EUROPEAN COMMISSION
DIRECTORATE-GENERAL HUMAN RESOURCES AND SECURITY
Directorate HR.AMC –Account management Centre
HR.DDG. AMC 8

2018-IPR-C-000-010550 **Storage design for ancillary services**

Position for: Trainee	As the science and knowledge service of the Commission, the mission of Joint Research Centre is to support EU policies with independent evidence throughout the whole policy cycle. The JRC is located in 5 Member States (Belgium, Germany, Italy, the Netherlands and Spain). Further information is available at: http://www.jrc.ec.europa.eu **Short description of activity:** Unit C.3 "Energy Systems, Distribution and Markets" aims at serving EC policy DGs in assessing the options to build more resilient, secure and fair power system and markets. The Unit does so by analysing real power systems challenges across several Member States (Baltic States, Greece, Cyprus, ...) from a variety of perspectives (RES integration, Generation Adequacy, Load Flow, provision of ancillary services etc.) and to do so uses each time the best available software and tools to do that specific analysis. The activity foreseen for this trainee, under the help and supervision of the Traineeship adviser, will be directed towards providing a design methodology for battery storage systems with a particular focus on maximising revenue streams from provision of ancillary services (Frequency Containment Reserve Capacity, Frequency Restoration Reserve Capacity, and congestion management), balancing energy and energy arbitrage. In fact, while battery storage is poised to become one of the main technologies shaping the future smart grid, there is a lack of a systematic approach on the interactions between the different possible revenue streams from trading in the different segments of the wholesale market (e.g. Day-Ahead and Intraday Energy market, Balancing Capacity market and Balancing Energy market). Moreover, the impact of different design options of the battery storage system on the aforementioned revenue stream opportunities is to be investigated. The research to be performed aims at contributing in the understanding of the above issues, as well as examining the impact on battery

	storage take-up of different market arrangements currently in force in Europe, especially regarding the Balancing Capacity markets. For this internship, Unit C.3 aims at combining desktop work, focused on market modelling, with the facilities of the Smart Grids Laboratories (real time simulators, storage systems) for evaluating storage models. The Unit would like to assess the results of this investigation with other studies and pilot projects. The trainee will collaborate to: • Set up a market model based on the specific arrangements of the Member State of Italy • Run the required market simulations • Contribute to test, in team with the Unit's researchers, of storage behaviour under characteristic operational regimes as defined by the market simulations. **Qualifications:** **Essential:** • University degree in power engineering, energy engineering or similar, and/or MSc in a field relevant to the topic of the call (in case the Master is not yet awarded, the subject of the Master thesis must be directly related to the purpose of the training) • Programming skills (e.g. Python, MATLAB or equivalent). • Good oral and written knowledge of English (level B2). **Advantage** • Familiarity with power market modelling • Proven basic knowledge of power system economics (teaching modules, seminars etc.) • Proven basic knowledge of battery storage systems (teaching modules, seminars etc.) • Basic experience in laboratory work **For general eligibility requirements, please read the rules governing the traineeship scheme of the JRC:** https://ec.europa.eu/jrc/en/working-with-us/jobs/temporary-positions/jrc-trainees

Unit /Directorate	Directorate C: Energy, transport and climate. Unit for Energy security, distribution and markets. Further information: https://ec.europa.eu/jrc/en/research-topic/energy-system-and-security-supply
Indicative duration	5 months
JRC Site **Country**	Ispra Italy
JRC contact details	**For any technical problems with your application, please contact:** HR-AMC8-RECRUITMENT-TOOLS-SUPPORT@ec.europa.eu