

MONASH INDUSTRY TEAM INITIATIVE (MITI)

Honeywell - Cognitive Office Buildings

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BRIEF

Monash University is targeting net zero emissions by the year 2030. The partnership between Monash University and Honeywell focuses on the large data pool acquired through IoT devices in smart buildings to drive energy efficiency. This will lead to the collaborative development of a *Cognitive Building*; one that has the ability to learn and self optimize using data sets.

OBJECTIVE

To reduce building energy consumption by optimizing HVAC systems without compromising occupant comfort.

FINDINGS

Our experiment showed that HVAC energy was reduced by up to 27% through set point management, relative circulation of outside air and variable fan speed control. The combination of preconditioning and real time occupant feedback can validate the performance of this strategy.

PROCESS

1. Understanding of stakeholder needs at Monash University and Honeywell
2. Occupancy based HVAC optimisation validated through thermal modelling and an on-campus test
3. Establish occupant comfort profiles using surveys to establish a baseline comfort profile (Building 56)
4. Prototype visualisations for HVAC optimisation and occupant comfort taking inspiration from Honeywell's suite of building management products

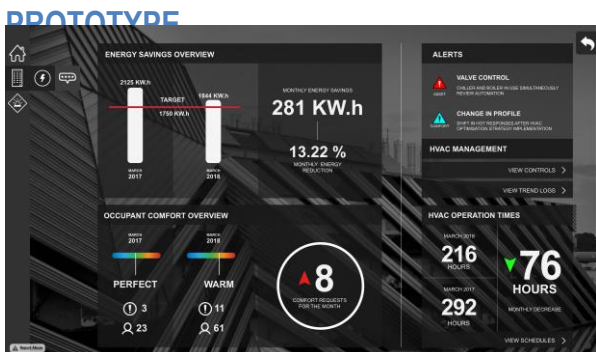


Figure 1: Prototype prototypfinal.businesscatalyst.com

HVAC SIMULATION

| HVAC Strategy | Relative Energy Reduction | Conditioning Time | Relative Peak Load |
|-----------------|---------------------------|-------------------|--------------------|
| Triggered | 18.3 % | 38 mins | 190% |
| Band adjustment | 8.5 % | 6 mins | 120% |
| Preconditioning | 5.6 % | 0 mins | 118 % |

Table 1: Overview of results from MATLAB SIMULINK model

HVAC EXPERIMENT: SOUTH ONE

| Experiment Date | Relative savings | Relative savings with VSD Fan |
|-----------------|------------------|-------------------------------|
| 6/03/2018 | 19% | 27% |
| 7/03/2018 | 13% | 19% |
| 8/03/2018 | 21% | 26% |
| 9/03/2018 | 20% | 25% |
| 13/03/2018 | 0% | 12% |
| Average | 15% | 22% |

Table 2: Relative hourly energy savings in Building 64

OCCUPANT COMFORT: BUILDING 56

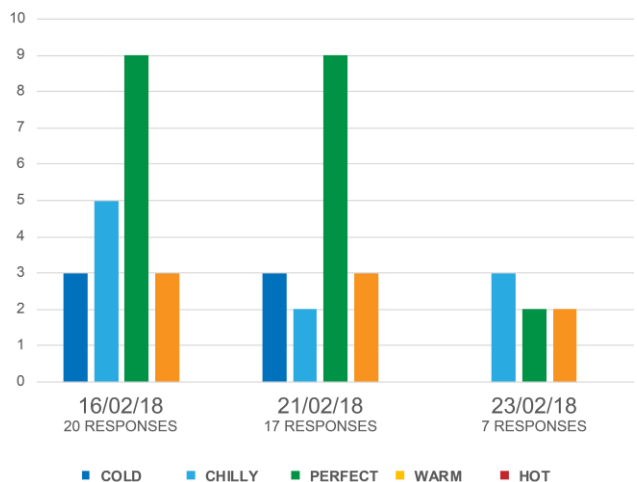


Figure 2: Occupant comfort profile of Building 56 (BPD)

