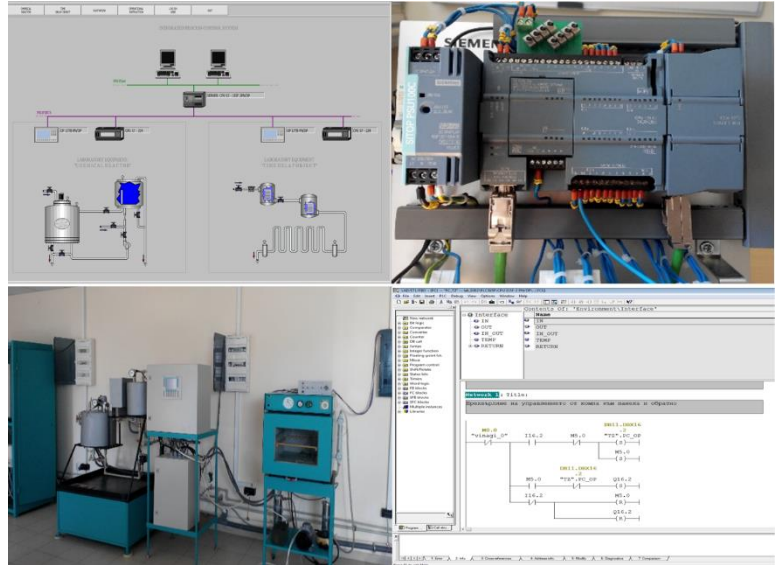


Technical Specification

Test facility 4: Communications, Process Control and Energy Efficiency in Industry Laboratory - CPCEEIL

The laboratory for Communications, Process Control and Energy Efficiency in Industry Laboratory (CPCEEIL) (Fig.1) is a part of Faculty of Automatics of Technical University of Sofia. The laboratory consists thermal heating system, chemical reactor, vacuum furnace, pressure box for paper industry and other physical models of real industrial equipment. The control systems are PLC based process control systems. All of the facilities are equipped with individual electrical power analyzers. The control systems are networked with PROFIBUS, PROFINET and MODBUS TCP communication interface and are included in a central SCADA system. The laboratory is equipped with industrial HMI panels for process control. Algorithms for energy saving process control, demand side energy forecasting and electrical loads control and optimization are developed and tested in the laboratory. The algorithms are implemented in programmable logic controllers (PLC). OPC, SQL and FTP servers are installed for data acquisition and secure data transfer over the Internet. Support of IEC61850 and IEC60870 protocols is included. Data mapping between SIMATIC NET process data and IEC61850 is done in the laboratory.

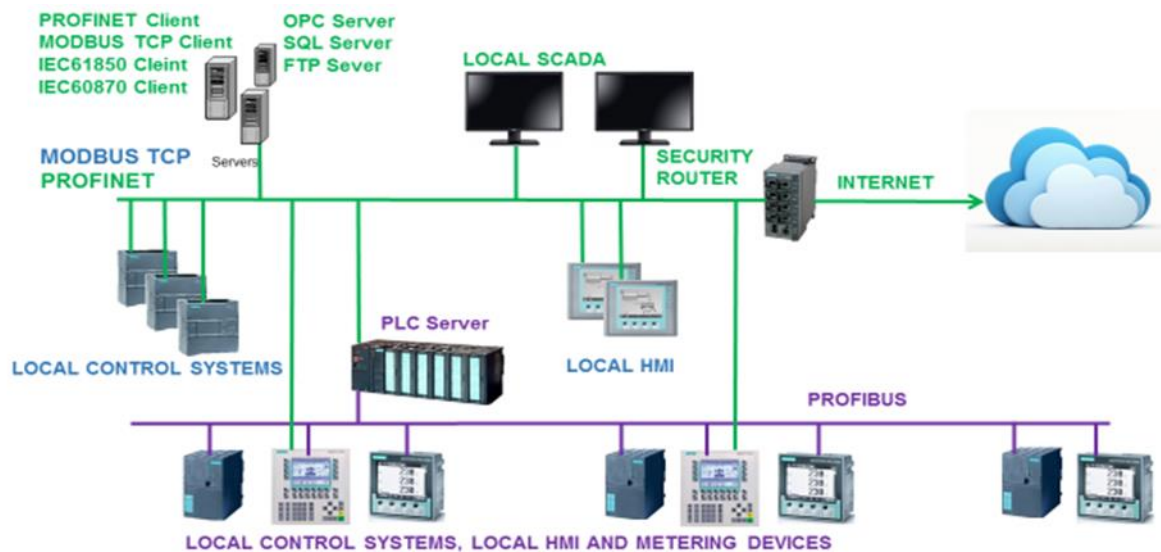


Facilities, SCADA and control systems overview

Proposed services:

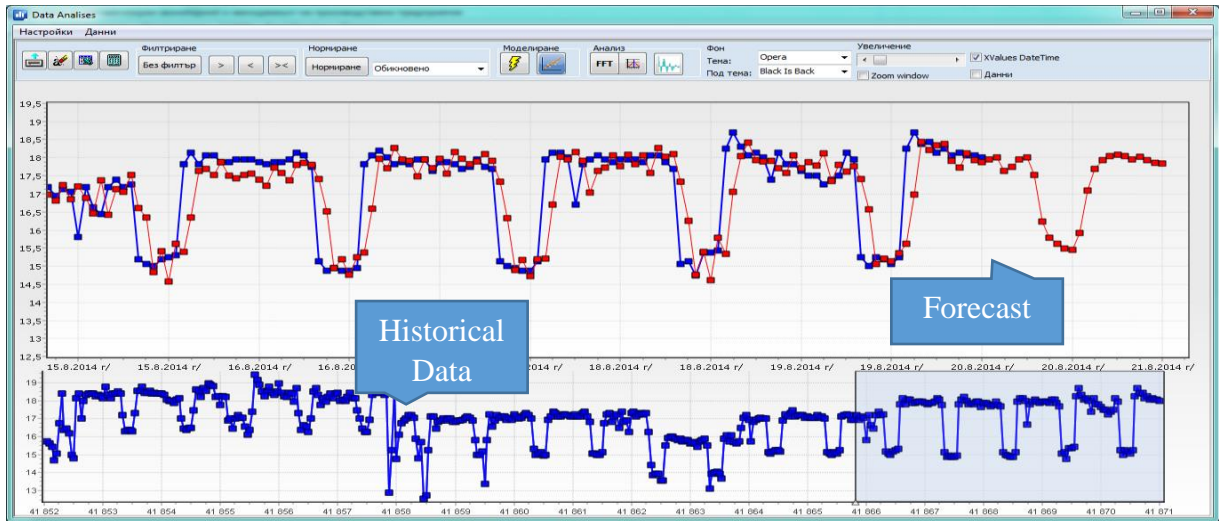
The laboratory is involved in the following activities:

- industrial process control systems,
- energy effective and process control optimization,
- communication issues in industry including network security,
- SCADA systems development for industry and energy sectors,
- Smart building control systems
- Smart grid management including Photovoltaic and electrical vehicle control

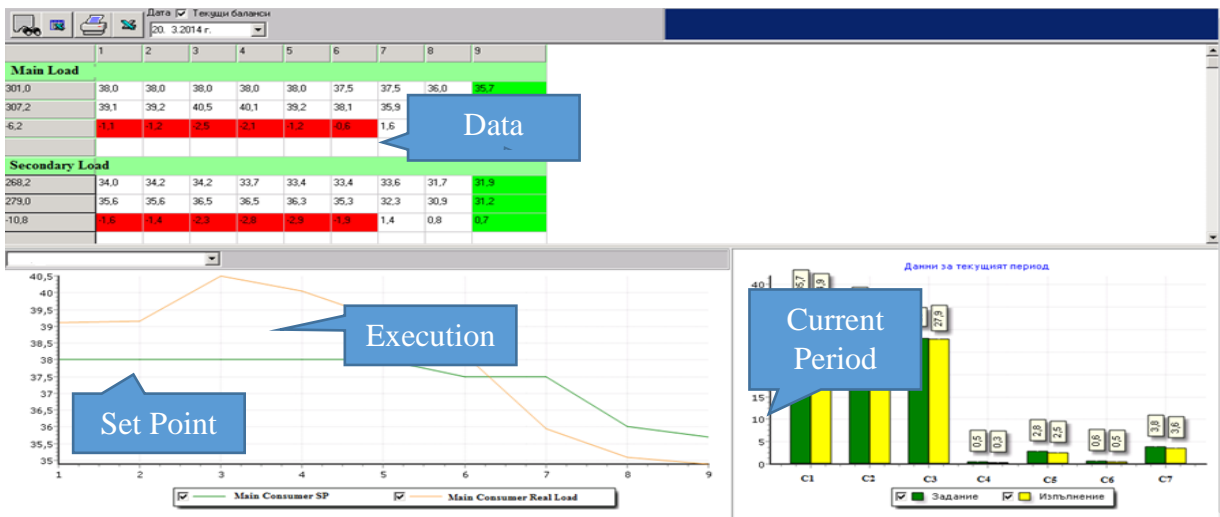


Structure of the communication network

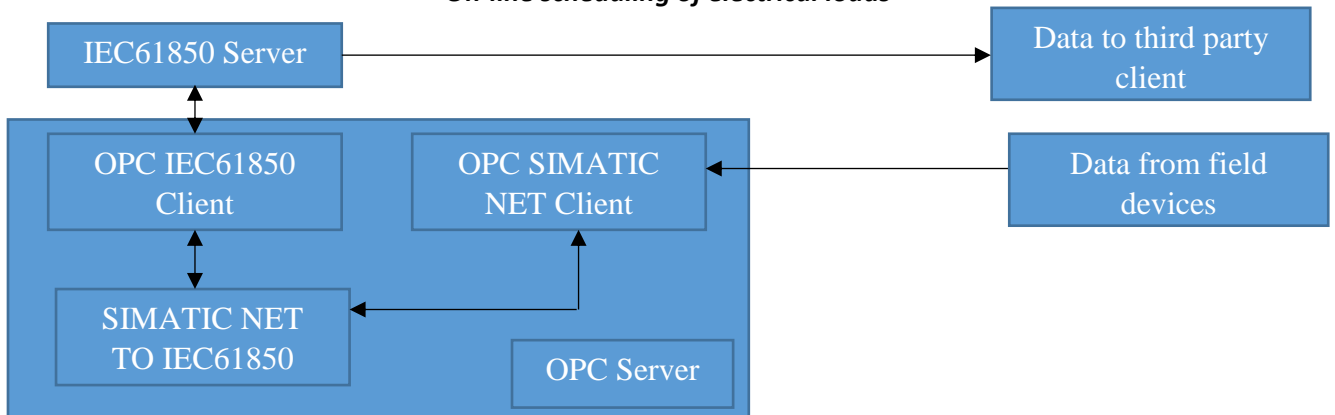
OPC and SCADA systems for remote process control and measurement, energy loads control and scheduling (Fig.4), data acquisition and networking in industry and energy sectors, energy production and consumption forecasting (Fig.3), demand side energy management, demand side load optimization.



Demand side energy forecasting



On-line scheduling of electrical loads



Data mapping for IEC61850 Data transmission

Current researchers

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