District Energy Vanguards Newsletter

Issue 27 – August 2015

This District Energy Vanguards Network Newsletter is named August as it covers items emerging in that month. It comes at a time of unprecedented changes in the UK to the systems of support for the nascent low and zero carbon technologies.
In response Michael King explores below the issues surrounding how to finance the growing number of CHP/DH opportunities identified.
We invite your thoughts for future lead articles and offers of pieces of up to 500 words.
David Somervell, *Newsletter compiler*

Mind the Gap

In 2103 DECC published research on 'Barriers to deployment of district heating networks'. This identified the upfront capital cost of networks as one of the principal barriers. Last month's editorial commented on the apparent availability of a long term 'wall of capital' on the market.

Surely it should be possible to match the two together?

HNDU and the Scottish Heat Network Partnership are doing a splendid job of building a solid pipeline of projects across the UK. But once the development work is completed they will require investment to make them a reality. Many of the feasibility studies undertaken are showing projects are able to provide a return on capital in the range 5 -8%.

Projects will also need some headroom to allow for operational expenditure, otherwise known as the debt coverage ratio. For infrastructure projects this is a good rate and in the longer term as a secondary market develops it could be attractive to institutional investors. Short term commercial investors, however, are looking for returns higher than 10% even before costing in any risk factors.

How to close this gap?

Well, higher financing costs could be passed through to customers as higher charges. This is possible in areas where district heating is obligated under the planning system. But this would risk disgruntling consumers, as suggested in the recent *Which?* report. Outside of these areas heat networks compete against gas prices, prohibiting higher charges.

Alternatively, projects delivered under municipal ownership could access low cost capital through the Public Works Loan Board (PWLB), where rates are currently around 3.5%. Here the cost of capital is linked to the covenant strength of the local authority rather than the project finances. But not every council is willing to take this route.

There is fierce internal competition for capital funding, some councils do not have sufficient headroom to accommodate more borrowing whilst others are uncomfortable with the risks of a technology with which they are unfamiliar. Furthermore, it runs counter to the current political model which expects councils not to provide services directly but to commission them from external providers.

The gap could be closed through grant funding. In such straightened times this is unlikely to come from the public purse. Until recently, two routes to private sector grants did hold out promise. Namely, the Energy Company Obligation (ECO) and Allowable Solutions carbon offsetting scheme under Zero Carbon Buildings Policy.

Recent changes have put these in doubt. In 2014 ECO2 was changed mid-term. Initially it seemed that district heating would benefit as it was included as a primary measure and CHP was given a generous lifetime period. But relaxing the overall target and allowing credits to be carried over from ECO1 reduced pressure on ECO providers and including less costly loft insulation and cavity wall insulation made these measures more attractive in a competitive environment.

Additionally, the energy companies are now attempting to deliver their commitments through their own contracting arms or companies. More recently, the Government has announced that it does not intend to proceed with the Allowable Solutions scheme.

The options for DECC to provide routes to capital financing for projects appear to be narrowing. But they can still prevail if they are able to pull these elements together into a coherent strategy for low carbon heat.

Firstly, the current ECO term comes to an end in 2017. Calls are being made to remove control over ECO spending from the energy companies and put it into the hands of local authorities who are able to match investment where it is needed, take an area-base approach and prioritise affordability.

Secondly, the Zero Carbon Buildings Policy was designed to deliver near to zero carbon buildings by 2021 in order to comply with the EU's Energy Performance in Buildings Directive (EPBD). District heating is likely to be a crucial infrastructure for future developments meeting this target.

Abandoning the zero carbon homes policy means there is now no DCLG policy to require zero carbon buildings between 2016 – 2021. But, as recently pointed out by the University of Exeter, given the long lead times necessary to deliver major development projects local authority planners should still incorporate district heating as a cost-effective means of future-proofing areas for low carbon buildings in the long term.

Thirdly, the Scottish District Heating Loan Fund provides a model that could provide a bridge between short term high risk investors and long term institutional investors by aggregating a number of projects in one fund.

Lastly, a risk underwriting mechanism could provide confidence for investors, shaving percentage points off the return on capital required, and any risk adverse local authorities.

Michael King, *Editor*

UK, devolved and EU administrations

Policy, regulation, consultations, guidance and funding

DECC's revised family tree / corporate organogram of key staff under Amber Rudd.

Green Alliance analysis of likely DECC budgets to 2019: a "roller-coaster" - 90% staff cut?

DECC's Renewable Heat: standards and training research identified confusion & lack of clarity: 164 standards-type guidance documents on RH from 36 organisations.

CHP Quality Assurance programme (CHPQA) Guidance Notes revised on 26 August.

Since 2014 UK domestic fuel prices fell in real terms: 30% for oil, 4.2% for gas, 2.5% for electricity and 0.7% for coal according to Domestic energy price statistics released 29 Aug.

DECC publish positive Evaluation of the Heat Networks Delivery Unit by CAG Consultants.

DECC publish Low carbon pioneer cities Heat Networks Project: a process evaluation – Sheffield Hallam University reviewed the Heat Networks project supporting Leeds, Manchester, Newcastle, Nottingham and Sheffield deploy low carbon heat networks.

Consultation on UK Feed-in Tariffs (FITs) scheme proposes no change for micro CHP as only 645 installations to date – against cap of 12,000. Responses due by 23 October.

The Energy Technologies Institute (ETI) seeks EoI for help with modeling how electric heating can play a role in decarbonisation of heat in UK homes. By 8 September 2015.

UK conferences, workshops and awards

SIRACH / Institute of Refrigeration 1st October Network Meeting at Newcastle University with presentations from University of Warwick use on Organic Rankine Cycle, Newcastle City Council district energy plans, heat pump updates + tour of Byker District Heating Site.

Squeezing the Orange: Maximising CHP's electricity value – a half day ADE briefing for CHP operators:1-6pm Thurs 10 Sept at Pinsent Masons offices, London.

OPRA webinar: Gas Turbine CHP for Particle Board factories on morning 10 September.

UK News

400+ Anaerobic Digestion installations / 500MWe capacity listed in **ADBA Market Report**.

Rob Raine, University of Sheffield, blogged about a 2013 study by Buro Happold showing that tapping the waste heat rejected into London's environment could heat the whole city.

Council tenants "to save £1.4million from annual heating bills" as Sheffield Council set to install 6,000 heat meters – pilot homes "save average of £238 on annual heating bills".

Grant Thornton commentary on Energy from Waste potential to serve local DH markets.

Chicken manure to heat huge factory farm near Hereford – using Limerick-based BHSL deploying fluidised bed technology for a 1MWe CHP system – with RHI & ROC support.

Scottish Greens "Jobs in Scotland's New Economy" outlines transition from North Sea Oil - 200,000 jobs over 20 years in renewables, green chemistry, home insulation and forestry.

Europe

A new data centre planned by Apple in the town of Viborg, Denmark plans to offer low grade heat to supply DH network. Concerns raised by residents include who pays for heat pumps etc.

German project with 20 9.5MWe GE Jenbacher engines – with electrode boiler to better manage heat / power load balancing will cut emissions from coal (1,800,000 tCO_2e) to just 540,000 tCO_2e.

The International Renewable Energy Agency (IRENA) has published a configurable map of geothermal heat sources across EU >50degC at 1,000m and >90degC 2,000m down.

The Americas and Africa

CHP as a Compliance Option under Clean Power Plan – Template and Policy Options for State Regulators – July 2015 IIP report on how CHP can help meet new US EPA emissions targets

US EPA Energy Star CHP Award for massive $377m Thermal Energy Corp (TECO) facility serving Texas Medical Center in Houston – the world's largest medical facility. CHP/DH&C + buffer stores.

For more DH related news covering North American and beyond see the IDEA news blog.

China, Asia and Australasia

China DHA, Korea DH&CA and Mongolian Ministry of Energy have signed a Memorandum of Understanding with IDEA & Euroheat & Power promoting CHP/DH&C in their countries.

International conferences, symposiums and forums

7th Middle East DC Summit to be held in Doha (Qatar) – 10-11 November – this year's presentations, discussions and case studies are expected to focus on technologies, regulations, projects and financing.

General interest, technology and research

5 Nov – the feasibility of a novel DH system using new low-temperature technology – this work uses a laboratory-scale system to demonstrate the usability of a low-temperature technology based on ring network topology and a mass flow control system (Finland).

1 Nov – fault detection in DH substations – an important conclusion from this study of big DH-related data volumes is that automatic meter reading systems can provide proactive fault detection by continuous commissioning of DH substations in the future (Sweden).

15 Oct – power dispatch from integrated large-scale DHC and wind power systems – in this study a multi-objective optimisation algorithm has been developed as a component of a decision making method used to determine a final optimal solution (China).

1 Oct – evaluation of the most influential parameters of heat load in DH systems – this study uses the ANFIS method on data from a DH substation to identify predominant variables affecting the short-term multistep prediction of consumers' heat load (Serbia).

1 Oct – forecasting residential DH demand based on monthly gas consumption – this study uses three methods, namely, extreme learning machine, artificial neural networks and genetic programming to forecast heating demand (Malaysia-Iran).

5 Sep – integration of decentralised energy systems using the energy hub approach – in this study the original energy hub concept is further developed to include decentralised and local energy technologies such as PV, biomass, or small hydro power, together with DH systems and storage technologies at neighbourhood level (Switzerland).

1 Sep – measures to improve energy saving of DH systems in North China – measures proposed by the author include the management by heat source companies of generation, peak-shaving and primary networks, while heating companies manage secondary networks and heating services of end users.

15 Aug – actual and predicted energy use of new residential buildings compared – this study vindicates the requirement of the municipality that new residential buildings in the Östra Lugnet area be connected to the local DH network (Växjö, Sweden).

16 May – upscaling a DH system based on biogas cogeneration and heat pumps – in this study, an optimisation model was developed which maximizes profitability based on DH&C cooling demand patterns and enables optimal CHP size, boiler size, and operational hours to be determined for various scenarios (Netherlands).

Link to the glossary of terms and acronyms

This monthly newsletter is prepared in Edinburgh with support of correspondents – in Aberdeen, London and elsewhere – who alert us of useful content and upcoming events.

This is David Somervell's first one so is much shorter than Mike Martin achieved – thanks to him for the "General interest, technology and research" section – and we hope you find it useful.

All contributions welcomed – please email to David.Somervell@ed.ac.uk.

This is a legacy undertaking following the Heat and the City project led by colleagues at the University of Edinburgh which continues to bring together leading practitioners promoting District Energy in the UK.

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