

The theme: ***Equipment for quality electric energy monitoring at medium voltage based on unconventional measuring sensors with a view to identify compensation and filtration optimum solutions***

Contract: PNCDI2 21076/1/15.12.2007

Contracting Authority: National Center for the Management of Innovation and Technological Transfer – Politehnica Bucharest

Contractor: National, Research-Development and Testing Institute for Electrical Engineering – ICMET Craiova

Project Manager: Eng. Cornelia BODÎRNEA

Program: PARTNERSHIPS IN PRIORITY FIELDS

The category of project: Complex Research-Development Projects

The type of project: PC

The acronym of project: CESEMET

The period of project development: 18.09.2007 – 15.05.2010

Total value of project: 997 500 lei of which:

- State budget: 945 000 lei
- Co-financing: 52 500 lei

Partners involved in the project:

Project leader: National, Research-Development and Testing Institute for Electrical Engineering – ICMET Craiova

Project Manager: Eng. Cornelia BODÎRNEA

Partner 1: University of Craiova

Project responsible: Reader Dr. Eng. Lucian MANDACHE

Partner 2: Technical University Cluj

Project responsible: Prof. Dr. Eng. Virgil MAIER

Partner 3: SC VIG IMPEX SRL

Project responsible: Dr. Eng. Ion PURCARU

Partner 4: SC CEZ Distribuție SA

Project responsible: Eng. Ștefan MUNTEANU

Thematic areas: Energy efficiency increasing

Clean energy

Lasting energy technologies and solutions

The technologic platform: Electrica Branch

Objectives:

The main objective of the project is to identify connections from the interdisciplinary field making possible the taking over of conception or peak technological accomplishments from other sectors of the technique in order to increase the technical level of electro-technical equipment, the efficiency and the reduction of energy consumption and the environment preservation.

The aim of the project is to monitor as exactly as possible the electric energy quality at medium voltage with a view to obtain *clean energy*. The project is characterized by its actuality and importance from the point of view of electric energy keeping in the electro-energetic system, quality which depend both on the producer and on the consumers which can disturb the power factor. It has in view the replacement of classical current and

voltage measuring transformers with unconventional sensors embedded in medium voltage bushings.

The following research activities are necessary:

- applicative research – it carries out a functional model which will be experimented and introduced in the power grid;
- dissemination of information by publishing articles in the specialty reviews, participations in conferences and symposia organizations.

Strategic objectives

- The carrying out of a technological network for the medium voltage bushings at different levels of voltage, made with silicon rubber insulators and which include the current and voltage measurement with unconventional sensors.
- The involvement and the training of young graduates in the research activities.
- The publishing of articles and books and the participation in conferences in order to prepare the partnerships.

The manner of project finalizing

The carrying out of the experimental model, experimentations on the model and the demonstration of the functionality of the carried out model.

The schedule of project carrying out / The time calendar

2007 – Stage I / Concepts and theories regarding the electric energy monitoring with unconventional sensors.

Period: 18.09.2007 – 15.12.2007

The total value of the stage: 100 000 lei

2008 – Stage II / Documentation related to the carrying out of functional model of monitoring equipment with unconventional sensors at medium voltage and specialized software.

Period: 15.12.2007 – 15.10.2008

The total value of the stage: 246 250 lei

2009 – Stage III / Carrying out of experimental model of monitoring equipment with unconventional sensors of medium voltage and specialized software. Carrying out of the experimental model.

Period: 15.10.2008 – 15.09.2009

Total value of the stage: 506 250 lei

2010 – Stage IV / The presentation and the development of the functionality of electric energy monitoring equipment at the potential beneficiaries.

Period: 15.09.2009 – 15.05.2010

Total value of the stage: 145 000 lei

The potential users:

- electric energy distributors and electric energy consumers which disturb the power factor in the network;

Technical, economic and social impact

The theme of the project is part of an important field, both on the national plan and on European level: *clean energy – electric energy monitoring* which makes possible, in the same time, to take measures in order to improve the power factor.

By applying the results of the project it obtains direct benefits in the electric energy monitoring at medium voltage. This comprises both quality components, high accuracy because the measuring principle is different, and economic components thanks to reduced

overall dimensions and therefore a reduced consumption of materials, and the embedment of sensors even in medium voltage bushings with more economical and performant materials as the silicon rubber. These technological modernizations of insulators are necessary since the entry of this type of insulating materials into the field of electrical apparatus – if they include also current and voltage measurements they are so much more profitable. Concerning their exploitation, the protection of the environment and the health of servicing personnel in substations, they are so much higher in comparison with the ceramic insulators. We mention that these bushings and the medium voltage composite insulators are more reliable and they have a longer lifetime.

Besides, from the point of view of the electromagnetic compatibility the unconventional sensors ensure the elimination or the reduction, in the admitted limits, of the influence of electromagnetic disturbing fields – in this way the servicing personnel in the substations of the power grid is not exposed to this danger.