

Marie Skłodowska Curie Action –Postdoctoral Fellowship 2023
(MSCA-PF-2023)

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Department /Institute /Centre	Name	Grupo de Investigaciones Termoenergéticas / Group of Thermal-Energy Research ETSI Industriales
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	Province	Madrid
Research Area		Information Science and Engineering (ENG)
Brief description of the Centre/Research Group		<p>The Group of Thermal-Energy Research, created in 2006 by Prof. Martínez-Val, is currently a well consolidated research group in the field of applied thermal engineering. Among a wide range of research lines in this field, concentrating solar power system is the main focus of the group, including optical design of collectors, design of innovative concentrators, study and development of advanced power cycles and thermal energy storage.</p> <p>The research group has a great commitment with technological development activities: more than 50 patents have been granted, many of them international, and more than 100 papers have been published in high-impact journals. All these outcomes have been raised thanks to the participation in National and International projects, including Plan Estatal, CDTI, FP7 and H2020, and to the collaboration with companies and research institutes at national and international level, such as IASS-Postdam or SANDIA laboratories.</p> <p>During the last 5 years this level of commitment has been strengthened, highlighting the participation in two H2020 projects (WEDISTRIC -GA 857801- and ASTEP -GA884411-), one international private funding project, two coordinated national research project and one public funding innovation project led by the industry. This has led to 6 new national and international patents and more than 30 articles published in high impact journal during these years.</p> <p>Recently, UPM has participated as a main partner in a new Horizon Europe proposal related to advanced concentrating solar power systems based on particle receivers and sCO₂ power cycles.</p>



Expression of Interest – UPM Supervisor

Project description	<p>The future of concentrating solar power is necessarily associated to 3rd generation plants, based on particle central receivers, particle thermal energy storage and sCO₂ power cycles. This solution should lead to very high working temperatures, up to 800°C, that increase the thermal to electricity efficiency of the power cycle and reduce the cost and volume of the storage system. Furthermore, this system would depend on environmentally friendly materials and would lead to low water consumption, as it is the case of current CSP plants. Although these plants are not in the market yet, the technological barrier for the implementation of these systems is being addressed by several entities around the world.</p> <p>The Marie-Curie proposal would be focused on the sCO₂ power cycle and, more specifically, on its dynamic behavior. Indeed, one of the main advantages expected from sCO₂ power cycles compared to steam cycles is the faster start-up and its higher performance under part-load conditions. Nevertheless, there are very few research works that tackle the dynamic behavior. Furthermore, start-up operation is not well established for large power sCO₂ plants, which is a main feature to characterize their capability to adapt to the demand. This is especially important for 3rd generation plants, which should be used as peaking power plants in a future electricity mix where non-dispatchable sources share would be very high.</p> <p>The Marie Curie Researcher candidate would carry out the following tasks:</p> <ul style="list-style-type: none">• Development of a dynamic model of a sCO₂ recompression cycle, including its key components: particle/sCO₂ HXs, recuperator HX and turbomachinery.• Analysis of the best control strategies to adapt to part-load operation. <p>Design of the start-up and shut-down strategies, including hot and cold starts and obtaining the ramp rates.</p>
Applications: documents to be submitted and deadlines	CV, letter of motivation, letter of references, Eligibility Self-declaration. Deadline: 30/04/2023