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Controllable Power Components for Renewable Energy Integration - CPC1

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Project funded by:



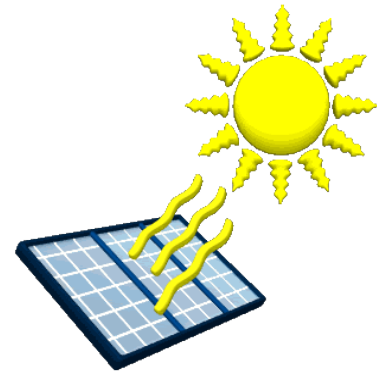
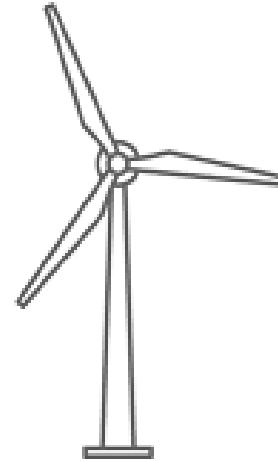


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- Reduced inertia due to decrease in synchronous generators
- Increase in distributed generation
- Intermittent energy sources

Background



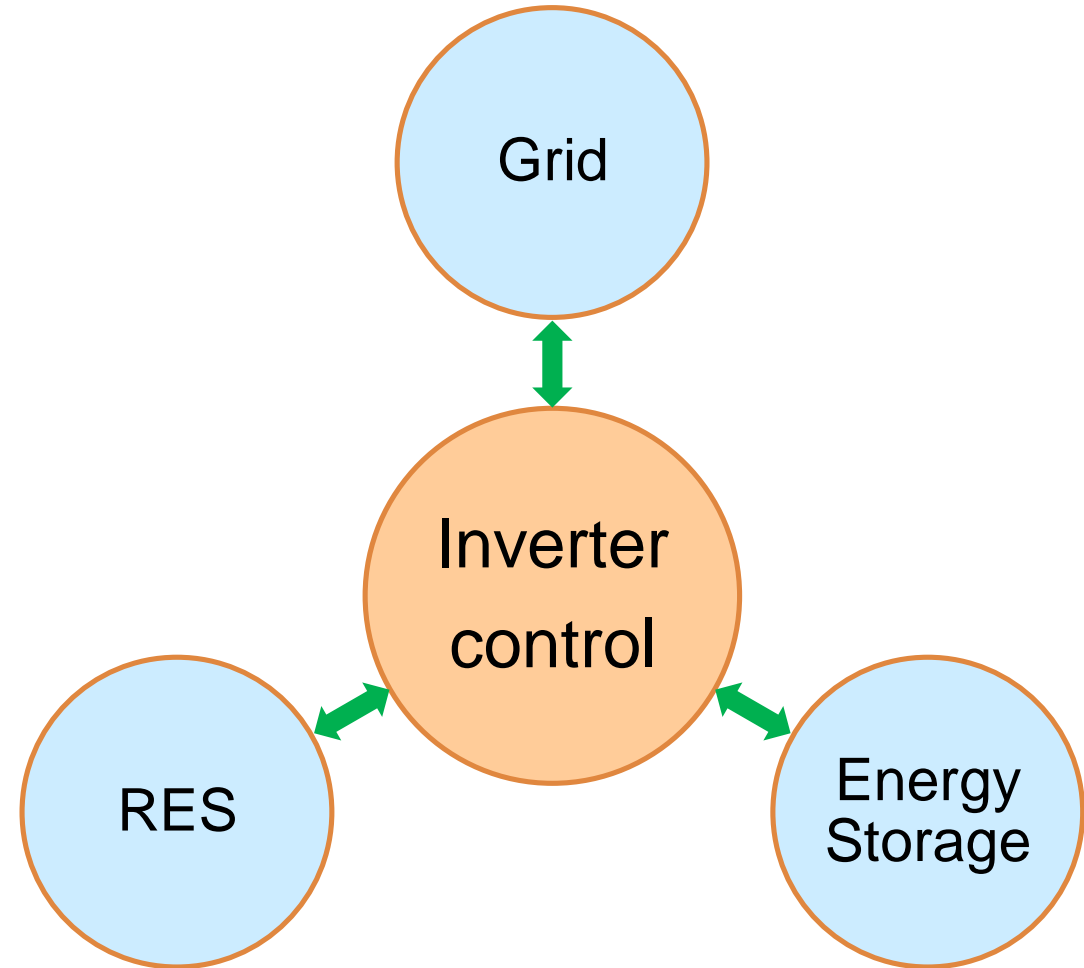
Objectives



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- Reactive Power compensation
- Virtual inertia
- Set grid voltage and frequency in islanded mode





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Approach & publications

- Simulation studies of inverter control for power smoothing^{1,2}
- Literature review³

¹ S. Anttila, D. Cardoso da Silva Junior, I. Temiz, J. G. Oliveira, J. Leijon, A. Parwal and C. Boström, "Power control strategies for a smoother power output from a wave power plant", Published and presented at the 13th European Wave and Tidal Energy Conference, EWTEC2019, 1 - 6 September 2019 in Napoli, Italy.

² A. Parwal, J. Hjalmarsson, T. Potapenko, S. Anttila, J. Leijon, J. Kelly, I. Temiz, J. Oliveira, C. Boström, M. Leijon "Grid Impact and Power Quality Assessment of Wave Energy Parks: Different Layouts and Power Penetrations using Energy Storage", Accepted for publication in IET The Journal of Engineering, June 2020.

³ S. Anttila, J. Döhler, J. G. Oliviera, C. Boström "Grid Forming inverters: A review of the state of the art of key elements for microgrid operation" Manuscript submitted to IET Renewable Power Generation.

Results



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- Inverter control will have an important role for power system stability
- Inverter control needs:
 - Autonomous operation
 - Robustness to changes in grid topology
 - Ride-through ability



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Thank you for your attention!