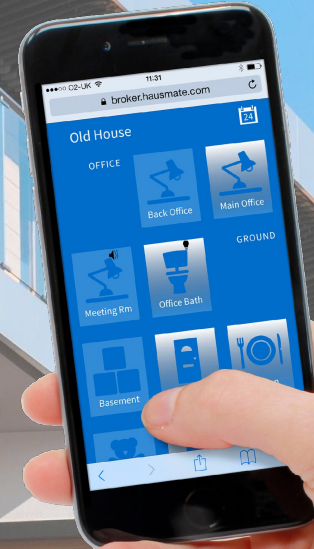
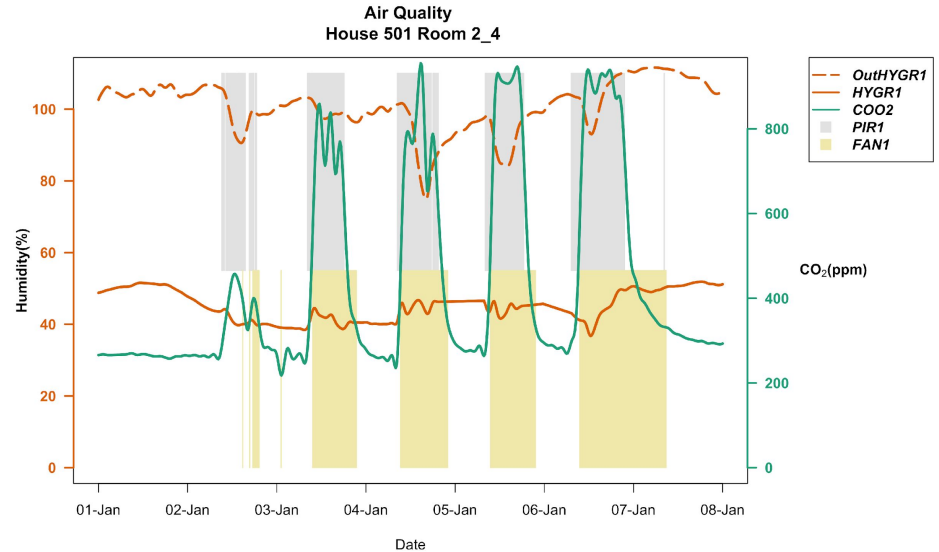


**Natural  
ventilation  
reducing costs and  
improving comfort**



# Today's Talk

- Ventilation overview
- Demand Control Ventilation



# Why Ventilate

Provision of fresh air

Remove / dilute pollutants

- CO<sub>2</sub>
- Humidity
- Odours, bacteria, dust etc

Prevent condensation

Air for fuel burning appliances

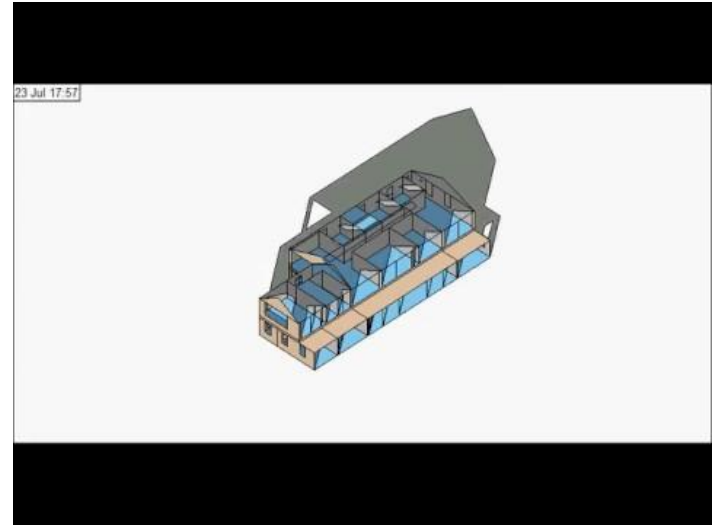
Moderate (summer) temperatures.



# Ventilation increasingly important

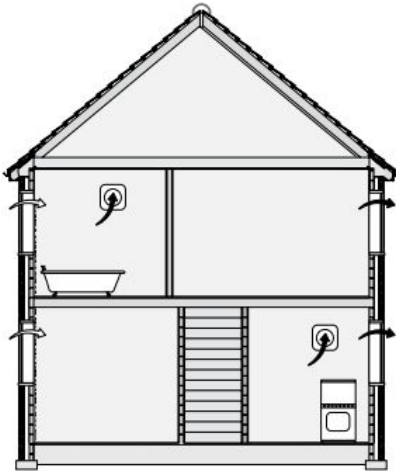
New building:

- have good fabric (insulation)
- less infiltration (built airtight)
- need to reduce ventilation heat losses
- have a propensity to overheat
- Increasing awareness of air quality.

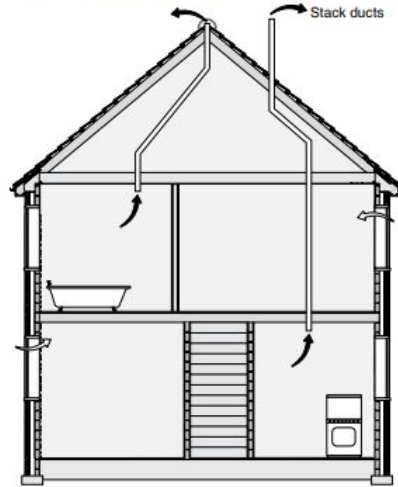


# Regulations - Part F

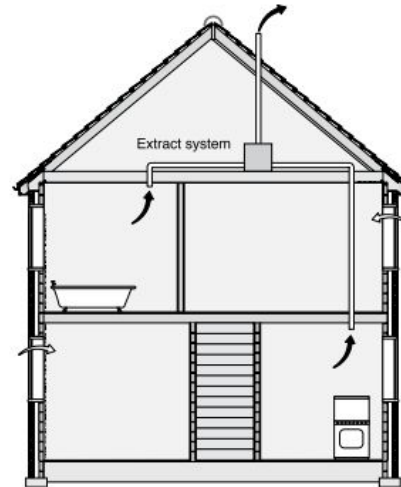
Background ventilators  
and intermittent extract fans



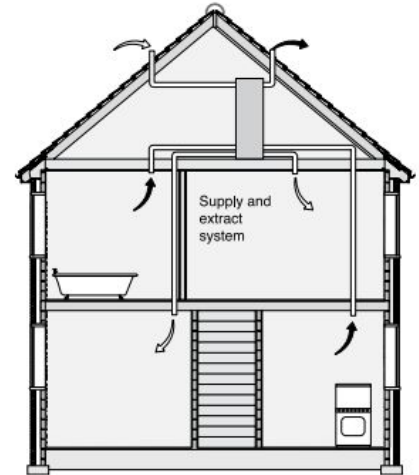
Passive stack ventilation



Continuous mechanical extract



Continuous mechanical supply and  
extract with heat recovery



# What is natural ventilation

## Wind driven / Cross ventilation

- Double aspect buildings
  - 5x floor to ceiling height
  - Approx 12 - 15m
- Single aspect building
  - 2.5 x floor to ceiling height
  - Approx 6m room
- Local weather / wind.

## Buoyancy driven / Stack ventilation

- Area of stack opening
- Height of stack
- Temperature difference

Can become very complex - may alter building design

# Ventilation wish list

	Natural	MVHR
Maintain a good IAQ	✓	✓
Minimising heat loss from ventilation	✗	✓
Recovering exhaust heat	✗	✓
Allows passive (night) cooling	✓	✗
Does not constrain design	?	?
Simple installation	✓	✗
Low cost	✓	✗
Low noise	✓	✗
No maintenance	✓	✗

# Adding Control

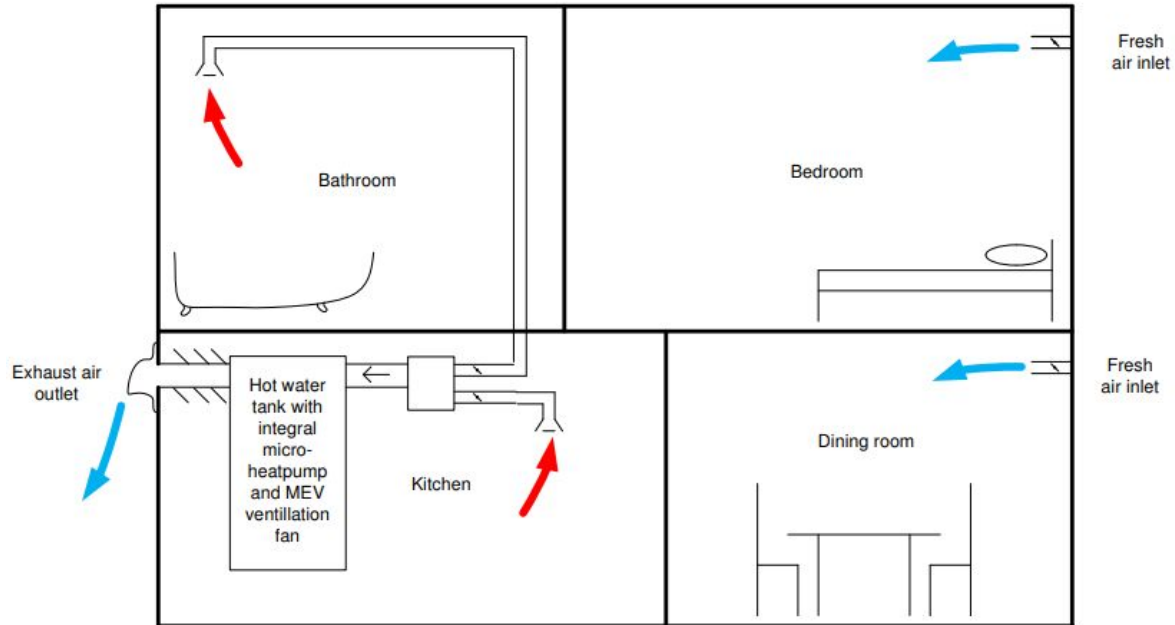
Atamate Control can minimise ventilation heat loss:

- Occupancy
- Air quality
  - CO2
  - Humidity





# Demand Control Ventilation



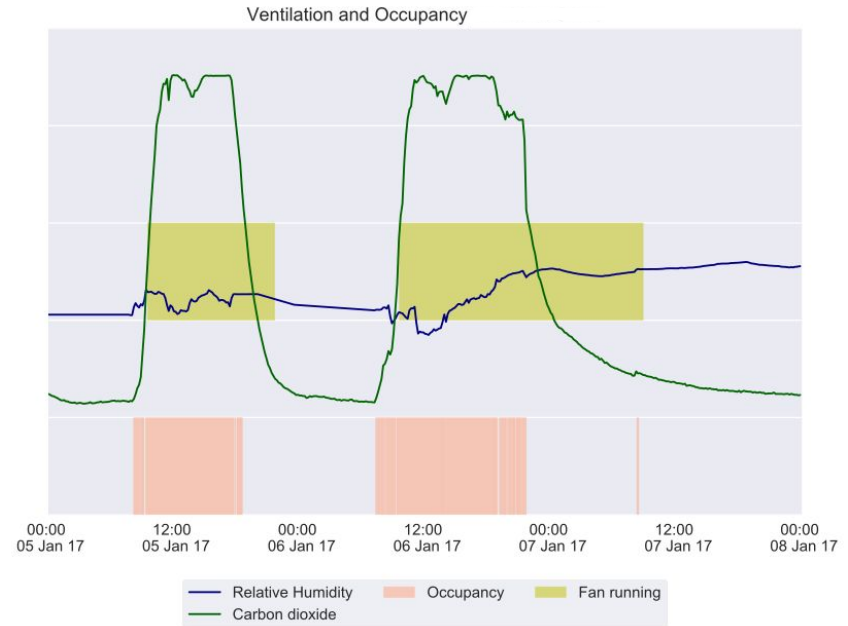
# 1 year study post occupancy study

2 houses each split into 3 flats

- Build to SAP2012
- Atamate controls
- Electrical heating

1st house with trickle vents

2nd house with DCV

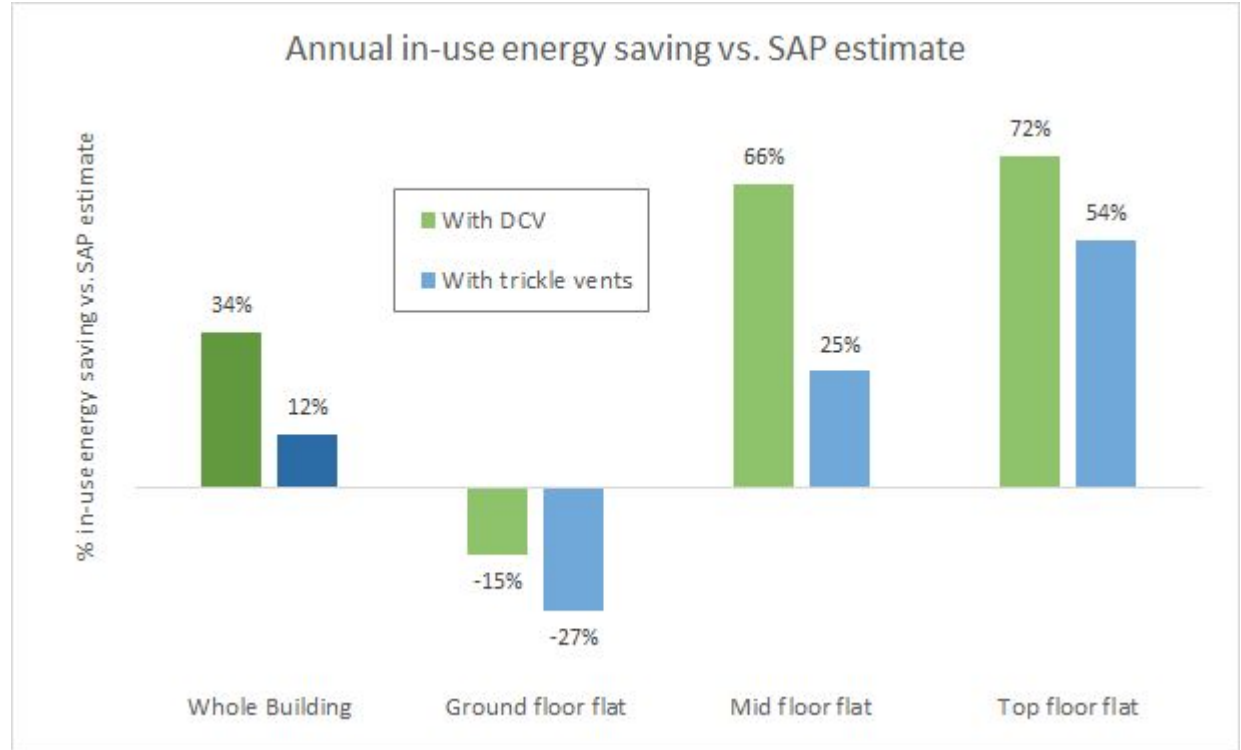


# What is impact of DCV

Modelling shows DCV has similar energy efficiency to MVHR

Heating was direct electrical

Electrical water heating with a COP 3.5+



# Results overall

30% capital saving on building services

Low utility bills

Lower maintenance

Popular with tenants as 'bills inclusive'

<b>Flat</b>	<b>Flat Size (m<sup>2</sup>)</b>	<b>Actual Heat Requirement (kWh/m<sup>2</sup>/yr)</b>
14A	67	20.32
14B	58	5.26
14C	34	6.11
16A	67	21.6
16B	58	11.6
16C	34	10.0

PassivHaus heat threshold set at 15 kWh/m/y

# Ventilation wish list

	Natural	MVHR	DCV
Maintain a good IAQ	✓	✓	✓
Minimising heat loss from ventilation	✗	✓	✓
Recovering exhaust heat	✗	✓	✓
Allows passive (night) cooling	✓	✗	✓
Does not constrain design	?	?	✓
Simple installation	✓	✗	✓
Low cost	✓	✗	✓
Low noise	✓	✗	✓
No maintenance	✓	✗	✓