conferenceseries.com SciTechnol

J Nucl Ene Sci Power Generat Technol 2016, 5:5 (Suppl)
http://dx.doi.org/10.4172/2325-9809.C1.003

International Conference on

Power and Energy Engineering

September 29-30, 2016 London, UK

Tower Technology: High temperature looking for decrease the cost of energy; impact of surface treatment

Noelia Martinez Sanz
Abengoa Research, Madrid, Spain

The latest concentrated solar power (CSP) plants built around the world have used the tower technology, instead of parabolic trough, using molten salt or superheated steam as heat transfer fluid. This means, increasing the temperature, opens the technology to use more efficiency cycles. It is directly related to more profitable power plants and promoted the use of solar thermal energy. This type of technology has the solar receiver as a key element of the power plant. One of the challenges to have more efficient receivers is its high absorptivity surface. There are several options to coat the solar receiver but there is one paint (Pyromark) that is the most commonly employed. The authors study the bench marking of solar coating, after that, analyse that which are the options more suitable for the next power plants generation. The study considers different options of solar receiver cavity and external. To do the study, the receiver heat losses were modelled and simulated to obtain the receiver performance values, considering different coatings. The impact in the cost of energy will be analysed too, taking in to account the common indicators. Every single design point has to be considering to promote the use of CSP.

noelia.martinez@abengoa.com

Optimization of thin film photovoltaic structures using non-parametric regression

Shima Hajimirza
Texas A&M University, USA

Designing nano-scale materials with high external quantum efficiency is a complicated inverse design problem requiring the optimization of a utility function derived from the solution of an underlying dynamic system governed by electromagnetic Maxwell and electronic carrier mobility equations. Such design usually consists of layering or texturing the semiconductor material with metallic reflectors, nano-particles or wave-guides, transparent conductive layers, surface roughness and other simultaneous light trapping/career mobility improvement mechanisms and therefore lies within an extremely vast search space. The design problem is consequently very time consuming and challenging, and offers little intuitive understanding of the intertwined effects of joint variable deltas. These types of design problems can be handled more practically via the use "meta-model" optimizations. The idea of such approaches is that the utility function is locally or globally fit with an approximate meta-model based on past search points or carefully designed experiment points. The meta-model is then used as a guide to carry out a simpler optimization closely resembling that of the original design, or to recommend valuable candidate points. In the current work, we report on using a variety of such meta-model approaches to design highly efficient thin film silicon solar cells with multi-layered front and back coatings. We apply different meta-model optimization techniques to the proposed problem and compare the results to standard numerical optimization algorithms. In particular, we propose two novel techniques that have their roots in machine-learning applications; one based on a regularized linear local fit and the other one based on a global regression-tree fit, and we demonstrate that the with the help of these smart techniques we can indeed expedite nano-material search problems to a great extent.

shima.hm@tamu.edu