Case Study: Titanic Mill

PROJECT SUMMARY

This case study provides an overview of an initiative to create carbon neutral apartments at the luxury mill conversion Titanic Mill.

History

Lowestwood Mill is a Grade II listed textile mill in Linthwaite, West Yorkshire. Completed in the same year as the launch of the Titanic, the imposing 6-storey, masonry building is known locally as Titanic Mill. Now being refurbished, the building is being converted to provide 130 residential apartments on the upper 5 floors and a spa/leisure facility, a hotel and a restaurant and on the ground floor and part of the first floor.

HOW WAS IT STARTED?

In response to the challenge of climate change, the developer of Titanic Mill, Lowry Renaissance Ltd working in partnership with Energy for Sustainable Development Limited and Kirklees Metropolitan Council, has committed to making the apartments carbon neutral (on a net annual basis) and to minimise carbon emissions from the ground floor spaces.

Titanic Mill is part of a European scheme called SunCities. Through this programme Kirklees Council, with partners from the Netherlands and Germany, aimed to install a total of 3.05 MW (megawatts) of solar photovoltaic (PV) systems on several thousand dwellings. This includes a total of 400kW of PV in Kirklees. This represents 4.9% of the UK's installed capacity of solar PV (based on a 2004 estimate), which shows how significant this project is.

PROJECT AIMS

The project aimed to:

- **Reduce energy demand**

Lowry Renaissance incorporated a number of measures to reduce building energy use including high levels of insulation, high specification windows, mechanical ventilation with heat recovery and low energy appliances. Achieving lower energy consumption will reduce emissions of carbon dioxide and will result in lower running costs for the apartment owners.

- **Produce "green" energy**

As well as operating with lower energy demand, Titanic Mill will incorporate its own renewable energy generating plant to ensure that the energy consumed in the building will be supplied mainly from renewable sources.

TECHNOLOGY

The building features a roof mounted, 50 kWp solar photovoltaic system (part funded by the DTI Major PV Grants programme) and a biomass fuelled combined heat and power system (CHP), producing 100kW of electricity and 140 kW of heat energy, will be installed towards the end of 2007. This hybrid photovoltaic and CHP system is estimated to result in an annual CO_2 reduction of approximately 400 tonnes in the residential areas and 200 tonnes in the commercial areas.

The phased conversion and occupation plan means that early stages of the project use gas boilers for space and water heating. As later phases are occupied the CHP system will be commissioned. The gas boilers will eventually provide a support role for the CHP system during peak demand and maintenance periods. A number of options for sourcing wood chips are being considered.

The photovoltaic system is estimated to produce approximately 40,000 kWh per year of electricity (approximately 2% of the total demand).

The site will be connected to the local electricity grid. This will provide an opportunity to export excess electricity from the biomass CHP system and to purchase electricity from an electricity supplier when demand on-site is high or the CHP system is not operating.

ENERGY SERVICE COMPANY

Mill Energy Services

An energy service company called Mill Energy Services has been set up to manage the demand and supply of energy at Titanic Mill. The ESCo is a company limited by shares, wholly owned by the building's management company which, in turn, is owned by the residents and the ground floor tenants, that is the end-users of the energy.

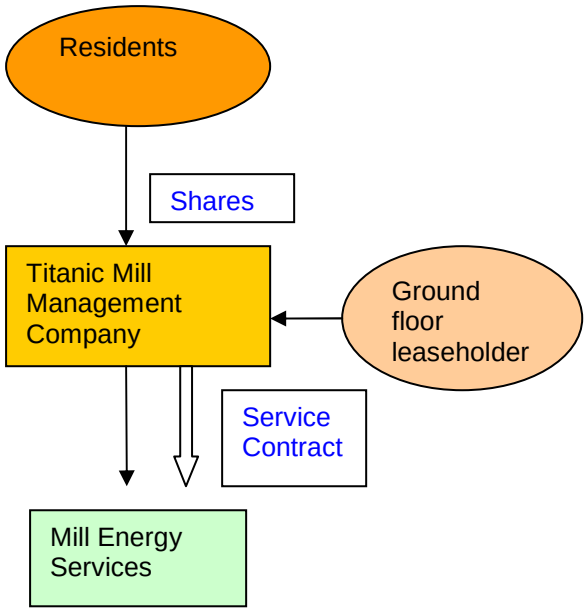

Figure: Ownership structure of Mill Energy Services

The vision for Mill Energy Services is to be a ground-breaking, small-scale energy service company demonstrating that a holistic approach to energy demand and supply can lead to the delivery of carbon neutral energy services for domestic customers. Mill Energy Services will achieve this on a commercially viable basis whilst maintaining competitively priced energy and water for its customers.

Mill Energy Services will be required through a service contract to operate the energy and water systems on behalf of the Titanic Mill Management Company and to provide metering and billing services.

MES will be required to play a central role in achieving the objective of "CO_2 neutrality" for the domestic properties, ensuring that this goal is met year on year and that it remains both financially viable and technically feasible.

Mill Energy Services will be involved in:

- Supplying hot water, electricity and drinking water to each apartment and to the ground floor commercial activities.
- Metering supplies of heat, electricity and water supplied to each apartment and the commercial activities
- Sourcing renewable energy fuels, i.e. wood chips, for the CHP system.
- On-site electricity generation using renewable energy systems and sale of excess electricity to the grid.
- Operating a borehole to provide water supplies.
- Bulk purchasing of the necessary supplementary supplies of gas, electricity and water.

Mill Energy Services will be operated as a not-for-profit company. It will charge the on-site end-users of energy and water for the heat energy, electricity and water it supplies according to the individual meter readings and a standing charge. It will also generate revenue from the sale of surplus green electricity to an electricity supplier. After running costs have been deducted from the revenue, any surplus will be used to build up a reserve fund for the long-term renewal of the energy and water system assets.

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