EcoStruxure™
Microgrid Advisor

Microgrid Solutions – Battlecard

June 2019

Executive summary

This document provides information regarding Schneider Electric EcoStruxure™ Microgrid Control Solutions

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Introduction

Microgrid and DER (Distributed Energy Resources) technologies are more and more chosen by end users as a solution to provide cost-effective, resilient, and secure supply of onsite sustainable energy.

A microgrid is a managed group of DER systems which mainly consist of:

- Energy (electricity, heat) production sources such as solar panels, wind turbines, combined heat & power systems (CHP), gensets, etc.
- Flexible loads such as electrical vehicles charging stations, industrial process, Heat, Ventilation and Air-conditioning (HVAC) via BMS (Building Management System), etc.
- Energy storage systems such as a BESS (Battery Energy Storage System), thermal energy storage system, hydrogen storage etc.

EcoStruxure™ Microgrid Advisor (EMA) is a cloud-based Energy Management System (EMS) for predictive DER management that automatically forecasts and controls site flexibility. It is in charge of the autonomous economic dispatch of site DER. The EMA solution helps optimize your energy assets by telling you when to produce, consume, store or sell energy in a Microgrid while paralleled with the grid. Also, it provides valuable services to grid operators and commercial aggregators such as Frequency response, ancillary service or Demand response.

EcoStruxure™ Microgrid Operation (EMO) is a Power Management System (PMS), in charge of the islanding management of the microgrid. EcoStruxure™ Microgrid Operation (EMO) is responsible for the real-time optimization of DER in islanded mode. It is composed of a local controller with specific algorithms and a human machine interface (HMI). EMO helps ensure the stability of the microgrid whatever the energy demand is, by synchronizing energy production sources, loads and energy storage systems.

Overview

The purpose of this document is to list/describe the killer phrases, battle cards and the differentiating capabilities of EMA/EMO (Schneider Electric microgrid control solutions) versus the competitors.

This document is for internal use only.

1. Schneider Electric Microgrid Solutions

Schneider Electric can provide the following expertise, product and solution in order to deliver best in class microgrids.
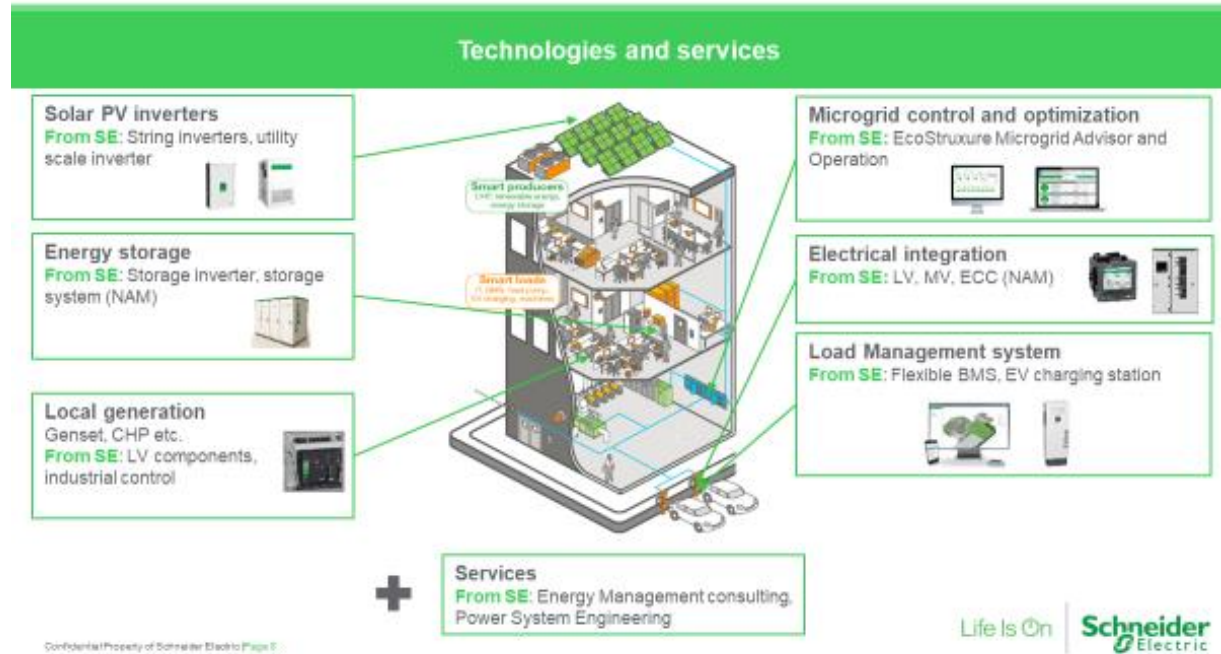

Figure 1: Technologies and services delivered in Microgrid

Consulting is key in order to understand and define the customer needs, as well as influencing the RFP / RFQ process for maximizing the prescription of Schneider Electric products and solutions.

During this phase, one of the most critical pieces is the sizing of DER from both an economical and technical standpoint.

In terms of product and solutions, control systems are the key:

➢ They maximize the operation of DER and makes the coordination between different DER much simpler.

➢ They ensure that the DER are delivering the value expected by the customer.

➢ They become the "face" of the Microgrid and are often used by customers for internal/external communication about their Microgrid.

2. Why Schneider Electric for your microgrid journey?

Strong experience and recognition in the energy management and automation field

Global trusted company:
- 100+ years legacy in power distribution & Energy Management.
- 130+ microgrid references worldwide
- Navigant Research recognitions SE as a global leader in microgrid technologies and services
- Ranked #1 for Energy-as-a-Service by Navigant Research
- Global footprint with local support (EAC in 5 regions)

Best-in class technology:
- Offering the most critical parts with monitoring, control & optimization, thanks to our advanced algorithms
- Able to provide all the equipment from MV to LV (strong knowledge in grid behavior, breakers, inverters, EV charging, BMS…)

Peace of mind:
- Involved with the customer since the beginning as it is seen as a key for a Microgrid-newbie
- Customer support throughout the microgrid journey (from finance to maintenance through design)
- Collaboration is essential for microgrid project: partnership is in our DNA
- Easy and fast integration of DER with ECC

Flexible:
- DER agnostic: flexibility to integrate third party equipment (PMS, DER components…)
- Scalable: system can easily evolve integrating additional DER
- Different business models supporting multiple financial contracting vehicles

3. EcoStruxure Microgrid Control solution value proposition

Our value proposition:

Integrating and optimizing DER for making the most of your energy, offering a solution:

➢ **DER Agnostic:** Flexibility to integrate both Schneider Electric and third-party vendor equipment (generation assets, BMS, storage …)

➢ **Scalable:** Can evolve over time according to your needs and growth

➢ **Optimizing energy costs, reliability and sustainability:** combining the best of an EMS and PMS control offers for reaching your goals
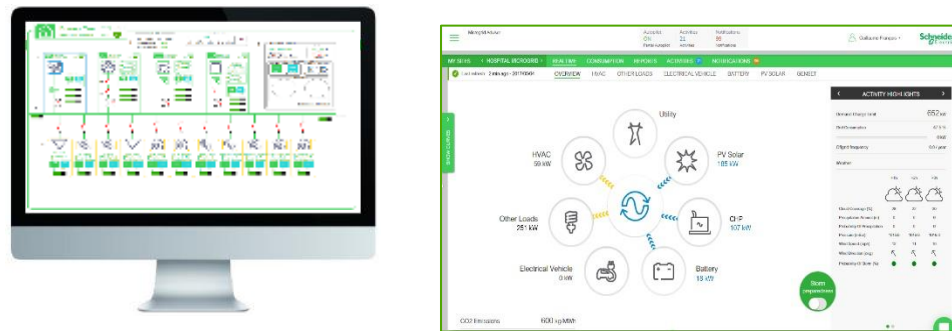

Figure 2: EcoStruxure Microgrid control Solution- EMO HMI & EMA HMI

4. EcoStruxure Microgrid Control solution features

- **DER Agnostic:** Our controller can integrate any type of equipment on the generation side (BESS, PV inverters, CHP, genset controllers…) and on the distribution side (power meters, breakers, transformers, remote switches…). It allows customers to choose the suppliers they prefer for initial implementation and for future expansion.

- **Advanced HMI:** Visualization of the right data at the right time allows our customers to make the right decisions. That's why Schneider Electric has developed an advanced HMI for both our PMS offer (EMO) and EMS offer (EMA).
  EMO HMI allows electrical engineers to interact with field DER and electrical distribution components for ensuring the continuity of service and maximize the reliability of the microgrid, regardless of grid availability.
  EMA HMI allows site managers to have an overall understanding about the Microgrid performance, and allows tracking of key metrics related to sustainability, energy costs, and reliability.

- **Network Management:** Schneider Electric embeds in its software functions to consider network topology and current/frequency/voltage issues. This will be particularly important when performing efficient load shedding actions as the decision must be taken based on power characteristics at local scale.

- **Flexibility of the solution:** Schneider Electric developed scalable solutions (EMA and EMO) which support a wide range of use cases depending on customer needs. We intend to work closely with customer to define the operating rules and sequence of operation which are the most relevant with your business, defining for instance the modes to optimize the use of storage and to prioritize load shedding capabilities at power meter level or LV feeder level.

- **Cyber Security:** Cyber Security is critically important as control systems are more and more threatened by attackers targeting energy supply. Schneider Electric considers Cyber Security as one part of the solution. E.g. we have many layers of security features implemented and can offer more advanced security features on customer's requests. We have the right experts and technology to meet varying cyber security requirements.

- **Customer Support:** Schneider Electric has a long and proven history supporting its customers. Leveraging our experience, we can provide a long-term customer support providing the right level of knowledge with skilled personnel by assisting from the beginning till the end.

5. Schneider Electric leadership in microgrid controller solutions

The controller is the brain of a microgrid and the most critical module to ensure the stability of the power supply as well as the profitability of the project for the operator. It helps to optimize the DER while allowing them to be in off-grid mode, as an important feature of microgrids is the ability to operate while connected or disconnected from the main grid. Furthermore, the controller must be customizable to adapt itself to the operators' present and future needs, as the network might expand over the time and new distributed energy resources and load will be connected to the microgrid.

Microgrid controller vendor

Schneider Electric microgrid controller solution (EMS, PMS) are open, flexible and scalable to enable the delivery of a controller which fits with our customer expectations. This is why the independent consultancy company **Navigant Research** considers Schneider Electric as a visionary and leader on the market in its 2018 study. (see graph below).
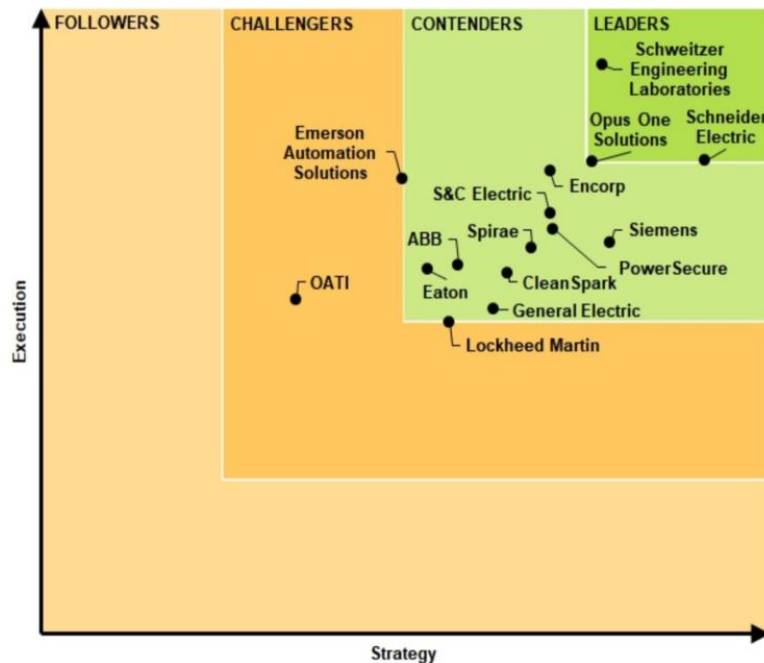

Figure 3: Navigant Research's leaderboard / Microgrid controller vendor market 2018 [1]

Schneider Electric is also ranked as the number 2 best vendor for microgrid control solution

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[1] *Source : https://www.energymanagertoday.com/schweitzer-schneider-and-opus-one-rank-high-in-top-10-list-of-microgrid-controller-vendors-0175992/*
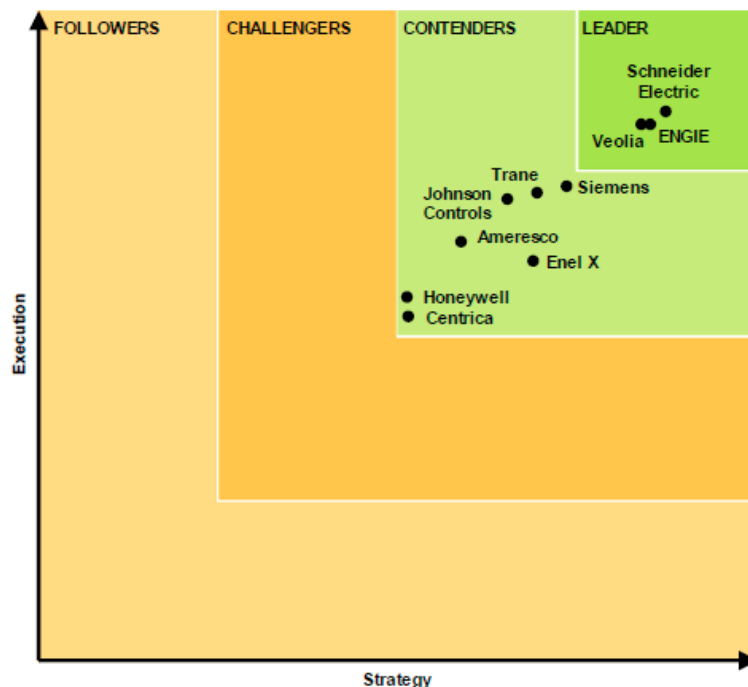
"The top 10 vendors are:

1. *Schweitzer Engineering Laboratories*
2. *Schneider Electric*
3. *Opus One Solutions*
4. *Encorp*
5. *Siemens*
6. *S&C Electric*
7. *PowerSecure*
8. *Spirae*
9. *Emerson Automation Solutions*
10. *CleanSpark"*

Energy as a Service Solutions Providers

The independent consultancy company **Navigant Research also considers Schneider Electric as the best Energy as a Service (EaaS) solutions providers on the market in its 2018 study.**

Navigant Research Leaderboard examines the strategy and execution of 10 leading energy as a service (EaaS) solutions providers. According to a report by **Navigantresearch.com, 2018,** these companies are rated on 10 criteria viz **"*vision; go-to-market strategy; partnerships; EaaS technology; geographic reach; sales, marketing, and distribution; solution depth, solution performance; pricing; and staying power".*** Using Navigant Research's proprietary Leaderboard methodology, vendors are profiled, rated, and ranked with the goal of providing industry participants with an objective assessment of these companies' relative strengths and weaknesses in the global C&I EaaS market.*"*

(Source: Navigant Research)

Figure 4: Navigant Research Leaderboard / Energy as a Service Solutions Providers [2]

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[2] *Source Navigant Research*

"Top 10 Vendors:

1. *Schneider Electric*
2. *ENGIE*
3. *Veolia*
4. *Siemens*
5. *Trane*
6. *Johnson Controls*
7. *Enel X*
8. *Ameresco*
9. *Honeywell*
10. *Centrica"*

Remote Microgrid Players

Schneider Electric is ranked #4 in Remote Microgrid Players.

Navigant Research Leaderboard examines the strategy and execution of 12 leading remote microgrid companies. As mentioned in the report by **Navigantresearch.com, 2019** *"Threshold scores determine each vendor's categorization (Leader, Contender, Challenger, etc.). These players are rated on 12 criteria: vision; go-to market strategy; partners; business model innovation; value chain capture; geographic reach; sales, marketing, and distribution; system quality and reliability; project portfolio; pricing; and staying power''*
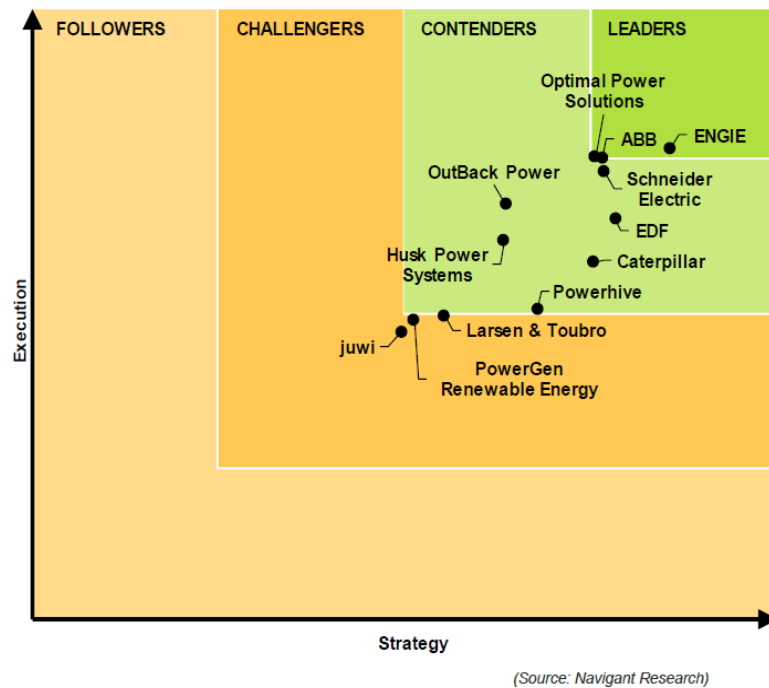

Figure 5: Navigant Research Leadership / remote Microgrid Players[3]

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[3] *Source Navigant Research*

Here, the companies are ranked on two different criteria: Strategy and Execution. Below is the result of the Leadership board.

"Top 10 Remote Microgrid Players:

1. *ENGIE*
2. *ABB*
3. *Optimal Power Solutions*
4. *Schneider Electric*
5. *EDF*
6. *Catepillar*
7. *OutBack Power*
8. *Husk Power Systems*
9. *Powerhive*
10. *Larsen & Toubro*
11. *PowerGen Renewable Energy*
12. *Juwi"*

6. Differentiators vs competitors

Type of Competitor	Traditional	DER/ Controller providers	Low-cost Players	Local/ Global New entrants	Control experts
Main Competitors	GE, ABB, Siemens	SMA, Caterpillar, DEIF, Woodward, Tesla, Socomec	Nari, Huawei, Delta	Canopy Power, STEM, Geli	SEL and S&C
Description	Global experienced companies, similar scope and approach to Microgrids	Players adding simple Microgrids control/ optimization solutions on top of their base-products	Aggressive competitors coming mainly from China and India	New Players interested in the microgrid market (different approaches)	Companies with strong background on control / automation
Competitive advantages (Compared to SE)	- Slightly bigger scope (with BESS and/or generation) - Direct financing and/or EPC capabilities	- Competitive for simple and repetitive configuration - Usually bigger scope with the generation assets or PCS	- Very price aggressive - Bigger scope (PV, BESS) - Strong local references	- More agile - Aggressive price - Innovative solutions - Innovative GTM	- Strong experience - Advanced and competitive solution for control-related complex applications
SE Strengths (How to beat the competitors)	- Strong experience working with partners	- Ability to provide ED & electrical network knowledge - Local support - EAAS business model	- Global and long experience in the industry - Worldwide references - Higher quality products / solutions - Stronger local and after-sales support - Experience working with partners	- Global and long experience in the industry - Worldwide references - Stronger local and after-sales support - Larger scope -Finance capabilities	- Bigger scope with ED - More advanced EMS
Other Comments	Expected toughest competition for C&I market	Competitors but potential partners as well	Expected less of a competitor for C&I markets		

We are well positioned among global key vendors

Well equipped with project dev & tech capabilities: MG services to be strengthened

Microgrid project value chain

Global key vendors

	Project development			Technology					EPC	Microgrid services	
	Energy consulting	DERS capability	Power engineering	DER & Genset	Storage	Integration	Control	Analytics		Financing	VPP
Schneider Electric	●	○	●		●	●	●	●		●	
ABB	●	●	●		●	●	●	●		●	
SIEMENS	●	○	●		●	●	●	●		?	○
GE	●	○	●		●		●	●		●	?
PowerSecure	●	●	●		●		●	●		?	?
CAT	●	●	●		●		●	●		●	
stem	●	○	○		●	●	●	●		●	●
S&C	●	●	●				●	●			
ENCORP	●		●	A lot of suppliers; not key capability required for MG vendors			●	●	A lot of local players; not key capability required for MG vendors	?	?
OATI	●	?	?				●	●			●
Tesla SolarCity	●	○	○		●		●				
Bolloré		●	●		●					○	
PA Power Analytics	●	●	●					●			
eps ENGIE	○		●			●					
green charge networks	●	○	○		●			●		●	○
DEIF							●	●			
SMA		●	○		●	○	●	●			

● Solid capability   ○ Limited capability   ? Unknown

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