Coventry District Energy
Delivering Low Carbon Energy
The ground breaking scheme is the first of its kind in the UK, seeing ENGIE take the unique role of ‘heat shipper’ by buying heat from an Energy from Waste plant (EfW) and ‘shipping’ it via a 6.6km network of buried pipes to consumers in the city centre. The energy will then be sold back to the City Council and other scheme partners at a competitive rate.

The contract is delivered by a new subsidiary company, Coventry District Energy Company (CDEC) which is owned by ENGIE Urban Energy (EUE), working in partnership with Coventry City Council. The low carbon network has been delivered through a capital investment of £3 million by ENGIE with a further £2.3 million from the Government’s Homes and Communities Agency (HCA) for installation of the infrastructure.

In Phase I, heating and hot water is supplied to a range of Council buildings and Coventry Cathedral. The scheme will benefit the environment by providing low carbon heat which will be cheaper than heat from traditional gas boilers, providing the Council with reduced costs and also saving circa 1500 tonnes of carbon per annum – the equivalent of fuelling 300 homes. Later phases will connect to residential properties as well as businesses and institutions who want to save money and reduce their carbon footprint.
WHAT IS DISTRICT ENERGY?

District Energy is widely recognised as a sustainable, cost-effective solution to the provision of heating, cooling and power. District Energy scores highly in environmental assessments such as Code for Sustainable Homes (CFSH), Building Research Establishment Environmental Assessment (BREEAM) and Leadership in Energy & Environmental Design (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 in urban areas.

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 a CHP plant, which may be combined with 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 ARE CHP & TRIGENERATION?

CHP plants simultaneously produce 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 local or national electrical requirements. In summer, the surplus heat may be used to drive an absorption chiller to generate chilled water for cooling in these buildings (Tri-generation).

In the correct situation, this can deliver significant energy savings compared to conventional methods of providing heating, cooling and power.
Coventry has a long tradition in manufacturing and engineering and is recognised around the world for its strengths in these sectors. But the Council is leading the next wave of manufacturing – with green technologies and low carbon at the centre of its thinking. Coventry has always been at the forefront of innovation and this district heating scheme is a fine example of how the Council is working with ENGIE to combine innovation with opportunities for economic growth. Developers and investors will be able to enjoy the environmental, economic and social benefits that this brings.

Heat supply in 2013 was 9 GWh and has the potential to rise to a predicted 73 GWh over the contract period.

The first phase of the CDEC scheme is delivering low carbon heat to eight prominent buildings within the city centre including:
- Coventry Council House
- Coventry City Council Civic Buildings 1,2,3 & 4
- Herbert Art Gallery & Museum
- Coventry Sports & Leisure Centre
- Coventry Cathedral

The world famous Coventry Cathedral is one of the core consumers of the scheme’s first phase. The Cathedral identified that joining the city centre-wide scheme would prove a more consistent and lower cost basis for their heating.

The CDEC scheme has received £2.3 million worth of funding from the Government’s HCA for the installation of the infrastructure.

The HCA is the single national housing and regeneration delivery agency for England. Their work provides an opportunity for people to live in homes they can afford and places they want to live, by enabling local authorities to deliver the ambition they have for their own areas.

CDEC has been developed under an award-winning framework based on the successful Leicester, Birmingham and Southampton District Energy schemes. Financial savings for the schemes are developed on a whole life costing basis and maintained throughout the contract by indexing charges to national fuel prices, the retail price and labour indices.
CUTTING CARBON WITH ENERGY- FROM -WASTE

CDEC utilises recovered heat from the EfW facility on London Road in Coventry. EfW is the method of creating energy in the form of electricity or heat from the processing of waste after full resource recovery has taken place. The processing of waste releases energy which can then be used to generate power and usable heat. Depending on the waste stream used, different proportions of waste can be considered as biomass, resulting in carbon emission savings.

A European directive from 2000 sets and maintains stringent operational conditions, technical requirements and emission limit values for all EfW plants in the UK. As a proportion of the waste is biodegradable, the heat can be considered as renewable resulting in carbon savings and contributing to renewable energy targets.

THIRD PARTY CONSUMERS

Considerable financial, environmental and planning benefits make joining the CDEC network an extremely attractive proposition for building owners and developers.

A connection to the CDEC scheme would eliminate the requirement for any future boiler maintenance or replacement for new and existing buildings and developments.

RESILIENCE OF THE SCHEMES

ENGIE’s District Energy schemes are designed to provide added resilience to ensure continuity of supply. For example, in the unlikely event of a LZe (low/zero carbon) generation plant being offline, efficient top-up and back-up plant is in place within the energy centres to meet the demands of the energy network.

In order to help meet peak heat loads in an optimal way, the CDEC scheme also incorporates a 650,000 litre thermal storage vessel. The highly visible vessel features a carbon calculator display to show how much carbon dioxide the scheme is saving. This extra resilience also ensures there is no disruption to services during routine maintenance.

FUTURE PROOFING AND RENEWABLES

The inherent flexibility of the modular design of the energy centres also enables the scheme to expand with growing demand, while taking advantage of emerging energy efficient technologies as these become financially viable.

CDEC expects to add substantial renewable energy generation to the scheme as new consumer connections are made. This will not only reduce emissions but also help to future proof the scheme against fossil fuel shortages.
Thermal Storage Vessel

Energy from Waste (EfW) facility
Questions & Answers

Who is the CDEC scheme open to?

The CDEC scheme is open to both public and private sector consumers. The primary energy service is for heating and domestic hot water purposes. The exact suitability of each building for district energy requires a whole life cost cycle assessment, taking into account energy needed, proximity to the existing district energy system and the age and condition of the existing boiler plant and heating systems.

What is involved in connecting to the CDEC scheme?

The complexity and size of a connection will vary depending on the heat load, size of the building, location of the building to the District Energy pipework and also in the wider context of the District Energy scheme. As a minimum, this will involve underground pipework connections into the building (flow and return) and also a small metering station and heat exchanger system inside the building normally in the place where the current boiler system is installed. For larger buildings and multiple site locations, this could involve installing a CHP engine which will supply heat and power to the building and potentially export to the District Heating network and grid.

What capital savings can be expected from connecting to the CDEC scheme?

Capital cost savings are achieved in two ways. Firstly, it will provide a capital cost saving against a conventional stand-alone solution. Secondly, there are significant savings on plant room space.

Do existing heating and cooling systems need to be changed?

Not usually. The temperatures and pressures used by the scheme are the same as those typically used in heating and cooling systems. Heat exchangers are generally installed to ensure that the customer and client systems remain separate.

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.

Can the scheme facilitate compliance with energy legislation and meet local planning obligations?

Yes. As 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.
ENGIE: DISTRICT HEATING EXPERTISE YOU CAN RELY ON

ENGIE operates over 180 District Energy schemes throughout Europe, many of which were also financed, designed and constructed by ENGIE. ENGIE operates some of the largest and most technically demanding District Energy schemes in the UK.

With over 30 years’ experience, ENGIE has the expertise to provide a comprehensive turnkey service for 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
- Contract energy management including utilities procurement

We are also one of the few UK-based companies to offer a true Tri-generation experience, delivering low cost, highly efficient air conditioning and comfort cooling alongside heat and power generation. Crucially, ENGIE is independent of all equipment manufacturers and is free to offer the best technical and financial solution for each project.

Southampton District Energy scheme

A Tri-generation system saving over 11,000 tonnes of carbon dioxide emissions per annum. It utilises heat from a geothermal aquifer 1.7km below ground, supplemented by large scale CHP and conventional boilers. It also incorporates a district cooling system. Users include private, public and residential buildings.

Key facts
- Over 38 GWh of heat p.a.
- 23 GWh of electricity from the CHP plant
- More than 10 GWh of chilled water
- 12km of insulated distribution pipe
- Serves buildings within a 2km radius of the energy centre
- Just 0.5°C temperature loss per km of pipe

Queen Elizabeth Olympic Park & Westfield Stratford City, London

The Energy Centres for the Olympic Park & Stratford City, built and operated by ENGIE, include a 3MW wood chip biomass boiler and Combined Cooling, Heat and Power (CCHP) plant to generate heating, cooling and electricity. Hot and chilled water are distributed through a district energy network to the Olympic Park and Westfield Stratford City. It also extends to businesses in Stratford City and through to Stratford High Street.

Key facts
- Design, build, finance, operate and maintain contract
- Two integrated Tri-generation energy centres
- Over 16km of distribution pipework
- 12 GWh of heat from biomass
- A key element of the Olympic legacy for London
- Plant housed in low energy building, making extensive use of recycled materials
Leicester District Energy scheme
Leicester District Energy is a 25 year partnership between Leicester City Council and ENGIE to initially link four district heating schemes and then extend the enlarged network further across the City. The system is the largest of its kind within the UK to be installed city-wide in one phase. It uses a combination of gas-fired CHP and a biomass boiler. The scheme provides heating to several key civic buildings including De Montfort Hall, Town Hall, Leicester Central Library and the University of Leicester.

Key facts
- 91 GWh of heat p.a.
- 40 GWh of electricity from CHP plant p.a.
- 100 kW biomass boiler
- 14km network of distribution pipework
- 7000 tonnes of carbon saved p.a.

Whitehall District Heating scheme
ENGIE is responsible for the operation, maintenance and management of two Energy Centres, distribution of heat and power and procurement of gas and diesel. We are also extending the existing district heating network and optimising of power plant performance.

The Whitehall District Heating scheme generates and distributes high temperature hot water (HTHW) to the Whitehall Estate, which includes the Houses of Parliament and a wide range of the central government departments. As part of the contract, ENGIE sells heat and power to the Government Procurement Service at an agreed unit rate.

Key facts
- 4 x 6 MW High Temperature Hot Water boilers
- 4.9 MWe Gas turbine CHP
- Power exported to the grid
- ENGIE assumes financial risk relating to heating and power plant

Birmingham District Energy scheme
Serving local authority buildings and commercial properties in the centre of Birmingham, Broad Street District Energy scheme is a total design, finance, own and operate Tri-generation network.

The consumers include notable building such as the International Convention Centre, Library of Birmingham, Barclaycard Arena and the Hyatt Hotel. To the eastern side of the city, the scheme incorporates the Aston University and Birmingham Children's Hospital district heating networks.

An award winning partnership
ENGIE’s approach to partnering with Birmingham City Council was recognised at the 2011 Premises & Facilities Management (PFM) Partnership Awards where it won not only the Partners in Expert Services Award, but was also voted Overall Winner 2011 (‘best of the best’) by the judges.