

Woking: New ways of cutting costs on power

Since Woking Borough Council implemented its energy efficiency and environmental policies in 1990/91, it has made rapid progress towards achieving its 10 year target to reduce energy consumption by 40 per cent between 1991/92 and 2001/2002. The council's achievement against target to 1999/2000, was as follows:-

- **Energy consumption**
savings 118,864,195 kWh, 36.9 per cent saving,
- **Carbon dioxide CO² emissions**
savings 64,310 tonnes, 56.6 per cent saving,
- **Water consumption**
savings 267,157,000 litres, 43.3 per cent saving,
- **Savings in energy and water budgets**
£3,956,187, 34 per cent saving.

The council's innovative energy efficiency recycling fund has meant that financial savings achieved by energy and water efficiency projects are ploughed back into the capital fund creating an ongoing recycled capital fund (ESCO finance model). This has led to a total investment of £2.2m over the last nine years from the original capital fund of £0.25m established in 1990/91 (the base year). This has enabled savings of nearly £4m over the same period to be made resulting in current annual savings of £700,000 a year.

Innovative projects

Innovative projects implemented by the council include:

- The first small scale CHP/heat fired absorption chiller system in the UK which provides heating, hot water services, air conditioning and electricity to the civic offices without the use of CFCs, HCFCs or HFCs as water is used as the refrigerant.
- The council installed the first local authority private wire combined heat and power systems in the UK to provide heating, hot water services and electricity directly to its sheltered housing residents reducing residents' total energy bills to an affordable level.

Tackling fuel poverty

The council has the most energy efficient public sector stock in the UK with an average energy efficiency rat-

ing of NHER 8 being part way through to achieving its target of NHER 9.

Due to the council's innovation in private wire residential CHP and its inherent efficiency, community heating residents connected to these systems pay typically six to seven per cent of their income (based on a state pension as the only income) for heating, hot water and electricity for approximately the same price that they were paying previously for heating only. This compares with the government's affordable warmth criteria of 10 per cent of income for heating only.

Thameswey

Thameswey Ltd is an Energy and Environmental Services Company or EESCO wholly owned by Woking Borough Council. It enters into public/private joint ventures to deliver its energy and environmental strategies and targets (primarily energy, tackling fuel poverty, water, waste and green transport).

Thameswey Energy Ltd is a public/private joint venture Energy Services Company or ESCO between Thameswey Ltd., and ESCO International A/S owned by Hedeselskabet Miljo og Energi A/S, a Danish green energy company. As the council is a minority shareholder within the requirements of the Local Authorities (Companies) Order 1995 the ESCO is treated as being in the private sector. Projects are financed with shareholding capital and private finance.

The ESCO concept

Thameswey is not an energy supplier but an energy services provider. The production and use of energy and their cost implications involves several things, including the cost of new or replacement primary energy plant (boilers and chillers), their eventual replacement in say 15 to 20 years' time, the related inflation, consultancy and financing costs, their maintenance and the consumption of energy.

Thameswey Energy Ltd, is an exempt generator, distributor and supplier taking advantage of the Electricity (Class Exemptions from the Requirement for a Licence) Orders 1995 and 1997 which enables Thameswey to supply green energy direct to customers rather than to the licenced energy dinosaurs.

**Allan Jones
MBE, energy
services
manager at
Woking Borough
Council,
outlines the
innovative
projects to
reduce fuel
poverty...**

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Woking town centre CHP – phase one

Phase one of the first Thameswey Energy Ltd, ESCO project is currently under construction in Woking town centre and is due for completion in January 2001. The buildings connected to the 1.5 MWe sustainable community energy network comprise the civic offices, Victoria Way car park, a new four star, 162 bedroom Holiday Inn hotel (with no boiler or chiller plant, since the hotel derives its energy services from the CHP station), the Planets Hotel, the Big Apple (a bar/leisure/bowling alley complex), Quakes Nightclub and the HG Wells Suite.

The combination of the green technologies connected to the sustainable community energy system (with reverse winter/summer thermal profiles) enables the CHP to be much bigger than conventional CHP achieving 125 to 130 per cent sustainability in electricity (ie., makes the site self sustainable in electricity with a minimum of 25 to 30 per cent available as export offsite over public wires to other local customers).

Initially, the surplus CHP power will be exported over public wires to other council buildings to reduce the authority's exposure to the Climate Change Levy, but as the system grows other local businesses and residential customers will be supplied in this way within the limitations (and barriers to green energy and local competitive supply) of the Exempt Licencing regime which is currently being reviewed by the government.

This project will be the first sustainable community energy system, operating in a competitive energy market, of its type in the world and has important implications for future sustainability and how to supply local green energy rather than outdated national energy dinosaur systems which have no future in a declining fossil fuel world.

Woking Park – fuel cell CHP

Planning permission and the second stage tenders have now been received for the project and are in the process of being evaluated. The sponsors of the project are the Department of Trade and Industry (DTI) via ETSU, AEA Technology Environment, BG plc and the US Department of Energy with the balance of funding being procured by the host organisation Woking Borough Council via the council's innovative Thameswey Energy and Environmental Services initiative.

The project will comprise a 200 kWe fuel cell CHP, together with photovoltaic screening, 950 kw_e of CHP, thermal store and heat fired absorption cooling serving the Pool in The Park, Leisure Lagoon and Leisure Centre by heat mains and private wire.

The quadgeneration fuel cell CHP system will supply low grade heat to the swimming pool water, high

grade heat to the heating systems, chilled water to cooling and air conditioning systems via the heat fired absorption chillers, electricity and 100 per cent pure water via a water recovery system to the Woking Park complex.

Subject to funding authorisation by Thameswey Energy Ltd, the project is expected to commence in



Allan Jones MBE with Angela Eagle MP, then minister for energy efficiency

October/November 2000 and be completed by June/July 2001.

Renewable energy

Although generally too expensive to implement as a stand alone technology on conventional payback criteria without grant support or subsidy, renewable energy is included in the Thameswey EESCO concept. This is where dilution economics and the advantages of private wire technology can be applied by integrating renewable energy with sustainable green technologies such as CHP, as applied to the Fuel Cell CHP project. The cost of renewable energy technologies should reduce in time.

Funding has been secured to implement the first integrated CHP and photovoltaics system in the UK in 2000/01. The 60 kW matched photovoltaics roof and CHP system will have a reverse winter/summer electricity profile for an existing private wire residential CHP system with the potential to achieve 100 per cent sustainability in electricity.

A second project will incorporate 4 kW of photovoltaic screening on the civic offices roof which will be interconnected to the Victoria Way multi - storey car park via Woking town centre CHP – phase one private wire system as phase one of a proposed solar electric vehicle scheme.