Global energy transitions combined to exponentially increasing global population and complex high-energy societies led the world energy consumption to follow a monotonic increasing trend since the beginning of the 19th century, producing enormous amounts of waste heat, with the side effect of locally increasing the atmospheric temperature and contributing to greenhouse gases emissions. Simultaneously with the development of powered devices, several approaches for reducing energy losses have been conceived. In this work, a deep analysis of the state of the art of Waste Heat Recovery and Waste Heat to Power technology is proposed. On the other hand, advancements of materials science and cybernetic systems show that, compared to conventional robots, colloid-based robots would offer several technical advantages representing a new paradigm in the field of cybernetic systems, joining the versatility of conventional and the advantages of soft robots. Here, energy harvesting from the external environment and internal subsystems is fundamental, in order to increase the energy efficiency and the autonomy level of intelligent robots. For this purpose, in this work, the engineering feasibility of a Colloidal EneRgEtic System has been assessed, proposing also a starting point to address waste heat to power and energy harvesting with nonconventional solutions, combining the nanoscale properties of solid materials and the advantages of fluids. First, a concise but exhaustive overview of the physics and materials involved is provided. Then, the main steps of the research project are presented, starting from the initial conceptual idea and the first prototype, its evolution, the test conducted with the main findings and, finally, future optimizations. At last, the investigation of new colloidal materials exploiting different physical effects, for the purpose of energy harvesting, is proposed.