



Response of Electrical Flexibility
of commercial buildings & industrial sites
for smart grid



REFLEXE

Electrical Flexibility

ISGAN webinar
29 ctobre 2013

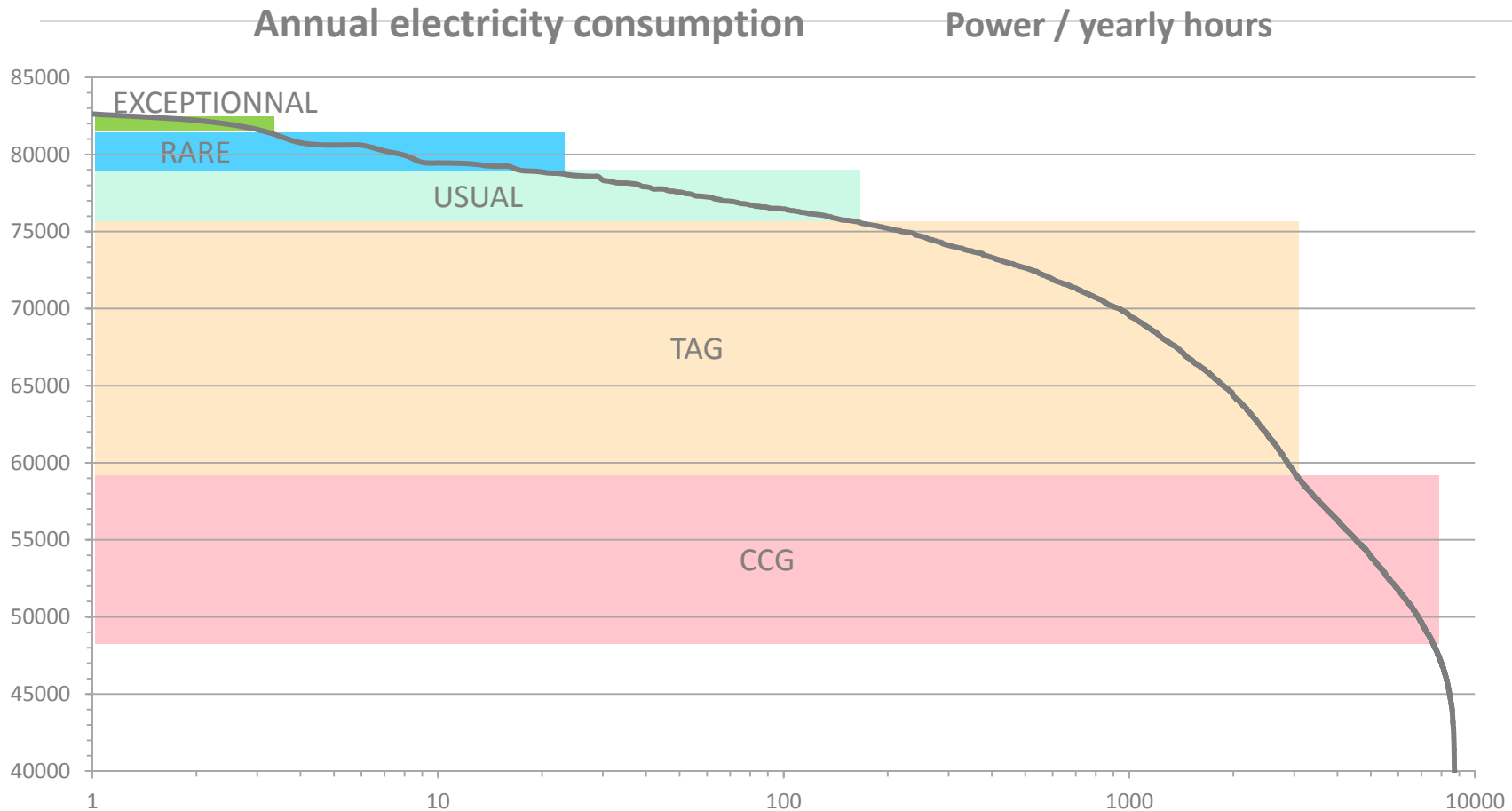
October 2013

) REFLEXE – Smart Grid

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Market needs

Peak demand on national consumption

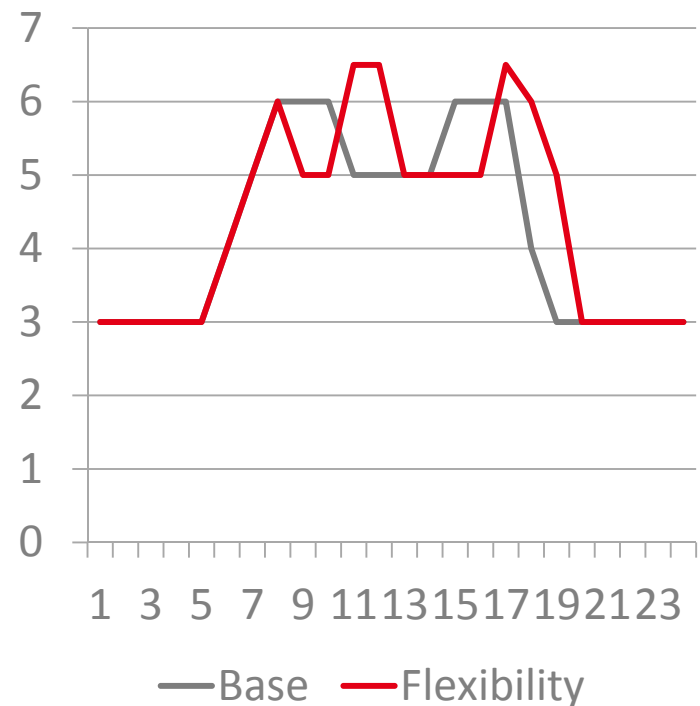


Here, we identify 8 GW of peak demand, classify in 3 types according the occurrence

Exceptionnal	2Hours	1 000 MW
Rare	20Hours	2 900 MW
Usual	200hours	3 800 MW

Definition : flexibility

- Definition :
 - Time shift of consumption need
 - No significant reduction of the consumption volume
 - So postponement, often just after the time shift need
 - It is existing storage on various form with constrains on charge and discharge
- Confusion : production / flexibility
- No rule today on the valorisation of CO2 reduction



Collective benefits of demand response

9 types of benefit for the collectivity

- Savings on energy
- Gains on flexibility and production efficiency
 - Include flexibility and efficiency on the consumer side
- Savings on investment in production capacity
 - Include pooling of consumer side investments
- Savings on the cost of network
- Reliability gains, reduced risk for the system
- Environmental benefits
- Benefits for innovation and new technologies
- Local job creation

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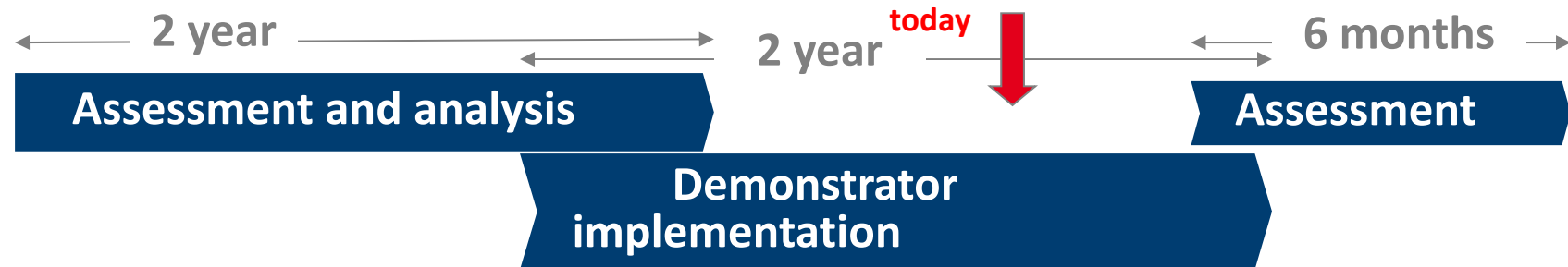
Project description

Project targets

- **Smart grid research project:** demonstration project approved by the French government and subsidized by ADEME
- Implementation of an **Aggregation centre** linked to:
 - Consumer sites (industrial and tertiary sector)
 - Decentralized production sites (solar PV, turbine & emergency generators)
 - Storage systems
 - Market operators (power exchange: spot; balancing reserve level)
- **Technical targets:**
 - System integration and flexibility potential assessment
- **Financial targets:**
 - Investments costs validation
 - Financial valuation of the electrical load flexibility
- **Environmental and social targets:**
 - Environmental impact assessment
 - Social acceptance by the end consumer

Project planning

The REFLEXE project in 3 phases until 2014



- **Implementation upstream studies**
- **Assessment** of the flexibility potential of the physical assets
- **Equipment Specifications analysis**
- **Aggregation mechanism studies:** How it works and the and the economic models impact

- Effective **Implementation** of the demonstrator
- **Validation** of the aggregation architecture
- **Validation** of the flexibility strategies
- **Validation** of the valorization strategies

- **Summary** of the experimental results **assessment of the socioeconomic and environmental outcome**
- Identification of the **key lessons**
- **Recommendations**
- **Business model proposal**

The Consortium and institutional supports

Coordinator :



Industrial partners

• Veolia / Dalkia



- Energy operator on commercial buildings and industrial sites
- Aggregator Management

• Alstom Grid

- Aggregation software
- decision making tool



• Sagemcom

- Smart metering
- Communication to the pilot centre



Research Partners

• INES (CEA)

- Photovoltaic power generation simulation
- Electrical storage



• Supélec

- Storage implementation location study
- Buildings energy management pilots



With the support of:

• ADEME

« Selected project by ADEME for a financing within the programme of Loan for the future" »



• City and CCI NCA



• CapEnergies competitvity pole



Perimeter in south-east of France: commercial & industrial sites (>250kVA)

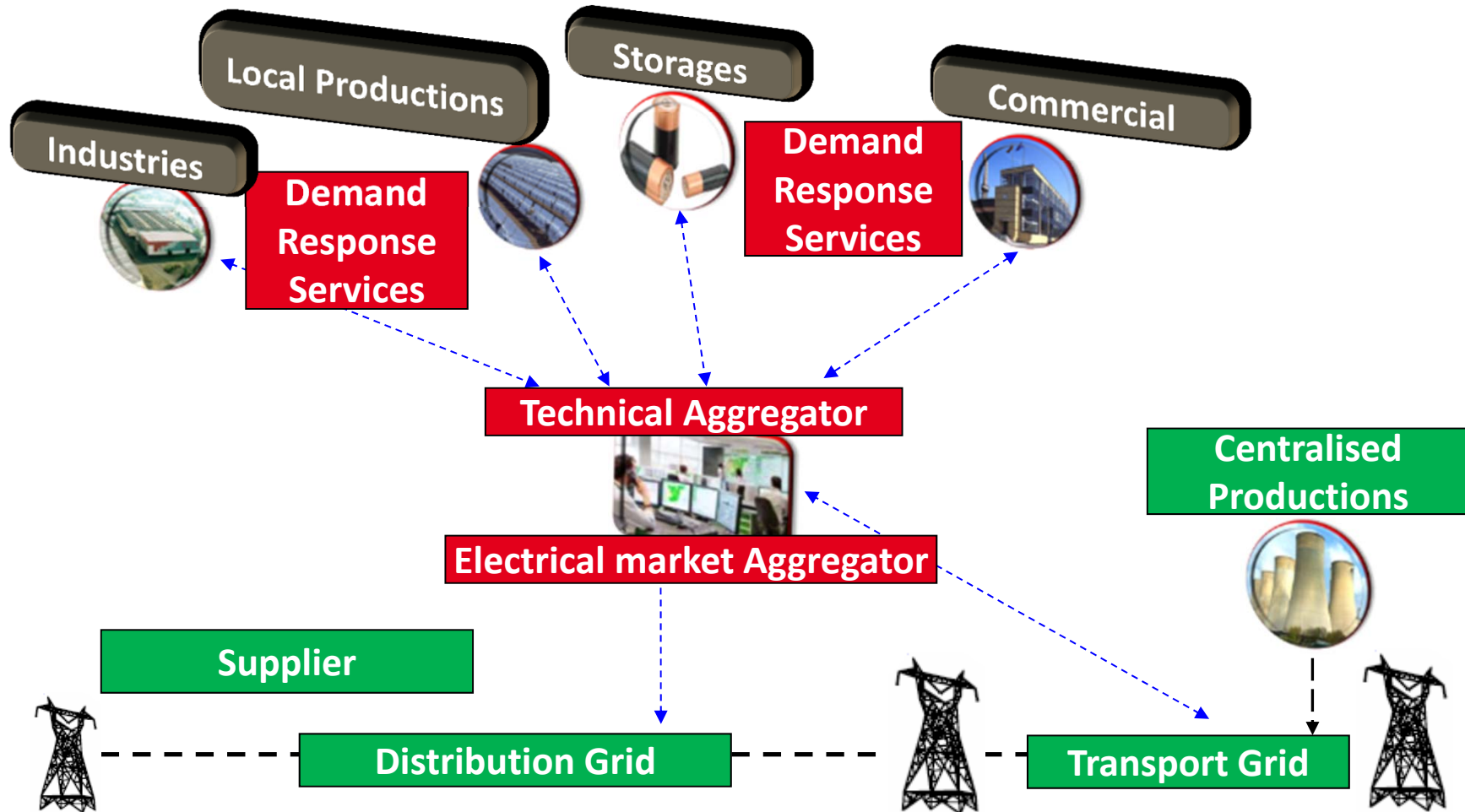
- **Hotels :**
Fairmont & MC Bay
- **Office :**
C2R, RSI, ETSI, Toyota, Piazza
- **School:**
EDHEC
- **Public buiding :**
Airport of Nice, Diacosmie ,
2 Museums, 2 Leisure Centres
- **Industries :**
Pharmaceutical site
Waste water Station
Drinkable water grid
2 waste centres
Waste storage site

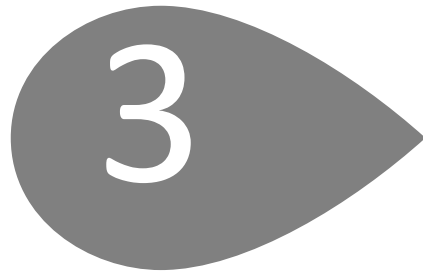


- **Local productions:**
PV , water turbines, biogaz motor
- **Storages :**
Water tanks, thermal storage, batteries

- 14 commercial sites: 300 000m² • 19 MW subscription to grid
- 6 industrial sites
- de 1 à 6 MW capacity of flexibility

Demand response service & the acteurs on the market



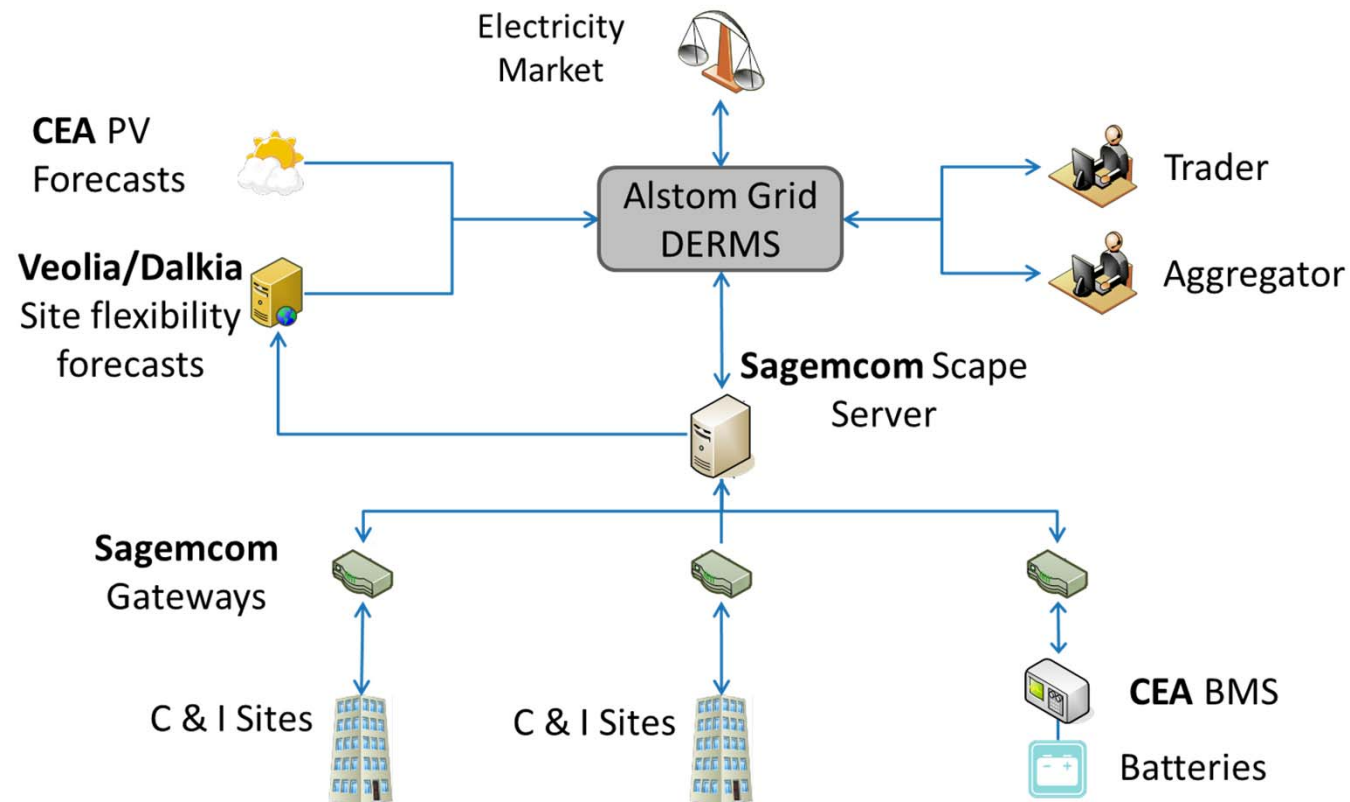


Aggregator platform

Solution for Aggregators

Functionalities

- Asset management: registration, provisioning, and modeling.
- Device communication: telemetry data management and device activation
- Flexibility aggregation: optimized market bid creation and event monitoring and control.



Market Bid Creation

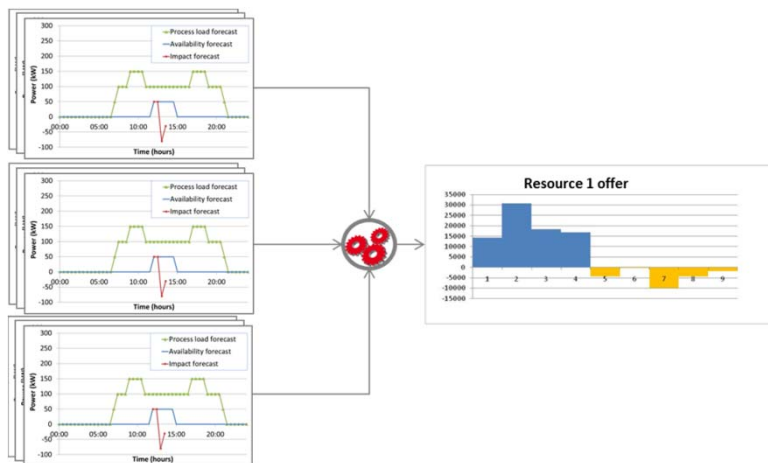
Challenges:

- Optimally aggregate **diverse** and **numerous** flexibilities into valid bids.
- Provide meaningful **bid options** to the Trader and **encapsulate** asset management **complexity**

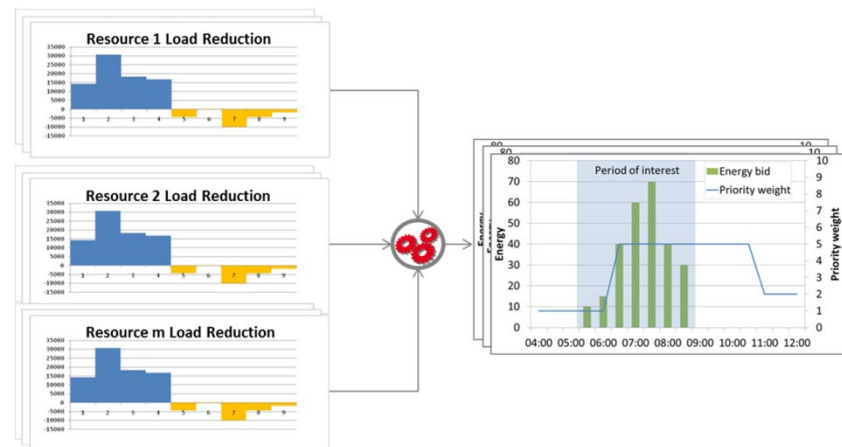
Solutions:

- Multi-level aggregation applications developed in the Alstom optimization engine
- Provide bid options based on Trader preferences: max. energy, min. cost, period of interest, etc.

Flexibility forecasts \Rightarrow Resource offers



Resource offers \Rightarrow Market Bids



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Summary

Project progress – Oct. 2013

- The aggregation platform is operational
- The industrial and commercial sites are ready for connection. Demand response have been tested on sites.
- Deployment of communication from sites to aggregation platform is on its way
- To come: tests of the whole demonstrator as aggregation in 2014 and review of project

Main results – Oct. 2013

- Lack of definition and regulation on the demand response
- Needs on collective benefits and impact of business models
- Resources : commercial and industrial site (with a connection to the grid over 250 kVA) have accessible resources of demand response for an operator like Dalkia, compatible with the existing business model

>10% of flexibility



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THANKS

Find information on the project:
www.smartgrid-reflexe.com