# Case Study | Clovercroft

## Local Authority:

**Pendle Borough Council**

## Location:

**Clovercroft, Higham Hall Road, Higham, Burnley**

**BB12 9EZ**

**OS Grid Reference: 380805, 436547**

## Development type:

**Medium sized residential development**


Ordnance Survey License No. 100018418(2010)

**Location Plan**

## Description

Clovercroft is located 5 kilometres north west of Burnley town centre, in the rural village of Higham. The village is surrounded by agricultural land set upon a high plateau 200m above sea level.

The village is small and compact with a local pub, church and village green in the centre surrounded by a mixture of traditional stone cottages and terraced housing with modern housing on the outskirts of the village.

The construction of the A6068 bypass to the south of Higham has helped to preserve the traditional character of the village which dates back to Roman and Saxon times.

Higham is enclosed by open countryside and green belt land to the north east and south. The village green to the west of the development has been designated in the Pendle Local Plan as a site of settlement character which helps to maintain the openness and character of the village.

Clovercroft is a medium-sized housing development, consisting of 18 three and four bedroom houses, 5 townhouses and 10 one and two bed apartments. The development is being constructed on the former Clovercroft Mill site situated in the heart of Higham village within the conservation area. Properties are being constructed of local natural sandstone with natural grey slate roofs. The

**Developer's 3D model of the site**

**View of construction of Clovercroft**

## Technology

This site was selected as an example of medium scale residential development and is also useful as an example of development within a sensitive area.

External space within the development is limited with parking occupying most of the space. Some of the properties have front and rear gardens which could provide space for ground source heating coils or boreholes for example.

Some properties are orientated in a southerly direction which could allow their roof space to be used for solar technologies. The remainder of the properties are orientated east-west which will reduce the effectiveness of solar panels and their output. Therefore the amount of suitable roof space is limited.

The restricted space and the compact nature of the development coupled with its location within the conservation area means that implementing renewable and low carbon energy will have to be sensitively handled to prevent negative impact on the conservation area.

## Development

| Buildings | No. of dwellings | Annual Gas Consumption (kWh/year) | Annual Electricity Consumption (kWh/year) |
|---|---|---|---|
| Apartments | 10 | 62,560 | 22,010 |
| House - Semi-detached | 18 | 146,682 | 55,026 |
| House - Mid-terraced | 3 | 20,172 | 8,157 |
| House - End-terraced | 2 | 14,770 | 5,438 |
| Development cost | | £2,000,000 - £2,250,000 | |

Notes
1. Domestic consumption figures based on standard floor areas per dwelling type (Energy Savings Trust 2005).
2. Build cost based on an indicative cost of £110 per sq ft. Actual costs may vary

## Energy requirements, emissions and targets

| | | |
|---|---|---|
| Estimated total energy requirements | 334,815 | kWh/year |
| Total $CO_2$ Emissions ($kgCO_2$/yr) | 85,618 | $kgCO_2$/ year |
| 10% Renewable Energy Contribution | 33,482 | kWhe |
| 20% Renewable Energy Contribution | 66,963 | kWhe |

## Summary


The Clovercroft Mill development is a medium-sized development of approximately 33 new homes of varying size. Approximately 12 houses have south facing roofs which could be used for some form of solar power installation.

The development is situated on a hillside upon a plateau at approximately 200m above sea level.

The site space is confined and external space limited which further reduces the site's potential for some forms of renewable and low carbon energy types.

The site is potentially further constrained by its location within the Higham Hill village conservation area which may restrict technology choice.

Technology Mix Option 1 demonstrates how renewable energy targets could be met by a combination of onsite electricity and heat generation. The additional extra over cost could be up to £138,000; a 6% increase in the development build cost. Based on income revenue alone the payback period could be up to 17 years.

Technology Mix Option 2 illustrates how the renewable energy targets could be met through heat generation. The additional cost of the development would be up to £84,000; a 4% increase in the build cost of the development. This would result in a reduced payback period of up 13 years based on income revenue alone. However the distribution of heat within the development to spread the benefit across the households is likely to add significant cost to the development.

In this instance a mixture of onsite generation with reduced heat generation and a greater focus on renewable electricity generation may be more appropriate.


## Technology Mix Option 1

| Renewable energy technology | Renewable energy contribution (kWh/yr) | No of dwellings | Annual Yield (kWh) | Estimated Installed Cost (£) | FIT/RHI Revenue (£) | 10% RE Contribution | 20% RE Contribution |
|---|---|---|---|---|---|---|---|
| Solar PV (1kWp) | 750 (1) | 12 | 9,000 | 60,000 - 90,000 (2) | 3,249 | 27 | 13 |
| GSHP (8kwp) | 17,520 (3) | 4 | 70,080 | 25,200 - 48,000 (4) | 4,906 | 209 | 105 |
| Estimated Maximum Total | | | 79,080 | 85,600 - 138,000 | 8,155 | 236 | 118 |

Notes
1. Assume yield of 750kWh/year per 1kWp installed (Burnley RenewEL 2005)
2. Microgeneration Certification Scheme 2009
3. Based on domestic GSHP load factor (Towards Broad Areas for Renewable Energy Development. Report for 4NW. Arup 2008)
4. Assume vertical borehole system. Installed cost £800 - £1,500 (Energy Savings Trust)

## Technology Mix Option 2

| Renewable energy technology | Renewable energy contribution (kWh/yr) | No of dwellings | Annual Yield (kWh) | Estimated Installed Cost (£) | FIT/RHI Revenue (£) | 10% RE Contribution | 20% RE Contribution |
|---|---|---|---|---|---|---|---|
| Solar HW (4m2) | 1,200 (1) | 12 | 14,400 | 38,400 - 48,000 (2) | 2,592 | 43 | 22 |
| GSHP (8kWp) | 17,520 (3) | 3 | 52,560 | 19,200 - 36,000 (4) | 3,679 | 157 | 78 |
| Estimated Maximum Total | | | 66,960 | 57,600 - 84,000 | 6,271 | 200 | 100 |

Notes
1. Based on 300kWh/year per m² (Burnley RenewEL 2005)
2. Based on an install cost of £800 - £1,500 per m² (Burnley RenewEL)
3. Based on domestic GSHP load factor (Towards Broad Areas for Renewable Energy Development. Report for 4NW. Arup 2008)
4. Assume vertical borehole system. Installed cost £800 - £1,500 (Energy Savings Trust)