Numerical Energy Analysis of PV Modules as Adaptive Building Shading Systems

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This thesis developed a methodology to simultaneously calculate the building energy demand and the PV electricity production of a building with PV modules as adaptive building shading systems. A parametric model was built for dynamic evaluations and optimizations of such a system. A case study was then performed on a model representing the prototype of the ASF at the House of Natural Resources at ETH Zurich.

It was possible to find the optimizing configurations of the described system as well as the corresponding building energy demand. Furthermore, various influences were evaluated including sensitivities on the building orientation, the geographic location, the control strategy, and the building system parameters. The work was published in two conference papers “Energy Analysis of Dynamic BIPV Modules as Adaptive Shading Systems” (PVSEC 2016) and “Energetic performance and system design of adaptive photovoltaic envelopes (Forschen für den Bau im Kontext von Energie und Umwelt 2016)



