

SERVICE DE METROLOGIE NUCLEAIRE
RELIABILITY AND SAFETY OF POWER SYSTEMS

MASTER THESES

Academic year **2021-2022**

*The topics listed below correspond more to **themes** in which master theses can be realized, than to a detailed description of topics. Depending on the interest of the students, more theoretical or instead industry-related topics will be developed. Some of the proposed themes are more convenient for an **internship**, to be made before the master thesis.*

*The themes proposed are preferably **accessible mainly to students in engineering physics and in electromechanical engineering**.*

4. Application of SDDP to assess the need of seasonal storage in decarbonized systems

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A fundamental ingredient to achieve a decarbonized European energy system at the horizon 2050 will be seasonal storage. However, because it is not possible to perfectly forecast future weather conditions, impacting renewable energy sources and the electricity demand, an optimal management of seasonal storage to ensure the security of supply must rely on stochastic optimization. A specific method, called Stochastic Dynamic Dual Programming (SDDP), was developed in the nineties to solve stochastic optimization problems in order to optimally manage hydro dams in Brazil. The objective of this MSc thesis will be the adaptation of that method to assess the need of seasonal storage in decarbonized systems, such as the European one in 2050.