

DIMSAI Doctoral Seminar

Thursday, 30 September 2021

School of Engineering – Viale Risorgimento 2, 40136 Bologna, Italy

Council Room 10 a.m./Teams Platform: DIMSAI Virtual Aula

The constructal law and energy storage issues

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In this lecture I will discuss how the constructal law of design brings new insights to a crucial current issue: the use of renewables in the energy mix as a contribution against global warming. When most of today designs are based on trial and error, the constructal law empowers us with the ability to predict what the shape of the energy system should be.

The design of Phase Change Materials systems for solar energy storage will be covered first. When the time for energy storage is fixed, together with the amount of material, the heat transfer fluid can be allocated in the storage volume in such a way that the heat transfer mechanisms are used when and where they are the most efficient. Thermochemical storage reactors for household applications are another domain in which a constructal methodology brings a theoretical framework for the design of compact reactors. Finally, radiant systems for cooling and maintaining indoor thermal comfort will be investigated. Their shape and allocation in the room ceilings can also be approached through the lens of constructal design.