

## INTEGRID

### Impact of New TEchnologies and GRId codes on the local Distribution of nuclear power plants”

#### OBJECTIVES

This project deals with the impact of the new Grid-Codes and the implementation of new technologies on the electrical systems and equipment of NPPs. The newly proposed modifications of Grid-Codes, with wider voltage and frequency ranges, could lead to increased stresses of the equipment of the Nuclear Power Plants (NPPs). The different aspects raised and linked to this new context, such as the impact on the regulation of machines, overheating and vibrations of the equipment, and the appearance of electrical transients in the plant Distribution network, need to be addressed. The implementation of new technologies, replacing the existing equipment is also an important issue.

New Grid-codes provided by the ENTSOE have been developed, requiring increased flexibility from existing power plants including NPPs, with the aim of the greater integration of Renewable Energy Sources (RES), particularly the handling of the electrical power provided by the wind farms of the Nord-sea on the European electrical network.

#### DESCRIPTION OF WORK

In order to meet the project goals, specific actions have been planned and performed, as presented with some points listed below. They are mentioned in the technical part of the INTEGRID Projet, those points being also a way to handle this topic from a practical point of view. They may drive this subject including different aspects : electrotechnics, electrical networks, thermal aspects, mechanical aspects, monitoring issues, etc...

Considering the points being examined, the main tasks being addressed are the following:

- New Grid codes and past/ review,
- Impact on the stability aspects of the new Grid-Codes,
- Stresses on generators ( fluxes, thermal aspects, for all components),
- Development of tools and codes (existing ones and new development),
- Impact of the new Grid-Codes on the Distribution Network / consequences and studies to be performed,
- Development of monitoring systems.

The out-come is a complete review of those aspects and proposals concerning new points to be addressed in the future.

#### MAIN RESULTS / HIGHLIGHTS

Publication: « Michel Rioual, François Duffeau, Ignacio Marcelles, Sarah Ruiz, Kostas Kopsidas, Robin Preece, Waldemar Geissler, Jimmy Lorange: « Impact of new GridCodes on the local distribution network of Nuclear Power Plants » IAEA, Technical Meeting, Amsterdam, 21-23 June 2016

#### DURATION

1 March 2015 – 31 August 2016  
18 months

#### CONTACTS

**Technical Project Leader:**  
Michel Rioual (EDF)  
[Michel.rioual@edf.fr](mailto:Michel.rioual@edf.fr)

#### PARTNERS

EDF / UNIMAN / AREVA / TECNATOM