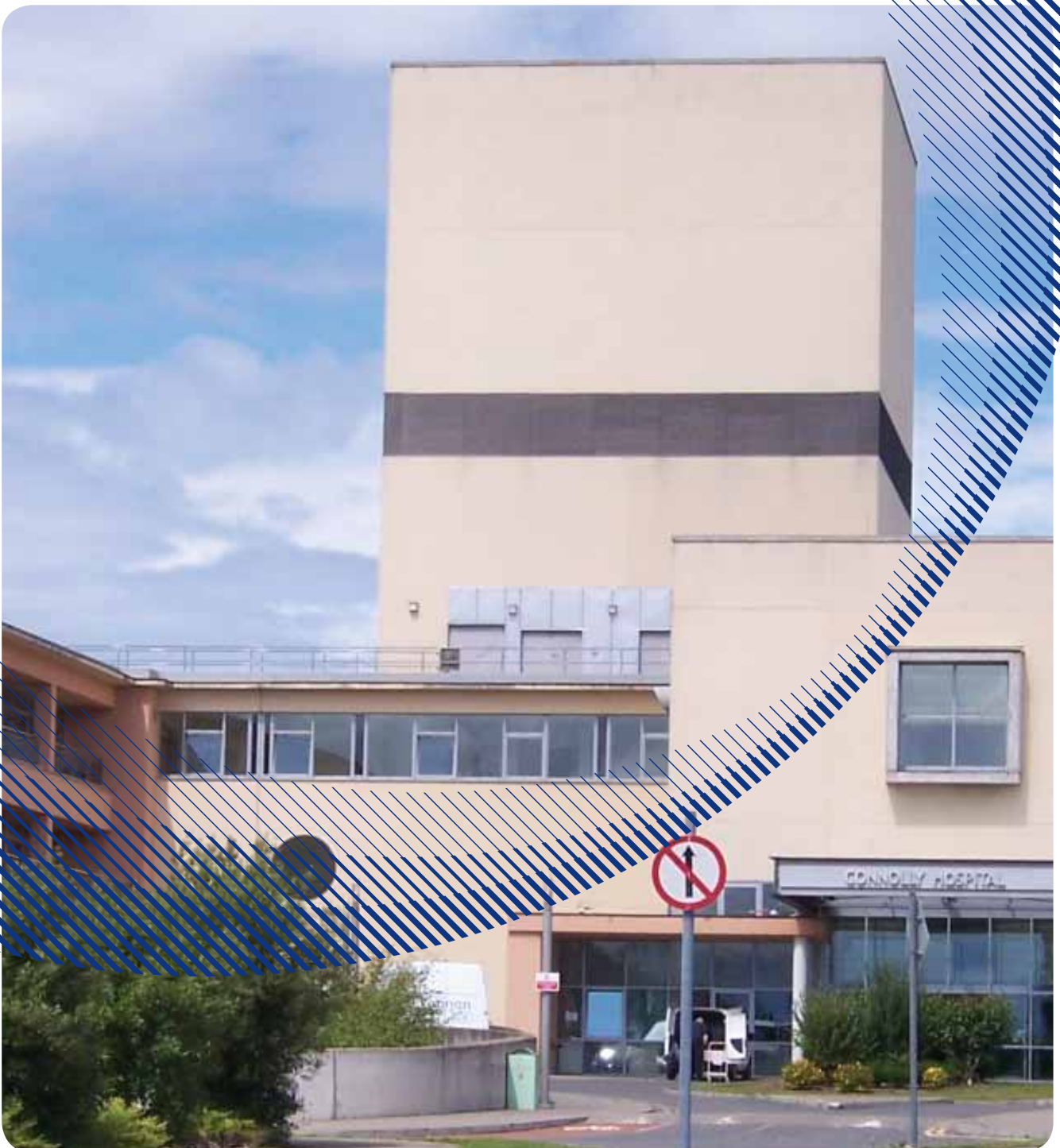


Connolly Hospital Blanchardstown makes rapid recovery on energy technology investment



Connolly Hospital, Blanchardstown (CHB) is a major teaching hospital and provides medical, surgical and support services to a population of 290,000. This Supports for Exemplar Energy Efficiency Projects (SEEEP) project focused on implementing the lighting and heating system recommendations made by energy advisors in a review of energy efficiency opportunities carried out as part of SEAI's business support services. The changes at the hospital will annually save almost 2 million kWh of energy, valued at over €180, 000 and recovering the investment within 20 months.



Introduction

The Estates Department responsible for Connolly Hospital, Blanchardstown was keen to reduce unnecessary energy waste at the hospital through better management practices and investment in improved technologies that would give a rapid payback. The hospital had not previously had an energy efficiency programme, so there were substantial opportunities for savings.

The main areas of opportunity were identified as lighting, heating services, and cooling services. A vital consideration in the upgrading of building services at the hospital was that there would be no adverse effect on the comfort of patients and staff.


Project Overview

The project involved implementing the following:

- Installing presence/lux level detection in all hospital circulation areas and corridors to switch lighting in response to occupancy and natural light levels.
- Fitting presence detectors to rooms that are often unoccupied such as stores, toilets and photocopy areas.
- Replacing all incandescent lamps and luminaires with more efficient CFL and LED luminaires offering an 80% reduction in power consumed for the same light output.
- Converting T8 tubular fluorescent fittings to operate with low energy high frequency T5 lamps with a 30% reduction in energy use for the same light output.
- Interlocking of room heating and cooling systems, thus ensuring air-conditioning and radiators are not switched on together or when windows are open.
- Fitting a motorised valve to each gas fired boiler to reduce standing losses, avoiding hot water being circulated through boilers that are not required to meet the live heating load.
- Installation of thermostatic radiator valves to provide local control of radiators and prevent over-heating in specific areas.
- Flushing out of heating systems so that controls can work better.

Energy Technology Initiatives

Four groups of energy efficiency initiatives were carried out at the hospital:

- Lighting improvements
 - Upgrades to air-conditioning controls
 - Upgrades to boiler and radiator controls
 - Heating pipework flush-out.
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Lighting improvements

The lighting system initiative is a combination of more efficient lamps and automated control of the light switching circuits by using presence detection and daylight sensors.

All corridors and public areas are controlled using a KNX data communications protocol. This allows integration of sensing devices via a bus communication network and individual programming of system controls. The use of KNX devices within this project will also allow future re-programming of the system as the needs of the hospital change over the years.

Upgrades to air-conditioning controls

There are 68 split air-conditioning units in Connolly Hospital. Originally there was no control of the units other than a thermostat in the return air stream that senses air temperature and switches on the cooling to achieve the set-point temperature. As a result of this limited control system the air-conditioning units were often running in cooling mode while the heating radiators were also switched on. In addition windows were also left open in heated and cooled areas which wasted treated air. The units were operating unnecessarily 24/7, even over the winter months. The KNX controls now ensure that heating and cooling is not on simultaneously in the same area and that these services are shut down if windows are opened in the rooms.

Some local control was incorporated into the system design such as an off/auto button for lighting systems and limited temperature set point adjustment for air conditioning split units.

Upgrades to boiler and radiator controls

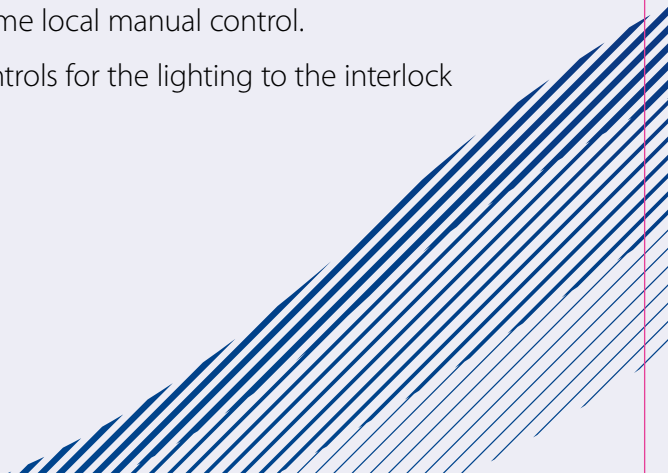
Connolly Hospital has 6 gas fired boilers, each rated at 600 kW. Under part load conditions the off-line boilers are now isolated using motorised valves. This reduces boiler standing losses and avoids unnecessary heat loss. Thermostatic radiator valves (TRVs) were fitted to ensure better local heating control for patients. In rooms with split air-conditioning units the TRVs are fitted with electrical on/off actuators to co-ordinate the heating and cooling.

Heating pipework flush-out

Some controls were not functioning properly due to dirt and slag accumulation within the pipework and this interfered with the operation of control devices. The distribution system was flushed out and all components cleaned.

The fact that the system is programmable helped to customise the system operations to individual user and location needs and meant that staff could retain some local manual control.

There was minimal additional cost in integrating the KNX controls for the lighting to the interlock controls for the heating and air-conditioning systems.



Benefits

The controls technology has given effective retrofit control of lighting, heating and cooling systems at a fraction of the cost of a Building Energy Management System and is a unique application of the technology in an Irish hospital. The application of the controllers to window locks, thermostatic valves and air conditioning units is a cost-effective, robust and creative application of the technology.


These improvements in automated control will ensure minimisation of energy waste while in no way compromising the need for comfortable and healthy internal environmental conditions.

The overall average payback period for these initiatives is 20 months, broken down as follows:

- air conditioning split units controls; 1 year
- thermostatic radiator valves; 1.2 years
- flushing of heating system; 2 years
- lighting; 2 years
- motorised valves to boilers; 2.75 years.

Even allowing for the additional demands on the heating and lighting systems of an increase of around 10% in occupied space at the hospital, early indications from energy records are that the project will achieve the target savings, projected as follows:

Projected annual savings directly attributable to the project			
Fuel Type	kWh	€ Savings (excl. VAT)	Tonnes CO ₂
Electricity	936,596	140,489	504
Thermal (gas)	1,014,396	42,827	199
Total	1,950,992	183,316	703



Project team

Connolly Hospital:

Estates Manager, Bill O'Reilly assisted by the Electrical Maintenance Officer and the Mechanical Maintenance Officer.

Electrical contractor:

O'Hara Engineering

Mechanical contractor:

McKenna Engineering Services

Controls system:

KNX



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