

# Decentralized and embedded electrical networks



## Component

École Nationale  
Supérieure  
d'Électrotechnique  
d'Électronique  
d'Informatique  
d'Hydraulique  
et des  
Télécommunications

## In brief

> **Code:** NEGE2E

## Presentation

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### Objectives

- Know the characteristic criteria (security, stability ...) of an embedded or decentralized electrical network compared to a conventional distribution network.
- Understand the main elements (storage ...) used in the design of such a network.
- Propose different network architectures in relation to a given specification.
- Be able to read a complete electrical diagram of a photovoltaic installation by being able to identify the various devices necessary as well as their function and sizing.

### Description

#### 1. Security and reliability

- Related concepts (fault isolation, reconfiguration, backup network, ...)
- Example of an aeronautical network

#### 2. Mission Profile to be completed

- Interest of sources hybridization to optimize their use

- Using the Ragone plan in sizing storage units
3. Quality (AC and DC networks)
- Definition of quality standards (current, voltage)
  - Quality Improvement Solutions
4. Stability (AC and DC networks)
- Architecture and operation of AC power grids
  - Principles of frequency and voltage settings on networks (primary, secondary adjustments)
  - Power limitation of transportation lines
  - Instability related to filter - regulated system interactions
5. EMC issues
- Coupling types
  - Disturbance measurements and means of protection
  - EMC issues for power grids
  - Problems associated with indirect lightning strike
6. Study of PV installations connected to the distribution network
- Definitions of electrical switchgears and classes of protection
  - LV earth connection diagram
  - Electrical surge protection
  - Study of plant schematic examples

## Useful info

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### Place

- › Toulouse