

Wireless ALL|OFF

Energy Saving Study — Hub by Premier Inn, Berwick Street, Soho

Introduction

Wireless ALL|OFF is an energy saving occupancy sensor for hotel guest rooms that replaces conventional key-card switches. According to the Architectural Association of America, traditional key-card switches are overridden by guests — usually with a business card or spare key — up to 65% of the time. Wireless ALL|OFF intelligently senses when a room is occupied and automatically switches the lighting and HVAC off when it is empty. As it cannot be overridden by the guest, the energy savings are assured.

The system uses a combination of wireless door and occupancy (motion) sensors to determine when all guests have left the room — typically two PIR motion sensors, one covering the main bedroom area and one covering the bathroom. The door sensor adds reliability and creates a welcome effect by triggering the lighting and HVAC when the guest enters.

How ALL|OFF Works

Using PIR motion sensors alone is not a guest-friendly way to detect occupancy, since regular movement would be required to keep the lights on. ALL|OFF solves this with the addition of a door sensor: when the door opens, the sensor immediately switches on the lights, creating a pleasing welcome effect. If motion is detected after the door closes, the room is 'latched on' with a status of 'occupied', so further motion triggers are not required to keep the lights on.

When a guest leaves and the door closes, a timer starts — typically running for 5-10 minutes. If no further motion is detected within that period, the room's lights and HVAC are switched off and its status is set to 'un-occupied'.

Whitbread Hub by Premier Inn Case Study



Whitbread install occupancy sensing as standard across all their Hub-branded hotels, and allowed the newly-opened 108-room hotel in Soho to be used to monitor guest behaviour and energy usage over a three-month period.

The occupancy sensing system in every room was connected to a central monitoring server, capturing every guest action and logging HVAC and lighting power consumption on a minute-by-minute basis, alongside which lights were switched on, off or dimmed, and when the AC/heating was in use and at what temperature.

Data was captured from 4th April to 30th June 2021. To create a comparison, occupancy sensing was disabled in 10% of rooms, so lights and HVAC were not automatically switched off when the guest left — this allowed a direct comparison of power usage between controlled and uncontrolled rooms.

In total, data from over 1,500 guest-nights was collected across 108 rooms, enough to establish a reliable pattern of guest behaviour and energy consumption. Data was analysed in 24-hour periods, from 1pm to 1pm each day, capturing guest behaviour from check-in to check-out and everything in-between.

Energy Savings vs. Guest Behaviour

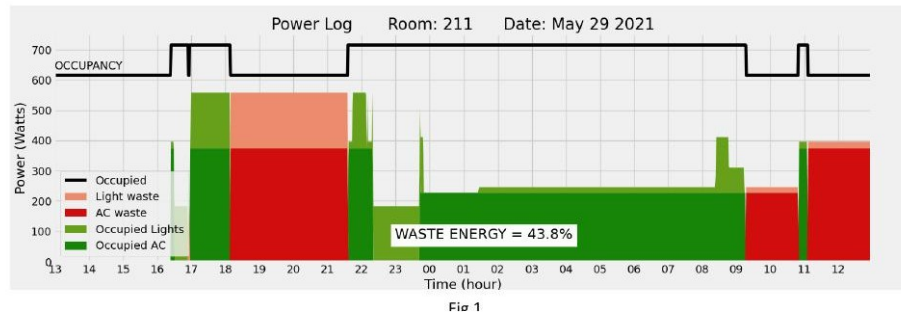


Fig 1 — Room 211, 29 May 2021: 43.8% of total energy was used (wasted) while the room was empty.

The black plot shows the room's occupancy status; the red and green areas show actual power consumption in Watts, with darker colours representing the HVAC and lighter areas the lighting. Red regions show power consumption while the room is unoccupied (waste); green regions show the occupied period.

This hotel has efficient modern LED lighting installed, so the majority of power consumption is caused by the HVAC system — typically more than 70% on average. In the example above, the guest left their room at 6pm without switching anything off, creating a constant wasted power draw of circa 550W until returning around 9:30pm. This pattern of guest behaviour — leaving lights and heating running while out of the room — was very typical of the data collected.

As can be seen, guest behaviour plays an important role: if a guest diligently switches everything off each time they leave, no savings are possible. However, across hundreds of nights of data collected, this perfect behaviour was only observed three times.

Key Times Where Energy Is Wasted

The behaviour data showed most energy was wasted in two key time periods. Generally a guest would visit their room briefly after checking in, typically around 3pm-5pm, then leave the room unoccupied until anytime between 9pm and midnight — a wasted period of between two and nine hours.

The second significant period begins after check-out, typically around 8:30am, after which the room usually remains fully powered until the cleaner arrives between 10:30am and 1pm — a further two to four hours of waste. These events sometimes combine to produce waste figures over 90% in extreme cases, although 30-60% was much more typical.

Conclusion

Including extremes of guest behaviour, the aggregated results revealed 40-45% energy waste was typical overall. A small margin of ambiguity (3-5%) exists due to uncertainty over whether some short room visits were guests or housekeeping staff, but the results were nevertheless conclusive and compelling: on average, 40% to 45% of energy is reliably saved by the ALL|OFF occupancy sensing system.

Case Study Data

Client	Whitbread PLC
Site	Hub by Premier Inn Hotel, Berwick Street, Soho, London
Study Period	4th April – 30th June 2021
Rooms	108 (all logged)
Modified Rooms	Automatic occupancy energy saving disabled in 10 rooms (10%) for the purpose of the study
Data Resolution	1-minute, extrapolated from timestamped recorded events
Interval Period	24hrs, 13:00 – 12:59
Data Captured	Total Lighting Power, Total HVAC Power, Occupancy Status, Lighting mode, AC mode
Result	Average Saving 40% – 45%

Appendix – Random Data Sample of 20 Rooms

AVERAGE SAVING: 41.8%

