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European Union
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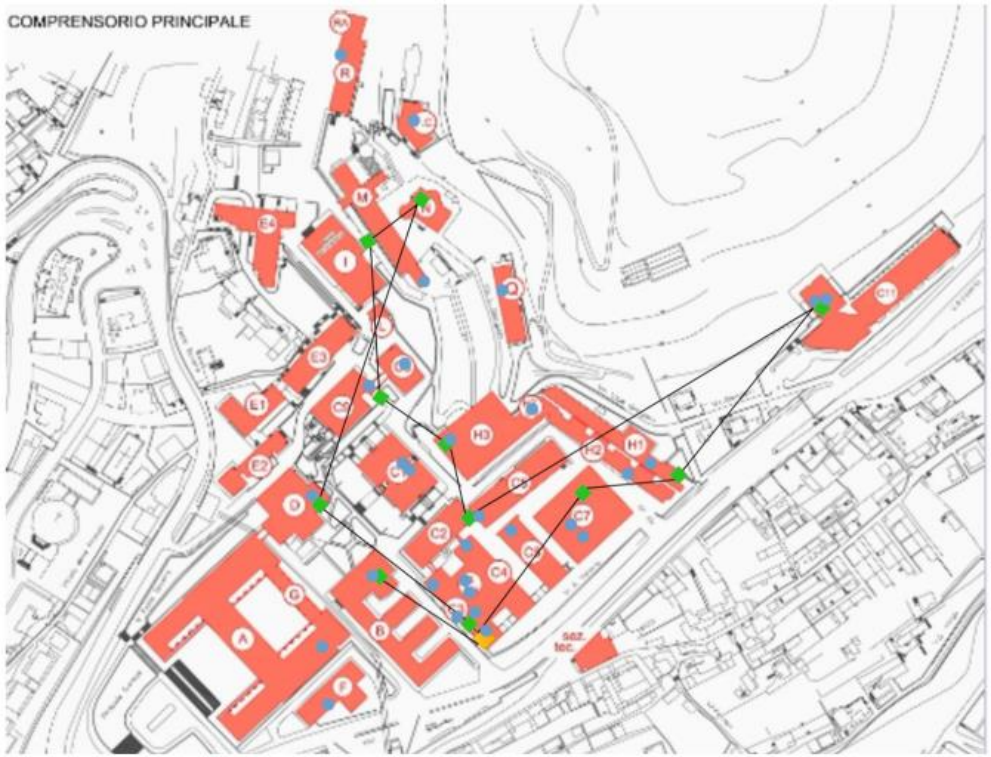
Smart Energy Monitoring for Efficient Buildings

Dr. Daniele Bosich
Assistant Professor at UniTS

dbosich@units.it

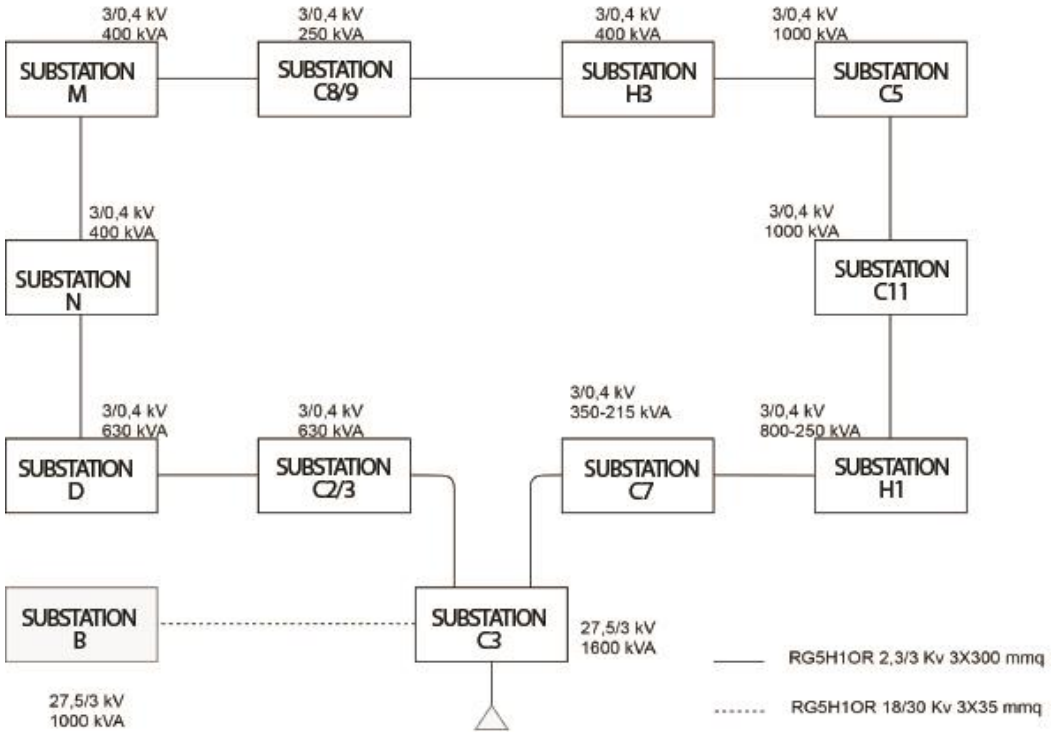
- Regional Policies are to be defined to ensure more efficiency in buildings
- Two important points to be considered!
- The building efficiency can be evaluated by the Smart Readiness Indicator
- An advanced measurement system is requested to understand the building losses
- To improve the energy efficiency, it is firstly necessary to have electrical measurements on the building

Electrical distribution system – Smart Campus



- Smart Campus
- European pilot project
- The campus MVAC grid operates at 3kV line-to-line rated voltage in ring topology.
- The distribution network is fed by two different 27,5kV/3kV substations

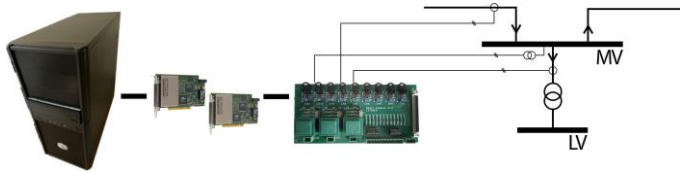
Electrical distribution system – Smart Campus

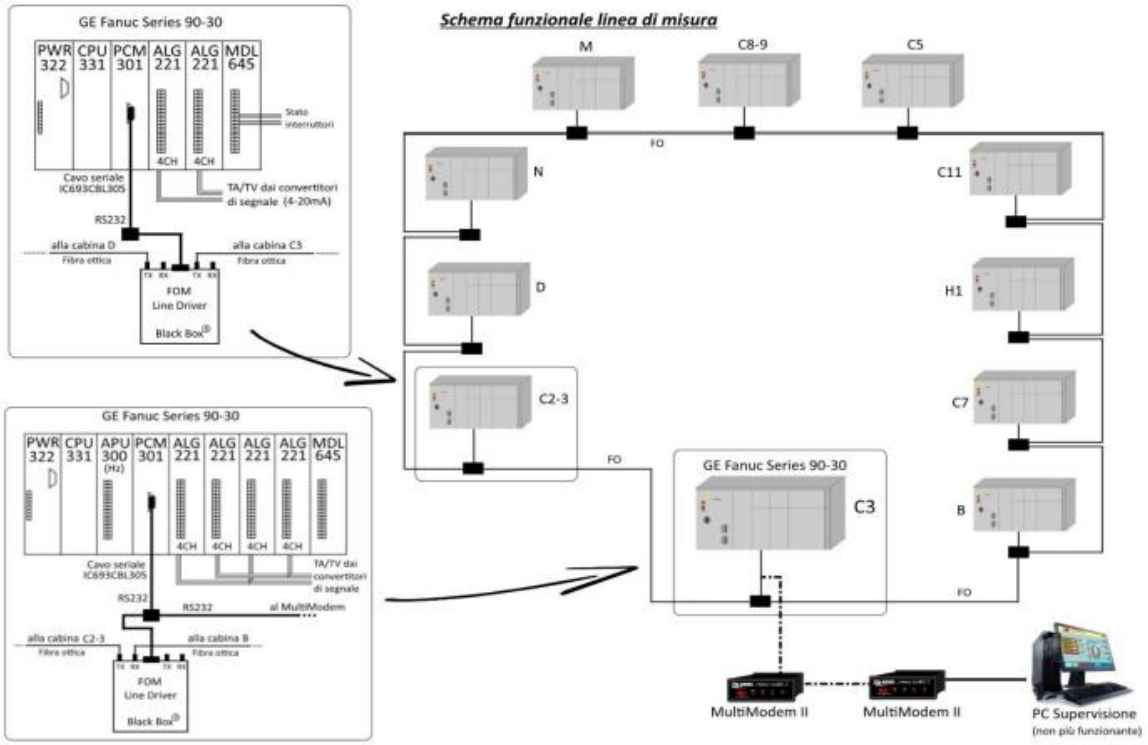


- Ring distribution
- Primary substation (substation C3) with 1600kVA rated power
- Secondary substation (substation B) with 1000kVA rated power
- 10 substations with 3kV/400V transformer
- Rated power of MV/LV transformers in figure

M. D. Feste, M. Chiandone, D. Bosich and G. Sulligoi, "The Control and Monitoring System on a Medium Voltage AC Distribution Grid: Device Implementation and Calibration Procedure," 2021 IEEE 15th International Conference on Compatibility, Power Electronics and Power Engineering (CPE-POWERENG), Florence, Italy, 2021, pp. 1-6

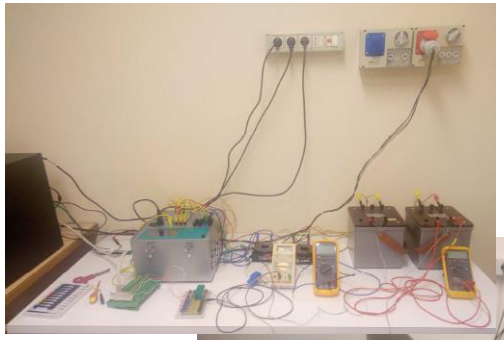
Data measurement acquisition/communication





- Each MV/LV substation has its own real-time measuring system constituted by a CPU and a real-time process
- A central CPU receives sampled data from all the substations via TCP/IP protocol network
- Here the physical layer is mainly constituted by fiber optical cable
- The measurements are sent via a simple protocol based on UDP packets.

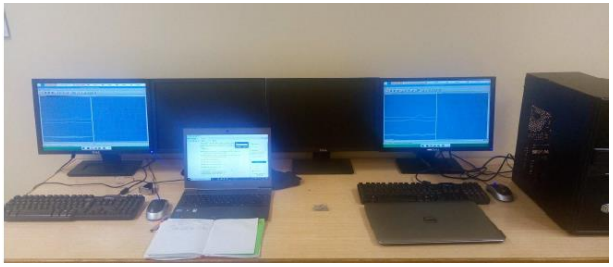
Data measurement acquisition/communication

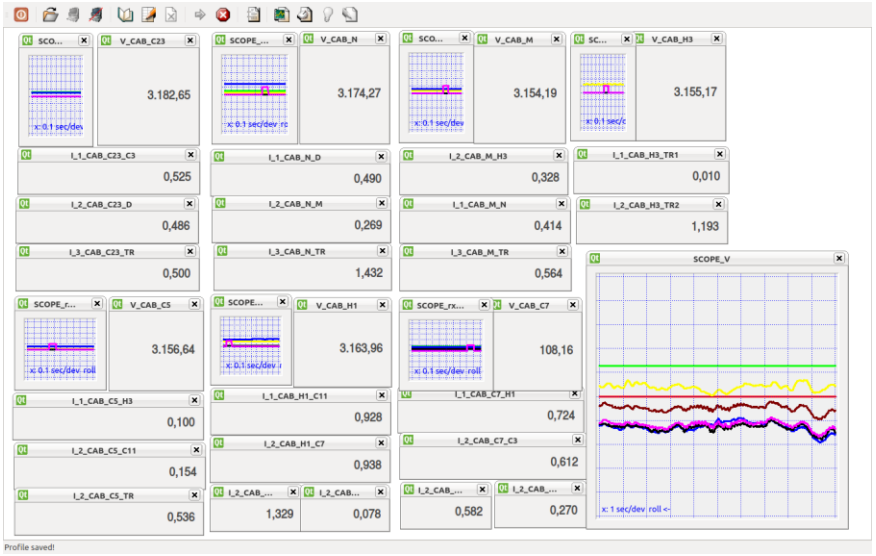


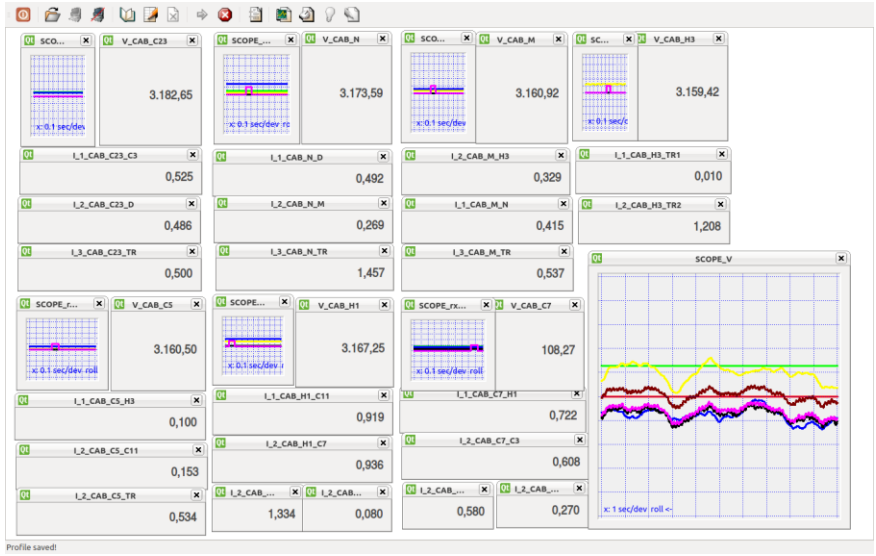
calibration

installation

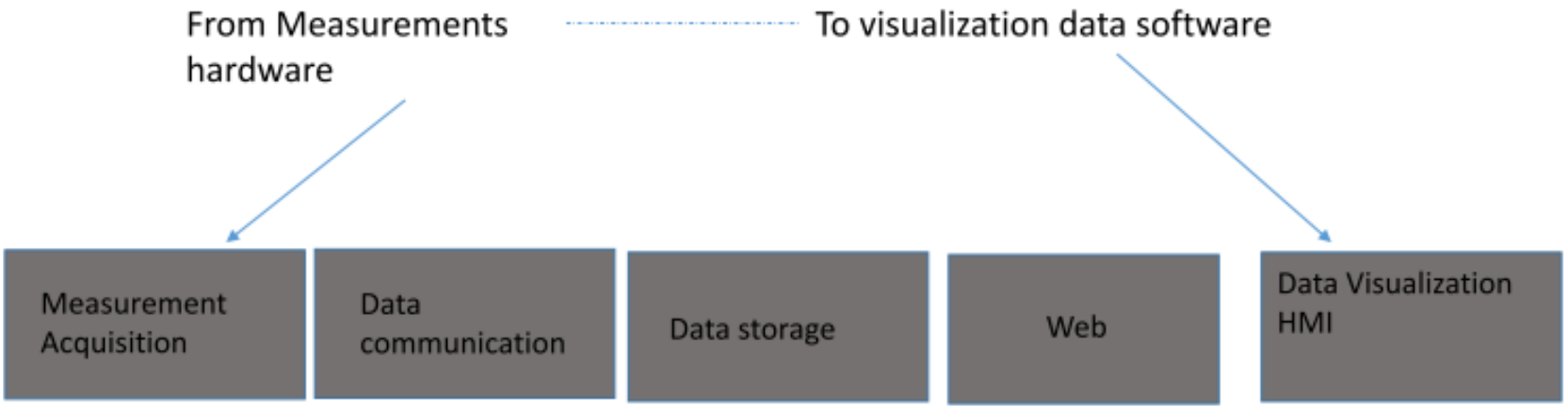
measurement







Monitoring system



- Fiber optic connections that are perfectly functional and reusable for the future
- Upgrading line connections through several viable choices
- Real-time option: flexible, high scalable and easy to implement
- Wide range of usable protocols: trend towards TCP / IP

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Thank you!

Questions welcome

Project media