

**Marie Skłodowska Curie Action –Postdoctoral Fellowship 2024  
(MSCA-PF-2024)**

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<b>Department /Institute /Centre</b>	<b>Name</b>	Thermal Energy for Sustainability (TE4S) Research Group ETSI Industriales
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	<b>Province</b>	Madrid
<b>Research Area</b>		Information Science and Engineering (ENG)
<b>Brief description of the Centre/Research Group</b>		<p>The Thermal Energy for Sustainability (TE4S) research group specializes in applied thermal engineering from component and system level design to numerical analysis and experimental stages. Key areas of focus include concentrating solar technologies, hydrogen production, thermal energy storage, turbomachinery, advanced power cycles, and energy system modelling.</p> <p>TE4S is firmly committed to technological innovation, as demonstrated by the acquisition of over 50 patents, a significant number of which have international recognition, the publication of more than 300 research articles in leading journals, and almost 50 Ph.D. thesis in less than 20 years. These achievements are the result of participation in numerous projects funded by the Spanish and regional governments, the European Commission and the U.S. Department of Energy. TE4S has developed strong alliances with renowned academic institutions and laboratories such as MIT, IASS-Potsdam, or Sandia National Laboratories. In addition, frequent collaborations with industry and private companies in the energy, power, and propulsion sector boost TE4S innovation leadership.</p> <p>For further information, please visit:  TE4S staff members: <a href="https://short.upm.es/qwmqx">https://short.upm.es/qwmqx</a>  TE4S scientific production: <a href="https://short.upm.es/8a3zb">https://short.upm.es/8a3zb</a></p>

## Expression of Interest – UPM Supervisor

<b>Project description</b>	<p>High penetration of renewable energy sources in the electricity grid is leading the electricity market to very abrupt variations in the short and medium terms. This is why large-scale energy storage systems are regarded as a key element in the very near future of the energy market. Electrochemical batteries have not been able so far to become competitive, whereas hydrogen is not reducing costs as fast expected.</p> <p>In this regard, Carnot Batteries are gaining expectation as a promising technology in terms of levelized cost of storage, where thermal storage systems are already a very mature technology. At current time, there are many configurations, which have been analyzed in terms of round trip efficiency and cost. However, the potential of short- and medium-term storage systems depends very much on their dynamic behavior. Indeed, storage systems require very fast ramp-ups in order to face demand peaks and renewable shortages. A solution to increase the fast-response of the storage system, Carnot batteries can be hybridized with other technologies.</p> <p>Aligned with the experience of the TE4S group on dynamic modelling of thermal models, the Marie-Curie proposal would be focused on the development of a complete model of the storage system under different configurations, analyzing parameters such as the ramp-up time (both for charging and discharging) and minimum load. Then, annual simulations under annual demand profiles will be carried out. The Marie Curie Researcher candidate would carry out the following tasks:</p> <ul style="list-style-type: none"> <li>- Identification of the Carnot batteries configurations and selection of those with highest steady-state analysis.</li> <li>- Model development on Modelica.</li> <li>- Simulation of performance parameters.</li> <li>- Annual simulation of the Carnot batteries alone and hybridized with other technologies.</li> </ul>
<b>Applications: documents to be submitted and deadlines</b>	<p>CV, letter of motivation, letter of references, eligibility self-declaration.</p> <p>Deadline: 30/04/2024</p>