Modeling and Simulation of the Dynamic Operating Behavior of a High Solar Share Gas Turbine System

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Summary:

Solar gas turbine systems provide the opportunity to utilize solar heat at a much higher temperature than solar thermal power plants based on steam turbine cycles. Therefore, GT technology has the potential to improve the efficiency of future solar thermal power plants. Nevertheless, to achieve mature technology for commercial application, further development steps are required. Knowledge of the operational behavior of the solar GT system is the basis for the development of the systems control architecture and safety concept. The presentation addresses the basic priciple as well as the dynamic behavior of high solar share GT systems, which are characterized by primary input of solar heat to the GT. To analyze the dynamic operating behavior, a model with parallel arrangement of the combustion chamber and the solar receiver is presented.