**SUSTAINABLE MATERIALS, PROCESSES AND SYSTEMS FOR ENERGY TRANSITION**

**DM 630/Yanmar R&D Europe S.r.l.- Physical analysis and modelling for post-Li battery chemistries**

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**Context of the research activity**

The GHG emissions reduction targets established by the European Green Deal are increasingly pushing industry and research towards the development of electric and hybrid powertrains: up to now, these systems have relied mainly on Li-ion batteries as electric energy storage elements, but these chemistries, despite continuous technology improvements, still have inherent downsides and limitations in terms of energy and power density, materials availability and cost. In this context, post-lithium battery chemistries are expected to entail advantages in terms of performance (in particular energy density) and/or material availability, and cost, compared to the currently established lithium-ion based systems, always considering the ethical sustainability of raw materials.

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**Objectives**

First of all, a preliminary deep and comprehensive analysis of post-Li chemistries with the aim to identify the most promising solution(s) for the target applications, (i.e., off-road vehicle is the most interesting but also stationary storage can be considered in this preliminary scouting). Development and validation of simulation models and methodologies providing insights into the physical (electrochemical, mechanical and thermal) behaviour of the chemistry under analysis at different levels of detail (cell, module, pack) in view of the overall system design, state estimation in terms of, for example, aging, and battery management.
| Skills and competencies for the development of the activity | The ideal candidate should be a material scientist or engineer, chemical engineer, a chemist or equivalent degree, with expertise in electrochemistry and 1D and 3D modelling. Electrical engineer can be considered too. Problem solving ability and practical experience in laboratory would represent an additional value. Candidates should have a solid theoretical background, strong motivation to learn through advanced research and willingness to regularly report and share the results of their activity. |