Dynamic simulation of combined cycle power plant with thermal storage using Excel user interface for two different scale simulators

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In process engineering different detailed levels of analysis are of interest to engineers or researchers depending on the depth of understanding expected. To this purpose, different computational tools are used to achieve the expected target. With these computational tools or simulators, simulations ranging from detailed and rigorous mathematical models to overall process plant of black box models can be carried out. Whereas most of these computational tools cannot execute different scales of models at the same time. This study proposes Excel as an interactive scale bridge of data exchange to aid the multiscale modelling and dynamic simulation of combined cycle (CC) power plant integration with a two–tank thermal energy storage (TES) system using SimCentral and gPROMS. The study also explored saving energy from the CC during low energy demand for later use with the aid of the TES system. With the developed Excel interface, the performance of the two–tank TES system was analyzed at the various operation modes for the entire process and obtained an efficiency of 99.7%