ENERGETICS

DiaSorin - Artificial Intelligence Tools for Monitoring and Optimal Management of Energy in the Life Sciences Industry in Line with Environmental Impact Reduction

Funded By	DIASORIN ITALIA SPA [P.iva/CF:02749260028]
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Context of the research activity	The proposed topic is part of an Energy Master Plan (EMP) that encompasses various initiatives across Diasorin's European industrial sites aimed at energy efficiency and CO2 emission reduction. Specifically, the goal is to provide high-level training for professionals capable of managing industrial energy using efficient technologies, intelligent monitoring and control systems for industrial processes, and artificial intelligence techniques.
Objectives	The research activity aims to build such expertise by developing innovative methodologies and procedures within the PhD program to redefine the process of centralized management and control for efficient energy use at various industrial sites distributed internationally. These sites are characterized by different technical, economic, and environmental conditions. Machine learning and artificial intelligence (AI) techniques will be developed for monitoring the plant's consumption (both electrical and thermal final uses), detecting operational anomalies, defining multi-variable energy signatures (including both meteorological and process variables), and predicting final energy consumption patterns. 'Gray-box' models, which combine physical models of the building /process and data-driven approaches, will be used to assess the energy performance of the building (in terms of both the envelope and the production process) to create digital models for testing advanced control techniques (such as deep learning/reinforcement learning) of HVAC systems and process devices. Starting with the final use of energy, the extension of similar techniques and predictive models to other aspects of industrial processes, such as capacity, saturation, and reliability, will be evaluated to contribute to the achievement of long-term industrial strategic objectives.
Skills and competencies for the	The ideal candidate for this position has a scientific background in physics, engineering, mathematics, statistics, and software development. The development of the research activity requires a candidate with: • Solid background in statistical methods and simulation techniques • Solid background in mathematical and physical modelling • Background on energy systems

development of the activity	• Background in computational methods • Ability to analyze the scientific literature state of the art • Scientific writing and reporting • Proactive, independent, and parallel thinking • Ability to work in a multi-disciplinary team