



ETIP SNET Lisbon September 28-29 2017

Smart ZAE Project – Smart Solutions for Energy Management



L'engagement pour une performance durable



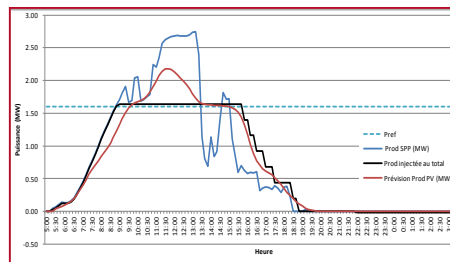
Agenda

- » SCLE SFE in brief
- » SMART ZAE Project
- » Portfolio of solutions for Energy Management
- » Typical Storage Projects

SCLE in brief – Products and solutions for efficient and sustainable grids

SCLE SFE designs and manufactures **Intelligent Electronic Devices and Systems** which contribute to **efficiency, availability and sustainability** of grids :

- **Protection and Control Systems** for Power grids
- **Signaling relays** for railways and urban transportation
- **Energy Management and Storage Systems** for Power Grids and Micro-Grids.



SCLE in brief – Main References










 225kV
90kV
63kV
S/stations

700 Digital Protection and Control Systems in operation





 225 kV Step up Power Station

Digital Protection and Control Systems in operation






 Traffic regulation

400000 Relays in operation



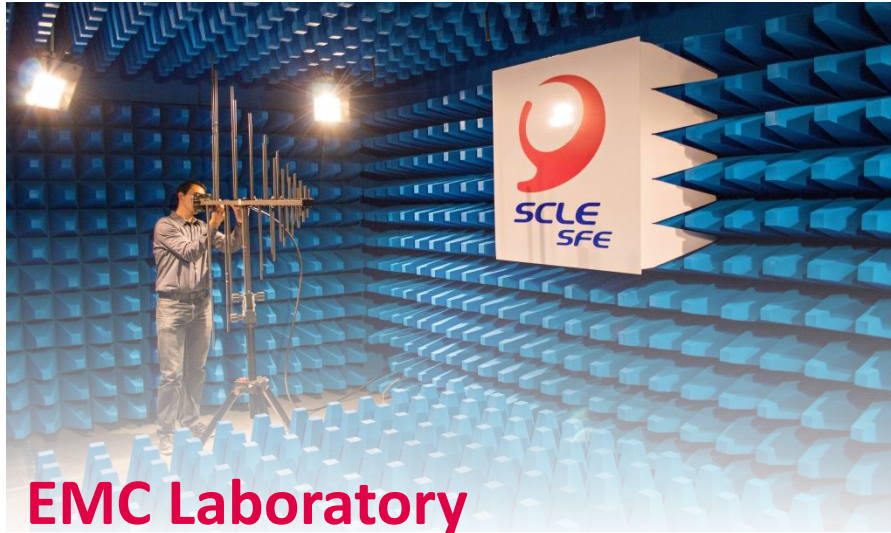


 Renewable Energy Management

5 Energy Management and Storage Systems in operation

SCLE in brief – Resources

R&D
33%
of workforce



Smart ZAE Project – Challenges and issues

Global warming ?

Integration of more intermittent resources ?

Smart Grids
technology ?

Time to market ?

An industrial site able to
cover 40% of our needs
in energy

40 years of experience in
automation systems for
HV grids

Electric Vehicle
a brick in the system
?

Sustainable business
model?



Smart ZAE Project – Expertise and partners

Our expertise

Ingénierie



- Modélisation
- Etudes de court-circuit
- Etudes de sélectivité des relais de protection
- Etudes dimensionnement
- Etudes d'écoulement des puissances
- Plan de tension, étude de pollution harmonique

Software



- Développement de logiciels embarqués robustes et ergonomiques
- Développement d'IHM conviviales et sécurisées de configuration et d'exploitation des systèmes, en accès local ou distant via le web

Algorithmie



- Modélisation de réseaux électriques
- Création et optimisation d'algorithmes sous Matlab

Hardware



- Maîtrise de la fiabilité et de la performance de nos équipements
- Garantie de la gestion de l'obsolescence des composants et de la pérennité des équipements fournis
- Mise au point de nos propres bancs de tests cartes électroniques et équipements

Réseaux de communication



- Maîtrise des protocoles de communication
- Norme CEI 61850
- Cyber-sécurité

Our partners

Financing

ADEME



Agence de l'Environnement
et de la Maîtrise de l'Energie

Research



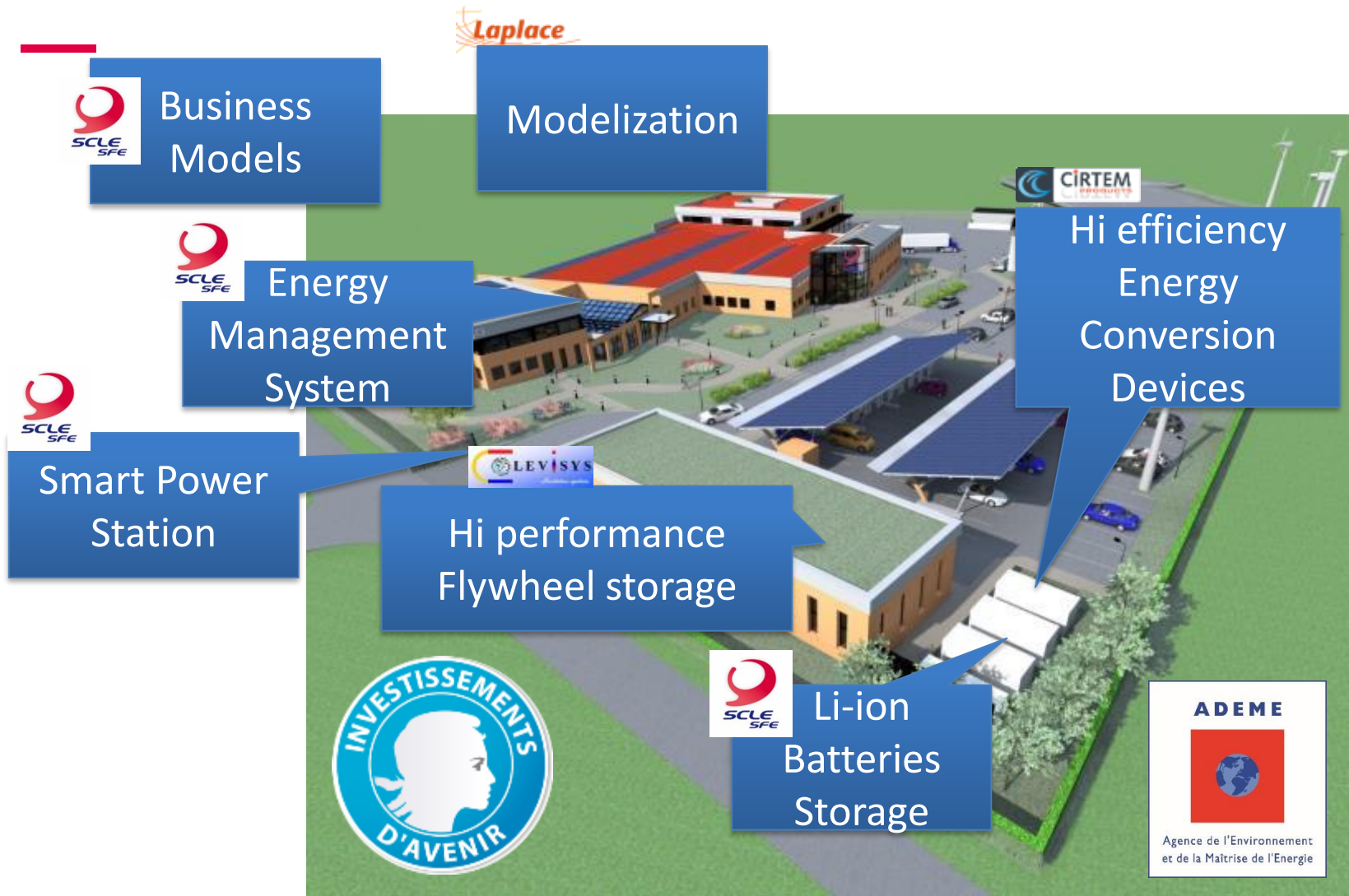
Energy Conversion
Design



Innovation

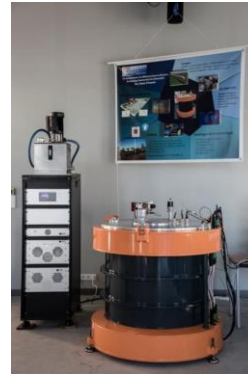


Smart ZAE Project– Toolbox design

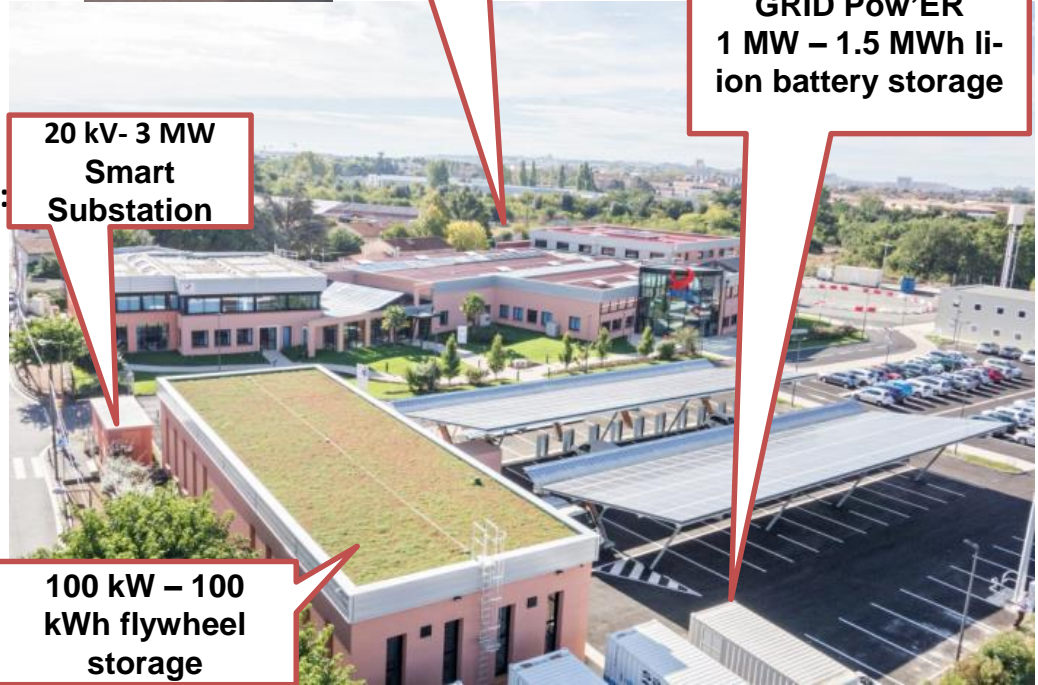


Smart ZAE Project – Results

- A 1MW/1.5MWh li-ion battery storage able to provide different services such as energy smoothing, demand side management, energy shaping, peaks shaving
- A 100kW/100kWh storage equipped with 10 high performance flywheels able to cycle more than 300000 times to perform ancillary services such frequency with a 98% efficiency
- An innovative Energy Management System which :
 - Monitors the energy production, the energy consumption, the energy storage
 - Drives the energy storage facilities
 - Integrates solar or wind forecasts
 - Optimizes the local energy
 - Mitigates the impact of the intermittence



Smart Energy Management System



20 kV- 3 MW Smart Substation

100 kW – 100 kWh flywheel storage

GRID Pow'ER
1 MW – 1.5 MWh li-ion battery storage



Portfolio - Solutions for Energy Management



Energy Storage Systems

GridPow'ER enables a better integration of renewable energies into the grid

This solution allows to smooth variable and intermittent production, ensure a better grid stability, and optimize the energy production.

Our system includes :

- The battery containers
- The Power converters
- The Power control system
- The Energy management system

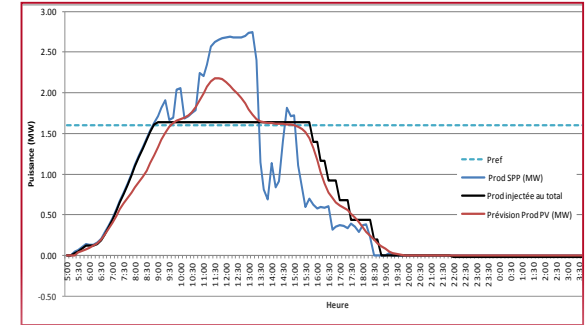


Energy Management Systems

Smart'eo is a friendly user tool to carry out a complete approach of energy efficiency

Smart'eo includes a set of energy devices able to collect and monitor the energy data:

- Specific devices to pilot flexible loads
- Communication devices and displays
- Software tools able to ensure automation function such as demand response algorithms



Engineering for storage systems

Maximize the renewable energy production

We help you to find the best technical and economical configuration:

- Type and size of renewable energy,
- Type and size of battery,
- Possible combination of services
- Optimized profile

in order to offer the optimized solution that meets your needs.

Typical Storage Project – Grid scale application

ENGIE launches the first frequency support service from a storage system connected to the French power grid

A new offer

ENGIE designed an innovative frequency support service, based on BattGrid™, developed by ENGIE Ineo, that stores excess electricity and injects it if required into the power distribution network. ENGIE's "Global Energy Management" BU is making use of the flexibility provided by BattGrid™ to market and operate a unique balancing service in France.



A new opportunity

In 2016, French legislation ended the exclusive use of facilities connected to the transmission system for electricity balancing, opening the way for new alternatives such as the use of storage systems connected to the power distribution system.

GEM's expertise

- Flexibility aggregation
- Intermittency management

BattGrid™

A smart energy storage system, with a 1 MW lithium-ion battery, connected to the French power distribution network.



FASTER
BattGrid™ is more responsive and agile than a power plant meeting energy needs faster.



CHEAPER
This enables ENGIE to offer frequency support services at a competitive price.



GREENER
The battery contributes to reducing CO₂ emissions by using power that has already been produced.

ENGIE targets to become an aggregator of all types of storage systems on the power grid

Battgrid Project :
1 MW/1.5 MWh storage

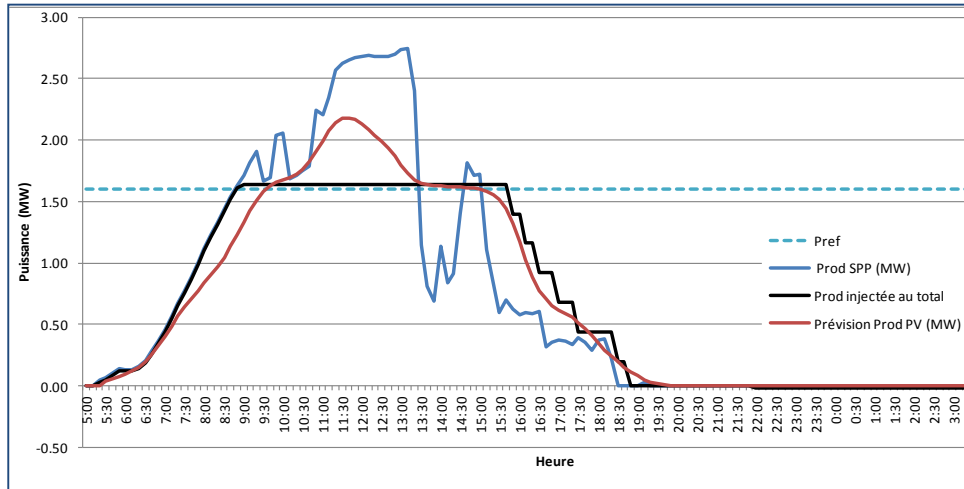
Client : RTE

Location : Toulouse

Objective : Supplying frequency reserve



Typical Storage Project – Solar Farm Storage application



ALATA Project :
4 MWp solar plant equipped with a 2.4 MW/4.3 MWh storage

Client : Corsicasole

Location : Corsica

Objective : maximizing the revenues according to a requested profile



Typical Storage Project – Isolated Hybrid Solar Plant

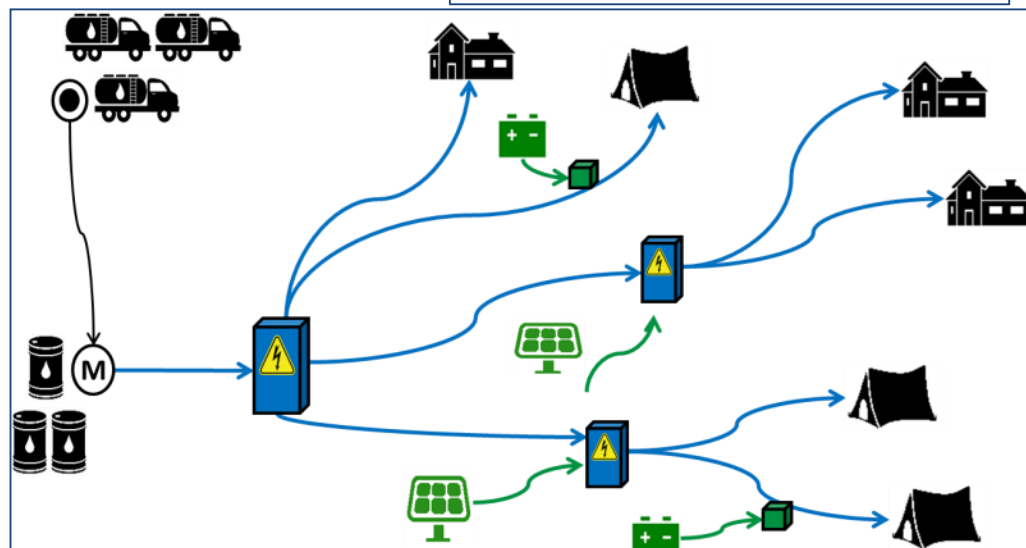
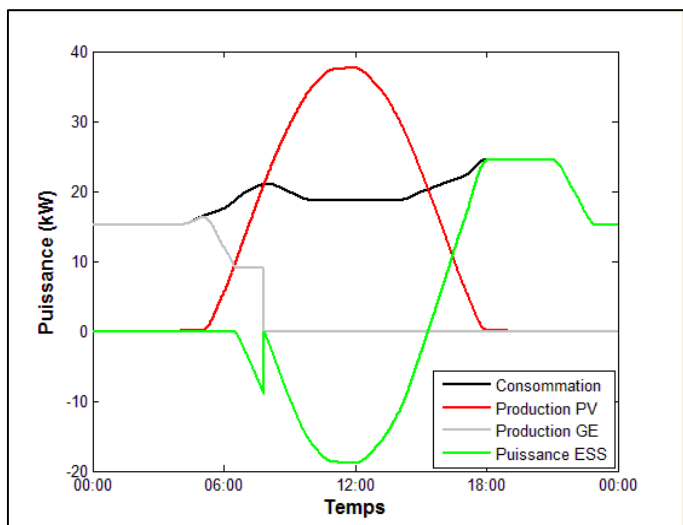
GENALT Project

- 16 kWp PV
- 122 kWh lead batteries

Client : DGA

Location : Mobile Military camp

Objective : optimizing the logistics



Thank you for your attention

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