



Case study Caddsdwn Industrial Estate Bideford

RENEWABLE ENERGY 4
DEVON



Introduction

The development is an extension of the existing industrial estate and includes 11 small and medium sized new build industrial units, an extension to the business support centre and conversion of a 200 year old stone farmhouse and outbuildings to flexible office space.

Both the client, Torrington District Council (TDC), and contractor, Web Construction have whole-heartedly embraced sustainable development.

Project development

- TDC was keen to make the development as sustainable as possible, showing that economic development does not have to equal environmental degradation. So as well as using sustainable building materials they chose to include renewable energy generation in the form of solar photovoltaics, and biomass heating coupled with solar thermal in the former farm house and out buildings.
- For biomass heating to be feasible it was imperative that a local supplier could be found. Fortunately Woodfuel Solutions were able to meet this requirement and the timber for the wood-chip boiler comes from a sustainable source in Shebbear, approximately 12 miles away.
- The Centre Managers received 50% of the funding for 'Caddsdwn Phase-2' from Government Office for the South West, a total of £2 million. They were also able to secure a grant of £10,000 to cover 50% of the installation costs of the PV system from the Low Carbon Buildings Programme, so the installation took place in June 2006.

How the system works

Solar PV on the Business Support Centre converts sunlight into electricity and also provides passive summer cooling by shading the office windows below. The three modules are connected to the grid through G83 inverters which convert the electricity from DC to AC, increase the voltage, and match the frequency of the mains-supply. The system performance can be monitored from the reception area where a remote display is located, providing a graphic display of the performance that is constantly updated via a radio-link to the inverters.

The woodchip boiler is integrated with the solar water heating. The boiler is auger-fed from a supply of wood-chips stored in an adjacent building. The wood is burned in a forced-draft burner, heating water via a heat exchanger, which is then pumped through radiators and a wet under-floor heating system. The silo holds 30m³ of chip, which is enough for several months, even in winter, and the boiler requires no day-to-day maintenance as it produces very little ash. What little it does produce, it self clears to an ash pan, which needs emptying no more than once a month. The system helps to offset the business support centre's power consumption.

Costs and benefits

- The PV system produces around 2,880kWh of electricity and saves approximately 1.24 tonnes CO₂ pa. compared to mains electricity.
- The 4m² of solar thermal panels can provide around 1,760kWhth as hot water p.a. During the summer this equates to about 160 litres of hot water per day.
- The solar thermal system will save approximately 334kg CO₂ pa compared to mains gas.
- The wood chip boiler will use around 120m³ of wood chips each year, saving around 23 tonnes of CO₂.

Technical details

PV modules	3 x 1.2 kWp polycrystalline modules
Inverters	3 x Sunny-Boy 1100E inverters
Display unit	Sunny-Beam remote display
Installer	Filsol Solar
SHW	4m2 solar-thermal panels, 2.25kW thermal
Wood chip boiler	KWB - Multifire USV – 60kW
Installer	Econergy Ltd.
Wood chip supply	G30-grade wood-chips, <30% moisture content

Wider benefits

This sustainable development includes the use of local and recycled materials, such as reclaimed bricks and railway sleepers. Even the footpaths are made from recycled road aggregate. The scheme also makes use of rainwater harvesting, barn owl boxes, access for bats and the channelling of surface water to a small onsite lake.

The new build industrial units are designed for small technology based businesses, and are all timber framed, with good levels of insulation, high use of natural daylight, and passive-stack ventilation.

TDC also purchases the remaining electricity from a green tariff.

TDC's designer, Doug Jenkin, "...wherever possible we have tried to improve on the building regulations requirements by double. For example, the area of roof lights in the industrial units is twice what was required. As a result, the need for artificial lighting is reduced..."

Further information

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Boiler house



Boiler



PV also act as brise-soleil

