



SOUTHAMPTON DISTRICT ENERGY SCHEME

DELIVERING LOW CARBON ENERGY FOR OVER 25 YEARS



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to Utilicom Group Limited

Southampton District Energy

UK's No1 District Energy Company

COFELY District Energy is a specialist company of COFELY and is the UK's largest district energy company, providing district energy solutions to users in public, commercial, industrial and residential sectors.

With over 30 years experience, COFELY District Energy has the expertise to provide a comprehensive turnkey service for District Energy, encompassing:

- Initial feasibility/financial viability studies
- Provision of finance for projects
- System design
- Installation and commissioning
- Project management of associated works
- On-going operation and maintenance
- Long term delivery of energy to agreed output specifications

We are also one of the few UK-based companies to offer true Tri-generation experience, delivering low cost, highly efficient air conditioning and comfort cooling alongside heat and power generation.

Crucially, COFELY District Energy is independent of all equipment manufacturers and is free to offer the best technical and financial solution for each project.

COFELY District Energy operates some of the largest and most technically demanding District Energy schemes in the UK and are currently saving over 65,000 tonnes of carbon emissions, compared to traditional non-centralised systems.

COFELY DISTRICT ENERGY IN THE UK

245MW
of boiler plant

74MW
of chilled capacity

35MW
of CHP

50km
of district heating
& cooling pipework

65,000 tonnes
CO₂ saved per annum

The Southampton District Energy Scheme (SDES) is a pioneering project that has led the way in the delivery of sustainable supplies of heat, chilled water and power in the UK. For over 25 years SDES has pushed the boundaries of district energy and tri-generation and continues to expand into new areas. The scheme now encompasses over 45 energy users in the public and private sectors.

The SDES is operated by COFELY District Energy working in partnership with Southampton City Council – under the name of Southampton Geothermal Heating Company Ltd (SGHC). It is currently saving around 10,000 tonnes of carbon dioxide emissions per annum, utilising heat from a large scale combined heat and power (CHP), supplemented by geothermal energy and conventional boilers. It also incorporates a district cooling system.

Users include TV studios, a hospital, a university, a shopping centre, a civic centre, residential buildings and a hotel - as well as public and private sector residential developments.

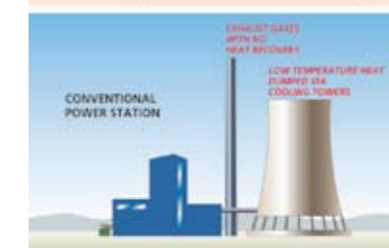
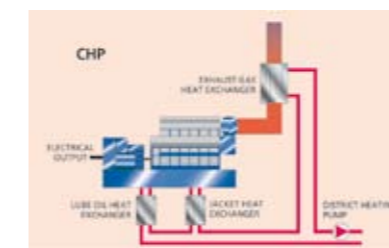
What is District Energy?

District energy systems produce low/zero carbon (LZC) energy from a central energy centre. The steam or water is distributed via insulated pipework, often laid with a cooling and electricity network, to individual buildings. As a result, buildings served by a district energy system do not require their own boilers or chillers.

District Energy is widely recognised as a sustainable, cost-effective solution to the provision of heating, cooling and power and scores highly in environmental assessment schemes such as BREEAM and LEED. It also facilitates compliance with Building Regulations Part L requirements. Increased use of District Energy coupled with Combined Heat and Power (CHP) is a cornerstone of the Government's strategy for reducing carbon emissions.

What are CHP and Tri-generation

CHP plant produces heat and electrical power. For much of the year the heat output is used for heating and hot water in the buildings served by the District Energy scheme, while the power meets their electrical requirements. In summer, when



heating requirements are lower, the surplus heat may be used to drive an absorption chiller to generate chilled water for cooling in these buildings.

Tri-generation delivers significant energy savings compared to conventional methods of providing heating, cooling and power.

What is an Energy Centre?

At the heart of every District Energy scheme is an Energy Centre serving a range of buildings through a network of underground pipes and cables. In most District Energy schemes the Energy Centre includes CHP plant, which may be combined with absorption chilling (Tri-generation) where there is a cooling requirement. Schemes may also incorporate other low and zero carbon (LZC) technologies such as fuel cells, biomass, solar thermal, heat pumps and high efficiency gas-fired boilers.

What is geothermal energy?

Geothermal energy schemes make use of heat energy that is stored deep underground, such as the 1.7km deep geothermal aquifer in Southampton. This hot water is pumped to the surface where its heat is extracted via heat exchangers.



Southampton District Energy Scheme

Since its launch in 1986 the Southampton District Energy Scheme has grown into a thriving and expanding multi-million pound, multi-source heating and cooling system, saving over 10,000 tonnes of carbon dioxide emissions per annum.

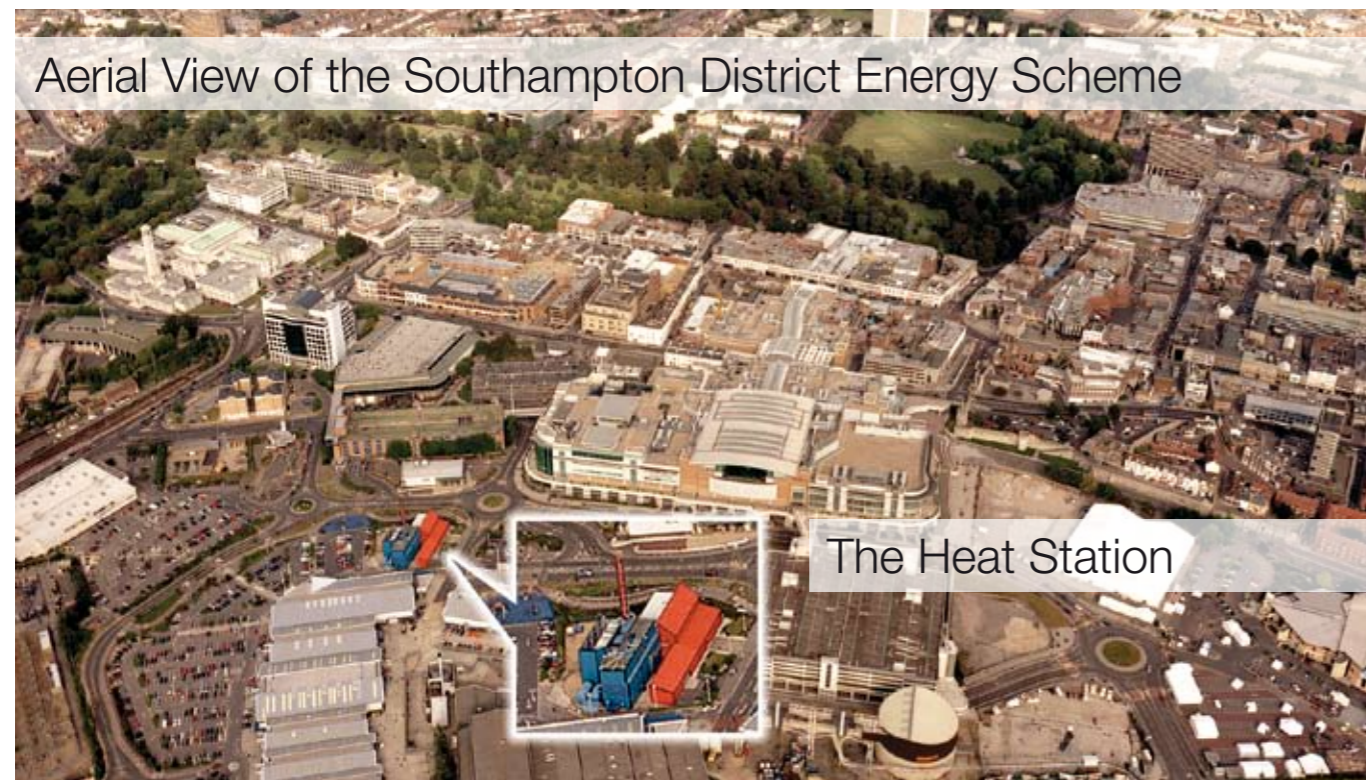
Initially, the scheme served a core of consumers from the geothermal well and this is now supplemented by large-scale CHP and absorption cooling, using conventional gas-fired boilers for 'top up' and standby. The heat from central plant is distributed through a 14km district heating network.

Continued organic growth is a key feature of the success of the Southampton scheme. Following the connection of the Civic Centre, the first commercial customer was ASDA in 1987 and more recent commercial participants include IKEA and Carnival (UK) Ltd. Chilled water supplies were added in 1994 and, again, demand for this service has grown rapidly.

More recently, in 2009, a cable was laid to the Port of Southampton, where electricity from SGHC's CHP engine is supplied under a 10 year Power Purchase Agreement. This enables the Port to consume all of the electricity generated by the 5.7MWe and 1.0MWe CHP engines at the Harbour Parade Heat Station.

Key facts and figures

- Saves 10,000 tonnes CO₂ annually
- Over 40,000 MWh of heat per annum
- 26,000 MWh of electricity from the CHP plant
- More than 7,000 MWh of chilled water
- 14km of insulated distribution pipe
- Serves buildings within a 2km radius of the energy centre
- Just 1°C temperature loss per km of pipe
- Hot water flow/return temperatures of approximately 80°C/50°C

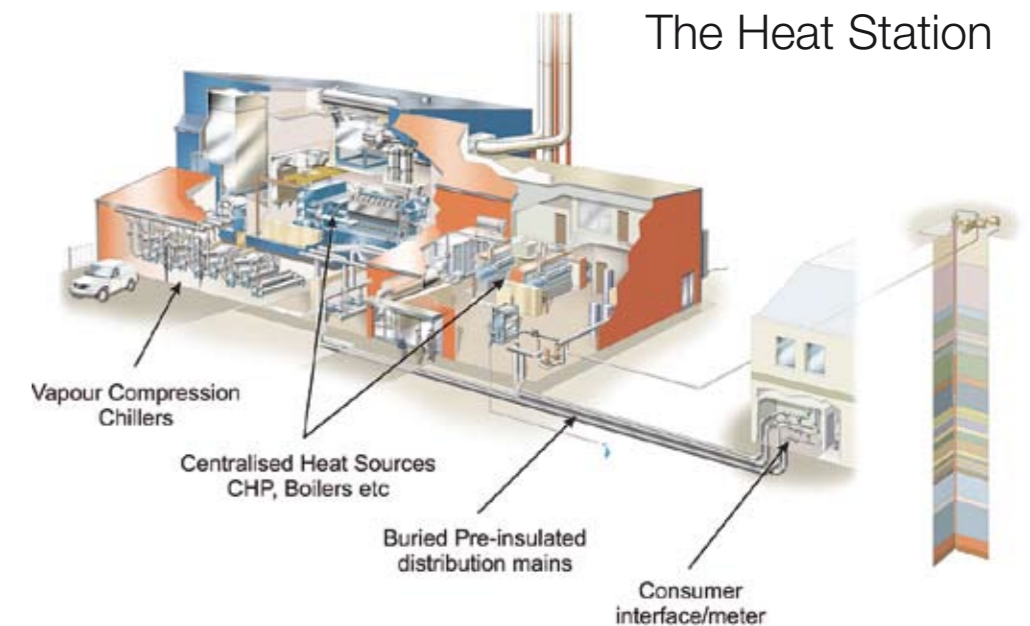


Scheme connections

Heat Station and Consumer Connections

The Scheme's main energy centre, located in the heart of Southampton's retail quarter, houses the core energy generation plant which provides heating, power and cooling to the consumers on the Scheme. The Energy Centre building was constructed in 1986 to house the geothermal well heat exchanger, district heating pumps and small scale CHP plant. Since that time the buildings have been expanded to include a 5.7MW CHP engine in 1998 as well as the district cooling plant, and in 2008 a reconditioned 1MW CHP was installed. This continued organic growth is one of the key features of the success of the Southampton scheme.

The Southampton scheme was developed on a low temperature, low pressure basis to reduce heat losses and maximise the life of the network. The network is operated using a flow temperature of approximately 80°C and a return of 50°C, with distribution pressures of approximately 5 Bar. This enables direct connections into most buildings, removing the need for heat exchangers, further reducing capital costs and energy losses.



ABP Connection

2009 marked the Scheme's electrical synchronisation with Southampton's Port, The connection enables the Port to consume, under a 10 year Power Purchase Agreement, all the electricity generated by the scheme's 5.7MWe and 1MWe CHP's located at the Harbour Parade Heat Station.

SGHC and Southampton City Council had long sought a commercial partner to locally consume the 23.5 million kWe of electricity generated by the scheme, which was previously exported to the UK national grid. Both parties were delighted when Associated British Port Southampton recognised the considerable benefits associated with the proposed connection.

To deliver the project, engineering history was made when during December 2008 COFELY District Energy's projects completed the final 'pulling' of a 25 ton "private wire" 33kV cable through underground ducts of over a mile in length across the city. Never before had such an ambitious engineering feat been attempted (and successfully delivered), a testament to the commitment and willingness of all parties to collaborate to deliver this remarkable project within the city. The link enables SGHC to supply the port with initially 55% of its total annual electricity consumption, although future increases to this figure are planned. The electrical connection will now aid and facilitate further expansion of the heat network and greater utilisation of the Scheme's CHP engines.

This truly is a mutually beneficial project, which has only been able to evolve through the Scheme's close collaboration and partnerships.

Joint Co-operation

Both Southampton City Council and COFELY District Energy firmly agree that the Joint Co-operation Agreement and the resulting close collaborative working, has been fundamental to enabling the SDES to grow to the size it is today. This agreement, originally signed in 1986, committed COFELY District Energy to:

- Develop the Scheme, initially utilising the city's geothermal resource, and then adding CHP

- Sell heat to the City Council at agreed savings, for its own administrative buildings

- Provide all necessary funding, technical and management expertise to ensure that the Scheme develops successfully

- Provide open book accounting and a long-term profit share to SCC.

In turn SCC committed to facilitate the success of the scheme by:

- Taking heat wherever practical for its own buildings

- Helping COFELY District Energy promote the Scheme to other potential users

- Providing general support to COFELY District Energy in developing the scheme – particularly through the Planning and Highways Departments

- Providing the land for the Heat Station at a peppercorn rent and transferring ownership of the geothermal resource to COFELY District Energy

- Treating COFELY District Energy as a "statutory utility" within the boundaries of the city.



Both SCC and COFELY District Energy cite their co-operative working relationship as a key factor in the success of the Scheme. In 2005 this groundbreaking agreement was renewed for a further 25 years. A total working relationship between the two partners, of 45 years.

The Joint Project Board, which is chaired by an Executive Director of the Council, regularly meets to examine development opportunities, such as new buildings or major redevelopments. However winning new customers to the Scheme is not always easy. There is still resistance to what is perceived to be new or unusual technology. The Council works closely with COFELY District Energy to actively promote the Scheme and the environmental and financial benefits which arise from a connection to the scheme. Southampton City Council's planning policy encourages connection to the city centre scheme.

Residential Developments

The Southampton scheme pioneered the addition of new build private housing in 1999 with the connection of the first such development in the UK; 'Park View' – luxury apartments constructed by Barratts (Southern). This development of over 100 dwellings delivers low cost sustainable supplies of heating to residents, via a thermal connection to the network. It is featured in Good Practice Case Study No. 400, published by DEFRA.

Each dwelling has an individual heat meter with COFELY District Energy reading these meters and invoicing the Managing Agent for energy supplies which are then recharged to the residents.

Scheme Awards

The high level of efficiency of the scheme won it the prestigious Queen's Award for Sustainable Development in 2001 and 2008, and a National Energy Efficiency Award in 2006. The scheme also holds the Green Flag award.

Future Expansion

Both COFELY District Energy and Southampton City Council view the scheme as a firm foundation from which to build a sustainable future. The District Energy network has also been designed to integrate additional low or zero carbon technologies as these evolve. In 2010, the HCA's Low Carbon Infrastructure grant enabled the network to extend to serve new and existing social housing schemes in The Gantry area.

Frequently asked questions

What energy services are available?

COFELY District Energy can provide hot water for building space heating and domestic hot water purposes. Chilled water is also available in some areas. Electricity can generally be provided if a CHP unit can be installed within the site or building. A thermal connection will then be made to the wider network.

Can connecting to the scheme help meet local planning obligations?

Yes. Many local authorities are choosing to address their climate change obligations by encouraging development of energy efficient, low carbon and sustainable energy schemes. Furthermore, CHP can help developments meet BREEAM and the Code for Sustainable Homes standards. Southampton's planning policies are contained in the Councils Core Strategy (www.southampton.gov.uk).

Can the scheme facilitate compliance with energy legislation?

Because the scheme is inherently efficient it helps to reduce energy consumption and carbon emissions, thus assisting with obligations under the Building Regulations, the CRC Energy Efficiency Scheme, Display Energy Certificates and Energy Performance Certificates.

Does electricity from the schemes substitute grid reinforcement from the regional electricity companies?

No. The scheme's power generation (where available) only offsets a proportion of electricity from the grid and does not substitute grid reinforcement.

Developers' Guidance

The SDES is open to both public and private sector consumers. The primary energy service is for heating and domestic hot water purposes, however chilled water can be provided to developments close to the Heat Station in West Quay. Electricity is available at local Energy Centres, generally where consumers are able to accommodate an on-site CHP unit, subject to there also being sufficient overall heat load.

A Developer's Guide to Connection

What savings can be expected from connecting to the scheme?

Savings are typically achieved in two ways, Firstly, capital costs are reduced by around 20%. Secondly, there are significant savings on plant room space.

What ongoing savings can tenants expect?

The inherent efficiency of District Energy schemes means that most consumers can expect to save 5-10% on their overall energy bills, compared to traditional methods.

Do existing heating and cooling systems need to be changed?

No. The temperatures and pressures used by the scheme are the same as those typically used in heating and cooling systems.

What is the typical contract period?

Contracts are typically for at least 20 years. Crucially, the value of the initial cost saving is maintained, in real terms, over the life of the contract through a transparent system of annual indexation.

