URBAN RENAISSANCE

The urban renaissance of regions major cities has led to a boom in the development of high density development typified by a mix of residential, commercial and retail uses. This has largely been driven by changes in demographics and aspirations for young people in particular to live in the centre of cities such as Birmingham.

New-build opportunities will largely take the form of thermally efficient apartment blocks with minimal heat loss walls, forming part of mixed use developments in each city centre and as part of edge of centre masterplans such as Eastside in Birmingham.

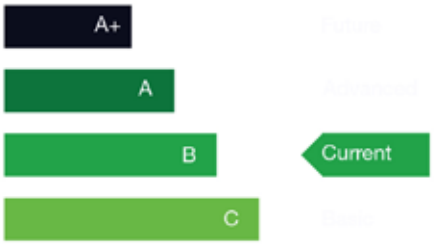
The existing stock consists largely of apartments constructed in the last 10 years the majority of which have electric space heating and domestic hot water systems with high associated CO_2 emissions, as well as local authority 1960-70's high rise blocks which may create significant opportunities for insulation overcladding and heating system improvements.

Refurbishment opportunities are likely to take the form of 19th Century industrial-era buildings - including mills, warehouses and works - and 20th Century office buildings.

New-build				
Scheme	Developer	Units	Completion	Description
Queens Gate, Croydon	Fairview	309	2007	Apartments for sale with integrated solar roofs. The renewable technologies have been prompted by Croydon's 10% renewables planning requirement.
Comet Square, Hatfield	Barratt Homes	270	2006	Apartments for sale, shared ownership and social renting built to 2001 Building Regulations, with heating supplied by an on-site Combined Heat and Power (CHP) system financed and operated by Utilicom.
Park View, Southampton	Barratt Homes	109	2000	Apartments for sale built to 2002 Building Regulations which are connected to the Southampton City district heating network which is supplied by gas-fired CHP.
Electric Wharf, Coventry	Complex Development Projects	18	Expected 2008	'Ecohouse' townhouses for sale developed as the final phase of an award winning development. The units are being built to a high standard of thermal efficiency and fit-out, and incorporating solar thermal collectors.
Refurbishment				
Titanic Mill, Huddersfield	Lowry Homes	150	2006	A luxury mill refurbishment, with comprehensive building fabric improvements to reduce space heating demand, together with a solar photovoltaic array and the proposed installation of a biomass CHP system.

URBAN RENAISSANCE
Queens Gate, Croydon (London)

Developer: Fairview Developments
Completion: 2007
Number of units: 309
Urban form: Apartment blocks and townhouses
Tenure: Private owner occupier
Building Regulations: Part L 2002



Background
Queens Gate is a private development of 309 homes for sale and rent in Croydon, South London. The development consists of 1 and 2 bed apartments and 3 and 4 bed townhouses.

Drivers for change
The developer has had to respond to the London Borough of Croydon's planning requirement to reduce the CO_2 emissions of new housing developments by 10%, over and above the Target Emissions Rate (TER) set out in the Building Regulations.

Energy strategy
In order to respond to Croydon's planning requirement the developer contracted specialist installer Solar Century to integrate solar technologies into the building designs. A new solar tile product developed by Solar Century for the UK market was selected. The tile product can be substituted for conventional clay or concrete interlocking roof tiles, and can either take the form of thermal collectors to supply hot water, or photovoltaic modules to generate electricity.

In addition to the solar technology, the development is notable in that the apartments each have gas boilers which, although not required under the current or 2002 Building Regulations, reduces the TER for the scheme because electric heating results in twice the CO_2 emissions of natural gas per unit of heating. The gas boilers are supplemented with solar heating via storage cylinders with twin coil heat exchangers.

Whole Life Costs
The solar photovoltaic tiles come with a manufacturer guarantee of 25 years. There is emerging evidence that both of these technologies have the potential to last longer than this, although some degradation in the performance of the specified form of solar photovoltaic cells can take place over long periods of time.

The electricity generated will meet the communal demand for lighting for the scheme, which will reduce service charges. The hot water supplied by the thermal collectors has been estimated to meet 60% of each units annual hot water demand.

The benefit of these accrue to the residents, who will have reduced gas bills, and so the upfront cost must be recouped through the cost of each apartment – which is only possible given the values that can be achieved for the scheme.

Market response
The development has proved to be very popular, with many units having been sold off plan before construction had commenced on-site. Fairview have been promoting the solar element in the belief that it could add value, with the offer of 'reduced electricity bills for life'.

Whilst the success of the scheme is undoubtedly due to high demand in the local housing market, and the overall quality of the scheme, the solar element has acted as a differentiator.

Key design features

- Gas boilers for apartments
- Solar thermal roof tiles
- High specification doors and glazing
- Solar photovoltaic (monocrystalline) roof tiles

Technical specifications

SAP 85-117 (SAP 2001)

DER 30-35 kg/m2

1,000 solar photovoltaics roof tiles (52Wp/tile giving total capacity 52kWp)

900 flat plate solar thermal roof tiles

Building fabric U-Values (W/m2K)

- External walls: 0.35
- Glazing: 2.0
- Roof: 0.16
- Floors: 0.25

Cost and value

Build cost: £1,000/m^2

Floor areas: 50 m^2 (2 bed) – 60 m^2 (2 bed ensuite)

Unit sales price: £227,000 - £237,000 (£3,950/m^2 - £4,540/m^2)

Elemental cost of design features:

Solar photovoltaic roof tiles: £240,000

Solar thermal roof tiles: £110,000

Additional cost: £1,133/unit or £21/m^2 (+2%)

Monitoring and performance

Performance data for the development is not currently available. The electricity generated by the photovoltaics will be monitored by the management company for the scheme.

Key learning points

- Roof integrated solar technologies can reduce installation and integration costs, but are more expensive than conventional modules of flat plates.
- Meeting the planning requirement for CO_2 reductions has added differentiation, but not necessarily value, to the house product in the market place.
- For flats communal electricity use can be a significant proportion of electricity consumption, requiring additional renewables capacity.

URBAN RENAISSANCE
Comet Square, Hatfield (Herfordshire)

Developer: Barratt Homes
ESCo partner: Utilicom
Completion: 2006
Number of units: 270
Urban form: Apartment blocks
Tenure: Private owner occupier, social rented and shared ownership
Building Regulations: Part L 2002

Background

Comet Square is a phase of the Equinox development in Hatfield, Hertfordshire, consisting of 270 one and two bed apartments and a 100 bed nursing home. 210 of the units are apartments for sale, and 60 provide units of affordable housing – 30 'homebuy' developed for Aldwyck Housing Group and 30 social rental for Paradigm Housing Association. The nursing home has been developed for Sanctuary Housing Association.

Drivers for change

Combined Heat and Power (CHP) formed part of the development brief for the Equinox site, which regenerates a former airfield. Barratt Homes also wanted to use the opportunity to demonstrate their commitment to innovation and sustainable development.

Energy strategy

The schemes heat and power is supplied by a gas-fired CHP system. The system is based around a gas-fired CHP engine which supplies over 65% of the developments space heating and hot water via a district heating network of pre-insulated pipes, and electricity over a private wire network.

The system replaces electric heating, which would have been the standard fit-out for the private units for sale. Each unit is fitted with a heat meter to ensure residents are billed for heat they use.

The CHP system is housed in an energy centre located on-site. The length of the heating network extending from the energy centre has been minimised because of the density of the development, although insulated risers are still required to distribute heat to each unit within each block.

Residential properties have pronounced morning and evening peak heating demands. This is no compatible with the efficient operation of CHP. Therefore the CHP engine runs throughout the day to maximise electricity generation, and the heat is buffered in a 40m3 thermal store for when it is needed.

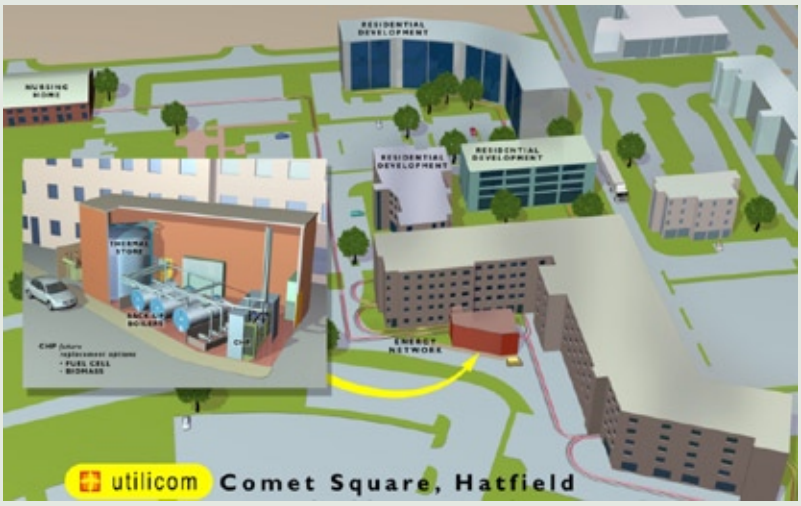
Whole Life Costs

In order to minimise the up-front capital costs Barratt Homes decided to partner with an Energy Service Company (ESCo) to finance and operate the energy centre. Utilicom were selected after a tender process, and are contracted under an Energy Supply Agreement to each development partner to provide heat and power services.

In addition for each element of the scheme to take heat from the CHP, electricity is also supplied over private wires, improving the financial viability of the CHP system but locking residents into one supplier for heat and power.

The avoidance of electric heating in the private apartments for sale allows for a reduction in the need for substation capacity, enabling a capital cost saving to be made.

The ESCo partner does not deal with individual residents because of the financial risk associated



Key design features

- 185 kWe gas-fired CHP engine to generate heat and power
- 2.1 MWth standby gas boilers and 40m3 thermal storage
- District heating network
- Private wire electricity network

with revenue recovery. Utilicom therefore supplies heat and power in bulk through an agreement with each managing agent – either the private agent appointed by Barratt Homes or the Housing Associations. Billing is then carried out on behalf of each agent by a specialist company.

The CHP unit, standby boilers and thermal storage are high quality products with a lifespan of at least 15 years. The CHP unit does, however, require more active maintenance than a conventional gas boiler, requiring down-time each year – hence the need for standby capacity to meet the peak load for the site. District heating networks generally have a design life of at least 25 years.

Because the district heating supply is communal it can be maintained without requiring access to resident's properties, in contrast to the need to carry out individual gas safety checks each year for typical properties – which are time consuming and costly and will therefore reduce running costs for the two Housing Associations. Private owner occupiers also avoid the need to take-out expensive service contracts for individual gas boilers.

Market response

The scheme has been popular, and although this is largely due to the high demand for flats in the area and the range of retail and leisure facilities provided on-site, prospective buyers have also responded well to the environmentally friendly features. The CHP energy supply appears to have created no issues for the mortgageability of sale of the flats.

Monitoring and performance

Post-occupancy satisfaction surveys are to be carried out in 2008-09. The relationship between the ESCo and the managing agents will enable monitoring of performance of the scheme over time.

Key learning points

- CHP and community heating do not appear to create any significant impediment to the sale of properties, although it is a more difficult concept to communicate than renewable energy or energy efficiency, and may not add value unless it offers a wet heating system in place of electric systems.
- CHP and community heating can be financed by third party utility specialists such as Utilicom who have experience and track record with the technology.
- Specialist utilities and ESCo's may not presently be in a position to take the risk of supplying energy directly to households, preferring housebuilders and/or management companies to underwrite the risks associated with debtors and revenue recovery.

URBAN RENAISSANCE
Park View, Southampton

Developer: Barratt Homes
ESCo partner: Southampton Geothermal Heating Company (Utilicom)
Completion: 2000
Number of units: 108
Urban form: Apartments
Tenure: Private owner occupier
Building Regulations: Part L 1995

Background
Barratt Homes connected properties at Park View, a development of 108 of one, two and three bed apartments, to the Southampton District Energy Scheme.

Drivers for change
Barratt Homes were encouraged to consider connecting to the network by Southampton City Council after the cost of a gas connection was found to be high. The development also allowed Barratt Homes to demonstrate their commitment to 'environmentally responsible housing development'.

Energy strategy
The development sought to benefit from being connected to the Southampton District Energy scheme. The Southampton District Energy Scheme is supplied by a 5.7 MWe Combined Heat and Power (CHP) genera¬tor which is able to maximise efficient operation because of the mix of different uses linked to the network and the utilization of district cooling in summer. The connection was estimated to reduce CO_2 emissions from the development by 38%.

The district heating network interfaces with a heat exchanger for the block. From there heat is distributed via pre-insulated risers within the block to each residential unit. Each unit has a heat consumer unit consisting of a heat exchanger and a heat meter. Metering is carried out remotely by Utilicom, and the residents are then billed by via management company.

Whole Life Costs
At first Barratts were nervous of the system, with concerns relating to security of supply for their buyers, the capital cost and the cost of the energy for residents.

An early dialogue with Southampton's contractor Utilicom resolved many of the concerns with evaluation showing the connection to be £20k cheaper than a gas connection, with further savings on the need for gas flues puncturing the building fabric.

The need for additional substation capacity for electric heating, which would have been the typical heating system for apartments, as well as hot water storage tanks in each residential unit was also avoided.

Although Southampton Geothermal Heating Company is a subsidiary of private contractor Utilicom, the company was established on the basis of a co-operation and profit share agreement with the City Council, which can help to re-assure potential consumers of the long-term financial planning for maintenance of the network.

The larger scale of the district heating and cooling network means that the unit costs of maintaining and delivering energy from CHP are lower. The typical design life for a district heating network is 25 years.

Key design features

- Block heat exchanger connection to a district heating network
- Individual apartment heat consumer units with heat metering
- Building fabric complies with the Building Regulations of the time

Occupiers benefit from competitive heating – prices are index linked to national fuel prices – high water pressure for showers, avoidance of the need for a gas servicing contract and of the need to provide access for meter reading, which is carried out remotely. The savings in maintenance and running costs have been estimated to be 15% per annum or £40/unit.

Market response

Barratt Homes took the view not to highlight the communal heating system in their marketing. They did not use the environmental or cost benefits of the system to market the apartments. Marketing agents were instructed to explain the benefits of the system on request, with literature setting out the benefits produced by Utilicom.

A post-occupancy was carried out following completion of the scheme. This confirmed that residents were very happy with the heating system, and the quality and value of the service it provided. As a result of the district heating connection, Park View received a Bronze Award in the Best Energy Saving Development category of What House? magazine's 2001 Awards.

Monitoring and performance

The terms and conditions of the district heating supply are governed by a supply agreement between Southampton Geothermal Heating Company and the managing agent for the scheme. There appear to have been no significant technical issues with the heating supply.

Key learning points

- CHP and community heating do not appear to create any significant impediment to the sale of properties, although it is a more difficult concept to communicate than renewable energy or energy efficiency, and may not add value unless it offers a wet heating system in place of electric systems.
- CHP and community heating can be significantly cheaper for housebuilders if there is an existing, larger network to connect to. The economies of scale and mix of uses on larger, city-wide networks mean that the CO_2 reductions are also greater and at lower unit cost.
- Councils can adopt planning policies that requires developers to demonstrate why it would not be economically viable to connect to wider networks.
- Specialist utilities and ESCo's may not presently be in a position to take the risk of supplying energy directly to households, preferring housebuilders and/or management companies to underwrite the risks associated with debtors and revenue recovery.

URBAN RENAISSANCE

Electric Wharf 'Eco-houses', Coventry

Developer: Compex Development Projects
Completion: Expected 2008
Number of units: 21
Urban form: Terraced townhouses
Tenure: Private owner occupier
Building Regulations: Part L 2006

Background

The Eco-houses are the final phase of the successful Electric Wharf scheme in Coventry. The development consists of 28 two and three bed townhouses for private sale located on the canal side. They are being developed by Complex Development Projects, a specialist regeneration developer working in partnership with Coventry City Council.

Drivers for change

Electric Wharf has proved a popular and distinctive scheme, contributing to the regeneration of Coventry. The Eco-house phase continues in this vein, providing a modern set of housetypes that reflect the importance of environmental issues to the developer and increasing consumer awareness.

Energy strategy

The townhouses have been designed to reduce gas and electricity use 35% on Part L of the 2002 Building Regulations and energy bills by £150 per annum, with a focus on energy efficiency and the incorporation of solar thermal collectors to supply hot water.

The homes form a row of townhouses, reducing the external wall area, and are being constructed using medium density block work to maximise thermal mass. The insulation is being applied externally to further enhance the benefits of the thermal mass. High specification argon filled low emissivity glazing is being used throughout to minimise U-values.

Flat plate solar thermal collectors will supplement the heating provided by efficient condensing gas boilers in each homes, with heat from the two sources regulated by a thermal storage tank.

Each property is to be provided with A rated appliances – oven, fridge, freezer and dishwasher. The designer fixed lighting has been specified with low energy compact fluorescent bulbs.

Whole Life Costs

The overall performance of the building fabric will minimise owner occupier's gas bills. The hot water supplied by the thermal collectors has been estimated to meet 60% of each units annual hot water demand.

The benefit of the solar thermal energy will accrue to the owner occupiers, who will have reduced gas bills, and so the upfront cost had to be met by the developer. The overall cost of the development has been supported by regeneration funding because of the gap between the build cost and the market values achievable in Coventry.

The benefit of the solar thermal energy will accrue to the owner occupiers, who will have reduced gas bills, and so the upfront cost had to be met by the developer. The overall cost of the development has been supported by regeneration funding because of the gap between the build cost and the market values achievable in Coventry.

Key design features

- High levels of thermal mass using masonry
- External insulation and low emissivity glazing
- Low energy lighting and appliances
- Condensing gas boilers supplemented by solar thermal collectors

Cost and value

Unit sales price: £190,000 - £225,000

(£1,919 – £2,064/m²)

The frequency of gas safety checks and/or the need to sign-up to a gas service contract will be the choice of each owner occupier, but are desirable because individual gas boilers are still required in order to meet demand during winter. The typical lifespan of a gas boiler is 10 years.

Market response

While the developer has sought to differentiate the properties in its marketing material, they have not been able to charge an additional premium for the eco specification over and above the added value created by the distinctive, contemporary aesthetics of the Electric Wharf scheme.

Monitoring and performance

The scheme is due for completion and occupation during 2008. All the properties will be pressure tested upon completion to ensure they meet airtightness standards.

Key learning points

- Low carbon housing can be successfully marketed in more difficult regeneration areas, contributing to the overall quality and differentiation of a scheme.
- In more difficult housing markets there is often little scope to increase values in order to pay for higher specifications, however, the ecohouses demonstrates that low carbon housing can be delivered within these cost constraints.
- Testing for airtightness is an important factor in demonstrating robust detailing to housebuyers.

URBAN RENAISSANCE

Titanic Mill, Linthwaite (Huddersfield)

Developer: Lowry Renaissance (Joint Venture)
ESCo partner: Mill Energy Services
Completion: Expected 2008
Number of units: 130
Urban form: Apartments
Tenure: Private owner occupier

Background

Titanic Mill is a Grade II Edwardian structure located in the village of Linthwaite near Huddesfield. The refurbishment consists of over 150 apartments with a spa occupying the ground floor. It has been developed by Lowry Renaissance, a partnership between local developer Renaissance Ltd and Manchester based housing developer Lowry homes.

Drivers for change

The Lowry Renaissance partners believed that the market existed to develop the mill to a high specification, and that there was demand for zero carbon homes which would allow the addition costs incurred to be passed on to the consumer.

Energy strategy

The aim has been to achieve 'CO_2 neutrality' and 'self sufficiency in sustainable energy'. As a starting point the building fabric of the mill has been addressed in order to improve its thermal efficiency and air tightness.

Dry lining (200-300mm mineral fibre insulation) has been applied to the internal walls, roofs and floors, and high specification low emissivity glazing has been installed. Mechanical ventilation with heat recovery has been installed in the kitchens and bathrooms. In addition, low energy appliances have been provided and low energy lighting has been installed throughout the development.

Renewable electricity is supplied by a solar photovoltaic roof tiles integrated into the inside facing roofline of the mill and, once the scheme is completed, this will be supplemented by a biomass fuelled Combined Heat and Power (CHP) system. The heating requirements of the mill be supplied communally from biomass CHP and standby central boiler plant. Each apartment will have its own thermal storage tank and heat and power meters, which MES will be able to read remotely.

Central to delivery of the developer's CO_2 neutrality aims is Mill Energy Services (MES) which forms part of the management company for the building, which is wholly owned by the residents of the building. Once the biomass CHP is installed - the developer did not want to install the CHP plant until all apartments were sold - the Management Company will own the energy system assets, which will include:

- Wood chip Combined Heat and Power system
- Back-up gas boilers
- Photovoltaic (solar electric) system
- Energy distribution infrastructure

The Management Company will maintain contracts to operate and maintain the energy system. It has been estimated that with the combination of the efficiency improvements, solar photovoltaic array and biomass CHP the CO_2 emissions from the scheme could be reduced by more than 50%.

Whole Life Costs

A gasifying CHP engine small enough to supply the scheme, and with a good commercial track record, is not currently available on the market. Biomass CHP units also require more active maintenance

Key design features

- High levels of internal insulation
- High specification glazing
- Ventilation heat recovery
- Low energy lighting and appliances
- 48.5 kWp of solar photovoltaic roof tiles
- 2 MWth communal gas-fired heating, with 100 KWe biomass CHP generator

Technical specifications

Building fabric U-Values (W/m2K)

- External walls: 0.35
- Glazing: 1.8
- Roof: 0.168
- Floors: 0.2

Cost and value

Floor areas: 41.5 m^2 (1 bed) – 80 m^2 (2 bed)

Unit sales price: £150,000 - £270,000 (£3,614 - £3,375/m^2)

than conventional gas CHP or boilers, which should have an operational life of at least 15-20 years. Pre-insulated heat distribution pipes generally have a design life of at least 25 years.

The problems experienced at Beddington ZED in London suggest that there may be an operational risk from installing the CHP engine. However, this has been mitigated by specifiying enough standby boiler capacity (which is relatively cheap) to meet the total heat load of the scheme.

Because the heating network is communal it can be maintained without requiring access to properties, in contrast to the need to carry out individual gas safety checks or to take out expensive service contracts each year for properties with gas boilers.

Market response

The scheme has been popular, generating values that have enabled the developer to pass the additional costs onto buyers. The sustainable energy measures have acted as a differentiator, however, the location and the quality of the scheme would have made it attractive regardless of these additional measures.

Monitoring and performance

Data on the electricity generated by the solar photovoltaic arrays is logged and displayed on a readout in the entrance of the scheme. The biomass CHP has yet to be specified and installed.

Key learning points

- Low carbon performance as part of a comprehensive lifestyle package can add value to niche developments where they are carefully targeted at more discerning apartment buyers.
- There is the potential for communal energy systems to be delivered alongside the ongoing management services for apartment schemes, with the recovery of capital and revenue costs through a service charge.
- Biomass CHP at a small scale (<1 MWe) is not currently commercially available and has a limited track record – although West Midlands biomass specialist Talbotts are commercialising a 100 kWe generator. For smaller schemes biomass heating-only is currently a tried and tested solution.

HOUSING MARKET RENEWAL

Regeneration and Housing Market Renewal areas can be found at the edge of the centres of most of the region's major towns and cities, as well as taking the form of Council overspill estates and housing estates originally associated with industry.

These areas are characterised by a range of different types and ages of housing, as well as mixed use local and district centres. The housing typologies include Council housing estates - which may be the subject of stock transfer - 19th Century terraces and interwar flats. Each will require a different refurbishment solution.

In the region's Major Urban Areas regeneration bodies such as the Walsall Regeneration Company and the regions two Housing Market Renewal Pathfinders are carrying out the improvement, remodelling and selective demolition of properties to achieve Housing Market Renewal and to meet Decent Homes Standards.

Significant associated investment is taking place in new mixed tenure housing, often based on partnerships between private sector developers and Registered Social Landlords. The urban renaissance of the West Midland's towns and cities is also driving the need to expand and diversify the range of urban housing currently available beyond just apartments.

These sites therefore represent a major opportunity for private developers and given that some sites will be publicly owned, or will have been assembled by the public sector with additional public sector grant for social housing, schemes will generally be expected to meet higher standards for CO_2 reduction.

New-build

Scheme	Developer	Units	Completion	Description
Showell Park, Wolverhampton	Haslam Homes	205	2007	A mix of flats and townhouses for sale and social rental. The scheme incorporates improved building fabric and detailing, low energy lighting and solar collectors.
Frances Court, Dudley	Accord Housing Association	15	2006	Terraced houses for social rental. The scheme follows passive and low energy design principles, specified with a super insulated building fabric, heat recovery ventilation and communal biomass heating.
Lyng Estate INTEGER project, Sandwell	INTEGER and Sandwell MBC	15	2002	Super insulated timber framed flats for social renting. The design incorporates winter gardens, low energy lighting and integrated solar thermal collectors.
Refurbishment				
Norwood Road, Birmingham	Black Country Housing Group	22	2000	Council properties incorporating some right to buy units. Comprehensive improvement of building fabric for 'hard to treat' properties, with low energy lighting, condensing boilers and solar thermal collectors.
Northmoor, Manchester	Manchester Methodist Housing Association	50	2001	Comprehensive refurbishment of Victorian terraces, including building fabric and heating system improvements, for social renting and outright sale. The refurbishment forms part of the wider regeneration of the Northmoor area.
Summerfield Crescent, Birmingham	Family Housing Association	42	2006	Existing social rental units. Installation of solar thermal collectors for 42 Victorian terraced houses by a local company which has trained local people to become installers.
Castle Vale, Birmingham	Castle Vale Community Housing	xxxx	1998-2004	Council high rise and Radburn-style units transferred to the former Housing Action Trust. Comprehensive improvement of building fabric and heating systems to address fuel poverty and respond to community aspirations.
Aberdeen Heat and Power Company	Aberdeen City Council	1,000+	2005-ongoing	Gas-fired CHP to supply community heating to high rise Council tenants and neighbouring public buildings, delivered by a new standalone Energy Service Company (ESCo).
Angell Town, Brixton	Estates Action	40	2001	Council housing units forming part of an estate renewal project. Comprehensive building fabric and heating system improvements to raise the thermal efficiency of 'hard to treat' 1970's deck access maisonette properties.

HOUSING MARKET RENEWAL
Showell Park, Wolverhampton

Developer: Haslam Homes
Architect: BM3
Completion: 2007
Number of units: 205
Urban form: Terraces, semi-detached, apartments
Tenure: Private owner occupier
Housing Association rented
Building Regulations: Part L 2002

Background
Showell Park is a scheme of 205 residential units developed by Haslam Homes. It comprises a mix of flats and houses, the majority of which are private for sale but also providing 32 affordable housing units to be managed by Midland Heart Housing Association.

Drivers for change
Haslam Homes worked in partnership with Wolverhampton City Council to agree the priorities for the scheme, which included high environmental standards. The development brief envisaged an Ecohomes score of at least Very Good.

However, recognising the low values for housing in the area, the difficulty for first time buyers to fund mortgages, and the importance of restarting the housing market with a distinctive product, the City Council reserved the right not to take the highest bid for the site, and instead opted to take a lower capital receipt in order to secure the social and environmental benefits of the proposed scheme.

Energy strategy
The building fabric was specified to meet the Building Regulations in force at the time, however, special attention was given to ensuring a high level of air tightness and the use of robust detailing in order to reduce cold bridging.

Highly efficient condensing boilers are supplemented by a Nuaire 'sunwarm' solar thermal system. The system provides two sources of heat – hot water which is distributed to a thermal storage tank, and additional space heating created by warming fresh air with stale air trapped under the roof, which is then recirculated in each home. The Nuaire system was incorporated following a recommendation by the sustainability officer at Wolverhampton City Council.

Whole Life Costs
The Nuaire 'sunwarm' system is unusual in that it is air based. It is designed to provide hot water during the months of May through to September – typically 50-60% of a homes annual hot water demand - and ventilation pre-heating during the remaining months.

The Nuaire system comes with manufacturers guarantee of 5 years, and it is recommended that the air handling system is serviced every 5 years. The Nuaire system is a relatively new product with less performance data available compared with more conventional flat plate or evacuated tube collectors.

The benefit of the sunwarm system will accrue to the owner occupiers, who will have reduced gas bills, but the upfront cost had to be met by the developer. However, the cost was offset in its entirety through a reduction in the land price. The system was the most significant additional cost of meeting the environmental aspirations of the partners.

The frequency of gas safety checks and/or the need to sign-up to a gas service contract will be the choice of each owner occupier, but is desirable because the individual gas boilers will still be

Key design features

- Careful attention to robust detailing and air tightness
- Solar hot water and warm air system

Technical specifications

SAP 80

Building fabric U-Values (W/m2K)

- External walls: 0.3
- Glazing: 2.0
- Roof: 0.3
- Floors: 0.25

Cost and value

Floor areas: 41.5 m^2 (1 bed) – 80 m^2 (2 bed)

Unit sales price: £121,995 - £189,995

Elemental cost of design features:

Sunwarm system: £5,800/home

required in order to meet demand during winter. The typical lifespan of a gas boiler is 10 years. acts each year for properties with gas boilers.

Market response

Haslam had discussions with a number surveyors for high street mortgage providers to ensure that homeowners could obtain mortgages for the properties, and to see if they would attract a greater value.

These discussions confirmed that mortgageability was an issue only in so far as the development was in a difficult regeneration area, and that improved environmental performance, and specifically the solar system, would not – in their opinion - add value to the units.

From Haslam and Wolverhampton's perspective this has however provided a clear differentiator for the properties in a difficult location and in a competitive first time buyers market.

Monitoring and performance

No formal monitoring of the performance of the Sunwarm systems is currently proposed.

Key learning points

- Low carbon housing can be successfully marketed in more difficult regeneration areas, contributing to the overall quality and differentiation of a scheme.
- In more difficult housing markets there is often little scope to increase values in order to pay for higher specifications, however, the ecohouses demonstrates that low carbon housing can be delivered within these cost constraints.
- Estate agents and valuers do not currently attribute additional value to low carbon housing
- The public and private sector can work in partnership to deliver low carbon housing, with each sharing some of the cost and risk of delivering innovation.

HOUSING MARKET RENEWAL
Francis Court, Halesowen (Dudley)

Developer: Accord Housing Association
Architect: ZED Factory
Contractor: Greswolde Construction
Completion: 2006
Number of units: 15
Urban form: Terraces
Tenure: Social rental
Building Regulations: Part L 2002

Background
Francis Court consists of fifteen two bed terraced 'lifestyle apartments' for the over 45's. The scheme is for social rental.

Drivers for change
Accord is committed to reducing its carbon footprint across all of its activities. Francis Court is one of a series of "Environmental Pathfinder" projects to inform its ongoing development programme. The lessons learnt are being put into practice on other developments. Accord's view is that the additional costs of higher standards are not excessive.

Energy strategy
The scheme has been specifically designed to minimised space heating, hot water and electricity demand, with the remaining thermal energy demand being met from a carbon neutral source. The key elements of the energy strategy are:

- Passive design: The use of south facing orientation, glazed sun spaces, high density block work for thermal mass and good daylighting. Ventilation is achieved through the use of wind cowls with heat recovery to warm incoming fresh air.
- Super-insulated building fabric: Careful attention to the specification and detailing of walls, roofs and floors, with the use of up to 300mm of mineral wool insulation and high specification double glazing. In addition sedum green roofs provide additional insulation.
- Zero carbon heating: The use of a 35 kW wood pellet boiler with backup thermal storage of 1-2 days to supply 100% net-zero carbon space heating and hot water for all the dwellings. Orders for fuel are made automatically when the fuel storage silo runs low.

The overall strategy is relatively low technology, with the exception of the biomass boiler and the ventilation cowls.

Whole Life Costs
The boiler will have a life span of at least 15 years, but requires more active maintenance than a conventional gas boiler. However, because it is communal it can be maintained without requiring access to resident's properties, in contrast to the need to carry out individual gas safety checks each year for typical properties – which are time consuming and costly for social landlords.

Resident response
The residents of the scheme have responded very well to the scheme, although formal monitoring has not been carried out. There was a need to run an induction programme so that they understood the nature of the scheme and its technologies.

An issue has been how to make best use of the sunspaces – these require active management of the internal doors to optimise their benefits during winter and summer.

Key design features

- Passive heating and ventilation
- Super-insulation coupled with thermal mass
- Sedum 'green' roof
- High specification doors and glazing
- Low energy lighting and appliances
- Communal biomass wood pellet heating

Technical specifications

SAP 85

DER 1.6 kg/m^2

Building fabric U-Values

- Walls, floors and roof: 0.1 W/m2K

- Glazing: 1.4 W/mK

Cost and value

Build cost: £1,875,000 (£1,373/m^2)

Elemental cost of design features: Wood pellet boiler (including fuel storage and housing): £35,000

Additional cost: £223/m^2 (+19%)

Key learning points

- A standby boiler or two smaller boilers should have been specified. In a few situations there has been down-time because the biomass fuel has not been re-ordered or because of essential maintenance, and the thermal store can only supply a finite amount of heat.
- Individual heat metering for each unit should be specified on future schemes to encourage residents to monitor their own energy consumption and to use less heat. At Francis Court the total heating costs are divided between the residents but not all support this arrangement. The market for wood fuel supply is still in its infancy. The wood pellets are currently sourced from Wales, however, Accord are hoping to source from local suppliers as they establish themselves.
- Collaboration with ZED Factory, who have experience of designing and specifying similar schemes, meant that Accord were able to tap into their knowledge and supply chain relationships.
- Induction is required for new tenants so that they can understand the nature of the building and it's technology, and obtain the most benefit i.e. reduced bills.

HOUSING MARKET RENEWAL

Lyng Estate INTEGER Project, Sandwell

Developer: INTEGER and Sandwell Homes
Architect: Cole Thompson Anders
Contractor: Wates Construction
Completion: 2001
Number of units: 15
Urban form: Terrace and apartments
Tenure: Council rental (now managed by ALMO)
Building Regulations: Part L 1995

Background

Completed in 2000 the Lyttleton Estate project was developed by INTEGER – a collaborative industry body that aimed to develop innovation in housing - for Sandwell Metropolitan Borough Council. The scheme consists of a mix of six one-bed apartments, six two-bed apartments, two three-bed houses and a single two-bed house.

Drivers for change

The aim of the project was to challenge standard housebuilding practices and increase the expectations of the public regarding social housing.

Energy strategy

The scheme was constructed using a timber frame system that delivers a super-insulated performance which meets the current 2006 Building Regulations. The wall panel system incorporates integral cellulose insulation and glazing, and was prefabricated, so reducing the construction time. The units share a single large condensing gas boiler, with intelligent controls regulating between solar thermal energy from flatplate rooftop collectors and additional boiler top-up heating.

Whole Life Costs

The benefits of the higher specifications, the more efficient communal gas boiler and the solar thermal collectors all accrued to the tenants in the form of very low heating bills. This has been validated by monitoring and a post-occupancy survey.

The additional upfront investment required to deliver these savings had to be met by the project partners, although maintenance savings also accrued to Sandwell Homes because of the use of a larger more efficient boiler, and avoidance of the need for annual gas safety checks in each property.

The total cost of the project (excluding the sun spaces and solar thermal collectors) was around 106% (£689/m^2 at 2000 prices) of the average build cost of comparable traditional social housing at that time, although this was in parity with the top end of the range.

However, it must be taken into account that this was a highly innovative project with only a small number of units. It was designed to act as a demonstration project for technologies and design approaches that could then be applied more widely. The team estimated that with 40 units or more the costs could have been reduced to around £650/m^2 at 2000 prices.

Market response

A post occupancy study was carried out on the buildings with Housing Corporation Innovation and Good Practice (IGP) programme grant. This confirmed the popularity of the properties with tenants, with a low turnover rate, and a high level of satisfaction with the low running costs and the quality and comfort levels provided by the properties. The project has also provided a local resource for educational purposes.

There have, however, been ongoing problems with maintenance, mainly cited as a result of the lack of involvement of housing managers in the design process.

Key design features

- Super-insulated timber frame
- High performance double glazing
- Low energy light fittings
- Solar thermal collectors
- Communal gas boilers with intelligent controls.

Technical specifications

SAP 85

Cost and value

Build cost: £689/m²

Additional cost: £49/m² (6%)

Monitoring and performance

The project was successful in delivering significant improvements in comfort for tenants, together with significant reductions in their heating bills. This has been validated by monitoring and a post-occupancy survey.

The project raises issues about management of the learning process from pioneering projects - which this undoubtedly was. The main individual involved in delivering the project no longer works for Sandwell Metropolitan Borough Council and the relationship with INTEGER was not maintained. This has limited the potential learning from the project, which is directly relevant to new-build projects currently being taken forward across the region.

Key learning points

- An open book approach to innovation and learning can facilitate the sharing of knowledge between projects, with the potential to reduce capital and whole life costs over time.
- Housing management should be involved in the delivery of innovative projects, particularly where new technology is being piloted for the first time.
- Low carbon housing can deliver high quality affordable housing units which provide improved comfort, low running costs and because they are popular low turnover of tenants which helps to maxmise rental income.
- Pilot projects are an important educational resource for the wider community, and should be used to stimulate further projects.

HOUSING MARKET RENEWAL
Norwood Road, Dudley

Developer: Black Country Housing Group
on behalf of Dudley MBC
Contractor: Dudley MBC Direct Works Company
Completion: 2002
Number of units: 22
Urban form: Semi-detached houses
Tenure: Council rented
Building Regulations: Refurbishment

Background
The Norwood Road refurbishment project consists of 22 semi-detached properties owned by Dudley Metropolitan Borough Council. The refurbishment was specified for Dudley MBC by Black Country Housing Group. An innovative approach to modernisation was taken in which elements of the homes were only replaced if they had reached the end of their lives e.g. kitchens, bathrooms.

Drivers for change
Demolition was not possible because a number of properties had been acquired by tenants under the right to buy, and Dudley wanted to explore sustainable approaches to refurbishment. The objective was to improve comfort, health and safety, in order to meet the (at the time forthcoming) Decent Homes standard and, most important, reduce fuel bills.

Energy strategy
The properties are solid wall and at the time had no central heating, with tenants unable to heat the properties effectively – adversely affecting their comfort and health. Significant overall improvements to the performance of the building fabric were undertaken to raise the SAP rating of the homes.

The most significant measure was the addition of external insulation. Although the most expensive option this was necessary because the internal spaces were too small to dry-line. External insulation has a dramatic effect on existing buildings because it seals older service penetrations, as well as the masonry, effectively eliminating cold bridges. The roofs, doors and floors were also insulated and high specification low emissivity double glazing was also added.

Although technically the homes no longer needed conventional central heating a small system was installed in 20 of the properties, supplemented by flat plate solar thermal collectors. Practically properties also still need a heating system to bring the internal spaces up to comfort levels if there is heat loss from open windows or doors, or during period of vacancy.

Tenant response
Post-occupancy surveys showed a significant improvement in tenants and health and comfort, and even their learning and employment.

Monitoring and performance
The predicted annual heating cost prior to the improvement works was £1021.34. After the improvements were implemented, the average use of gas cost tenants £155 per annum, delivering a saving of 85%.

Key design features

- External insulation
- Floor and loft insulation
- High specification doors
- Low emissivity argon filled double glazing
- Flat plate collector supplying gas water heater

Technical specifications

SAP increased from 11 to 85

Building fabric U-Values (W/m²K)

- External walls: 0.2
- Glazing: 1.8
- Roof: 0.1

Cost and value

Budget cost: £22,000/property of which £11,250 were related costs

Elemental cost of design features:

- Insulation, glazing and doors £7,700
- Solar thermal collectors: £3,000
- Passive stack ventilation £550

Additional cost: £49/m² (6%)

Key learning points

- Current budgets to meet the Decent Homes standards would not normally be sufficient to carry out this standard of improvements – with Decent Homes tending to be seen as a target rather than a minimum.
- The works were carried out by Dudley's arms length direct works company. The relationship worked particularly well as the personnel had retained knowledge from the former Council direct works, demonstrating the value of 'insourcing' rather than outsourcing knowledge and experience.
- Householders, especially in social housing have an aspiration of being able to "upgrade" to central heating. Overcoming the perception that central heating is a 'must' is difficult. The system need not be a boiler and radiators, and a feature effect gas fire in the living room could be adequate.

HOUSING MARKET RENEWAL

Northmoor, Longsight (Manchester)

Developer: Manchester Methodist Housing Association
Completion: 2001
Number of units: 50
Urban form: Terraces
Tenure: Housing Association rented and private owner occupier
Building Regulations: Refurbished to meet Part L 1995

Background

Located in East Manchester the area of Northmoor consists of large numbers of two bedroom terraced properties built in the late 19th and early 20th century. Much of this accommodation proved unpopular to homebuyers and subsequently transferred into the private rental market which resulted in a variety of socio-economic problems typical with a transient population.

Drivers for change

In order to address the issues affecting Northmoor Manchester City Council embarked on a joint venture with Manchester Methodist Housing Association (Now Great Places Housing Group) to fund and create a Home Zone area in Northmoor. The project concentrated on a joint programme of modernisation, refurbishment, new build and public realm works designed to improve overall living conditions within the first two phases of the project, resulting in the creation of newly refurbished properties for rent and sale.

Energy strategy

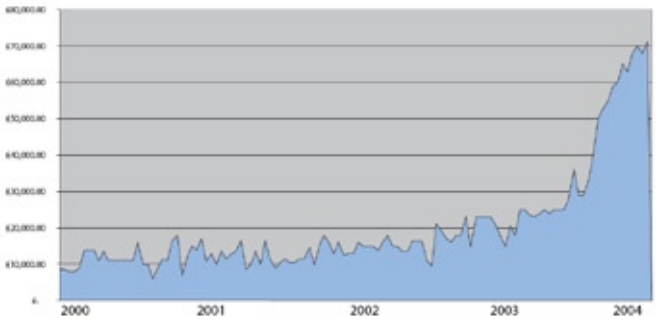
In total 50 properties will be acquired, with 35 homes being developed by MMHA, to be offered for sale on the open market. The existing properties to be demolished or refurbished are principally two-bedroom terraces. In their place 19 new-build units will be constructed and 16 units will be refurbished.

The comprehensive refurbishment works carried out included re-roofing (where necessary), new doors and double glazing, dry lined insulation and loft insulation to reduce damp and improve thermal efficiency, and new condensing gas boilers. A number of existing terraces were joined together to improve space standards and create larger family properties.

Whole Life Costs

The upfront cost of the high standard of refurbishment demonstrated at Northmoor was supported by regeneration funding made available through English Partnerships and the Neighbourhood Renewal Fund. The approach has been successful in raising values in the local housing market (see Figure below), but required significant upfront capital investment which was not recoupled from the uplift in values.

Change in average property prices in Northmoor



In areas with negative equity it could be self-sustaining for the public sector to support refurbish properties, which would then be transferred on a repairing lease to a social landlord for rental and sale on long leaseholds, with the initial investment repaid from the equity released. Projects must, however, form part of a wider neighbourhood programme of improvements to the public realm, facilities and amenities.

Key design features

- Re-roofing
- Loft insulation, Dry-lined insulation
- High specification glazing and doors
- SEDBUK A Condensing boilers

Technical specifications

SAP 70

Cost and value

Refurbishment cost: £66,800 per unit

Unit sales price: £70,000-£100,000

However, VAT restrictions mean that it is not cost effective for a private developer to carry out similar standard of refurbishment works – as demonstrated by Urban Splash's Chimney Pot Park scheme in Salford, Greater Manchester, where it was cheaper to demolish the properties and retain the facades.

Market response

While the refurbishment works have played an important part in raising standards, it is the combination of improvements to the public realm, and an expanded range of property types and tenures, that has all contributed to the successful regeneration of the area – as evidenced by the improved health of the local housing market which was close to negative equity.

Monitoring and performance

No formal monitoring of the performance of the properties has been carried out.

Key learning points

- High quality refurbishment of neglected streets of terraced housing, combining improved fabric and heating specifications can form part of a comprehensive approach to regeneration.
- These measures must form part of a wider approach to neighbourhood renewal, with improvements to the public realm, and the remodelling of properties to make them fit for purpose
- There is the potential for some or all of the cost of refurbishment and improvement to be recovered from an uplift in property values if the housing market recovers. This does, however, rely on public/risk money to be put in upfront.

HOUSING MARKET RENEWAL

Summerfield Eco-neighbourhood, Birmingham

Developer: Family Housing Association
Contractor: New World Solar
Completion: 2006
Number of units: Initially 42
Urban form: Victorian terraces
Tenure: Social rental

Background

Summerfield is an area of North West Birmingham consisting largely of Victorian terraced housing. Family Housing owns and manages units of rental housing in the area. Solar thermal collectors have been installed on homes as part of the Summerfield 'eco-neighbourhood' project.

Drivers for change

Tenants had lobbied Family Housing to take action in response to rising fuel prices and the need to improve the energy efficiency of their properties. In response, and following a series of meetings with residents to discuss the future of the neighbourhood, the Housing Association established and sought funding for the Summerfield 'eco-neighbourhood' project in conjunction with Birmingham City Council.

Energy strategy

An initial 18 month programme of measures has been initiated, beginning with the refurbishment of a demonstration 'eco-home' to showcase measures that can be taken to reduce energy use and CO_2 emissions. A programme to install flat plate solar thermal collectors on 200 properties was initiated early in 2007 and will be completed by March 2008.

The solar thermal collectors will supplement the heat provided by existing boilers. New thermal storage tanks are required in each property, and these regulate the supply of heat from the two sources. It has been estimated that the collectors will meet at least 50% of each households annual hot water demand.

The partners have worked closely with EAGA and a local installer, New World Solar, who are managing the works. The company is committed to the training of local people as solar installers, and 20 placements have been created during the initial programme of works.

Whole Life Costs

The benefit of each installation accrues to each tenant, and has the potential to reduce their annual fuel bills by around 10%. The upfront installation cost of £5,000 per property was met by the Housing Association, with financial support from the Neighbourhood Renewal Fund, and in some cases a financial contribution from tenants based on their ability to pay.

The solar thermal collectors are guaranteed by the manufacturer, and will require relatively limited maintenance. Access will still be required to service gas boilers, as these have been retained as the primary source of space heating.

Resident response

The programme of installations is a response to lobbying by the tenants, and it has been very well received.

Monitoring and performance

No formal monitoring of the solar installations is currently proposed.

Key design features

- Installation of flat plate solar thermal collectors and thermal storage tanks
- Upgrade to condensing gas boilers

Cost and value

Elemental cost of design features:

- Flat plate solar thermal collectors: £5,000/property

Key learning points

- Units costs were relatively high due to the costs of accessing the roofs from the street, with the need for scaffolding on the highway, and the difficulties in retrofitting the plumbing and thermal storage tanks.
- Regeneration funds can be used to invest in energy efficiency or renewable energy measures that reduce fuel poverty, and improve the image of an area.
- There is the need to train more installers for solar thermal technology, and this can created skilled apprenticeships and jobs in the local economy.

HOUSING MARKET RENEWAL

Castle Vale Estate, Birmingham

Developer: Castle Vale Community Housing Association
Architect: BM3 Architecture
Contractor: Mansell Plc
Completion: 2004
Number of units: 42
Urban form: High rise block
Tenure: Social rental

Background

Castle Vale is a former Council housing estate located five miles north east of Birmingham. The estate declined significantly during the 1980's with social and economic problems were exacerbated by physical problems.

The estate was transferred over to Castle Vale Housing Action Trust (HAT) in the 1993 and during the twelve years of its existence it carried out a comprehensive programme of investment to improve and rebuild 2,500 homes. Castle Vale Community Housing Association took over management of the estate following a ballot of tenants and residents in 2003.

Drivers for change

Built between 1964 and 1969 many of the homes were built using new and untested methods and as a result suffered from problems of damp and condensation, making properties difficult to heat. Many of the homes were in high rise blocks creating particular problems arising from their form of construction.

Energy strategy

In order to address the physical problems with the estate Castle Vale HAT sought to demolish many hard to treat and unpopular properties, including most of the high rise blocks, as well as comprehensively improving and refurbishing most of the lower rise housing.

From the outset there was extensive consultation with tenants and residents in order to take forward the programme. A wide range of home improvements and external works were carried out in order to improve the quality of life for people living on the estate. These included an emphasis on improving the SAP ratings of properties, with the Housing Corporation requiring ratings of 65-70.

The 11 storey Topcliffe House was one of the last remaining high rise blocks on the estate. As the final project for the HAT, it was decided that it should set new standards and incorporate distinctive design features.

External rendered insulation cladding was applied to the outside of the structure, and new high specification double glazing was installed, with the aim of achieving a SAP rating of 76. Distinctive multi-coloured louvres were installed to the stairwells.

Whole Life Costs

The improvements have been designed to give the building at least 30 more years of useful life. A wet render external insulation system was chosen, which is a cheaper option (£90-120/m^2) than rainscreen systems (£150/m^2) – although these are more of a requirement for very tall blocks. The lifespan of this system will depend on the quality of the preparatory works to the face of the building.

Resident response

The project was developed with extensive consultation with residents, who had to move out whilst the works were carried out, receiving the highest satisfaction rate of the HAT's projects.

Key design features

- External rendered insulation
- High specification double glazing
- Upgraded heating systems
- External louvres

Technical specifications

SAP 76

Cost and value

Budget cost: £2.7m

Key learning points

- Tower blocks can be successfully refurbished in order to improve tenants quality of life and to reduce heating bills.
- Extensive refurbishment such as carried out at Topcliffe House can create significant disruption, with tenants potentially having to be rehoused during the works. This requires careful planning.
- U-Values can be improved using external insulation, which can also improve the appearance of a tower block.
- Engagement of tenants in the process of refurbishment is important from the outset in order to secure their co-operation.

HOUSING MARKET RENEWAL

Aberdeen Heat and Power Company

Developer: Aberdeen City Council
Contractor: Integrated Energy Utilities
Completion: Ongoing
Number of units: Initial phase 1,000
Urban form: High rise apartments
Tenure: Council rental

Background

Aberdeen City council adopted an Affordable Warmth Strategy in 1999. This focussed investment into the least thermally efficient council-owned properties. These were found to be the 59 high rise blocks that were hard to treat and using electric storage heaters. The first project was the Stockehill cluster of 288 flats in 4 high rise blocks.

Drivers for change

Capital constraints limited what the City Council could seek to achieve. An independent study was therefore commissioned to identify the most cost-effective solution to providing affordable warmth and reduced CO_2 emissions.

The cost of overcladding was found to be £19,000 per flat, which the Council did not have the resources to carry out. At £5,000 per flat community heating supplied by gas-fired Combined Heat and Power (CHP) was found to be the most cost effective option.

In order to finance the project and reduce the risk the Council established an independent not-for-profit ESCo, Aberdeen Heat & Power Co, to undertake the development and management of CHP projects in Aberdeen.

Energy strategy

The company has a strategy to develop each project as a heat island based on gas-fired CHP and standby boilers distributing heat via pre-insulated district heating mains. These were then linked them together with the aim of creating a ring main serving a mixed portfolio of energy customers – domestic, institutional and commercial. It is also proposing to incorporate biomass CHP to diversify its input fuels.

Further projects have been undertaken with similar funding arrangements at Hazlehead and Seaton serving high rise blocks and housing estates, a school, sheltered accommodation, a leisure centre, ice rink, and sports facilities. In total approximately 1,000 flats are now connected.

Whole Life Costs

Funding to initiate the project came from the Council's Housing Capital Programme and a grant from the Community Energy Programme. The remainder was covered by a bank loan.

The back-to-back contractual arrangements between the Council and the company, set out over a sufficient term to amortise the loan, helped to secure a favourable rate of interest. Further funding from the Energy Efficiency Commitment allowed lower connection fees for owner occupiers in the blocks.

The contractual relationship between the Council and the company is covered by a Framework Agreement under which heat is supplied to the Council for onward sale to its tenants though a 'heat with rent' arrangement. The company has heat agreements with occupiers paid via direct debit. Electricity is sold to via a commercial consolidator.

Financial support, initially from Community Energy Programme grants from central government, has

Key design features

- Gas-fired CHP with standby gas boilers
- Pre-insulated district heating mains
- Supplies high rise apartments and public buildings

Technical specifications

SAP initially 40 improved to 60

Cost and value

Budget cost: £1,600,000

Elemental cost of design features:

Energy centres and heat distribution:

£5,000/unit

Split of costs:

- Grant: £1.3m Community Energy Programme
- Debt finance: £1m on the basis of income £215k/annum

enabled the company to achieve a critical size where it is now able to finance future projects against its own assets and revenue streams and undertake commercial projects for the Council and other landowners in the city.

The approach taken by Aberdeen requires a long-term commitment to management and maintenance. The design life of a typical district heating network is 25 years, and the CHP units and boilers have a design life of at least 15 years. CHP units require down-time for annual maintenance.

The communal approach to energy supply reduces the need to access individual properties for gas safety checks and meter reading. It also helps to reduce rent arrears by reducing their heating bills.

Key learning points

- There is the need for a new source of funding to support the costs of community heating networks, in order to replace the Energy Saving Trust's Community Energy Programme which closed in 2007.
- The establishment of a standalone new company enabled the Council to accelerate its action to tackle fuel poverty.
- Gas-fired CHP is an effective technology to reduce CO_2 emissions, and to manage the long-term cost of heating for tenants.

HOUSING MARKET RENEWAL

Holles House, Brixton (London)

Developer: London Borough of Lambeth (Estates Action)
Architects: Anne Thorne Architects
Completion: 2001
Number of units: 40
Urban form: Deck access maisonettes
Tenure: Council rented
Building Regulations: Meets Part L 1995

Background

The Angell Town estate was built in the 1970's and was based on a deck access arrangement, with maisonette flats and semi-basement parking.

Drivers for change

During the 1980's and 1990's the layout of the estate begun to create problems of security and supervision of the public realm. Thermal efficiency was not a design consideration and the concrete frame of the buildings created significant problems of damp and condensation caused by cold bridging, as well as overheating in summer on the south façade.

Energy strategy

In the late 1990's Holles House, which consists of 40 units, was selected to demonstrate a comprehensive package of energy improvements to the fabric of the building and the heating and hot water systems. This work took place at the same time as improvements to the local environment to improve safety and security and amenities.

The improvements have sought to tackle the specific problems created by this form of housing. The focus has therefore been on the creation of an uninterrupted layer of insulation, with external timber frame facades with cellulose insulation, the insulation of walkways and balconies with mineral wool and rigid insulation both above and below the concrete slabs, and the insulation of ceilings and roofs.

Steel window frames were replaced with timber frames with low emissivity double glazing. Condensing boilers and low energy lighting were also installed.

Residence response

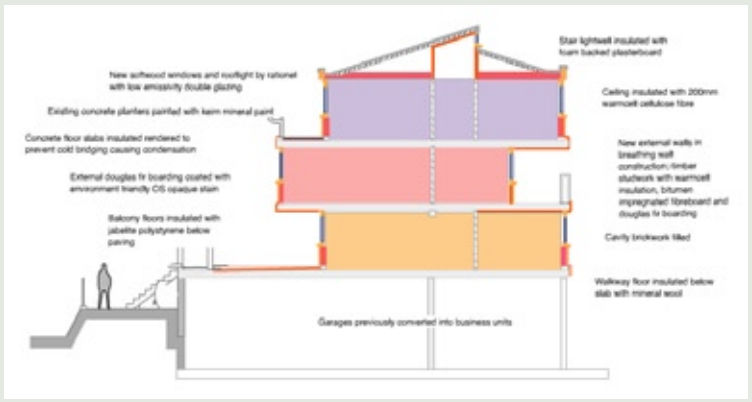
Residents were involved in decision-making relating to the refurbishment programme, and representatives were on the panel that chose the architects and contractors. The Estate Group maintained close links with the architect throughout the duration of the project.

Monitoring and performance

Post-occupancy monitoring has been carried out in order to compare the occupied and refurbished Holles House and the occupied but un-refurbished Warwick House. This was carried out for a full year and confirmed that Holles House residents use 40% less heating than Warwick House residents, delivering affordable warmth to residents. The overall CO_2 emissions have been reduced by 30%.

Key design features

- Timber framed insulated external wall system
- Insulation to concrete slabs
- Loft insulation
- Low emissivity double glazing with timber window frames
- SEDBUK A condensing gas boilers
- Low energy fixed light fittings



Key learning points

- Tenant and resident engagement in the design process helps ensure that projects respond to their priorities, and improves the sense of ownership over the outcomes.
- Deck access housing requires careful detailing in order to minimise cold bridging from the walkways and garages.
- A comprehensive package of measures can deliver a 50% or greater reduction in heating, reducing tenants bills.