



## MODELLING OF HYBRID VENTILATION SYSTEM IN BUILDINGS USING ENERGYPLUS SOFTWARE

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**Summary:** In the modern world today, the significant part of the total energy consumption is related to the building, so research and development of methods for improving energy efficiency in buildings are very important. A significant part of energy consumption in buildings relates to building ventilation. A hybrid ventilation system employs both, the natural and mechanical ventilation, at different times of the day. High energy savings can be achieved with heat recovery mechanical ventilation system, by using the special type of heat exchangers (HEs) - air-to-air heat exchangers. This paper presents a method of modelling the hybrid ventilation system in buildings by using EnergyPlus software. One illustrative example is provided.

**Keywords:** mechanical ventilation, natural ventilation, buildings, EnergyPlus software

### 1. INTRODUCTION

Heating, ventilating and air conditioning systems (HVAC) are essential for the maintenance of a comfortable and healthy indoor environment for building occupants. In developed countries the HVAC systems consume around a third of the total energy consumption of the whole society [1]. On the other hand, energy saving in buildings is being strictly regulated by official requirements and local authorities. In a modern building, the ventilation losses may become more than 50% of total thermal losses [2]. Taking into account the above facts, the improvement of the efficiency in buildings ventilating systems to reduce their environmental impact constitutes a key issue. The purpose of ventilation is to provide acceptable indoor quality and thermal comfort.

Hybrid ventilation system provides a comfortable internal environment using both natural ventilation and mechanical ventilation system, but using different features of these systems at different times of the day, or in different seasons. A hybrid system has an intelligent control system that can switch automatically between natural and mechanical modes in order to minimize energy consumption [3].

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