

Voltage and Frequency Control System for an Isolated Grid with HVDC-LCC Connection

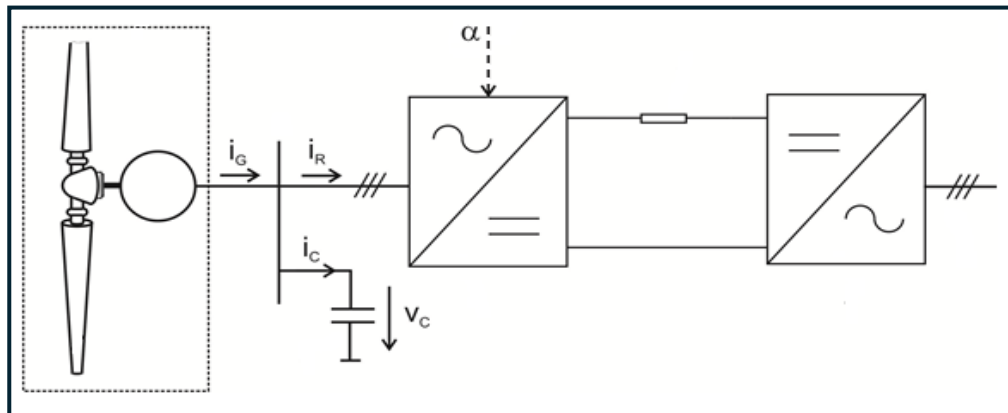
Summary/Characteristics

The Power Control Group at Universidad Carlos III de Madrid has developed a system that regulates voltage and frequency in an isolated grid, such as an offshore wind farm, enabling its integration into the main grid through a High-Voltage Direct Current Line-Commutated Converter (HVDC-LCC) link. The system solves the control issues traditionally associated with this technology, providing an alternative to current HVDC-VSC (Voltage Source Converter) systems, which are more complex, costly, and less reliable.

Technical collaborators and potential licensees are sought to further develop the technology.

Innovative Aspects

- Application of HVDC-LCC technology to offshore wind farms, traditionally avoided due to control difficulties, now solved by this system.
- Decoupled voltage and frequency control in isolated grids using a capacitor bank and vector control in a synchronous reference frame.
- Generation of a controlled voltage waveform in an isolated grid, maintaining constant RMS voltage and frequency values, even when connected to rectifier stations.



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Competitive Advantages

- Lower cost compared to alternative solutions, with reduced size and weight, improving adaptability.
- Lower converter losses, increasing overall system efficiency.
- Better capability for long-distance electric power transmission.
- Higher overload capacity, providing greater robustness and operational flexibility.
- Supports higher DC connection voltages.

Technology readiness level:

Proof of concept (prototype) completed and available. TRL 3.

Intellectual and Industrial Property Status:

Granted Spanish patent. Title: "Method and system for voltage and frequency control in an isolated grid."

Type of collaboration sought:

License Agreements and/or Technical Cooperation Agreements are sought to further develop the technology and incorporate it into the industrial partner's portfolio.