

Position profile: Post-Doc

Type of contract: 12-month contract

Dates: January 2015 – December 2015

Title: Development of a techno-economic model of a multi-stage fluidized bed heat recovery system, in the frame of thermal energy storage for solar power plant

Location: PROMES-CNRS, Font Romeu (66), FRANCE

Context:

Particle suspension may be used as an advanced heat transfer fluid that can also be stored, and applications to solar thermal power plants are under development. In heat storage systems using particles as storage medium, a dense multi-stage fluidized bed is placed between the hot tank and the cold tank as the heat exchanger that transfers heat from the hot particles to the working fluid (water/steam or air); the latter is then expanded in a turbine for electricity production. Indeed, the multi-stage fluidized bed creates the required gradual temperature difference between the hot and cold tanks, because the medium temperature is homogeneous in a single fluid bed (main fluidization characteristic). Consequently, there is a trade-off between the system thermal performance (an infinite number of stages leads to the best efficiency) and its cost (a single bed is the cheapest). The objective of the study is to develop a techno-economic model of multi-stage fluid bed heat recovery system that will account for the particle properties, the heat transfer properties of the fluidized bed system (tube-in-bed heat exchanger), both tank temperatures and the power block efficiency. The study will contribute to the techno-economical evaluation of a heat storage system using particles as storage medium. It will be developed in the frame of a European Project thus implicating contacts with researchers from other European countries, dealing simultaneously with high temperature thermal storage with solid powders.

Duty:

The research activity of the recruited doctor will be mainly theoretical, and it will be focused on the development of a techno-economic model of multi-stage fluid bed heat recovery system.

Prerequisite: Process and thermal engineering, solar energy, modeling and simulation, heat exchangers, fluidized beds.

Language: Excellent scientific English is mandatory

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Gross salary: 2 200 - 2 500 €/month (depending on professional expertise)