

# SIRFN Capability Summary

## EDF R&D Concept grid Les Renardières-France

### Introduction

Concept Grid is a new laboratory built by EDF R&D at Moret sur Loing (Les Renardières). Its commissioning is foreseen March 2013.

Concept grid is a representative distribution network:

- Primary substation 20/20 kV with three neutral grounding possible (resistor, Petersen coil and smart electronic neutral);
- Underground 20 kV self healing loop ;
- 20 kV overhead line with coordinated automatic reclosers located at the head of the feeder and in its middle ;
- The length of the network is artificially increased thanks to resistors, reactors and capacitors units (120km 20 kV network)
- LV network fed thanks to two secondary substations:
  - Variable length in order to change the short circuit power;
  - Five little homes with new usages (PV , wind mills, EV, heat pumps, storage, ...);
  - PV generation ;
  - 50kVA Motor/generator set
  - 120kVA LV amplifiers able to inject electric perturbations (frequency change, harmonics, dip sags, ...);
  - Hardware in the loop simulation thanks to the LV amplifiers.

A communication network is associated to the power network (optic fibers, copper, PLC, radio, Adsl, ...).

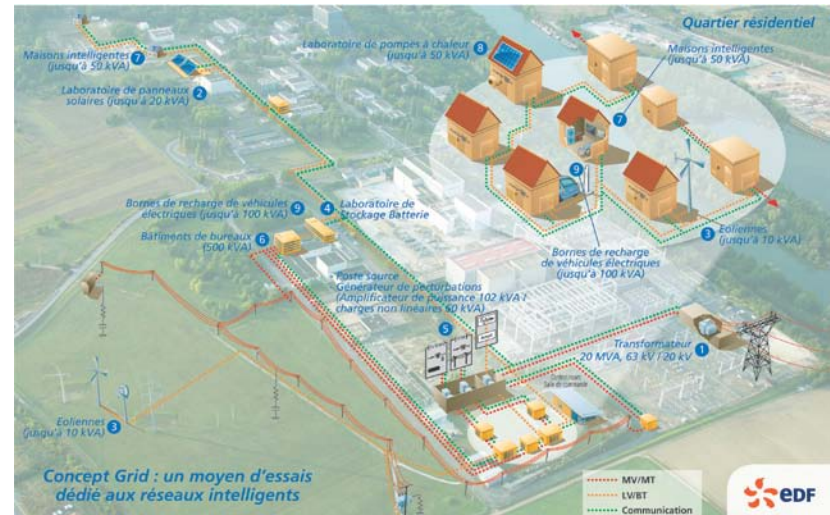
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Website URL: <http://>

# Renewable Energy and DER Integration

Desired Level of SIRFN Participation: ?

- 1 = Low 2 = Med 3 = High

## Description of Activities

Several DER are connected to the LV network of Concept Grid:

- Roofs PV panels on two homes;
- Two wind mills;
- 10 kVA ground mounted PV panels.

SIRFN Site Focus Area Lead(s):

Name  
Title  
E-mail:  
Phone:

Name  
Title  
E-mail:  
Phone:



Website URL: <http://>

# Building Automation

## Desired Level of SIRFN Participation: ?

- 1 = Low 2 = Med 3 = High

## Description of Activities

Describe activities in this subtask area with an emphasis on nature of research/testing. Include relevant information on current clients/customers and highlight any unusual capabilities, major accomplishments or relationships.

## SIRFN Site Focus Area Lead(s):

Name

Title

E-mail:

Phone:

Name

Title

E-mail:

Phone:

Area for photos, diagrams  
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Website URL: <http://>

# PEV Integration

## Desired Level of SIRFN Participation: ?

- 1 = Low 2 = Med 3 = High

## Description of Activities

Concept grid feeds several vehicle battery-charging facilities:

- Slow and fast charge methods;
- Connected directly on the LV network;
- Test bed laboratory.

It is possible to evaluate, on the one hand , the perturbations generated in several network configurations and on the second hand, the behavior of the facilities in case of disturbed network thanks to perturbations generator.

## SIRFN Site Focus Area Lead(s):

Name  
Title  
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Website URL: <http://>

# Microgrids

## Desired Level of SIRFN Participation: ?

- 1 = Low 2 = Med 3 = High

## Description of Activities

Describe activities in this subtask area with an emphasis on nature of research/testing. Include relevant information on current clients/customers and highlight any unusual capabilities, major accomplishments or relationships.

## SIRFN Site Focus Area Lead(s):

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Title

E-mail:

Phone:

Name

Title

E-mail:

Phone:

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# Distribution Automation

## Desired Level of SIRFN Participation: ?

- 1 = Low 2 = Med 3 = High

## Description of Activities

Two distinct network automations are installed on Concept Grid.

- Self healing MV underground open loop: the automation is based on the same algorithm installed in the protection and control system of every secondary substation and needs communications between the substations;
- Coordinated reclosers: two reclosers are installed on the same feeder, at its head and in its middle; the coordination does not need communication between the reclosers:
  - a fault upstream the middle recloser is eliminated by the head recloser;
  - a fault downstream the middle recloser is eliminated by this one without outage upstream;
  - the case of simultaneous downstream and upstream fault is taken in account.

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Phone:

Name  
Title  
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Phone:

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# Cybersecurity

## Desired Level of SIRFN Participation: ?

- 1 = Low 2 = Med 3 = High

## Description of Activities

Concept Grid works thanks to a communication network parallel to the power network. Actually it is made of three independent networks:

- Network dedicated to the protection and control system;
- Network for the experimentations supervision;
- Phone network.

Moreover, the power network can be used for PLC tests.

The experimentation supervision network can also be used to perform cybersecurity tests.

## SIRFN Site Focus Area Lead(s):

Name

Title

E-mail:

Phone:

Name

Title

E-mail:

Phone:

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# Summary of Capabilities for Simulation and Testing

## AC and DC sources:

- Substitute your own appropriate headings. Provide bullets on capacity and specification of equipment available for simulation and testing.

## Test Configurations:

- Provide summary bullets on configurability and test bed setups available.

## Loads:

## Storage:

## Controls:

Area for photos, diagrams or other graphic material.



# Summary of Capabilities for Data Acquisition and Analysis

## Data Acquisition:

- Substitute your own appropriate headings. Provide bullets on capacity, sensitivity, number of data points, key specifications of equipment available for data acquisition and analysis.

## Test Configurations:

- Provide summary bullets on configurability and flexibility of data acquisition and analysis tools

## Computer Analysis:

## Computer Simulation:

## Other:

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