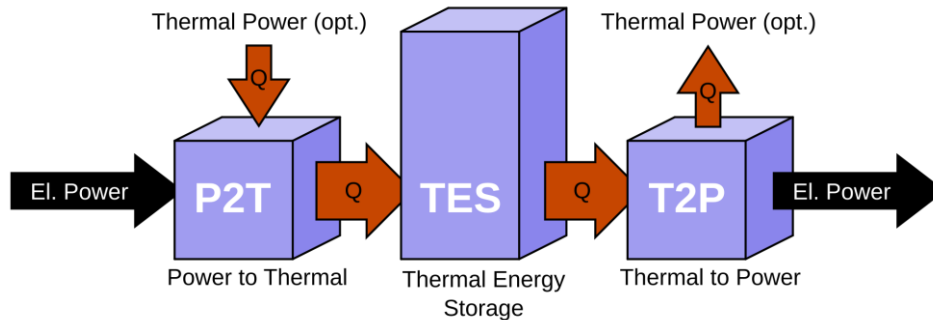




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## Rankine Memorial Lecture Carnot batteries and energy polygeneration A solution to the energy storage question?



The Carnot battery is known by several other names such as Pumped Thermal Electricity Storage (PTES), Pumped Heat Electricity Storage (PHES) or Electro-Thermal Energy Storage. This relatively new technology has become one of the most promising large-scale energy storage technologies.

The main advantages of the Carnot battery are: Free choice of site, small environmental footprint, life expectancies of 20–30 years, optional low-cost backup capacity, the components of an underutilized fossil-fueled power plant can be partially reused to build the Carnot batteries unit.

In addition, Carnot batteries can be used to cover the cooling and heating needs of buildings and processes. This is achieved through both the thermal energy storage (with a potential arbitrage with electricity production) and the thermal power "by-products" generated during conversion processes. As a result, Carnot batteries are evolving from purely electricity storage solutions into energy polygeneration systems and contribute to heat and electricity sector coupling. To reduce their cost and foster their deployment, the use of reversible P2T / T2P machines and the valorization of low-cost thermal energy storage (such as groundwater reservoirs) is being investigated.

Vincent Lemort is a Professor at the University of Liège (Belgium), co-leading the Thermodynamics Laboratory, a research team of around 20 people. His research activities are dealing with the modeling, the testing and the optimization of thermal energy systems and more especially refrigeration, heating and air-conditioning systems as well as small-scale Organic Rankine Cycles. Vincent has published more than 300 journal and conference papers on these topics. He has a strong background in working in collaboration with Industry but also in the frame of international research projects (among which projects supported by the International Energy Agency).



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**6.30pm Tuesday 28th  
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