WINPOWER project aims at developing a wide control strategy to manage large scale High Voltage Direct Current (HVDC) multi-terminal networks that will interconnect renewable energy sources (RES) to the main power network. The work deals with control strategies in a wide sense, from off-line optimization of network itself before its construction; to real time, multi layered, decentralized stabilizing control that is embedded into its components. This DC grid will allow for multi-RES generators efficient interconnection, for example off-shore Wind Farms (WF) and solar plants. This DC grid will also manage their connection to: the main AC grid; large loads (big cities or industrial facilities); other DC grids like a future European SuperGrid.

Keywords
- Wide control strategy
- HVDC multi-terminal networks
- Renewable energy sources (RES)
- Interconnection to the main power network
- Off-line optimization
- Real time, multi layered, decentralized stabilizing control
- Interconnection to other DC grids like a future European SuperGrid

Challenges
- Control of multi-terminal HVDC network
- Network modeling and parameter identification
- Remote information integration
- Integration of weather forecast and economics into the control
- Better use of storage components

New control systems
- System modeling
- External parameter Identification
- Better use of remote information – observers
- Integration of weather forecast
- Integration of economics information (real-time market)

Hierarchical control system:
- Computer Science – Multi-agents
- Robust and nonlinear control
- Real-time imbedded system
- Hybrid control (Intermediate level)

Partners