

Multi energy systems

Multi-energy systems (MES) whereby electricity, heat, cooling, fuels, transport, and so on, optimally interact with each other at various levels (for instance, within a district, city or region) represent an important opportunity to increase energy efficiency, along with technical, economic and environmental performance.¹ In addition, the rapid development of technologies has resulted in amplifying the joint operation of the multi-generation systems. This highlights the importance of focusing on multiple alternatives such as integration of renewable energy sources, effective energy conservation, energy storage, etc.

Period:	Period 4
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Educational management portal:	moodle.unitus.it
Objectives:	The objective of this module is to give to the students the design techniques to integrate different energy systems.
Programme:	EES: Pumped Hydro; Electrochemical storage; CAES; Hydrogen storage; Supercapacitors; flywheels. TES: sensible heat storage, latent heat storage, chemical heat storage. Power to gas systems. Standardisation
Pre-requisites:	i) Thermodynamics fundamentals. ii) Energy conversion systems fundamentals; iii) Renewable energy fundamentals.
Study material:	<ul style="list-style-type: none"> ● Lecture slides; ● Reading material; ● Additional literature handed out during the course / made available via Blackboard/Moodle.