EDF

ermes

ELECTROTECHNICS AND MECHANICS OF STRUCTURES

R&D EXPERTISE AT THE SERVICE OF INDUSTRY

PROJECT MANAGEMENT ASSISTANCE

Validating the design and reception of transformers

YOUR STAKES

- **Verify the conformity of manufacturers' datasheet with bespoke specifications**
- **Ensure system performance and durability**
- **Detect high-risk designs**

OUR OFFER

The offer consists in:

- Support for the drafting of the specifications
- Design review
- Support and assistance during acceptance tests

The offer can be detailed as follows:

- Assistance during the drafting of the specifications
- Design review :
  - Compliance with specifications
  - Expert advice (on thermal, dielectric and mechanical performance – short-circuit resistance –)
  - Use of advanced numerical tools and calculation means for verification of the positioning of hot spots and fiber optic instrumentation, the thermal behavior in degraded mode situations, the transmission coefficient of overvoltages and the stress on the electrical installations when the transformer is energized
- For acceptance tests, support for the specification, test monitoring and review of test results for compliance with expected performance
- Assistance during on-site measurements for commissioning to verify compliance with the specifications

Plant output transformer

Transformer in the 63kV pumping station substation

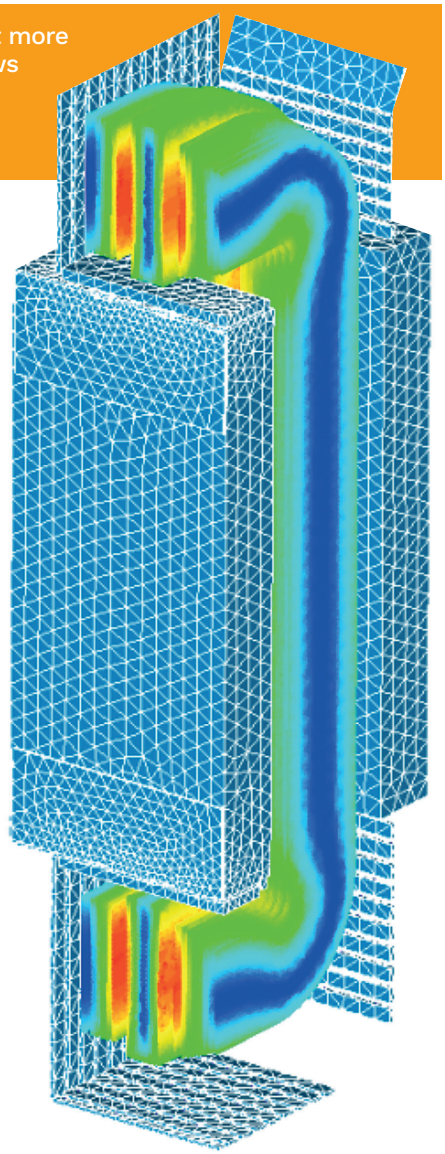
SECTORS OF APPLICATION

General industry, electricity producers (nuclear power plants, thermal power plants, hydraulic), tertiary ...

Validating the design and reception of transformers

KEY FIGURES:

- EDF R&D has in-depth knowledge of thousands of transformers installed on the sites of power production and distribution
- EDF R&D carries out more than 5 design reviews per year.



Modeling losses in windings

OUR ASSETS

- A recognized expertise in the field of transformers, the knowledge of the industrial fabric and the mastery of the rules of the art. Technical know-how proven by industrial studies carried out on EDF's production park in the last 30 years.
- Advanced numerical simulation tools, developed in-house, in 2D and 3D, consolidated by expert industrial know-how:
  - Finite element calculation software:
    - Electromagnetism (Code Carmel)
    - Thermal (Syrthes)
  - Finite volume calculation software:
    - Thermo-Hydraulics (Saturn Code)
- IT development skills allowing a total mastery of business standards.
- Support for test reviews.
- Support from EDF research engineers, experts in transformer technologies and their applications. Assistance in defining test procedures and interpreting results.
- An R&D network with high voltage test facilities that can easily be mobilized if need be.

SATISFIED CLIENTS

- EDF Nuclear Engineering
- EDF Hydraulics
- EDF Thermal Energies

A RICH HISTORY

- Systematic assistance with type testing of transformers at manufacturers' premises for those destined for EDF production sites.
- Presentation of best practices based on the thermal characteristics of power transformers, in the introduction to session A2 (Transformer) of CIGRE 2018, by EDF R&D experts. Systematic participation in many GTs of the CIGRE A2 Technical Committee.
- Participation in IEC GTs responsible for the revision of international standards of Technical Committee 14.

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