MSCA Postdoctoral Fellowships

HORIZON MSCA 2024 PF

Expression of interest

5th of July 2024

Deadline for submission of documents

instituto IMdea energía

EXCELENCIA MARÍA DE MAEZTU

Contact Person/ Scientist in charge

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Brief description of the Research Group

The principal activity of the Electrical Systems Unit is the development of intelligent algorithms for management of future electricity networks and energy systems. To achieve the necessary high levels of energy system flexibility, efficient and sustainable solutions are sought in integration of energy storage devices and renewable energy sources as well as in application of centralized and distributed control methods. Smartgrids, energy efficiency (smart buildings), grid forming, operation, stability and control of electricity networks and low-inertia power systems, are commonly used to describe the research interests of the unit.

Research Area

Information Science and Engineering (ENG)

Applications

Deadline for submission of documents 5th of July 2024. Documents to be submitted:

- Brief outline of the proposed research project (2 pages maximum)
- Complete curriculum vitae stating background and skills + two reference letters

Project description

The project can be presented in one of the following research lines:

Ancillary services in future power networks

The objective of this line is techno-economic-environmental evaluation of new services developed for grid operators (TSOs and DSOs) and providing assistance in creating future grid regulation. Assigning the value to “grid-forming” and other balancing services offered by power converters in future grids. Frequency and inertial response services as well as damping of frequency and sub-synchronous oscillations are of particular interest. Aggregation of different sources and, more specifically, the services provided by Dynamic Virtual Power Plants are studied. Exploring the role of demand control schemes in the grid services is of interest as well.

Optimal design and management of energy systems

Energy system management, their coordination and integration to power grids are all of increased importance to this research unit. Holistic approach is used for modelling demand and generation in energy systems and creation of their Digital Twins. Options for renewable and storage device integration are sought in order to improve energy system autonomy and increase its self-consumption. Finally, real-time optimal energy resource management techniques, based on advanced prediction algorithms and aiming at the minimisation of operational costs are under development.

Power electronics interfaces for future power networks

The research activities include development of control algorithms for advanced power electronics interfaces. Energy management of microgrids (both islanded and grid-connected), stability, control and operational aspects of power converters connected to the future networks interfacing renewable energy and storage devices are all studied. Development of control schemes for grid services like “grid-forming” with renewable power sources, Power and Sub-synchronous Oscillation Damping Energy scenarios of particular interest. All the algorithms are validated experimentally in the “Smart Energy Integration Lab” environment.