Example Ventilative Cooling
University Seminar Room in the UK

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Location and building description

Property	Unit	Value
Occupant density	m²/p	4
Hours of occupancy	h/week	60
Sensible Internal Load	(W/m²)	54
Window U-value	W/m²K	1.82
Window g-value	(-)	0.43
Wall U-value	W/m²K	0.56
Roof U-value	W/m²K	NA
Floor U-value	W/m²K	2.11
Q-value (from Japan)	(W/ m²)/K	
Thermal Mass (ISO 13790)	-	Medium
Window to Wall Ratio	%	50
Air-tightness (@50 Pa)	1/h	<10 m³/hm²
Shape Coefficient (1/m)	%	50%

Climate and ventilative cooling
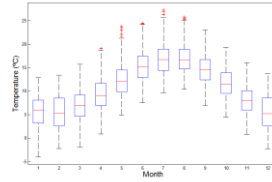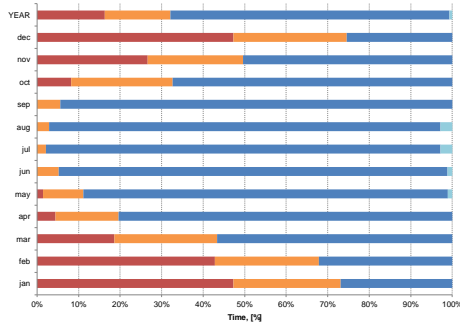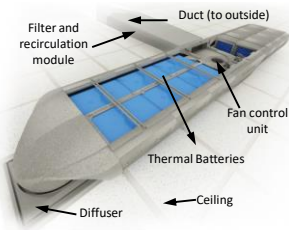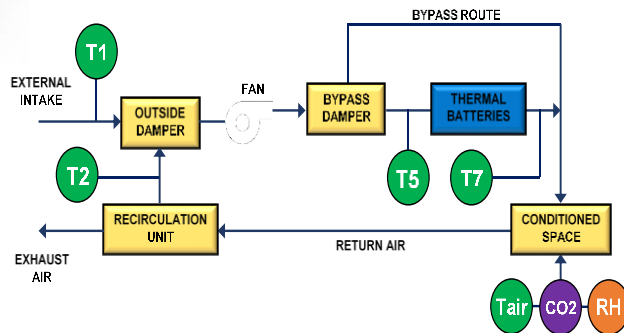
- VC mode [0]: ventilative cooling not required
- VC mode [1]: potential comfort hrs by direct ventilative cooling with minimum airflow rates
- VC mode [2]: potential comfort hrs by direct ventilative cooling with increased airflow rates
- VC mode [3]: potential comfort hrs with evaporative cooling
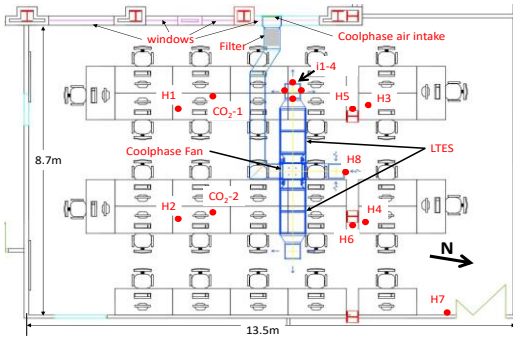- VC mode [4]: residual discomfort hrs
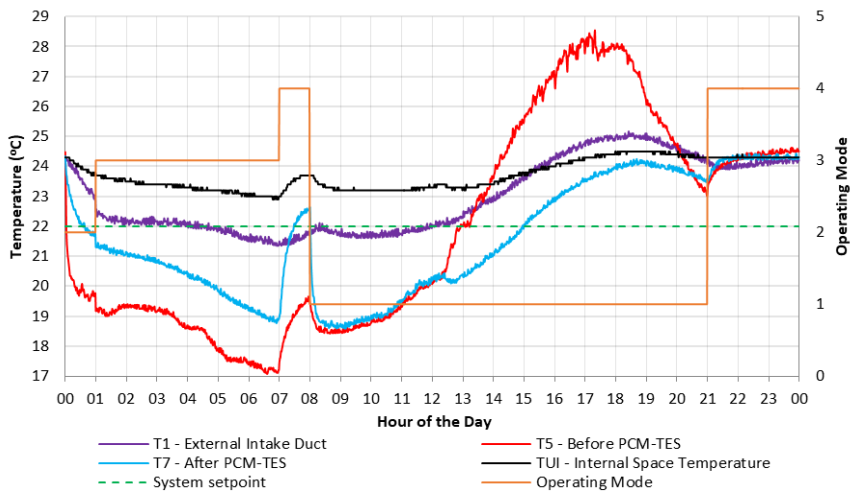
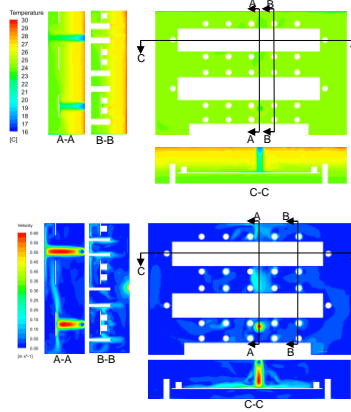# The system

Cool-Phase® by
Monodraught Ltd

Seminar room

Operation

Thermal Comfort analysis

IAQ
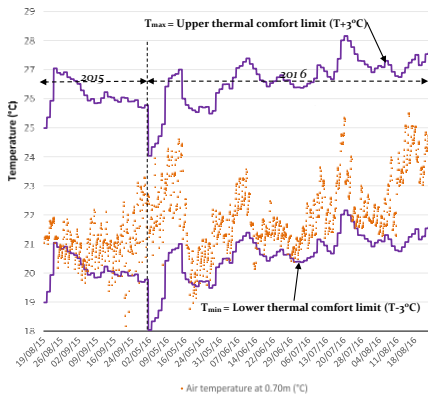
CO$_2$ concentration in the seminar room from 8:00 to 21:00.		
	2014	**2015**	**> 1500 ppm for more than 20 min**
Month	Avg. CO$_2$	Avg. CO$_2$	
Jan	601	563	0
Feb	719	671	1
Mar	695	645	0
Apr	559	549	0
May	469	443	0
Jun	412	420	0
Jul	409	420	0
Aug	423	418	0
Sep	493	541	0
Oct	599	689	0
Nov	701	752	0
Dec	551	586	0
Avg.	553	558	-

Summary of the talk

- This case-study presented a Ventilative cooling system that can be suitable for newly built and retrofit applications.

- It uses a mechanical ventilation system with PCM thermal storage that utilises night cool air for solidifying the PCM.

- The system's capacity and controls were able to provide indoor air quality and thermal comfort in the space under the external weather condition of West England.

- Detailed monitoring of the space and CFD analysis indicates that the system can provide acceptable thermal comfort throughout at occupant level.

Thank you