

Electricity For Canada's Remote Communities

Pratap Revuru

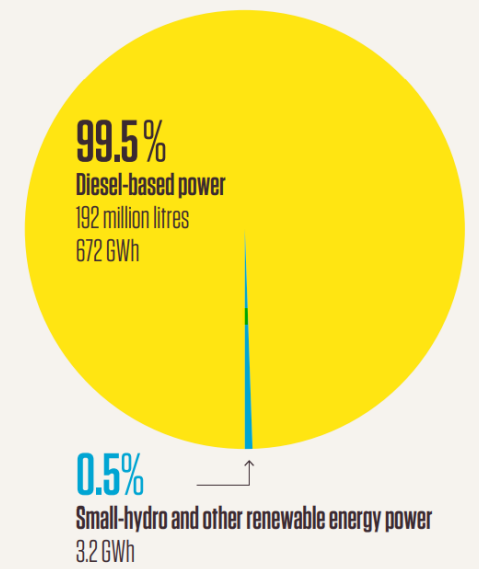
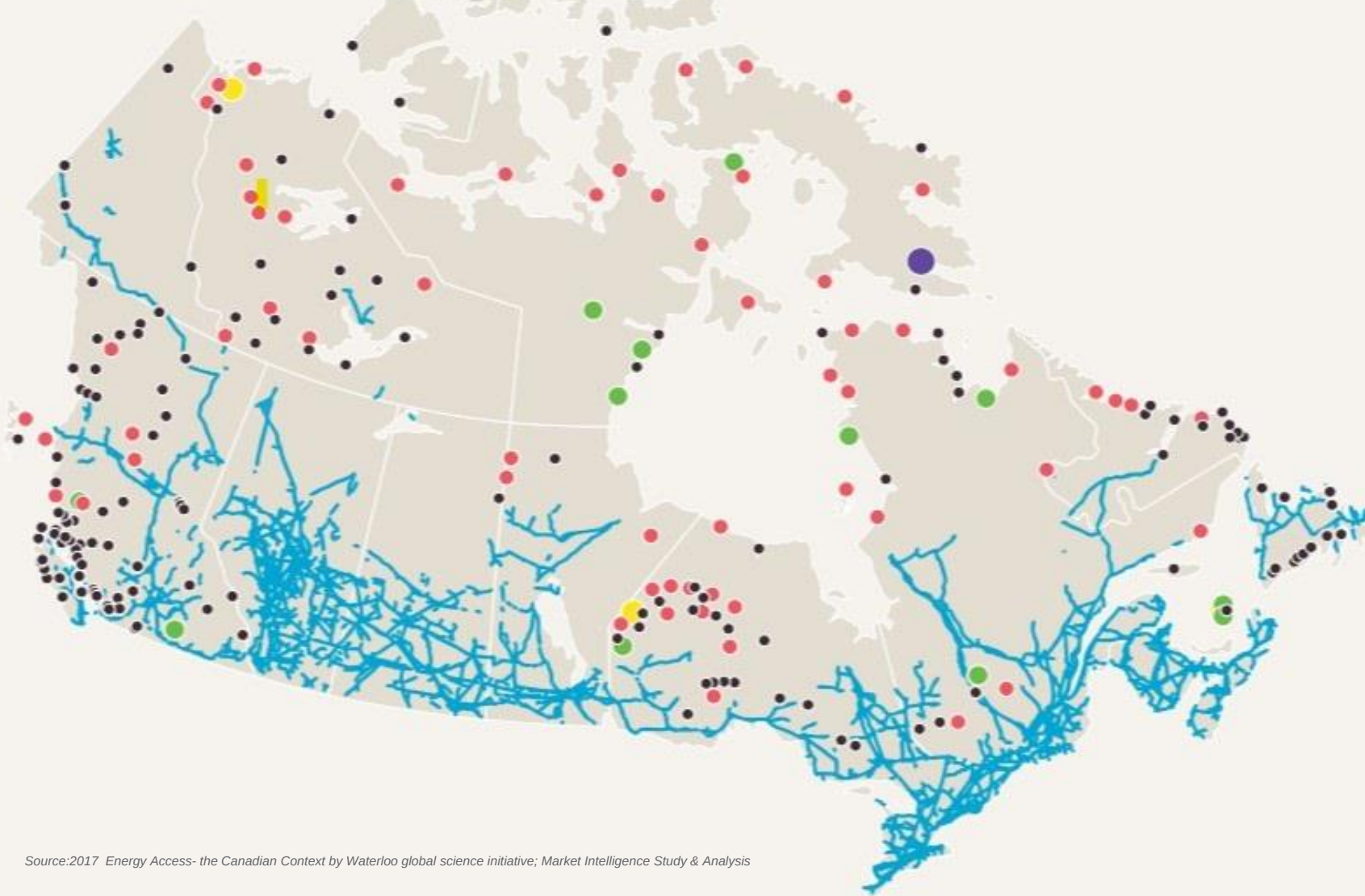
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11-11.45 AM EST

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Canada's Remote Communities: Landscape

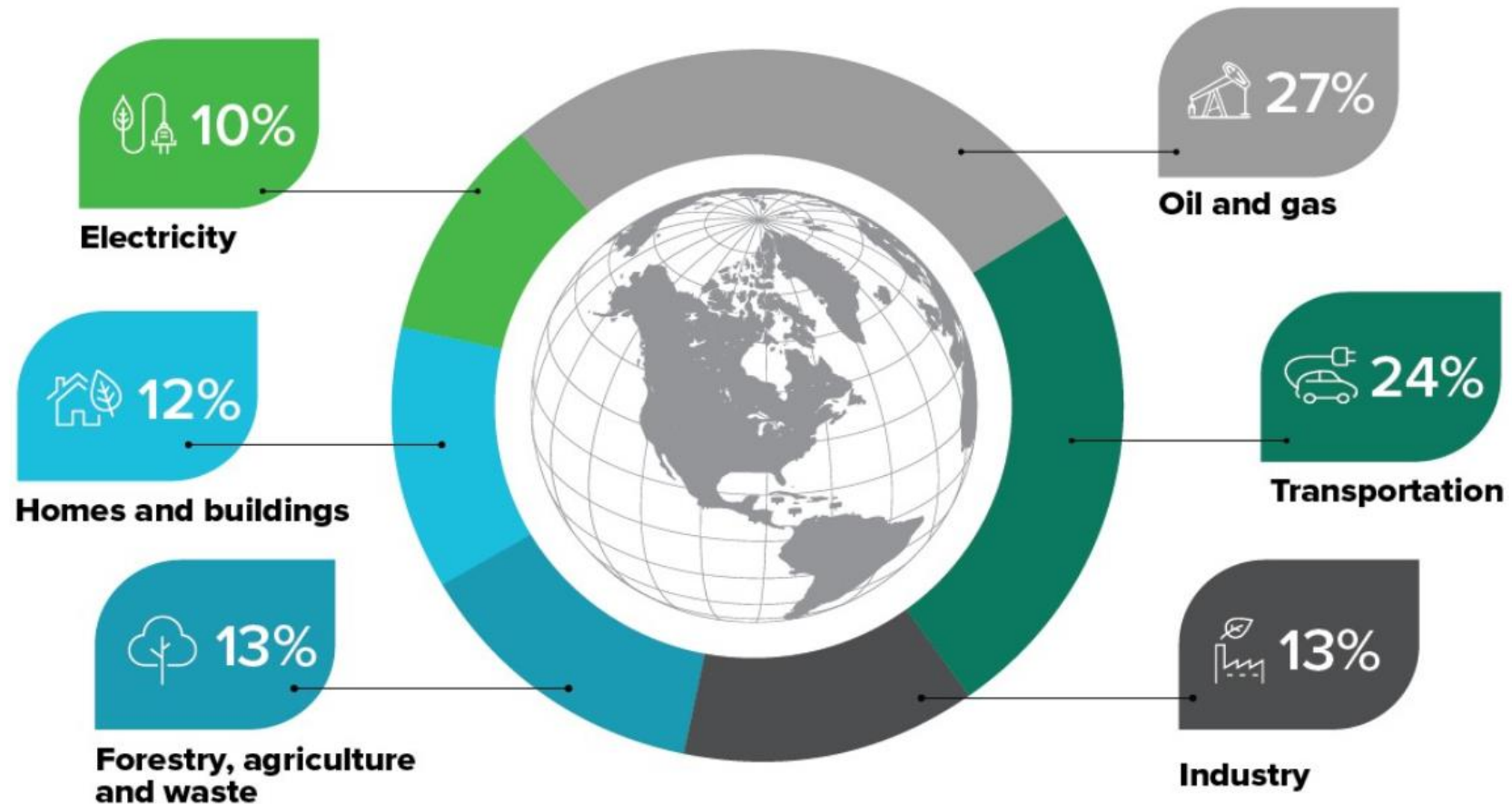


POPULATION

- < 500
- 501-1,500
- 1,501-2,500
- 2,501-5,000
- > 5,001
- Electricity Transmission Lines

Canada's Remote Communities: Environment

Where Canada's greenhouse gas emissions come from.



Canada's remote communities: Economy

Remote Communities need

- Local jobs
- Hospitals
- Water and wastewater facilities
- Local well-being
- Food storage
- Emergency shelter

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Schneider
Electric

Canada's remote communities

Energy

Fuel based Standalone generation



Historical Energy Generation

The New Generation

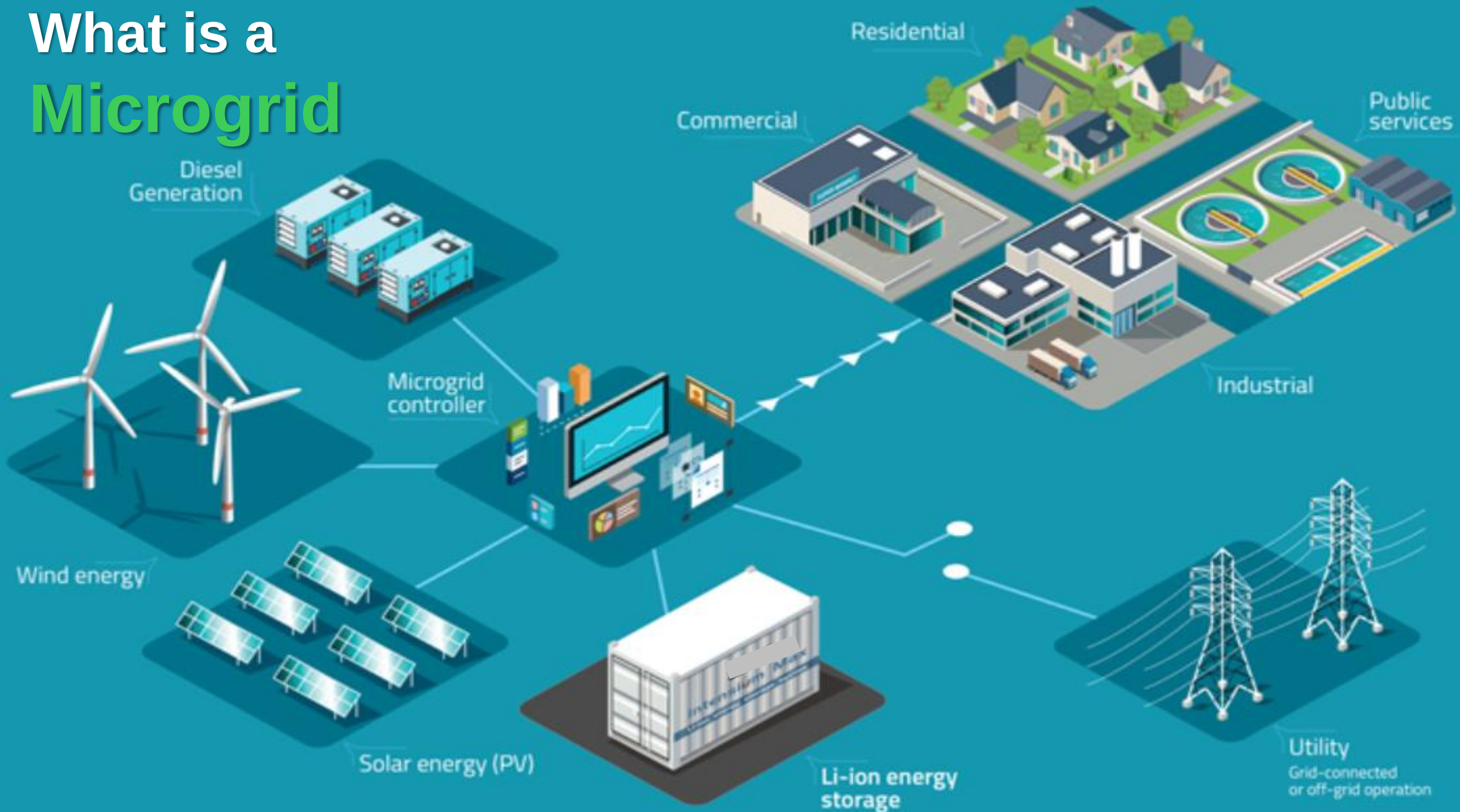


Off grid microgrid w/ new clean generation

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What is a Microgrid

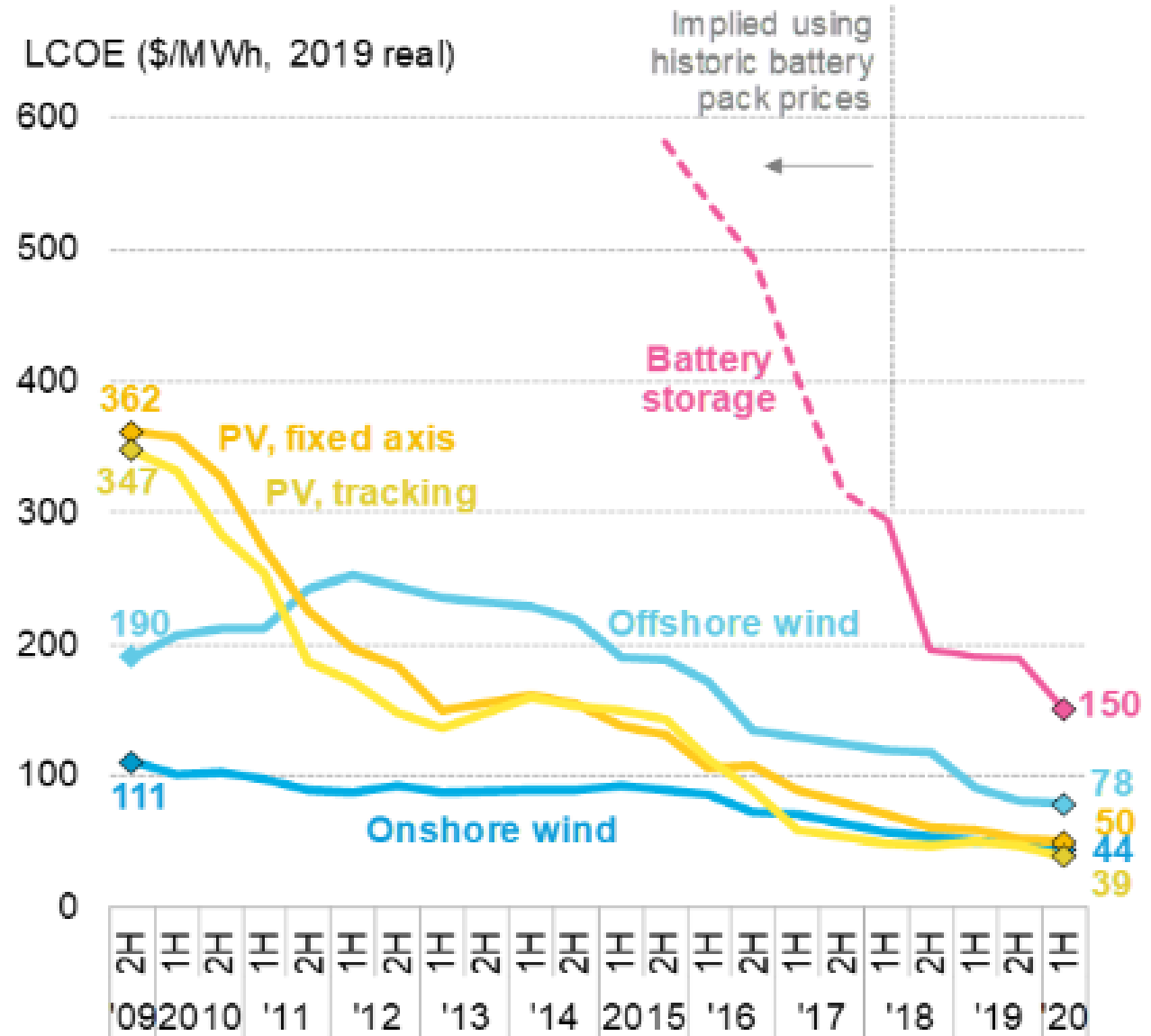




Microgrids transform
remote communities to become more
cost efficient,
resilient and **sustainable**

Falling prices of Wind, Solar and Battery...

Figure 2: Global LCOE benchmarks – PV, wind and batteries



Source: BloombergNEF. Note: The global benchmark is a country weighted-average using the latest annual capacity additions. The storage LCOE is reflective of utility-scale projects with four-hour duration, it includes charging costs.

Microgrid Architecture

Complex architecture to deployable Architecture

Technology Readiness

Cloud services



- Ancillary services
- Optimization Services

Supervision, HMI & Data Management



- Data Management
- Communication
- Remote and local Interfaces

Microgrid control



- Energy Management execution
- Power Management

Distributed Energy Resources



- Gensets, CHP, inverters for storage, PV or wind

Protections & Metering



- Protection schemes
- Loads flexibility management
- Power Quality & Metering

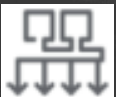


Digital
Services
Platform

Internet

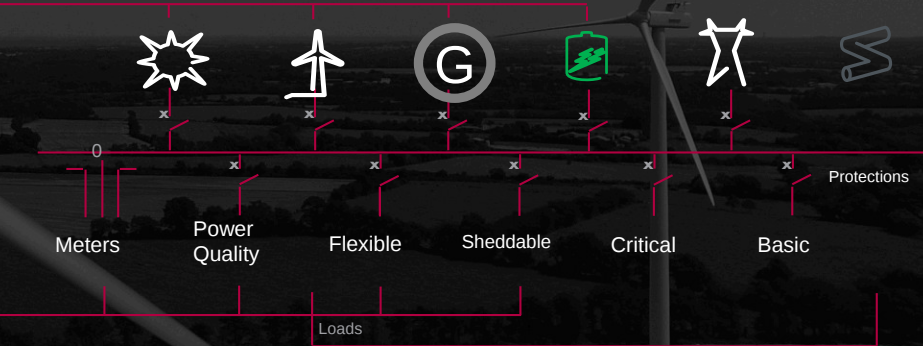


Supervisory
Control And
Data Acquisition

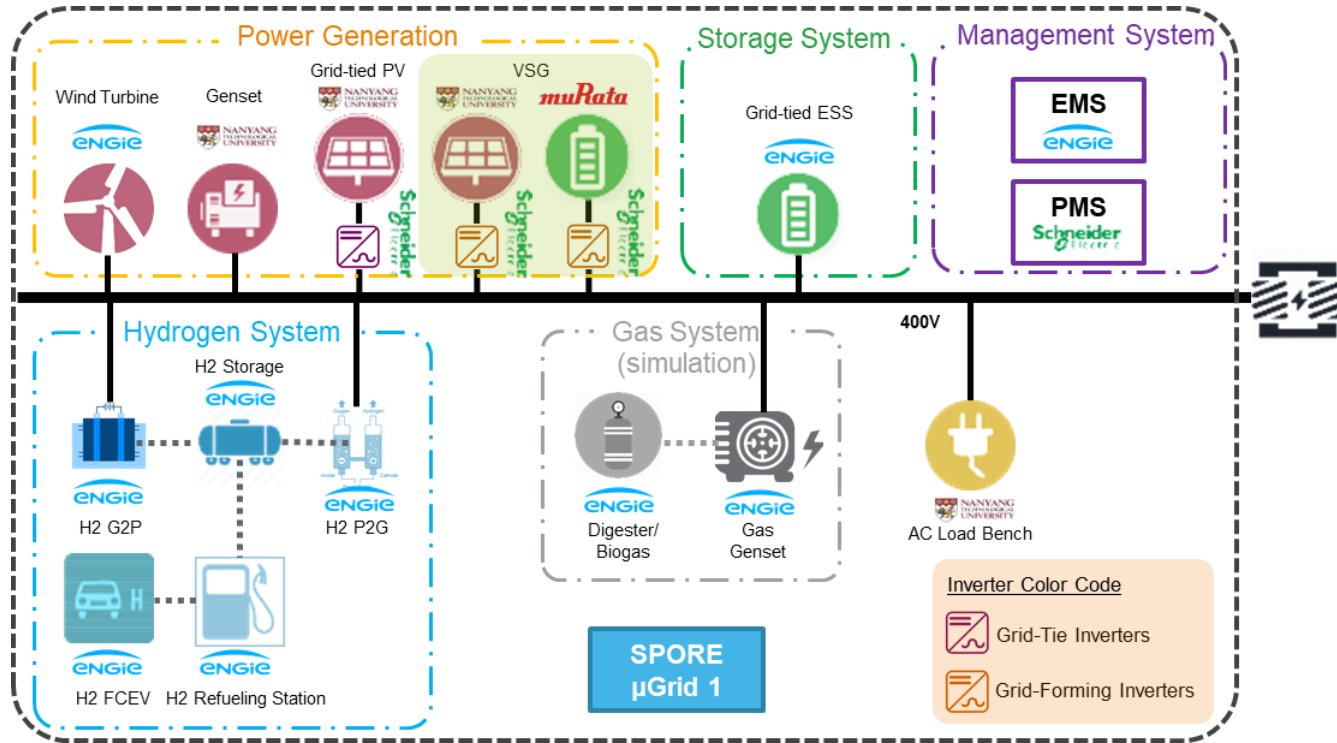


Microgrid
controller

Field communication



SEMAKAU Island



- SPORE Microgrid was built on SEMAKAU Island consisting majorly the following:
 - 1 Wind turbine 100 kA
 - 3 GENSETS 2x50 kVA + 100 kVA
 - PV Grid-tie 100 kVA
 - VSG** inverter 100 kVA with storage
 - Grid-tie 100 kVA storage
 - H2 power-to-power (P2P) system, a H2 refueling station (HRS) and a fuel cell electric vehicle (FCEV)

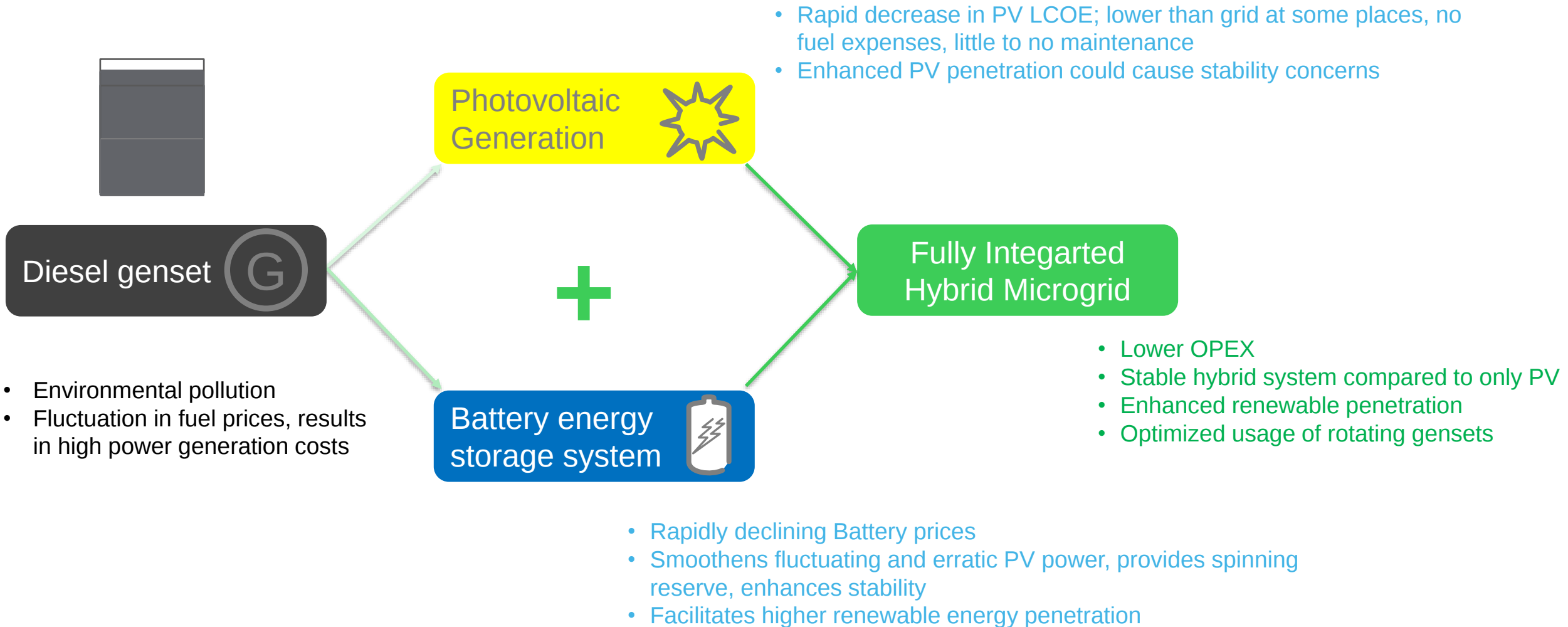


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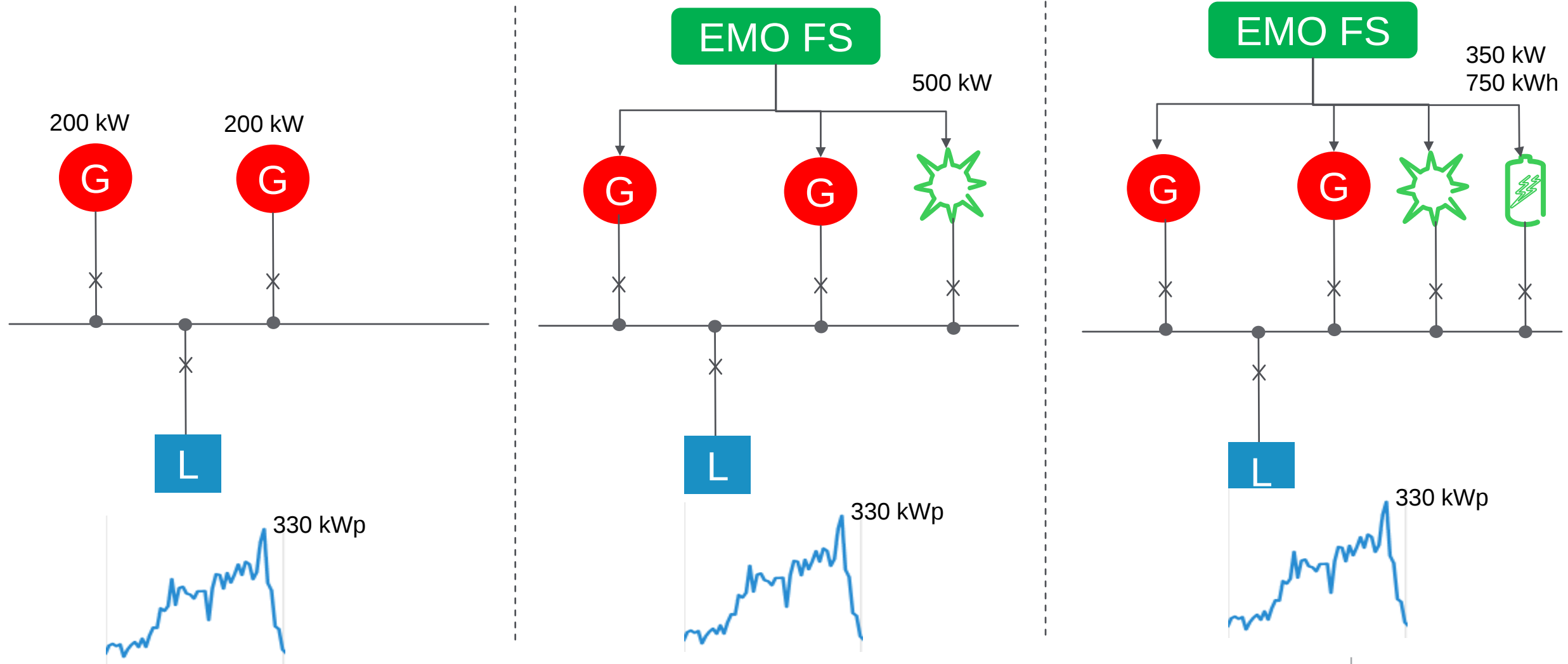
Schneider
Electric

Diesel reduction

Integrated Solution

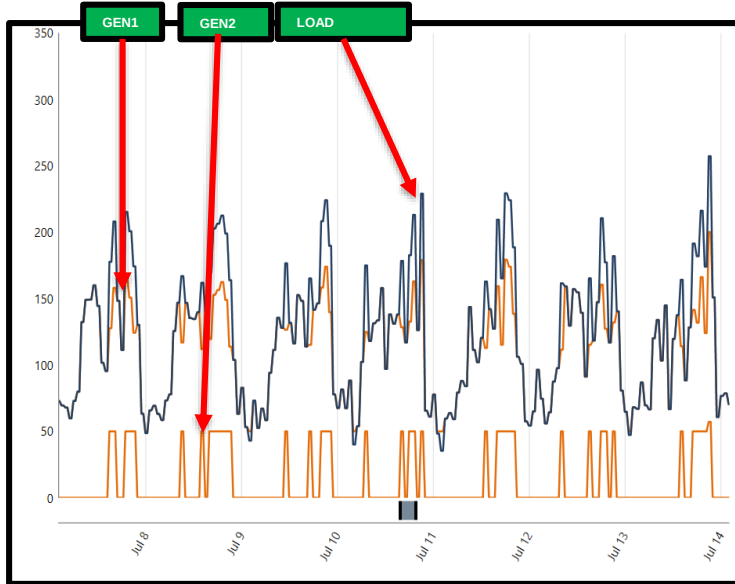


Renewable Energy Integration



Diesel Reduction Use Case

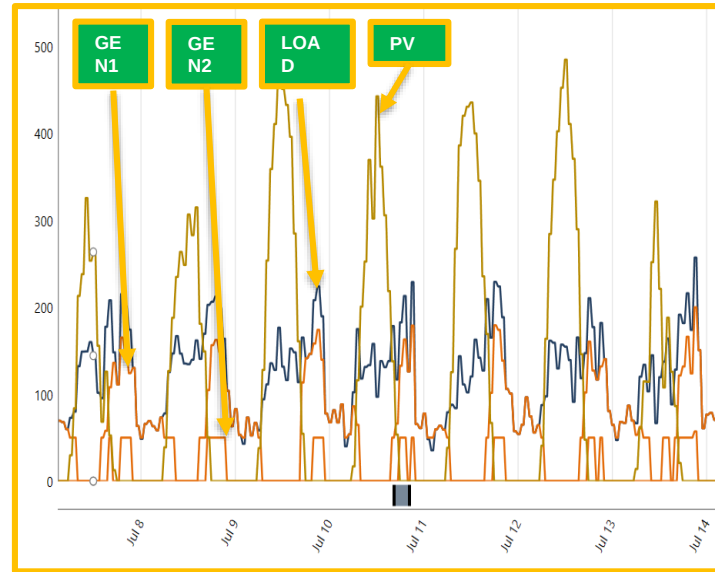
Only Genset



Total Fuel Consumption
= 321,321 litres

BASE CASE

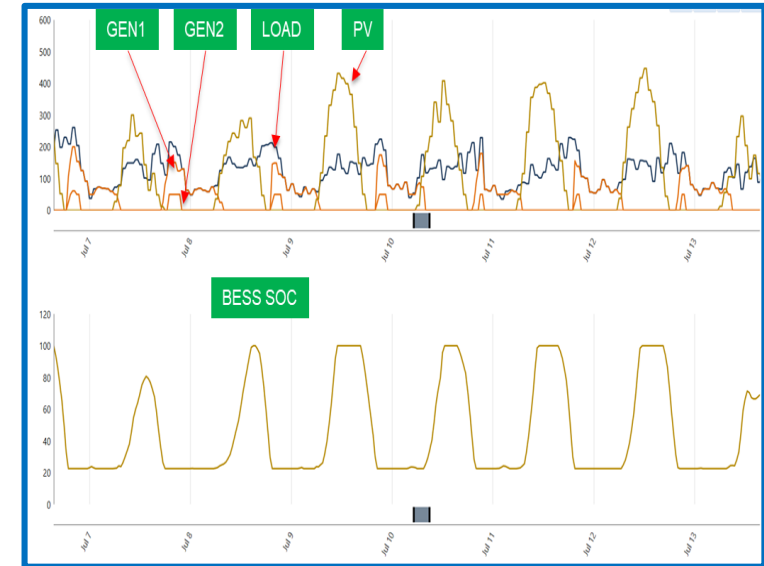
Genset + PV



Total Fuel Consumption
= 195,921 litres (-40%)

System payback = 4.4 years

PV+Genset+BESS



Total Fuel Consumption
= 136,715 litres (-57%)

System payback = 4.0 years

Power Management System

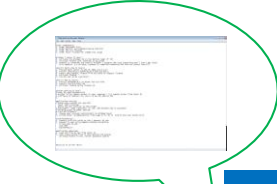
Fuel Saver

Customer Site



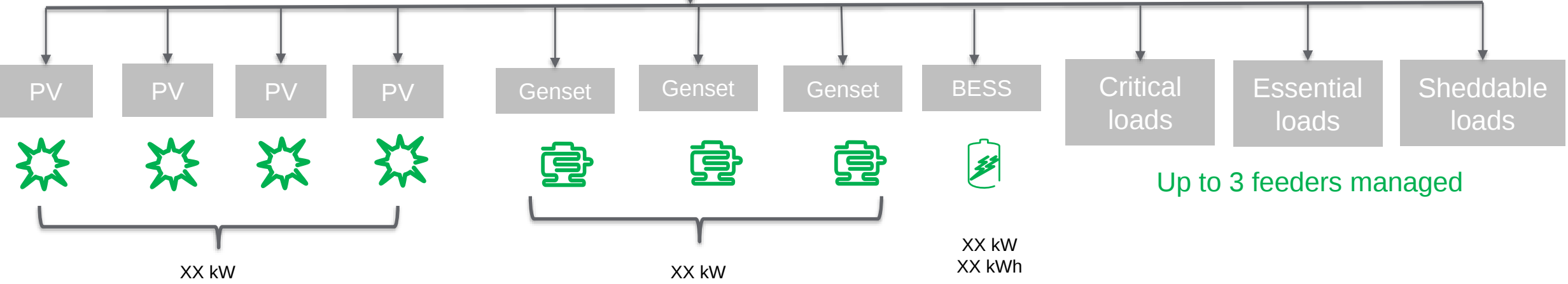
Local HMI

EcoStruxure Microgrid
Operation Fuel Saver



+ Configuration

Modbus



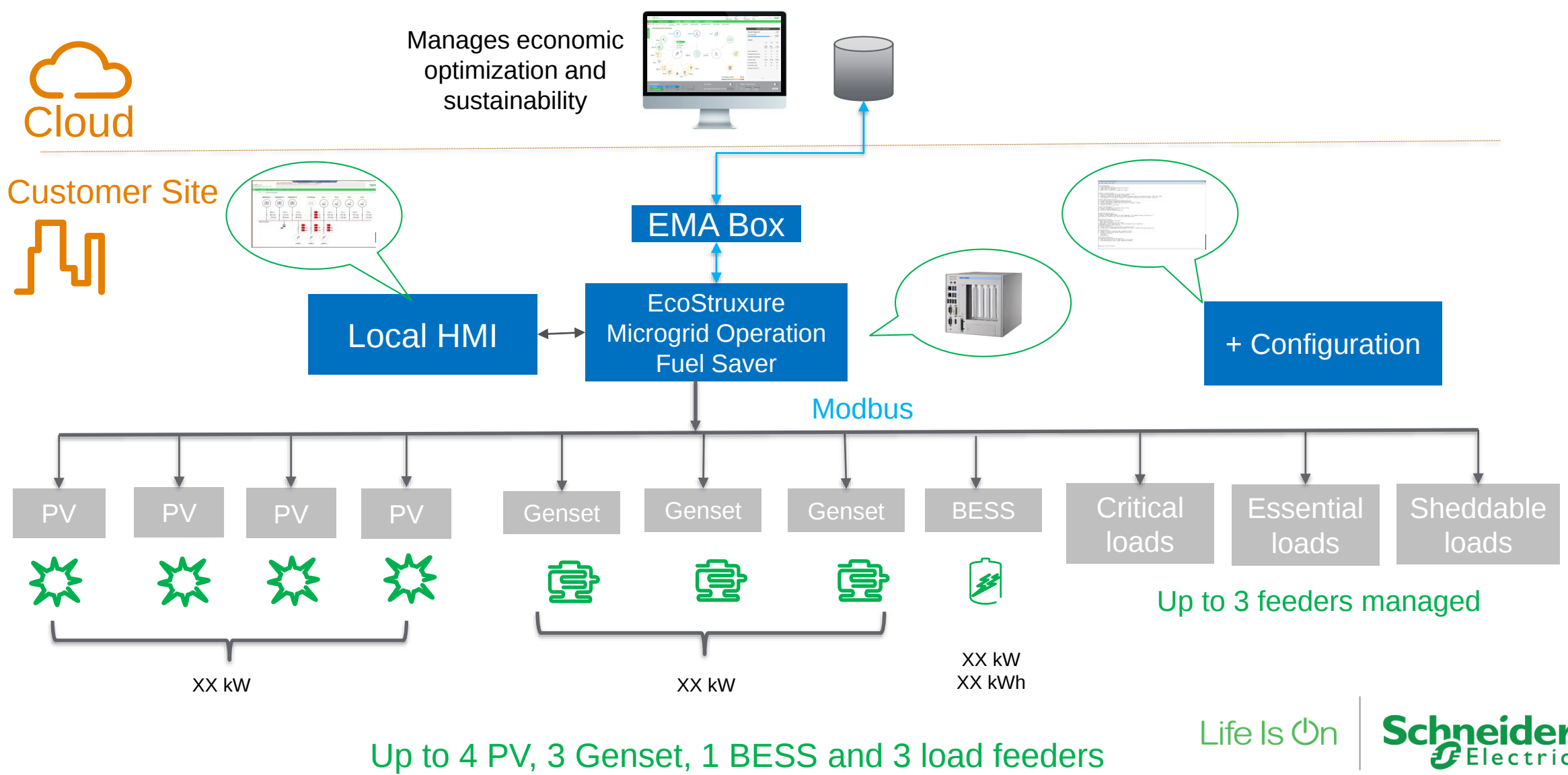
Up to 4 PV, 3 Genset, 1 BESS and 3 load feeders

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Power and Energy Management Systems

Fuel Saver

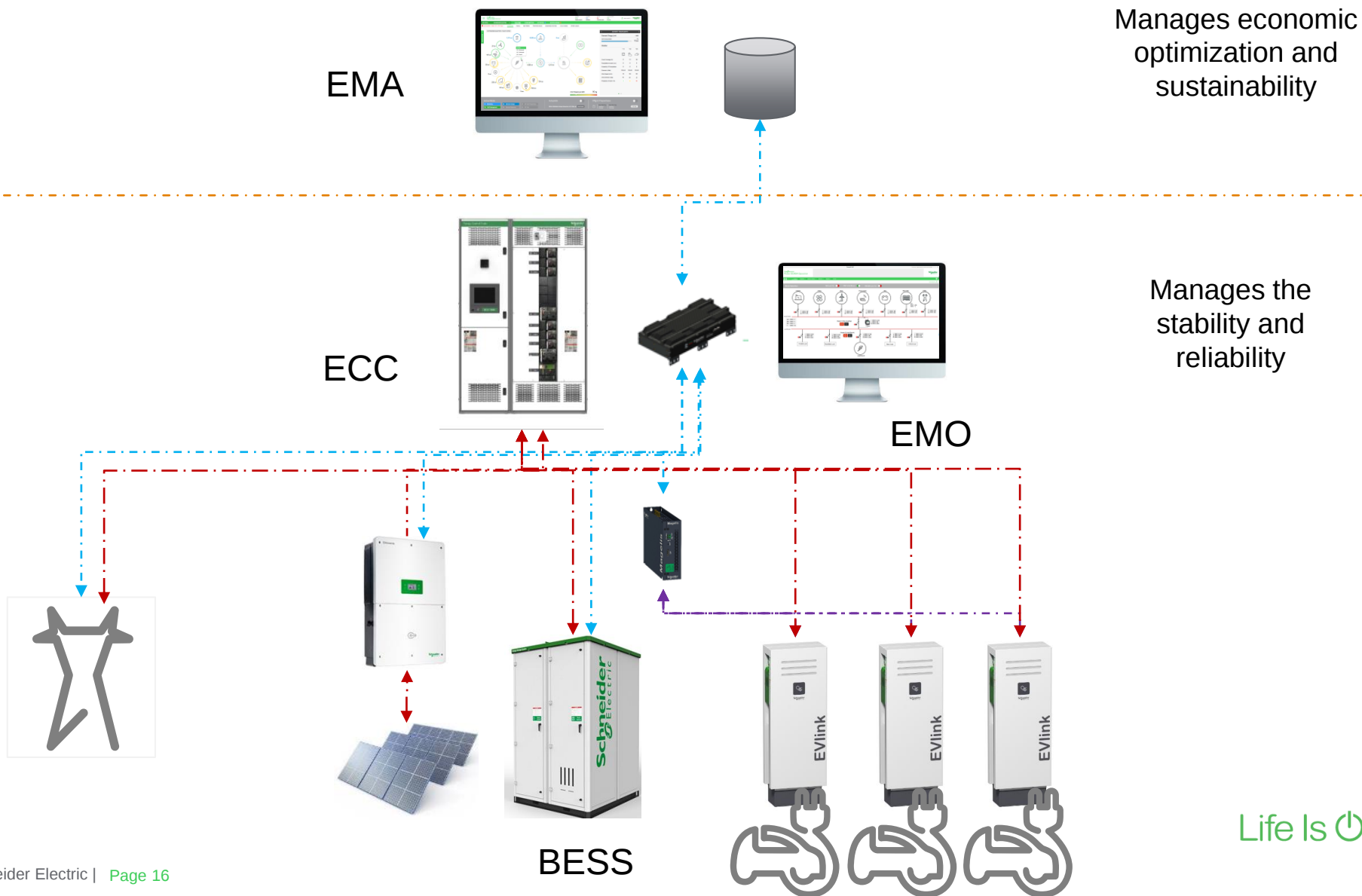


EMS* + PMS**+ DER's Architecture



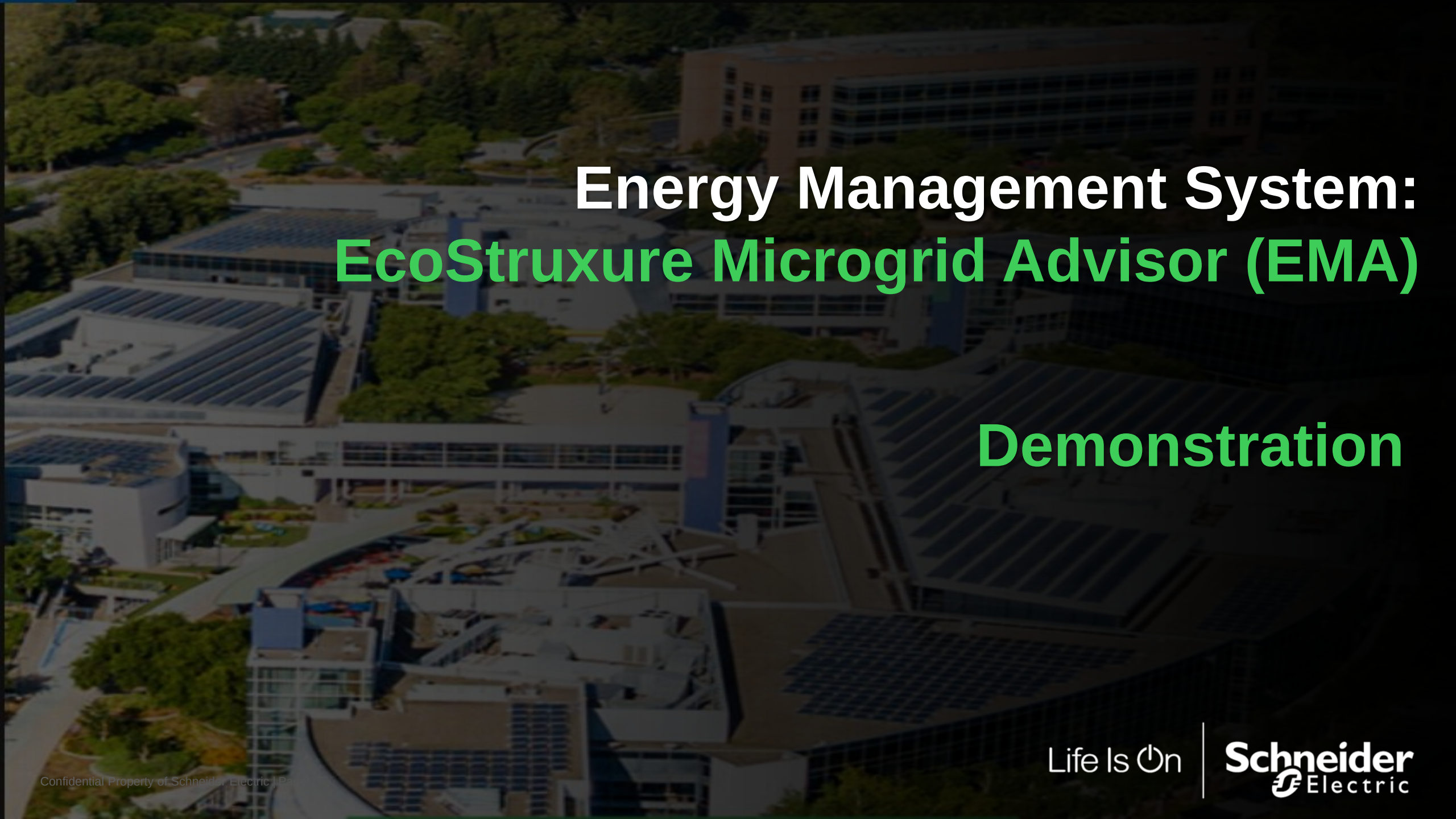
Power flow
 Communication flow
 (Modbus IP)
 Communication flow
 (OCPP)
 Communication flow
 (Web Service)
 Communication flow
 (xx)

- * EMS- Energy Management System
- ** PMS- Power Management System



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Energy Management System: EcoStruxure Microgrid Advisor (EMA)

Demonstration



There are **regulatory,**
financial, and
technological barriers that
can prevent you from having energy
resilience.

We can help!

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For additional information

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