

## PHOTOVOLTAIC SOURCES INTEGRATION IN THE ROMANIAN POWER SYSTEM. CASE STUDY FOR CARAS-SEVERIN AREA

### Goal of the project

Power system analysis and optimization for the photovoltaic sources integration in the Caras-Severin area of the Romanian Power System (Enel Banat Distribution Operator).

### Short description of the project

The renewable energy sources represent an important issue for the Romanian and EU energy policy and sustainable development strategy. The projects refer to photovoltaic sources integration in the Caras-Severin area of the Romanian Power System (Enel Banat Distribution Operator). The analysis has been performed for the North-Western, Western, Central and South-Western part of the System. Various operating condition, with the consumption forecast for 2013, 2018 and 2023, were considered, taking into account all the renewable energy sources (wind, solar, biomass, hydro). The medium voltage network for the interest area was modelled in detail.

### Project implemented by

- Solaris Gugulania Caransebes, Mino Energy Timisoara

### Implementation period

2013-2014

### Main activities

- power system data base validation;
- Enel Banat distribution network modeling and operating condition analysis;
- power consumption and renewable energy generation forecast;
- power flow computing for various operating condition of the North-Western, Western, Central and South-Western part of the Romanian Power System (peak and minimum type regimes, 2013, 2018, 2023);
- contingency analysis, in the presence / absence of the renewable energy sources.



### Results

- power flow corresponding to 2013 year and forecasted 2018 and 2023 years;
- power flow corresponding to the medium voltage electrical network (Enel Banat Timisoara area);
- voltage value without / with the new producers;
- quick / slow maximum voltage variation value for critical buses;
- transformer loading without / with the new producers;
- power flow through the power system elements and loading level;
- integration solution validation and system reinforcement recommendations (if necessary).

### Applicability and transferability of the results

Knowledge transfer to other photovoltaic power plants developers and designers. Electrical distribution network operator (Enel, CEZ, EON, Electrica in Romania).

### Fields of interest

- photovoltaic energy sources;
- other renewable energy sources;
- renewable sources' integration in the power systems;
- distribution network operators.

### Research Centre

Research Centre for Power Systems Analysis and Optimization

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### Research team

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