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CESAR: A bottom-up building stock modelling tool for Switzerland to address sustainable energy transformation strategies

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Abstract

This paper presents the building stock model CESAR (Combined Energy Simulation And Retrofitting), which is based on bottom-up modelling methodology for the development of sustainable energy transformation strategies for the buildings in Swiss districts. CESAR is composed of two sub-models: a Demand Model (DM) and a Retrofitting Model (RM). The DM is tasked with identifying the current energy demand of buildings in districts. It builds on geo-referenced information and available census data, and its flexibility allows it to be applicable to any kind of residential neighbourhood within Switzerland. The DM is based on an automated bottom-up modelling technique, which employs the dynamic building energy simulation software tool EnergyPlus as its simulation core to generate hourly energy demand profiles of individual buildings taking the interactions with neighbouring buildings (*e.g.* shading and solar inter-reflections) into account. Once current energy demands are calculated by the DM, the RM further offers the possibility to apply a set of energy transformation scenarios, based on the Swiss Energy Strategy 2050, to generate future demand and

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