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Reducing Radiology Reporting Workstation Energy Consumption

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Introduction & Aims

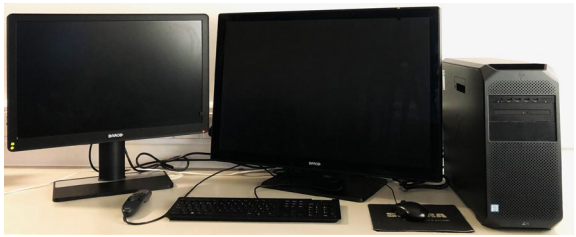
- Radiology departments are intense consumers of energy with high carbon footprints due to constant use of:
  - Interventional suites, CT & MR scanners
  - PACS reporting workstations

- Anecdotally, numerous reporting workstations are active 24 hrs/day at the Royal London (RLH) and St Bartholomew's (SBH) hospitals, even when not in use

- We aim to accurately estimate the annual energy consumption of these workstations and to identify an energy saving strategy

Methods

- January – March 2023
- Workstation energy states were categorised as:
  - **IN-USE**
  - **ACTIVE, not in use** (CPU and monitors switched ON but not in use)
  - **IDLE** (CPU switched ON, but monitors OFF)
  - **SLEEP**
  - **OFF**
- Energy consumption (kWh) for each workstation energy state was digitally calculated using CE-certified electricity consumption metered-plugs



Methods

- Energy states of all departmental workstations (n=41) were manually assessed at the end of a working week to estimate workstation energy states during a night shift

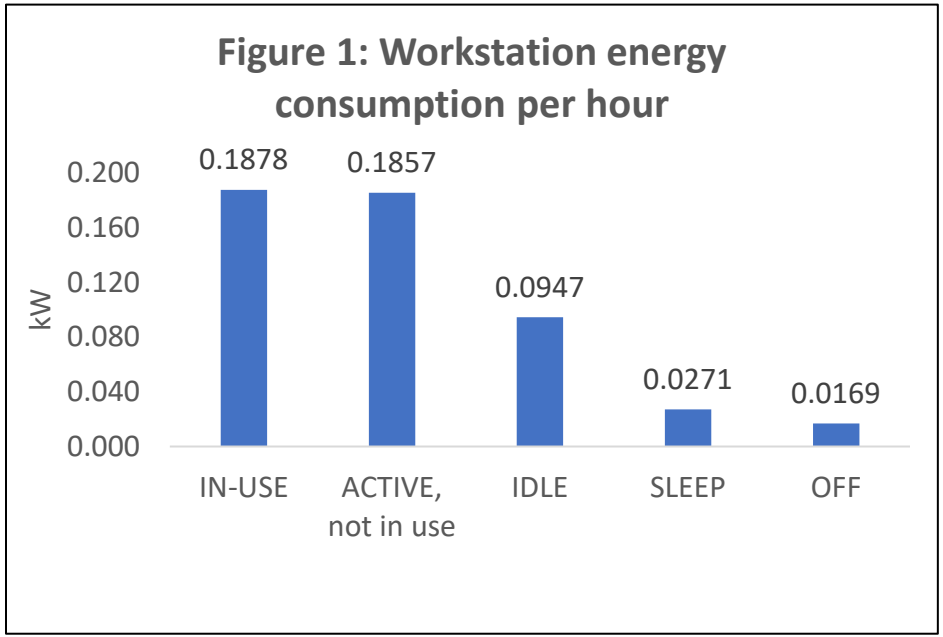
- Workstation energy states for evening/weekend and daytime hours were estimated using night-shift workstation energy states and the maximum rostered radiologists on duty during an evening/weekend or daytime shift

- Annual workstation energy consumption and running costs could then be estimated, and compared with scenarios in which all workstations not **IN USE** were programmed to **SLEEP** or **OFF**

Results

Compared to workstations **IN USE** or **ACTIVE, not in use**, workstation energy consumption falls by:

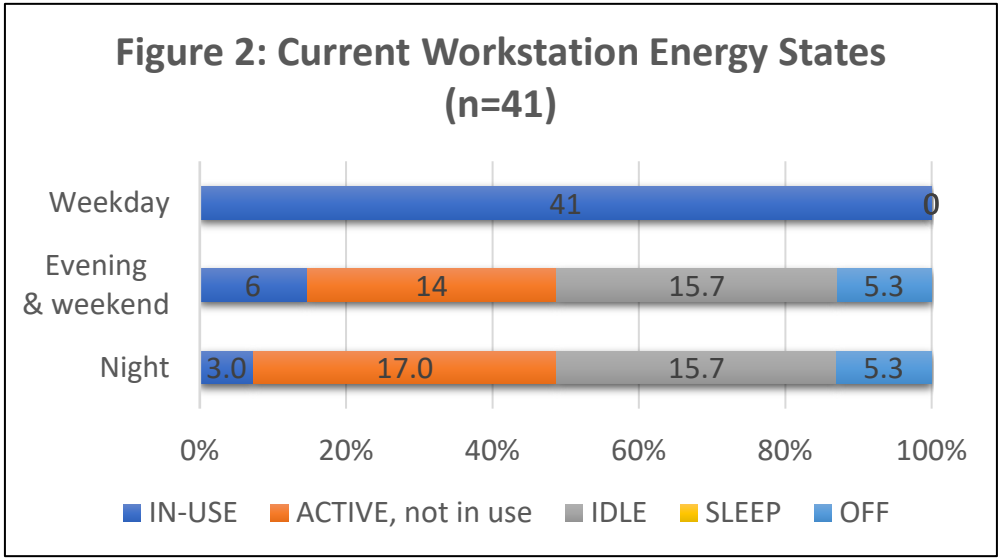
- Approximately a factor of two when workstations are **IDLE**
- Approximately a factor of seven when workstations are in **SLEEP** mode
- Approximately a factor of eleven when workstations are **OFF**



Results

Average workstation energy states are displayed for:

- Weekday shifts (40hr/week)
- Evening & weekend shifts (44 hr/week)
- Night shifts (84 hr/week)



Results

Estimated annual workstation energy consumption is:

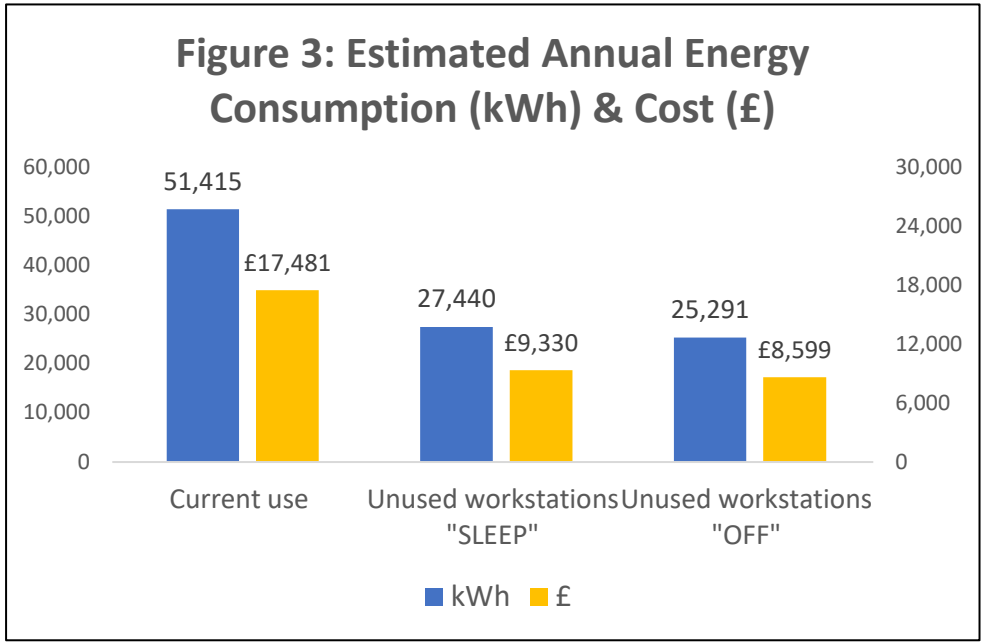
- **51,414.6 kWh/y (£17,481)**
- Current energy cost: £0.34/kWh

Estimated energy savings if workstations **SLEEP** when not **IN USE**:

- **23,974 kWh/y (£8,151)**

Estimated energy savings if workstations are **OFF** when not **IN USE**:

- **26,123 kWh/y (£8,882)**



Discussion & Intervention

- Workstations cannot be safely switched **OFF** every night, as essential cybersecurity and software updates cannot be missed

- Workstations can be safely updated when programmed to **SLEEP** however

Discussion & Intervention

- Long periods of workstations remaining **IDLE** or **ACTIVE, not in use** significantly contribute to high energy consumption in the Royal London & St Bartholomew's hospitals radiology departments

- Implemented intervention:
  - Workstations programmed to **SLEEP** when not **IN USE**
  - Predicted to reduce departmental energy consumption by an estimated 23,974 kWh/y, also saving the hospitals £8151 per year

References

- Büttner et al. Switching off for future—Cost estimate and a simple approach to improving the ecological footprint of radiological departments. Eur J Radiol Open. 2021; 8:100320.
- Hainc et al. “Green Fingerprint” project: Evaluation of the Power Consumption of Reporting Stations in a Radiology Department. Academic Radiology. 2020; 27:11.
- Prasanth et al. Greening Radiology. JACR. 2011; 8:11.
- Woolen et al. Radiology Environmental Impact: What Is Known and How Can We Improve? Acad Radiol. 2023; 30:625–630.

Conflicts of interest: None declared