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**Research and Innovation Staff Exchange**  
RISE funds short-term exchanges of personnel between academic, industrial and commercial organisations throughout the world. It helps people develop their knowledge, skills and careers, while building links between organisations working in different sectors of the economy, including universities, research institutes and SMEs.

**More information on:**  
[https://ec.europa.eu/research/mariecurieactions/actions/staff-exchange\\_en](https://ec.europa.eu/research/mariecurieactions/actions/staff-exchange_en)

**Project Coordinator**  
*University of Cantabria*  
*(Spain)*



**Academic Partners**

*University Carlos III of Madrid (Spain)*



*Silesian University of Technology (Poland)*



*University of Sapienza Roma (Italy)*



*University of Stuttgart (Germany)*



*University of Manchester (United Kingdom)*



*National University of the Littoral (Argentina)*



*University of El Valle (Colombia)*



*University of Piura (Peru)*



*Kyushu Institute of Technology (Japan)*



**Industrial Partners**

*BEST Transformers (Turkey)*



*Sea Marconi (Italy)*



*Tadeo Czerweny (Argentina)*



**RAISING KNOWLEDGE AND DEVELOPING TECHNOLOGY FOR THE DESIGN AND DEPLOYMENT OF HIGH-PERFORMANCE POWER TRANSFORMERS IMMERSSED IN BIODEGRADABLE FLUIDS “BIOTRAFO”**



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## TRAINING COURSES

- Winding geometries and specific characteristics of dielectric materials
- Design of experimental platforms
- Degradation assessment of dielectric paper and oil

## SEMINARS

- Design and construction of core type windings
- CFD and THN modelling in power transformers
- Experimental study of the thermo-fluid dynamics in a power transformer
- Moisture dynamics and ageing of insulation materials in power transformers
- Equipment and methodologies used in the characterization of the dielectrics materials
- Environmental impact of ester filled transformers
- Transformer predictive maintenance
- Partial discharge measurements
- Transformer fire risk assessment
- Future of transformers with biodegradable insulating liquids
- Use of Salome and Code Saturne in HPC platforms

## WORKSHOPS

- Thermal-fluid modelling on power transformers
- Aging assessment of biodegradable oil
- Cooling, aging, environmental and fire performance of biodegradable ester: Case studies

## THE PROJECT

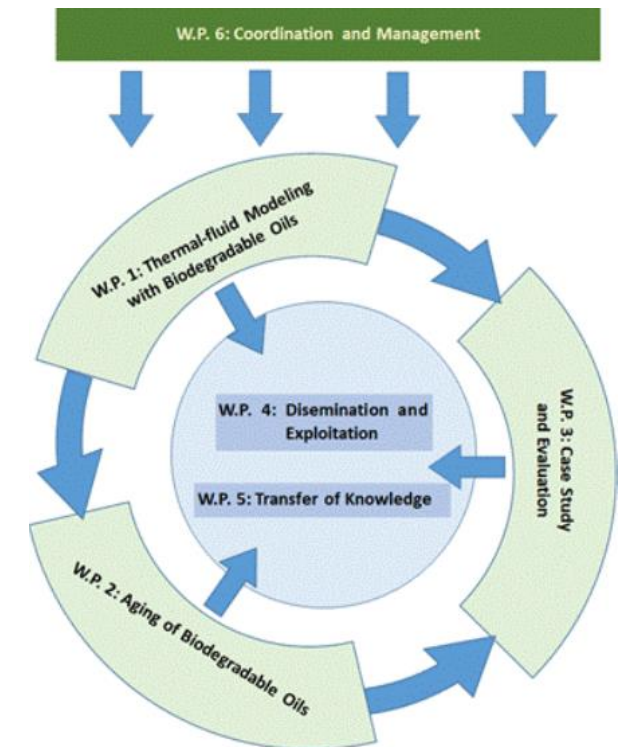
The BIOTRAFO project analyses the effect of temperature on the designs of **power transformers that use biodegradable esters as coolant**, the environmental and fire performance of these liquids being also evaluated. These machines are very common in our power distribution systems. Since electricity is generated until it reaches households, it passes through an average of four transformers. Currently the liquid used in most of these machines is a petroleum derivative, since its good performance is well known. However, the environmental awareness of many companies is demanding new transformers that are cooled by esters of natural origin.

In this framework, BIOTRAFO proposes a study that allows knowing the temperature in the windings of the transformer when using biodegradable liquids, which by their nature are more viscous. This temperature is a critical factor for the useful life of the transformer, due to **the aging of dielectric solid materials**. The aging of these materials when immersed in these liquids will also be analyzed. Not only the question will be observed from a theoretical perspective, industrial platforms will also be used to test the generated models.

The results of the research will be **disseminated** among specialized and non-specialized audiences, through broad different channels and considering the commercial exploitation of the results obtained. The project will also carry out tasks of **knowledge transfer** generated for this purpose. Moreover, the **training** aspects of the research personnel involved in the project will be taken care of in order to boost their careers.

To this end, a complementary high-quality consortium of **thirteen partners** has been formed, six of which do not belong to the EU. All of them have knowledge and proven experience in the field of study. Ten of the partners belong to the academic sector and three are companies. Two are manufacturers of power transformers, while the other performs diagnostic work on transformers that are in operation.

## PROJECT STRUCTURE



## BENEFITS – IMPACTS

