BUILDING GOOD PRACTICE
Energy Retrofit of Annabella Offices - Mallow, Co. Cork

Name of the public building renovation:		Energy Retrofit of Annabella Offices, Mallow, Co. Cork, Ireland
Index of Building Good Practice (kWh/m^2)		**Current Usage** 103kWh/m^2. **Good Practice:** 126 kWh/m^2 **Typical:** 224 kWh/m^2 ***REF: ECG087 – Energy Consumption Guide 87, Energy Use in Local Authorities, Carbon Trust, United Kingdom***
Sub-group		Offices
Description	Photo	
	Address	Annabella, Mallow, Co. Cork
	Public sector contractor	- McHugh Insulations - Joe McSweeney, Plumbing services - Thorn Lighting
	consultancy firms	- Casey Consulting - Systemlink Ltd
	Date of construction	1850
	Legal aspects (e.g.: protected property)	Protected Structure

	Date of renovation	2001 and 2009
	Nature of the work (short description)	The primary work undertaken in this buildings was a complete upgrade of the heating system and lighting and insulation top-up
	Budget and financing source	EU Funding, National Funding and Own Resources

AVAILABLE RESULTS	
What were the big problems (in terms of energy efficiency) to tackle?	The Annabella offices consist of a 3-storey building, which was built in 1850 as a hotel. Two extensions have been added to the building more recently. The building is occupied by approx. 70 people between the hours of 9am and 5pm, 5 days a week. The majority of the offices were heated with an old coal fired boiler which was converted to oil in the 1950's. The boiler was in very poor condition with little insulation. The heat is distributed throughout the building via a one-pipe system, which limited the options available when trying to improve the heating. Given the building is a protected structure no insulation works could be carried out to the external facade and the building was constructed of mass concrete and so the options for upgrading the insulation were limited.
Has this building been already analysed and certified?	Yes
What are the key innovative energy efficiency measures undertaken through the renovation?	**Heating System** - Replaced the existing oil boiler in the main boiler house with 2 modern, modular, highly efficient condensing gas boilers. - Incorporated zoning into the distribution system to permit zoning of the building. 18 zones were provided, enabling the building users to have local control over temperatures in their area of the building. - Installed a properly designed boiler house panel to facilitate manual and automatic control of the boilers including sequencing, load balancing and weather compensation facilities - Replaced existing standard radiator valves with thermo-electric valves on all radiators linked back to the boiler house A total of 51 thermoelectric valves were installed - Installed a pc monitoring system of local controllers. This system can set and monitor set points of the controllers, without loosing local setting ability.

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Lighting

- Primarily lighting fittings consisted of T12 twin 80w fluorescents which were in most cases replaced with T8 twin 36w high frequency fittings. This gave an improved light quality in all office areas as well as significantly reducing the energy use.
- Motion sensors were installed in relevant areas to control lighting levels.

Insulation

- 300mm of cellulose insulation was pumped into the attic space of the building

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<tr><td>What are the measurable improvements in terms of energy efficiency (kWh saved)?</td><td>

<table>
<tr><th colspan="3">Measured Improvements</th></tr>
<tr><th></th><th>kWh</th><th>€</th></tr>
<tr><td>Heating Upgrade</td><td>36,187</td><td>9,941</td></tr>
<tr><td>Insulation Upgrade</td><td>8,271</td><td>2,485</td></tr>
<tr><td>Lighting Upgrade</td><td>9,335</td><td>1,493</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>53,793</td><td>13,919</td></tr>
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<tr><td>What is the project Payback period (Years)</td><td>5 Years</td></tr>
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<table>
<tr><th colspan="2">ENERGY EFFICIENT MEASURES</th></tr>
<tr><td>Energy efficient measures of the building envelope</td><td>Given the complex nature of the building and the fact that the building is a protected structure no alterations were made to the building envelope. 300mm of cellulose insulation were pumped into the attic space to improve the thermal performance of the roof space.</td></tr>
<tr><td>Energy efficient measures of the heating system</td><td>

- Replaced the existing oil boiler in the main boiler house with 2 modern, modular, highly efficient condensing gas boilers.
- Incorporated zoning into the distribution system to permit zoning of the building. 18 zones were provided, enabling the building users to have local control over temperatures in their area of the building.
- Installed a properly designed boiler house panel to facilitate manual and automatic control of the boilers including sequencing, load balancing and weather compensation facilities
- Replaced existing standard radiator valves with thermo-electric valves on all radiators linked back to the boiler house A total of 51 thermoelectric valves were installed

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Energy efficient measures of monitoring energy including BMS	- Installed a pc monitoring system of local controllers. This system can set and monitor set points of the controllers, without loosing local setting ability.
Energy efficient measures regarding behaviour	In conjunction with the building upgrade consultation was entered into with the building users to ensure they were aware of the changes being made and the reason for the upgrades. A number of explanatory brochures were produced explaining the different aspects of the retrofit. Training on the use of the new system was organised for the relevant building users. As well as that training on basic energy efficiency in offices was also organised and delivered to all staff members. It is estimated that approximately 5-10% of the overall savings achieved in the building were as a result of behavioural change.

SUSTAINABILITY OF THE RENOVATION	
Design and choice of sustainable construction materials?	This was only relevant in relation to the insulation installed which was cellulose insulation manufactured from recycled newspaper.
Sustainable building site management? (sorting waste, water…)	N/A
Application of a valuation method (BREAM? HQE? Others?)	N/A

BUILDING MAINTENANCE: life of the building after the renovation	
Is the building object of an energy monitoring? Is there a responsible manager?	The building is constantly monitored via the control system which was installed as part of the retrofit. The building is also annually audited and certified using the national EPBD methodology. The building is maintained by a facilities manager and maintenance staff who also have responsibility for energy management.
Who is in charge of the maintenance of the heating system of the building?	The installers of the system have an annual maintenance contract.
Who is in charge of the day-to-day energy management?	This is mainly the responsibility of the building users

Are there some specific measures to raise energy awareness and to implicate users in energy efficiency?	Yes, as was previously stated a number of training events were organised and delivered by the energy section also information brochures were distributed.

FUNDING	
What financing plan?	The overall cost of the refurbishment was c. €70,000
Innovative or specific aspects in the method of financing (European funds or loan, energy performance contract,...)	The project was funded Via 3 sources - EU Commission ECOS Overture programme (45%) - National funding from Sustainable Energy Authority of Ireland (SEAI) (25%) Own Resources (30%)
What is the balanced budget for each stakeholder • **Energy costs for tenant/owner before /after** • **Increase in the rent**	
Is there any specific economical indicators (payback time on investment, global cost, ...)	The payback time for the overall project was 5 years

TRANSFERABILITY	
Transferable aspects according to the partner in charge of this example of good practice	The energy upgrade works would be directly transferable to a building of a similar construction type and age.
	The procurement process undertaken was in line with national procurement
	Rules and would be directly transferable.