

Modeling and simulation issues at EDF enabling energy challenges*

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An industrial utility like EDF needs to better understand the behavior of energy infrastructures like power plants (nuclear, thermal, renewable.), electrical networks, but also energy management. The objective is to increase safety, performance, lifetime, and optimize processes. To reach these goals, it is necessary to better understand various phenomena met inside the infrastructures, for example: nuclear components (containment building, PWR vessel, steam generator, fuel rods), networks (electrical grids) or energy management (quality of electricity), in order to win margins. This is done using various numerical softwares developed at EDF RD. The use of intensive simulation allows new approaches and new perspectives. On the other hand, due to the significant increase of data produced by our production systems, our electrical infrastructures and our commercial activities, and the progress of IT solutions, more and more problems can be handled by disruptive approaches, such as Data Science, Data Analytics, Artificial Intelligence, Virtual and Augmented reality. Here again, the use of the new computing powers allows new possibilities previously underutilized, complementary to physical modeling approaches. Some applications will be shown for various domains.

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