



*EMPOWER brings together all the key stakeholders of the electric energy sector in Cyprus, with an ambitious goal to develop sustainable and intelligent technologies and tools for the electric power system of Cyprus*



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# EMPOWER

*Empowering the Cyprus power system with sustainable and intelligent technologies*



The project INTEGRATED/0916/0035 is co-financed by the European Regional Development Fund and the Republic of Cyprus through the Research and Innovation Foundation.

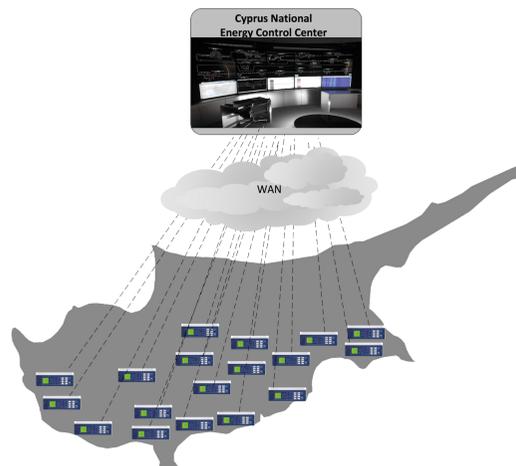


## PMU DEPLOYMENT

Acknowledging that the Cyprus power system is one of the island's most critical infrastructures, the EMPOWER project aims to modernize it, by deploying state-of-the-art sensing equipment in selected substations, and developing innovative, real-time monitoring and control tools. Thus, the project:

- Installed 18 Phasor Measurement Units (PMUs) across the Cyprus power system,
- Enhanced the communication infrastructure to support the transfer of PMU measurements to the Cyprus National Energy Control Center, and
- Set-up an advanced server operating system in the Cyprus National Energy Control Center to collect and process the PMU measurements

It is envisioned that the use of accurate synchronized PMU measurements will enhance grid stability, reliability and resilience.



WAM system in Cyprus



## WAM IMPLEMENTATION

An effective collaboration between the KIOS CoE, the Electricity Authority of Cyprus, and the Transmission System Operator was needed for the successful implementation of the Wide Area Monitoring (WAM) system infrastructure. This is a multistep procedure that includes:

- The finding of the 18 substations for installing the PMUs,
- The choice of SEL-2240 Axion PMU as the PMU that fits to the requirements of the project,
- The installation of the PMUs at the substations and the receiving of their measurements at the Cyprus National Energy Control Center, and
- The development and implementation of a dynamic state estimator for real time monitoring of the Cyprus power system.

## EXPECTED OUTCOMES

By the end of EMPOWER, the power system of Cyprus will probably be the first fully observable power system in Europe. Features such as real time monitoring every 20 ms and monitoring accuracy improvement by 20% will be evident in the Cyprus power system. At the same time, the oscillations in the Cyprus power system are expected to be decreased by 20%.

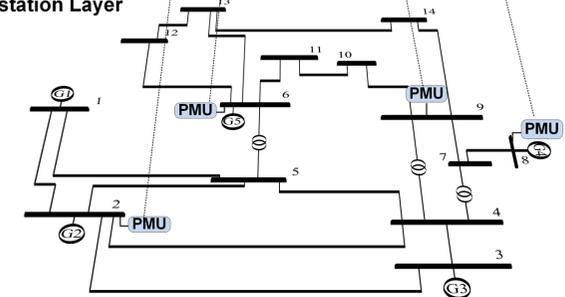
### Control Center Layer



### Communication Network Layer



### Substation Layer



Sample of a WAM Architecture



SEL-2240 Axion PMU