

Scientific Research Progress in Responsible Consumption & Production: Report 1



Six scientific peer assess papers have been written providing evidence of building occupants can be persuaded to save resources.

Summary

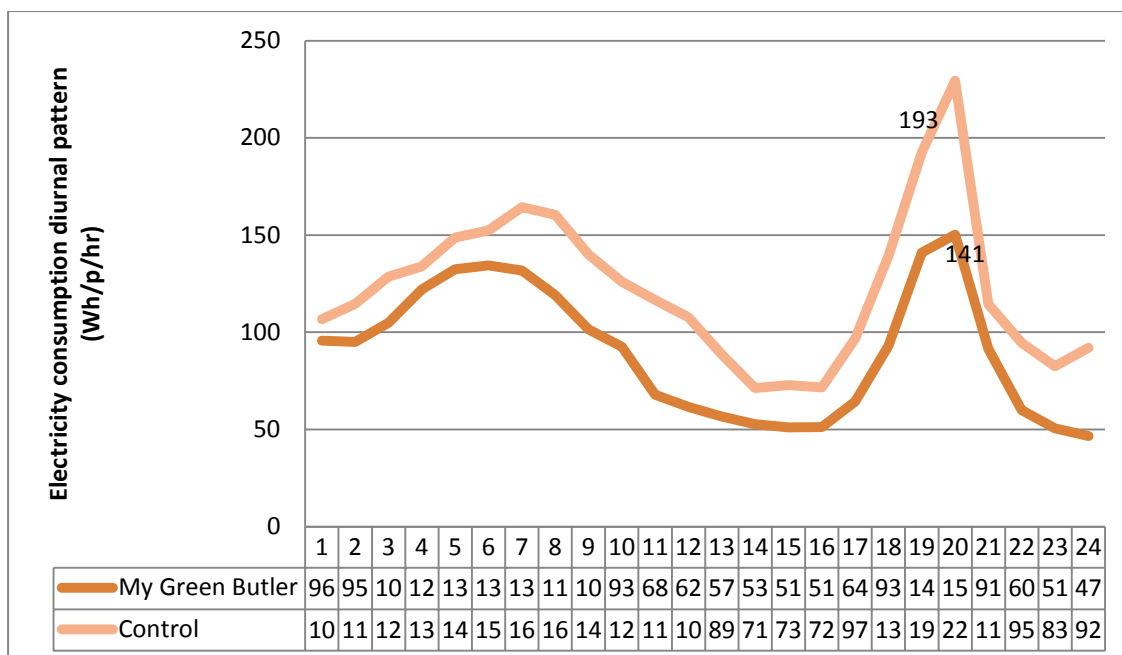
The design of our buildings and the occupant experience strongly influence amounts of resources used for thermal comfort and in conducting everyday routines (e.g. personal hygiene). Better understanding of how occupants use resources and the available pro-environmental amenities in tourist accommodation (one of the most energy intensive building types) could lead to more effective design of systems within buildings, so reducing carbon emissions. This is particularly the case for tourist accommodation where guests are strongly involved in the use of resources (energy/water), levels of food waste and use of laundry services. In hotels guests can account for directly using over half of the resources, and are responsible for a much larger proportion in self-contained places, making them a core component to responsible consumption and production. However, there is a significant research gap in behaviour science in offer hospitality in the built environment (1). We

therefore conducted high resolution monitoring of energy and water in four self-contained tourist accommodation sites, introduced a guest engagement intervention (My Green Butler) and carried out quantitative surveys and action research of a 16 month period. Data demonstrates significant opportunities for reducing building energy and water use through better user-design pro-environmental experiences.

This research is the first to provide detailed insights into resource use by guests staying in self-contained B&B style accommodation. Self-contained accommodation is a neglected yet important sub-industry in the hospitality sector, as it represents the largest and fastest growing share of accommodation providers in many regions. Our research provides valuable data from a smart metering system, collecting data every minute over four seasons and indicates sustainable consumption opportunities using renewable energy, guest behaviour change and eco-conservation. Findings have significant ramifications for building environments and how occupants can play a much large role in their greener operation.

Results

1. When comparing the intervention group with the control sample we recorded overall guest savings of 38% firewood ⁽²⁾, 33% electricity, 21% water and 20% gas ⁽³⁾. Notably these savings were achieved in a similar manner across four seasons indicating that when buildings incorporate cooling-warming user design experiences savings can be achieved across the year.
2. Guests were invited to use thermal comfort systems (for heating and cooling) as an alternative to relying on the 'ease of use' of switching on heating ventilating air conditioning (HVAC) mechanisms. The intervention group used twice as many pro-environmental methods (twelve) compared to the control group (six), with a consequential drop in electricity use. These alternative methods included wood fires, use of natural ventilation, and taking adaptive personal measures. Buildings which provide occupants with an array of pro-environmental amenities can therefore significantly reduce carbon emissions. This appears to be the case even when the amenities involve physical effort (opening windows and doors for natural ventilation), taking time to use (setting and lighting the wood fire), taking longer to generate the internal thermal comfort desired (putting on additional layers of clothing), or enjoying a lower performance (having a shorter shower), demonstrating that convenience is a relative factor in occupants' choice decisions ⁽²⁾.
3. Guests made savings across the day, consistently saving electricity - not solely in peak time.



(Warren, Becken, Nguyen & Stewart, 2018) Guests applied conserving behaviour across the day.

4. Guests who received the intervention were also were better able to acclimatise to outside temperatures enjoying warmer and cooler insider temperatures in winter and summer than the control group whilst also consuming less resources and maintaining similar levels of thermal comfort satisfaction to the Control sample.
5. The scientific peer assessed research has contributed to Responsible Consumption and Production research with five papers appearing in top academic journals and one scholarly conference paper ⁽⁴⁾ culminated in a 2018 doctoral thesis (Dr. Christopher Warren is now a Adjust Research Fellow at Griffith University). Further papers will be published soon.

Significance

Dr Christopher Warren’s doctoral thesis, is the first study to measure resource saving using smart meter technology and persuasive intervention to capture high resolution resource use and behavioural data at tourist accommodation. This contributes to a growing body of knowledge that provides scientific evidence that humans in the built environment can and will adapt their behaviours to directly assist in reducing carbon emissions. We now urgently need to apply this scientific knowledge to cut carbon emissions in the built environment through comprehensive persuasive communication experiences which give great control to occupants and motivate them to reduce consumption. Research now shows this can be a very effective way forward to help meet our globally agreed Climate Change goals ⁽⁵⁾.

Guests can be a core component to achieving responsible consumption and production provided they receive motivating and comprehensive persuasive communication, and the

building offers pro-environmental amenities so that we create a co-produced user experience. Human behaviour should also be a core component in green building design and construction. Ignoring the role humans can directly play limits our ability to achieve our globally agreed carbon reduction and sustainable development goals.

What you can do next

If you would like further details of our scientific studies into buildings, supply chain and behaviour or to discuss collaboration please contact Dr Christopher Warren, Director, International Centre for Responsible Tourism (Australia).

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References

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