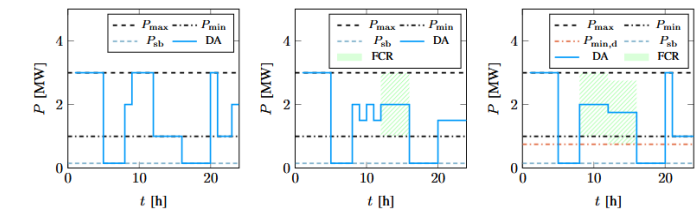
Plantwide control for flexible operation of alkaline water electrolysis systems

Introduction

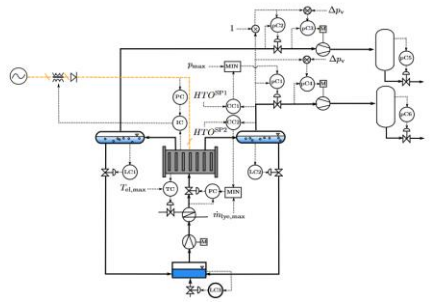
Coupling alkaline water electrolysis processes to renewable energy sources requires rethinking operating practices that today assume constant power supply. We are developing control methods to enable safe and efficient operation for renewably fueled electrolysis systems, both on and off the electricity grid. The methodologies used are from the fields of process systems engineering, optimization and control.

Selected publications

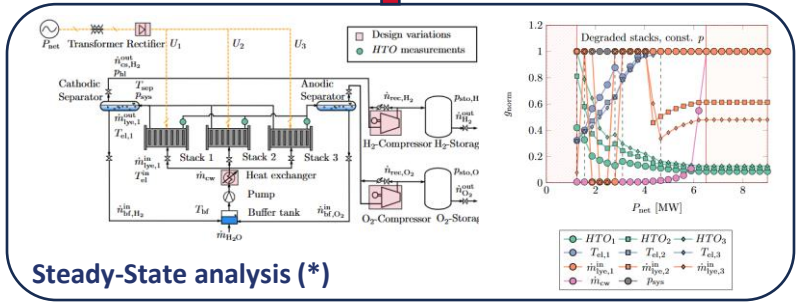
- L. Cammann et al. "Design and operational analysis of an alkaline water electrolysis plant powered by wind energy", *International Journal of Hydrogen Energy* (*)
- L. Cammann, J. Jäschke. „A simple constraint-switching control structure for flexible operation of an alkaline water electrolzyer", *IFAC-PapersOnLine* (**)
- L. Cammann, E.F. Alves, J. Jäschke. „Dynamic minimum loads for FCR market participation of alkaline water electrolyzers", *50th Annual Conference of the IEEE Industrial Electronics Society* (***)



Operating strategies (***)



Regulatory Control (**)



Steady-State analysis (*)

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Estimated progress of the PhD project:

Just started ...	< 50 %	> 50 %	Almost done ☺

Primary objective

- Develop control strategies for the plantwide operation of alkaline water electrolysis systems, specifically regarding process safety (HTO)

Secondary objectives

- Elucidate bottlenecks in current operating practices
- Analyze the control requirements for on-and off-grid operation
- Develop advanced operating strategies

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