

Energy efficiency in broiler poultry farms

Initial conditions

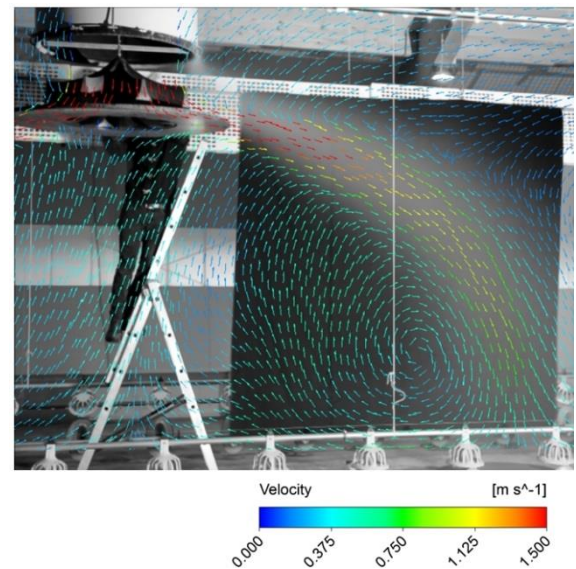
In collaboration with Agroscope (Tänikon TG branch), ZHAW examined a ventilation system with heat recovery (HR) in a broiler poultry farm. The SoE team consisted of members from the Institute for Energy Systems and Fluid Engineering (IEFE), the Institute of Materials and Process Engineering (IMPE), and the Institute for Signal Processing and Wireless Communications (ISC). The analysis was divided into three sub-areas: the energy analysis of a heat recovery system during four fattening periods (IEFE, ISC), a numeric flow simulation of the indoor air flow (IEFE), and the examination of possible surface coverings for the heat recovery pipes (IMPE).



Heat Recovery Examination in
a Broiler Poultry Farm

Project results

Thanks to the CFD analyses, the indoor air flows in the poultry house could be successfully visualised. The simulation was validated using video recordings combined with smoke and measurements taken in the poultry house. The results of the volume flow and climate measurements during the four fattening periods proved that a total of 55.6 MWh of thermal energy could be recovered and therefore roughly 54.3 % gas were saved. However, no conclusions can be drawn regarding the total year based on the results from the four fattening periods. In the final section of the analysis, the various surface coverings were tested in a simple set-up in the poultry house. The examined coverings remained strongly contaminated after the experiment. However, it was found that polyurethane without additives produces better results than other coverings. Further, IMPE suggests to replace the current PVC pipes with metal pipes, because in addition to improved conductivity, the material also offers additional covering options.



Validation of the indoor air flow through
air flow visualisation with smoke

ZHAW School of Engineering
Technikumstrasse 9
8400 Winterthur
info@engineering.zhaw.ch
www.engineering.zhaw.ch

IEFE Institut für Energiesysteme
und Fluid-Engineering
Prof. Dr. Frank Tillenkamp
Technikumstrasse 9
8401 Winterthur
Telefon +41 58 934 73 61
frank.tillenkamp@zhaw.ch
www.iefef.zhaw.ch