NHS Foundation Trust
Case Study

Retrofit increases energy performance and savings, and unlocks IoT benefits.

Wrightington, Wigan and Leigh NHS Foundation Trust (WWL) currently employs about 5,000 staff, with 750 inpatient beds and approximately 300,000 outpatients a year. Across its five sites, WWL is a major consumer of energy and has made it a priority to increase energy efficiency through a Carbon Management Implementation Plan (CMIP).

As part of this plan, Mark Hogan, Energy and Environmental Manager, initiated an energy saving lighting retrofit project for WWL after he and Chris Murphy, Estates & Facilities/Project & Business Development Manager, evaluated the existing lighting system in the Thomas Linacre Centre (TLC) and determined that there was a significant opportunity to contribute to the CMIP.

TLC is a dedicated outpatient centre in Wigan Town Centre, which previously had 904 fluorescent fixtures throughout the space, many of which were high-output T8s consuming a significant portion of energy. The lighting system at TLC was first upgraded in 2007, but realising that the technology has progressed at pace since then, the Trust decided to look again at the technology available from Enlighted, a Siemens company.

The Enlighted proposal involved replacing the existing lights with new LED luminaires that are additionally fitted with smart sensors, incorporating Bluetooth beacons that transmit and receive data, and establishing an Internet of Things (IoT) infrastructure across the site.

Installation objectives

For the retrofit, Hogan and Murphy outlined the following objectives:

- Achieve significant energy savings (approximately 80 per cent of prior lighting energy spend) with a less than five-year ROI by automating lighting control
- Gain increased lighting control across the building with task tuning, and occupancy and daylight harvesting capabilities
- Realise improved lighting quality and ambience in the building environment
- Unlock Internet of Things (IoT) benefits, including detailed occupancy views, utilisation reports and Real Time Location Services (RTLS) solutions that provide accurate indoor location and mapping for asset tracking

From pilot to campus-wide installation

Phase 1: Pilot Program

Prior to the TLC installation, Hogan and Murphy worked to replace 75 fluorescent fixtures and ballasts with 48 integrated LED fixtures and sensors as a pilot in their own office, WWL's Estates and Facilities Headquarters in Buckingham Row. They engaged with Enlighted to provide LEDs through its partner NoviLED, installation services through the Trust's, and Enlighted's joint partner Corlett Electrical and Enlighted's award-winning IoT sensory platform for advanced lighting control, space utilisation, and asset tracking.

Enlighted's energy consumption chart (Figure 1) analyses energy savings collected by the Enlighted Smart Sensor network, translating its data into detailed energy and occupancy insights around the clock. By deploying various control strategies at the individual fixture level, direct power metering provides data for comprehensive savings analysis at every individual fixture. The area was sub-metered before and after the installation, with the results showing a significant energy reduction of 91 per cent after installing the Enlighted system. This energy performance data supported WWL's case to expand the pilot to the project site at TLC.

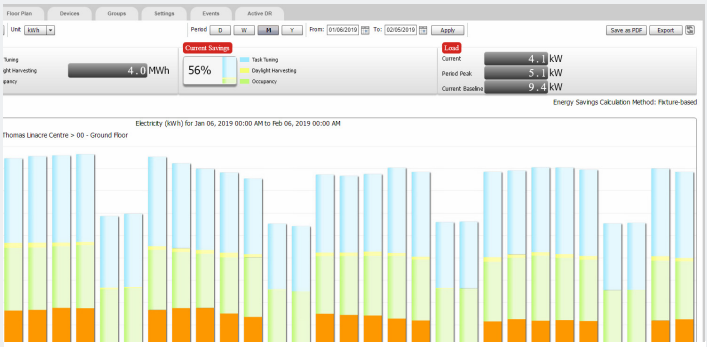


Figure 1. Energy consumption chart ground floor

This product can adjust the light level based on the task. Before, if anyone wanted less light in their environment, they took the bulbs out of their fixtures or for more light used desk lamps.

MARK HOGAN
Energy & Environmental Manager

Enlighted is a no-compromise solution. We dramatically reduced our energy spend, while increasing the comfort of building users. Instead of taking out bulbs or adding extra lights and getting an uneven light, we can tune it up or down.

CHRIS MURPHY
Estates & Facilities, Project & Business Development Manager

Phase 2: TLC installation and energy benefits

Enlighted sensors were pre-installed offsite into the LEDs, arriving as plug and play replacements for the fixtures already in place to minimise disruption and time onsite. Installation of 612 lights and sensors (replacing 904 fixtures) began in October 2018 and the project was completed by early January 2019. The installation was a staggered approach as the team could not interfere with the day-to-day running of the centre, which averages 96 consultant-led clinics per week and over 100,000 patients per year.

The project team faced three challenges:

1. In specialist examination rooms, consultants needed to be able to measure test results at a very low residual light level.
2. Staff acceptance was paramount, along with the working conditions for the team at TLC.
3. The building was previously a Grade II grammar school and featured thick walls that needed to be worked around for sensor coverage.

Due to the flexibility and adaptability of the Enlighted system, the team was able to address all three challenges.

Low output downlights were installed with a switch that has a specific scene setup for this exact use case, and Enlighted was able to offer high levels of customisation to ensure every individual employee at TLC was happy with his or her surroundings. And, with its one-for-one (one sensor per fixture) installation, the challenges with coverage were addressed.

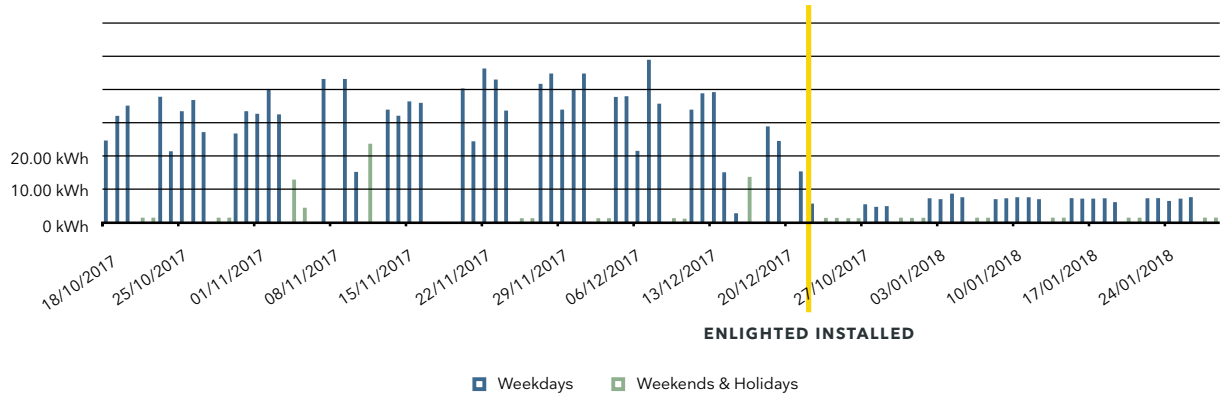
Phase 3: IoT applications

Since the lighting control and energy part of the program have been delivered successfully, the project moved into the next phase: installing Enlighted IoT applications.

The first application, Space, is enabled, allowing WWL to visualise and produce reports on the utilisation of the buildings. There are several visualisations providing: heat mapping, motion trails, motion animation, time series and more. In addition, reports are generated on different sections of the centre to measure utilisation, occupancy and vacancy. The Trust expects this greater awareness of space usage will be crucial when planning for future developments. WWL is currently taking on the management of community services and the data provided by Enlighted will be utilised to more effectively manage its existing building stock for the benefit of all patients.

As part of Phase 3, the Trust implemented Enlighted

Power Consumption (energy graph) – Phase 1



The above graph outlines energy usage before and after the Enlighted system installation, showing a dramatic decrease.

Power Consumption (Energy Graph) – Phase 1

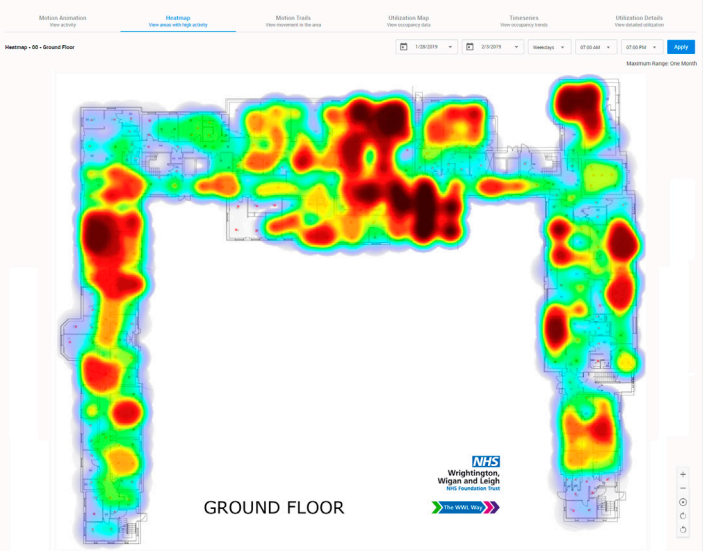
Location Services, Enlighted's asset tracking capability. As the Bluetooth is constantly monitoring and transmitting data, it can be used to tag and track medical equipment and assets much more effectively, and for real-time space modelling.

Predicted financial savings to CMIP from energy alone, before adding additional benefits of IoT, is £38,000 per year, which will result in a payback of four years. Even greater savings will be achieved once the benefits of the IoT applications have been realised.

With TLC complete, the team is looking at moving forward with the next site at Wigan and hopes to roll out this technology across the entire Trust.

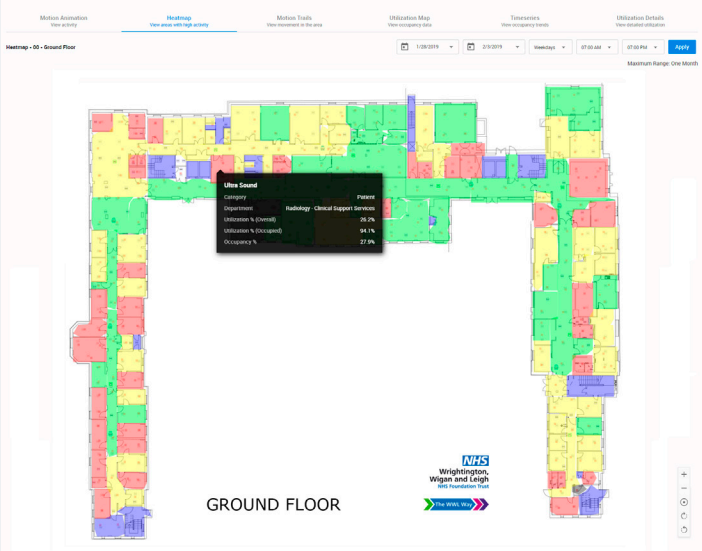
IoT space visualisation data: Thomas Linacre Centre

Ground floor heatmap



The occupancy heatmap is a visualisation of occupancy averaged over the selected time period. The darker the colour, the more occupancy has been seen, in this case between 7 a.m. and 7 p.m. Monday through to Friday indicate high activity.

First floor utilisation map



The utilisation map gives some actual percentage metrics to the occupancy and utilisation of the spaces defined within the app, which can then be filtered by space type and department. The data is visualised on various dashboards to provide useful insight into usage trends.

Data captured over 19 days in January 2019