Resilience for Critical Facilities

Port of Long Beach Microgrid — EPC-17-031

Contract Term: April 23, 2018 to March 31, 2023



mobile-BESS plugging in at a container yard



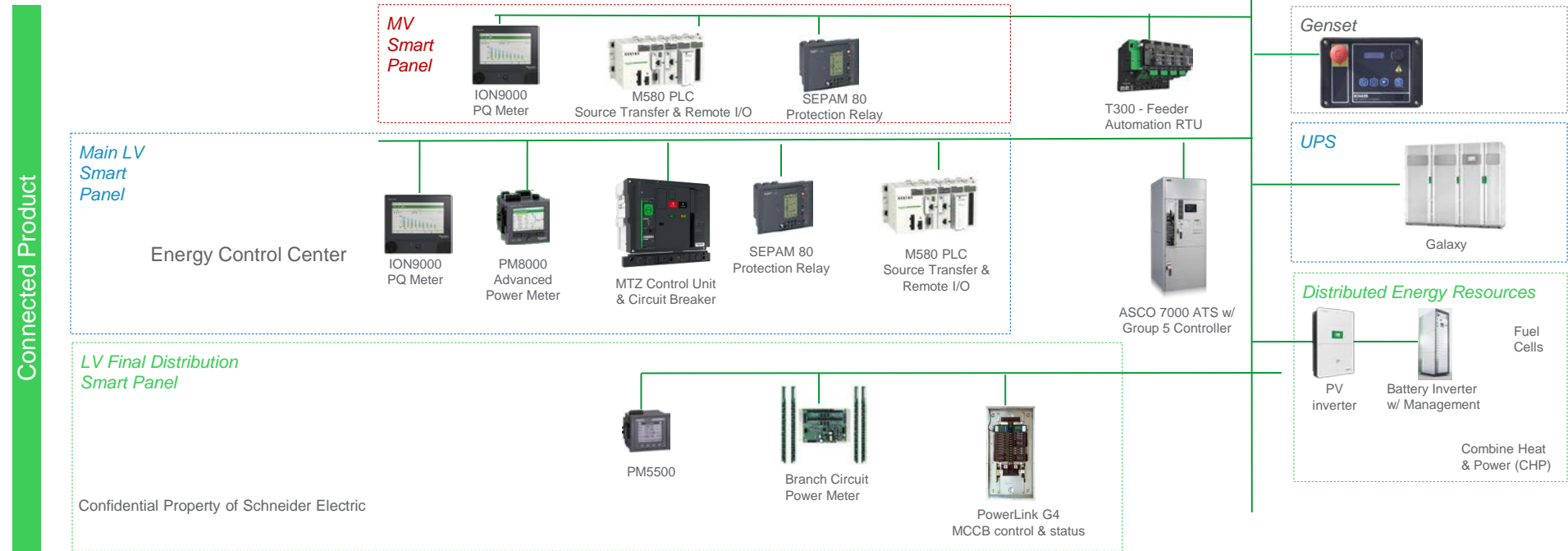
mobile-BESS plugging into a pump station

INNOVATION: Our project features a microgrid-extending, chassis-mounted mobile energy storage system (mobile-BESS). This 250kW/500kWh battery array will typically be plugged into the JCCC, but can be driven to other locations that are compatible with its 480V inverter. It's also quiet and emissions-free. We'll demonstrate the mobile-BESS at a pump station and a refrigerated container yard.

SE provides a wide range of offers for the MG projects as well as upgrades to existing infrastructure – **SOFTWARE – HARDWARE -SERVICES**

Services Applications **EcoStruxure Microgrid Advisor (EMA)** 

Edge Control **EcoStruxure Microgrid Operation (EMO)**  **Power SCADA Operation**  **Power Monitoring Expert** 



EcoStruxure Power for Advanced Microgrid Solutions

Grid & onsite production integrated management for savings & uptime

Services Applications

EcoStruxure Microgrid Advisor (EMA)



Edge Control

EcoStruxure Microgrid Operation (EMO)



Power SCADA Operation



Power Monitoring Expert



Energy Control Center

MV Smart Panel



ION9000 PQ Meter



M580 PLC Source Transfer & Remote I/O



SEPAM 80 Protection Relay



T300 - Feeder Automation RTU

Genset



UPS



Galaxy

Main LV Smart Panel



ION9000 PQ Meter



PM8000 Advanced Power Meter



MTZ Control Unit & Circuit Breaker



SEPAM 80 Protection Relay



M580 PLC Source Transfer & Remote I/O



ASCO 7000 ATS w/ Group 5 Controller

Distributed Energy Resources



PV inverter



Battery Inverter w/ Management

Fuel Cells

Combine Heat & Power (CHP)

LV Final Distribution Smart Panel



PM5500

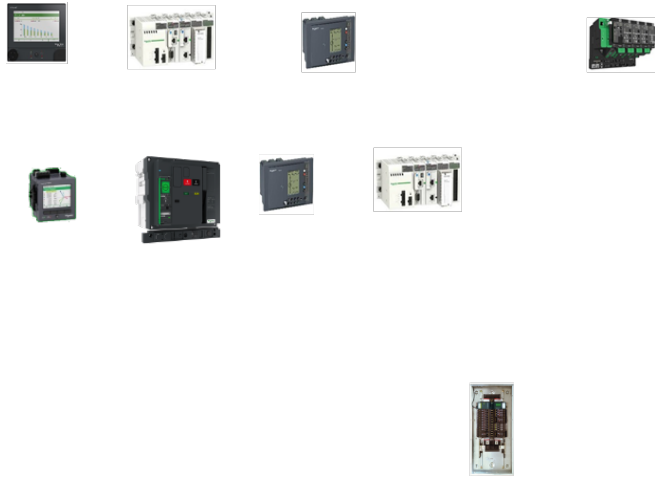


Branch Circuit Power Meter



PowerLink G4 MCCB control & status

Connected Product



CTO - Configured to Order
ETO - Engineered to Order



“Microgrid in a Box”

Energy Control Center – Engineered for Microgrid Solutions

Boston One Campus North American R&D Headquarters



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.

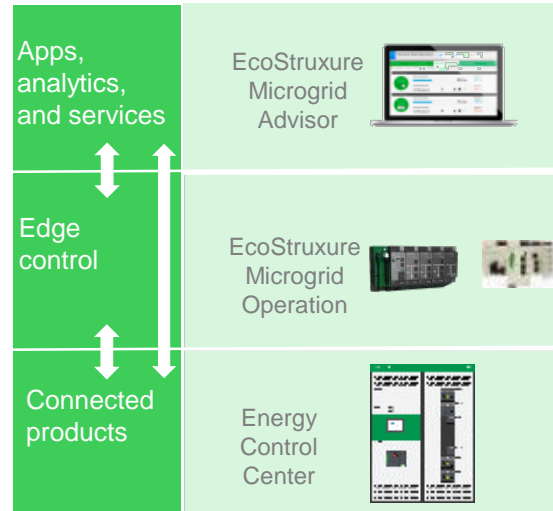
“The sustainability aspects of the microgrid create savings, and equipment upgrades can be funded by those savings.”

Mark Feasel,

Vice President Smart Grid, Schneider Electric

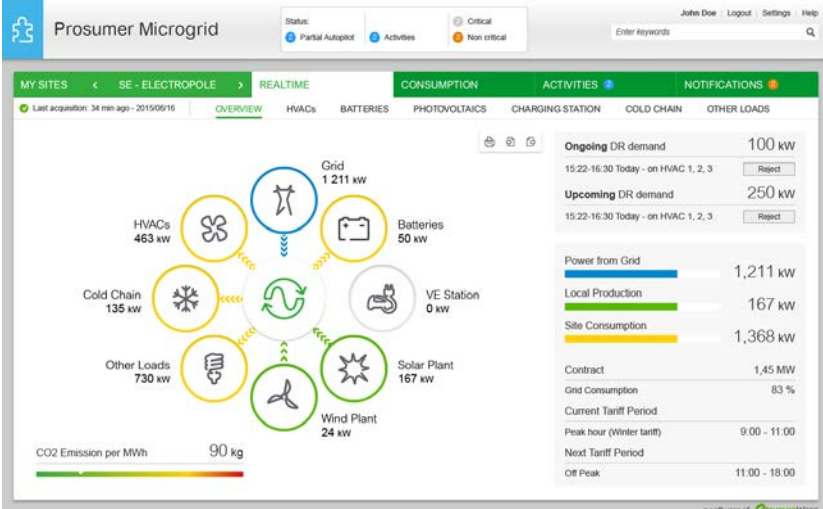
www.schneider-electric.us/microgrid

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



Life Is On





EcoStruxure Microgrid Advisor

Optimization Software for Site Managers

DER Monitoring & Autonomous Optimization

- Web accessible multi-stakeholder dashboards

Tariff Management

- Consume or produce energy at the most advantageous time based on variable utility rates

Demand Response & Control

- Reduce peak demand charges
- Partner with curtailment service providers for grid ancillary services

Self Consumption & Island Mode

- Toggle from economic optimization to resiliency storm mode



Battery Energy Storage System (BESS)

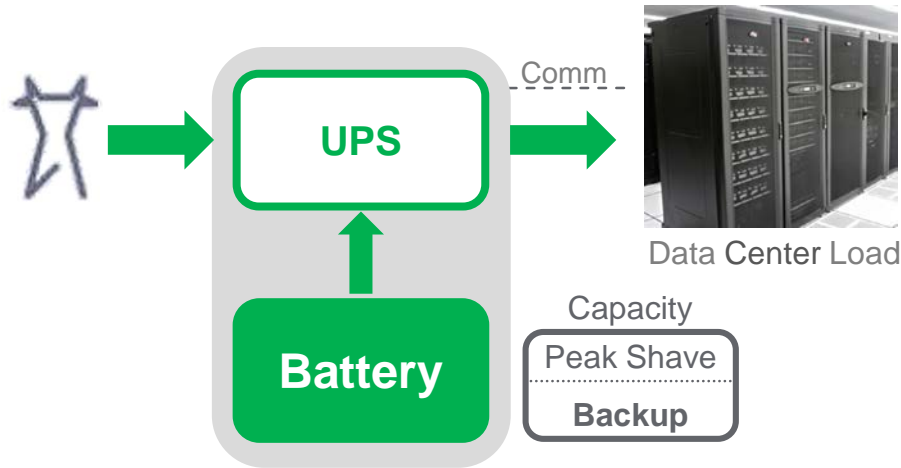
Schneider Electric's **BESS** hardware solution is best-in-class in terms of energy density, footprint and efficiency.

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.



Dispatchable Uninterruptible Power Supply (UPS) provides Peak Shaving Capability – Galaxy VM/X

High performance UPS including Li-Ion storage and dispatch flexibility



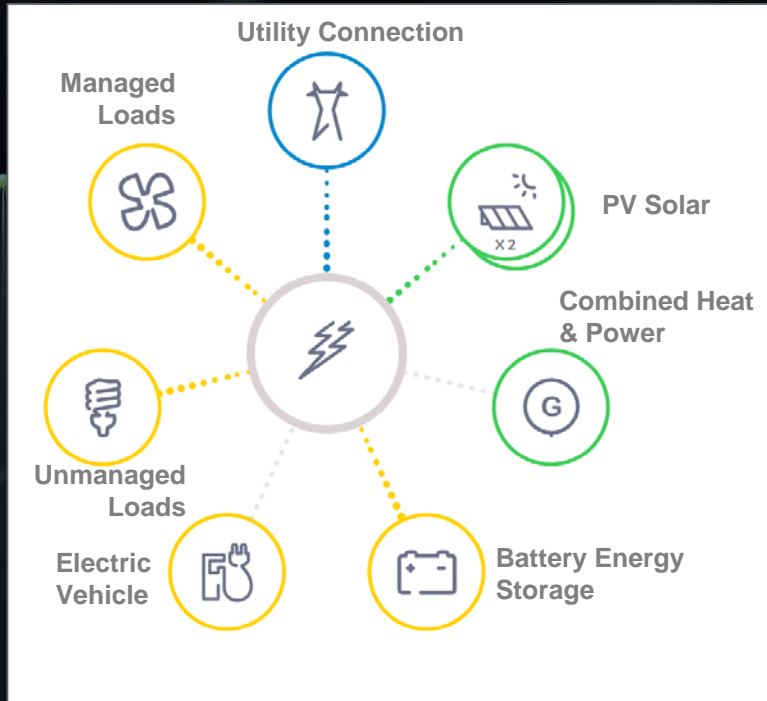
•With the Right UPS...

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

Higher resiliency → Battery issues can be detected BEFORE backup needed

Demand Side Digitization

Historically passive consumers are thinking about energy in new ways



Cost

- Lower / More Predictable Energy Costs
- Energy / Fuel Source Arbitrage
- Flexibility drives savings / incremental revenue



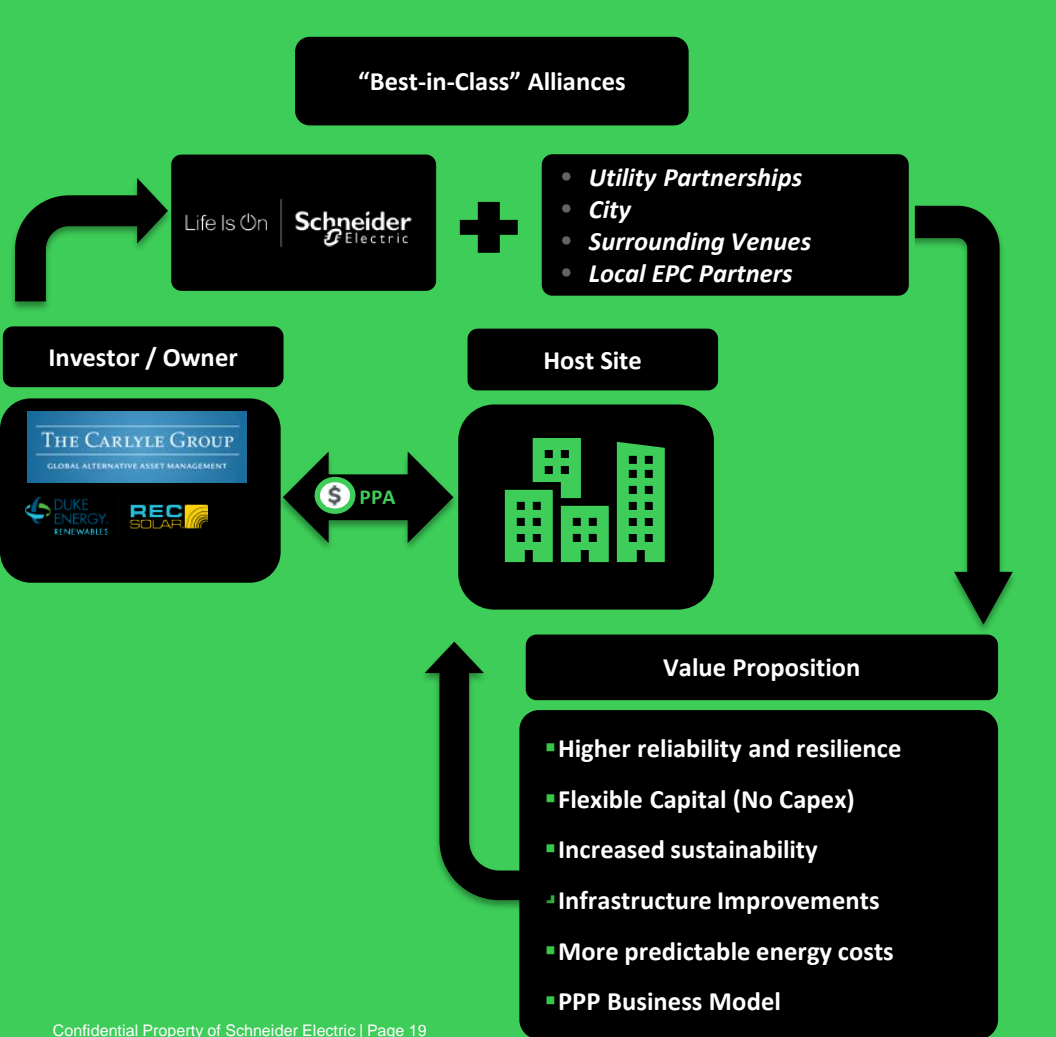
Resilience

- Serve loads during times of grid stability
- Oasis for employees / customers – shelter in place
- Protect power sensitive / critical assets from poor power quality



Sustainability

- Reduce carbon footprint
- Improve brand image
- Attract / Service carbon sensitive customers



Capital Availability

- The Carlyle Group’s stability (\$205 billion AUM & 30 years) underpins the ability to provide strategic capital
- Willing to put significant capital at risk to fund energy infrastructure initiatives



Structuring Capabilities

- Complex deal structuring with long term view in mind
- Flexible, innovative structuring approaches to meet all stakeholder’s objectives



Performance Standards

- Features incorporated in funding programs to align interests of project participants while holding DEN and Schneider Electric accountable for performance



Industry Expertise

- Schneider’s experience and expertise facilitates a unique ability to understand the needs of all project constituents



Minimize Complexity Solutions vs Projects New Energy Landscape Business Models

SE / Scale Microgrid, LLC - California R2M2

Background:

- Electrical transmission and distribution infrastructure contributed to igniting California's recent devastating wildfires.
- Over half of California citizens live or work in High Threat Fire Districts.
- • As part of Wildfire Mitigation Plans, state utilities have proposed drastically increasing the quantity and duration of Public Safety Power Shutoffs.
- Outages are expected to last 2 - 5 days

Rapid Response Modular Microgrids (R2M2)

Commercial and Industrial Power Solutions



Resilient






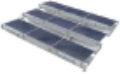

Timely




Sustainable



Cost Effective

Remote Monitoring & Microgrid Controls				
	EcoStructure Microgrid Advisor platform automatically optimizes the operation of distributed energy resources (DER).	1 Common Platform	Communication Protocol	
Manufacturer(s): Schneider Electric, Scale Microgrid Solutions, C-Power			Native Open ADR 2.0	
			Cyber Security Testing	
			NIKTO, DIRBUSTER, SQLMAP	
Energy Control Center				
	Integrates DER into an intelligent, pre-engineered, and configurable power control center to easily optimize resources and maximize facility performance.	3 Configurable Modules	800/1200: Typically used with 25-250 kW DER's	
Manufacturer: Schneider Electric			1600/2500: Typically used with 100-750 kW DER's	
			Engineered to Order: Used with any size and type of DER's	
Battery Energy Storage System				
	Modular, scalable architecture with best-in-class power conversion and battery technologies.	4 Standard Modules	125 kW/250 kWh	
Manufacturer: Schneider Electric			250 kW/500 kWh	
			500 kW/1000 kWh	
			1000 kW/2000 kWh	
Solar PV				
	We work with the best local solar installation professionals to design, engineer, and construct custom rooftop, carport, and ground-mount solar arrays to meet the needs of your facility.			
Dispatchable Generator				
	Provides on-site power that can be adjusted to the output needed.	7 Standard Modules	285 kW	1000 kW
Manufacturer: Mitsubishi			380 kW	1200 kW
			610 kW	1500 kW
			815 kW	
			Fuel Options: NG, RNG, Propane	



- ✓ Industry leading MG Controls
- ✓ Electrical Infrastructure – via  by Schneider Electric
- ✓ Leading Business Model – P3
- ✓ Seeking Channels and Alliances
- ✓ Targeting NE Region

Schneider Electric – Microgrid Competency Center

For information and assistance:



don.wingate@se.com
216-272-1792