DTU Byg
Institut for Byggeri og Anlæg

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Stack- and wind-assisted ventilation with heat recovery and night cooling

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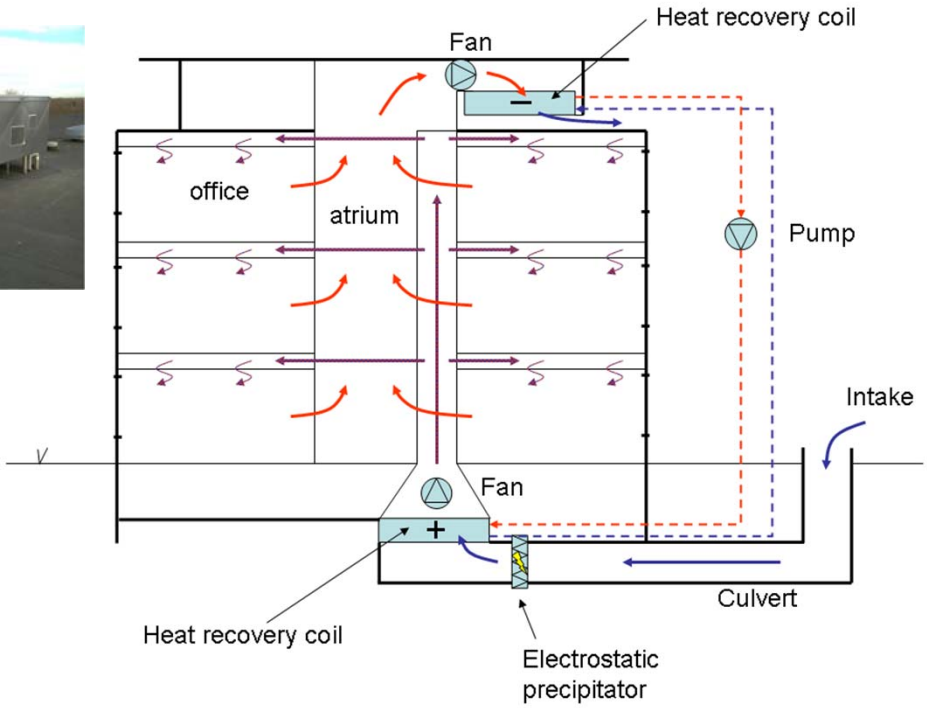
Passive ventilation is a special type of hybrid ventilation that combines the advantages of both natural and mechanical ventilation to achieve flow control and thermal comfort and heat recovery with low power consumption at the same time.
Intake and exhaust of the ventilation system are separated and located to design for maximum assistance from natural forces of stack and wind. Heat recovery is then performed by two coils and a pump-driven water loop.



The heat exchanger coils are made from plastic tubing with extremely low obstruction to the airflow. Because of the use of cheap plastic tubing it is possible to have very large heat transfer area, something which is necessary to achieve high heat recovery efficiency. One exchanger has more than 5 km of plastic tubing inside.
Results from full scale testing documents the simulated heat recovery of 63% with 1 Pa pressure drop. The total pressure drop of the system is 40 Pa and the fan power consumption is 10 times lower than for conventional mechanical systems.
Additionally, the design of the system improves the free night cooling potential because night-runs of the fans are very energy cost effective. This saves electrical energy which would otherwise have been consumed by a cooling machine.
The project was funded by Elforsk, Dantherm, ALECTIA and DTU Campus Service and runs in building 118 today.