

ENSTO *Saves Your Energy*

"Distributed ventilation with high efficiency heat recovery in multi-storey housing renovations."

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5.6.2012 Ensto Company Presentation

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Ensto Locations

Ensto is a family business and international cleantech company that employs 1 600 people in 20 countries in Europe and Asia. The company's turnover is 250M€.

Ensto Solutions

Overhead Lines	Underground Networks	Power Quality
Enclosing Systems	Industrial Components	Workpoint Electrification
Ensto Block of Flats	Ensto Hybrid House	Electric Vehicle Charging

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Indoor environment

The environment closest to us is the air indoors. Today we spend almost 90 % of our lives indoors. Therefore we should pay just as much attention to the air quality indoors as to the outdoor air quality.

Every day we need approximately
1 kg solid food to eat,
some 3 kg water to drink and
about 20 kg (17 000 litres) fresh air to breathe!

All foods and drinks have to be of good and controlled quality.

Sometimes we forgot how essential air is for our healthy

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Indoor environment

- In order to feel comfortable indoors we need to ventilate, heat, cool and/or dehumidify the indoor air.
- Often ventilation is adjusted according to what building needs not for human

Ventilation

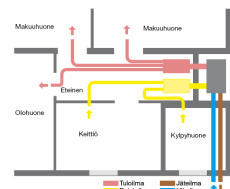
Principals of good ventilation system:

- Low CO₂ levels in bedrooms
- Clean fresh air, also in downtowns
- Draughtless supply air
- Low energy consumption
- Undisturbed for neighbouring areas



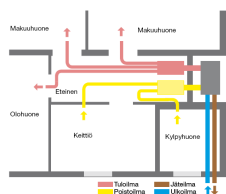
Different ventilation systems for renovation

1. Distributed system
 - All apartments have an own HRV
2. Centralized system
 - Main unit on the roof. Big vertical ducts
3. Mixed system
 - Mix of distributed and centralized system depending of the building.



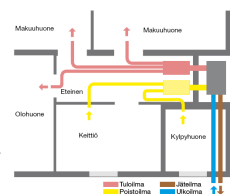
Distributed ventilation system, renovations

- Benefits of distributed system
 - All ducts are new and easy to clean
 - Service from corridors
 - Ventilation can be adjusted to be suitable for every apartment depending of use
 - Renovation can be limited to certain apartments.
 - No need for big ventilation shafts.
 - According to studies from Finland shortest payback time (no big differences).



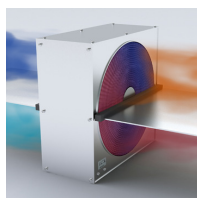
Distributed ventilation system

- Limitations for distributed system:
 - Fresh air inlet need to be planned really carefully, and waste air blowing as well.
 - Service concept between service company and consumers need to be clear. Distributed system needs more service. Service from corridors essential.



Energy efficient ventilation

- The air which is "used" indoors and discharged outdoors can, in the energy recovery equipment, warm up or cool down the incoming supply air. Up to 90 % of the outgoing energy can be recovered this way.
- Enthalpy efficiency is having big role to overall efficiency of heat recovery system, with new control systems we are able to control also distribution of the humidity across the rotor



CASE EXAMPLE:

Renovation of apartment specific ventilation in block of flats:
Case kv. Magistern, Växjö, Sweden

Starting point

- 4 three floor buildings
- Built in 1940-50
- 2-3 rooms in the apartments
- Surface on average 65 m²
- Totally 296 apartments
- Natural ventilation
- Problem with mould and humidity in the bathrooms



-> Envent solution Piccolo units in all apartments.



Installation imitating the structure

- Supply air is taken through the facade by the kitchen
- Exhaust air through the garbage shoot to the roof
- Extract from kitchen and bathroom
- Supply air to bedroom(s) and living room
- The air from the cooker hood is lead past the heat exchanger



An energy efficient and comfortable solution with Piccolo units

- Small energy consumption with direct current fans, SFP 1,42 – 1,92 kW/(m³/s)
- Units are equipped with electrical after heaters, but they have not been in use
- Annual increase in apartment electricity consumption ~400 kWh / apartment (=6,15 kWh,m²,a), the consumption of district heating decreased in proportion
- Total cost 50.000 SEK/apartment (n. 76 €/m²) including ventilation units, installation and construction work
- Investment in healthy and fresh indoor air **0,69 €/m² / month**



Cooling in historical buildings

Enervent Pegasos PRO greenair HP

- Enervent Pelican HP and Pegasos HP is a ventilation unit with rotating heat exchanger and integrated heat pump.
- The heat pump heats and cools the supply air. The units are suitable for spaces up to 500-2000 m³.



Conclusions

- Ventilation renovation needs more values than just a financial payback time. According to studies payback time is 20-30a in best case when compared with required airflows today.
- Ventilation renovation need to combine with bigger renovation of the building to make it financially reasonable. Reduces costs 20-40%.
- Project need to be planned carefully. Especially distributed system.
- Heat recovery efficiency is having a keyrole for energy efficiency. Both heat efficiency and enthalpy efficiency need to be considered on yearly basis.
- Specific fan power (SFP) need to be considered.
- The selection of ventilation system (centralized or distributed) need to be done case by case.
- Need for cooling is increasing, integrated units are available already (no outdoor unit)



THANK YOU!

