

# **The role of computational continuum mechanics in development and optimization of renewable energy technologies**

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**Abstract:** For many segments of renewable energy technologies, simulations based on computational continuum mechanics play an important role, since there is no substantial database on past experience or extensive experimental studies. In addition, market pressure is high and technology needs to be developed as fast as possible, which stimulates the use of computational methods to simulate various processes, such as fluid flow, heat transfer, structural deformation (in particular fluid-structure interaction), electro-chemical processes, phase change etc. Both commercial and open-source software is nowadays extensively and successfully used in industry and research institutions for this purpose. This presentation will review some aspect of simulations based on computational continuum mechanics, especially the recent advances in interface to CAD and automatic grid generation, physics modelling and discretization and solution methods. Some illustrative examples of flow, heat transfer and fluid-structure interaction simulations will be presented to highlight the benefits from simulation in the process of development and optimization of new technologies and products. Finally, future trends will be outlined.