Project Thesis:

Experimental comparison of the control behavior of an existing state-of-the-art versus cloud-controlled building automation and control system

Building automation is the central networking component for achieving the desired efficiency of system technology in the building sector. The expansion of the system to include the Internet of Things (IoT) and coupling with control applications from a cloud environment and the use of machine learning algorithms promise many advantages. Initial investigations have shown, however, that the control behavior could differ significantly between the existing system and the cloud-regulated system, possibly due to lower sampling rates or measurement value deviations. In order to be able to evaluate the effects and their influence more precisely, further systematic investigations of the control behavior are necessary, which are to be carried out experimentally in the system prepared for this purpose.

Scope of work:

In a current master thesis, the comparison of existing systems and cloud-regulated systems has been investigated. In particular, the control engineering comparison revealed that there are system-specific differences that cause different control behavior for the same control parameters, so that an adjustment was necessary. In this thesis, effects and the causes shall be investigated in detail. For this purpose, different experiments are carried out - for example, change of control in steady-state operation with the same control parameters, step responses, variation of the control parameters - and the results are analyzed. Furthermore, you will evaluate whether the cloud-regulated system has a fundamentally disadvantageous or more limited behavior compared to the existing system.

Our profile:

The E.ON Energy Research Center at RWTH Aachen University deals with sustainable energy supply concepts that take account of technical feasibility as well as social and economic aspects. The reduction of primary energy consumption in buildings and an increase of indoor comfort are among the research tasks of the institute. A further focus of research is the investigation of IoT concepts in order to be able to control conventional plant technology analogous to the smart home.

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