District Energy Vanguards Newsletter

May 2016

Editorial

We've got five years…

No – not a David Bowie song but how long we have got to turn the current cottage industry that is district energy in the UK into a robust and self-sustaining one. This, of course, refers to the Heat Network Investment Programme (HNIP). The DECC team overseeing its development have popped up at events in and out of purdah between the elections for local councils and the Scottish Government and the EU referendum. During which time the total investment package from Government seems – very welcomingly – to have crept up from £300m to £320m. Through the HNIP team's direct and sometimes indirect engagement with stakeholders over the past two months we have learnt something about the likely shape of it.

Firstly, we can speculate that there will be a Heat Network Investment Fund to allocate and manage the funds that will sit outside of government. This will allow it to continue to manage any investments, residual or otherwise, still in play after the five year term is over.

Secondly, the initial probable focus will be on local authorities. This will then open up to other public sector organisations – universities and hospitals – and it may in the long term also be opened to commercial organisations depending on the burn rate in getting through the money. However, there will be no constraint on the type of vehicle in which local authorities choose to invest funds received. So they could invest it in privately-owned entities developing heat networks in their area. This will cleverly ensure that the commercial ESCOs will be motivated to scour the area for opportunities to bring to the host local authorities. However, the funding cannot be used to invest in projects that are commercially attractive propositions that would happen anyway. Nor will it be used to prop up projects that will never stack up. Such eligibility will need careful policing as the tendency of technical consultants to 'goldplate' projects will falsely boost capex and consequently produce rates of return lower than they are in reality. The availability of the funding may also lead to 'massaging' projects to ensure that they fit.

Thirdly, it seems likely that the main form of investment will be as soft loans. The definition of 'soft' is not only low interest rates but also rolling up interest during the construction phase so repayment happens when revenues begin to flow, repayment holidays to help avoid cash flow crises and so forth. Amazingly, the length of term could be linked to the life span of the asset. As the pipe infrastructure could last up to 50 years that is very long indeed. Hence the need for the Heat Network Investment Fund to sit outside government to manage this investment. Loans should place a financial discipline on projects to manage their finances prudently. They will also

mean the funds are re-cycled. But whether they are re-paid to Treasury or re-invested is not clear.

There may be a case for grants. But the circumstances in which they may be offered does not seem to be clear at present. Likewise government taking an equity stake in projects or providing guarantees to underwrite the futureproofing of networks to meet speculative demand are possibilities but their application does not seem clear.

This may be linked to the fourth area which is what criteria will be adopted for investment. This seems very hard to decide and most probably will need a lot more work to determine a cogent set of principles. Whatever, simplicity should be an overriding one. But in terms of technical quality it seems likely there will be a requirement for designs to comply with the CIBSE Heat Networks Code of Practice.

Lastly, to provide for customer protection it seems likely that membership of the Heat Trust will be a requirement. There is also an idea of benchmarking costs against gas. Personally I think it should be on actual costs with some degree of open book transparency, possibly through the Heat Trust adjudicator. As production sources move away from gas as a fuel it seems unfair to both customers and operators to index it against what is likely to become a volatile price.

So what is missing? It seems likely that HNDU will extend its support into the commercialisation phase. But rather like a road engineer removing one set of barriers only for traffic to speed on to the next set of traffic lights, projects benefitting from such support may speed through this phase only to eventually crash into the ditch that is procurement. In consulting on the need for the District Energy Procurement Agency (DEPA) through workshops hosted by the Vanguards Network last month it seems that only those local authorities closest to delivery realise what a costly and complex barrier it is. DEPA will be able to address this barrier – but it is in a 'chicken and egg' situation in that it needs resourcing to procure frameworks of providers but potential users will only consider paying subscriptions once the frameworks are in place. As this is a non-capital activity it seems that the HNIP funds cannot be top-sliced to provide the necessary funds. Despite the fact that it will ensure that the government gets 'best value' for its overall investment by bearing down on providers pushing up their prices in anticipation of a feast. Possibly more thought could be given by the HNIP designers on how this might be addressed.

Once the EU Referendum is out of the way it is likely that DECC will define the HNIP more clearly. It is understood that the first call due in the autumn will be used as a pilot to test if the cogs and wheels are spinning smoothly. The feedback will then be used to make adjustments for later stages.

Project sponsors and industry should be gearing up to be ready.

Michael King
Editor

Spotlight on :

District heating in smarter, greener cities: A guide to commercial structuring and financing (Green Investment Bank) 24 May 2016

Finance options

The table below sets out some possible sources of finance and project characteristics that most suit the type of finance, together with how GIB could assist the financing.

Types of capital	Project characteristics	How GIB can assist
Corporate cash reserves • Cash resources used for projects with short paybacks, newer technologies, or where external funding not available or expensive • Should consider alternative uses and long term nature of assets	• Small size • No/low build out risk/limited build out potential • No/low demand risk • Low returns	Not applicable
Corporate finance (debt) • On-balance sheet, against the scheme owner's (borrower) credit rating • Fully owned arm's length entity to separate business unit can be established • Public sector use of Debt Management Office (DMO) finance • Banks can make term loan to private or public sector clients	• Small – medium size • Low build out risk/limited build out potential • Low demand risk • 100% public or private sector owned • Low – medium returns (sufficiently above internal cost of capital)	GIB's Green Loan offers the public sector a low, fixed-rate loan for periods of up to 30 years. It has been specifically designed to provide a flexible financing mechanism able to facilitate "spend to save" low carbon projects with repayments profiled to forecast project economics
Project finance (equity and debt) • Special purpose vehicle • Long term service provision with project risk transferred • Off-balance sheet, limited recourse finance • Some risk underwriting by the scheme owner could reduce cost of capital • Equity required and debt finance possible for large projects	• Medium – large size • Medium build out risk/visible build out potential • Some future demand risk • 100% private or public sector owned or public/private joint venture • Risk adjusted commercial returns	GIB's participation would be project specific. GIB could provide equity or debt, working with co-investors or could aggregate smaller projects initially
Grants/subsidised funding: • Support for demonstrators and new technologies, where external funding not available or expensive • Support for future proofing/oversizing network infrastructure • Central Government/European funding	• Small – large size • High build out risk/visible and speculative build out potential (oversizing) • High demand risk • Public/private sector owned • Low – medium return (sub-market given project risk)	GIB invests on a commercial basis and therefore cannot provide grants or subsidised capital. However, GIB can flexibly co-invest alongside this type of capital

UK News

Energy Minister unveils new energy centre at Elmsbrook, NW Bicester (nwbicester.co.uk) June 1 2016
Elmsbrook at NW Bicester developer, A2Dominion, and energy provider SSE today [23 May] welcomed Andrea Leadsom MP, Minister of State for Energy and Climate Change and Victoria Prentis, MP for North Oxfordshire, to mark the opening of the scheme's energy centre. The CHP, which will be operated and maintained by SSE once commissioned, marks the progression of the first phase of Elmsbrook – which will deliver 393 true zero carbon homes and is the initial phase of the UK's first eco-town of 6,000 homes.

Renewables have a place in community heating (Energyzine) 1 June 2016
John Bailey, Sales Director for commercial and renewable systems at Vaillant UK, believes that as the UK gets serious about communal heating systems consideration should be given to flexible and renewable technologies as the energy source.

Government urged to back district heating to bring a warm glow across the economy (The National) 31 May 2016
THE Scottish Government must prioritise a Warm Homes Act which helps deliver clean, affordable heat to homes, according to groups from the voluntary, renewable and academic sectors. The groups are urging new Energy Minister Paul Wheelhouse to push through the right regulatory framework to develop district heating, a system for distributing heat generated in a central location.

MSPs and industry call on Scottish government to boost district heating (BusinessGreen) 31 May 2016
The new Scottish government should bring in regulations to encourage investment in district heating, a group of businesses, politicians and civil society groups said today.
The minority SNP government should take advantage of the opportunity of the Warm Homes Act's cross-party support to promote district heating, according to the groups, which include Environmental group WWF Scotland, the University of Edinburgh, heatpump manufacturer Star Renewable Energy and cross-party MSPs.

Biomass district heating for a Somerset village (Centre for Sustainable Energy (CSE)) May 2016 The Somerset village of Woolavington is in line for a new biomass district heating system that will supply heat to around 300 local homes, and we're talking to the householders to make sure the system meets their needs.

Call for 'shared boilers' to heat homes (BBC News) 31 May 2016
Household boilers should be replaced with large shared boilers to heat multiple homes in Scottish cities, according to a group of MSPs, environmentalists and academics.
They called on the Scottish government to encourage investment in "district heating" as part of a Warm Homes Act.

MSPs and industry call on Scottish government to boost district heating (Business Green) 31 May 2016
The new Scottish government should bring in regulations to encourage investment in district heating, a group of businesses, politicians and civil society groups said today. The minority SNP government should take advantage of the opportunity of the Warm Homes Act's cross-party support to promote district heating, according to the groups, which include Environmental group WWF Scotland, the University of Edinburgh, heat pump manufacturer Star Renewable Energy and cross-party MSPs.

District heating could be subsidy free by 2021 (ADE Press Release) 26 May 2016
Low carbon district heating networks could succeed without subsidy from 2021 if put on a level playing field with other networks, says a new report published today by the Association for Decentralised Energy (ADE).

District heating in smarter, greener cities: A guide to commercial structuring and financing (Green Investment Bank) 24 May 2016

District Heating Network Completes at £330m Campus (decentralized-energy.com) 20 May 2016
The University of Northampton in the UK is relocating to its new £330m Waterside Campus, located on a 58 acre brownfield site, and Vital Energi have completed the 1,600m district heating network which will carry low-carbon heat and hot water throughout the campus.

How does cogeneration fit in with the Heating & Cooling Strategy and ETS? -(Cogeneration Channel) 20 May 2016
According to the Heating & Cooling strategy, cogeneration meets three needs perfectly: security of supply, decarbonisation and affordability. However, the Emission Trading System (ETS), with Phase 4, is still considering which technologies are appropriate for reducing emissions. Jonathan Graham of the ADE takes stock of the situation on these current issues

ENGIE (formerly Cofely GDF SUEZ) has been selected to form a JV with Cheshire East Council (ENGIE news release) 19 May 2016
ENGIE (formerly Cofely GDF SUEZ) has been selected to form a Joint Venture (JV) with Cheshire East Council to create a new flagship company to promote eco-efficient district heating networks in the Borough. Opportunities for district heating networks in East Cheshire and surrounding areas will be explored and developed through this JV with a focus on low and zero carbon sources of heat, including geothermal energy. District heating networks will help Cheshire East Council, its residents and businesses to benefit from cleaner, more affordable, and secure energy and to realise the Council's long-term ambition to deliver a low-carbon economy.

The Appliance of Science: How residents on community heating schemes can benefit from the latest energy technology (switch2blog) 13 May 2016
Such technologically advanced heat networks lie at the heart of the more decentralised energy systems that are widely expected to develop in future. From smart meters to energy sources, all areas of community heating systems are seeing techno-

logical advances, producing incremental enhancements that add up to cleaner, lower cost and higher quality heating provision.

Community scale heat pump to retrofit social housing estates – 10 May 2016
Heat pumps, such as those made by Voltimum UK partner Dimplex, use an established, clever and highly efficient technology that is finding its way into ever more energy-efficient homes. But for larger scale estates, bigger heat pumps are needed – as is the case with this Scottish development.

District Heating at Banbury Park in Walthamstow (evinoxenergy) 9 May 2016
Evinox Energy recently worked with Higgins Construction & Circle Housing on a development in the creative heart of Walthamstow. Banbury Park is mixed-use scheme comprising of private and shared ownership homes, with landscaped community spaces, shops, offices, a community centre and public square that will help lead the regeneration of the area. The site was a former warehouse, industrial works and electronics factory located in Waltham Forest. Evinox engineers completed a full design of the primary network for the district heating and hot water system for a complex of 6 different types of building.

Presentations from Vanguards Workshop – Heat Networks Investment Project and District Energy Procurement Agency (April 2016)
Michael King, DECC's Heat Networks Investment Project
Michael King, District Energy Procurement Agency (DEPA) Introduction
Nadeem Arshad, DEPA Company Form and Governance Structure
Peter Dahl, Procurement the Värmek Way

Managing Heat System Decarbonisation: Comparing the impacts and costs of transitions in heat infrastructure
Annexes
Imperial College Centre for Energy Policy and Technology) 5 May 2016
The paper's main focus is on the enabling networks, which provide the link between energy producers and end users. This element has not been extensively documented before, particularly with regard to the transitional impacts that will arise if new network infrastructures are installed. The paper considers electric heat pumps and resistive heating, district heating schemes, decarbonising the gas grid and combinations thereof.

Community-led heat projects: a toolkit for heat networks (Regen SW for DECC)
This toolkit aims to help community energy groups and local authorities understand some of the opportunities, and challenges associated with delivering a community-led heat network project. The toolkit is designed to de-mystify some of the aspects of community heat network projects, as well as provide signposting and links to additional resources.

Fife could be focal point for research into energy source (The Courier) 3 May 2016
Fife could yet become the focal point for plans to heat homes and businesses around Scotland using warm water recovered from rocks deep below the ground….Development of a wider district heating network which could heat homes in Leuchars and

Balmullo had been looked at, but the study concluded that a single well would not provide sufficient heat to expand the network beyond the Guardbridge site.

Solar industry will keep fighting after Government threaten to cut off support (Blue & Green Tomorrow) 3 May 2016
The potential for solar thermal is significant. Solar thermal is already used for cleaning purposes in British dairy and fruit farms, and a swimming pool in Bristol gets 70 per cent of its hot water from solar thermal. A new district heating scheme in Exeter uses 2,000m2 of solar thermal panels.

Power plant firm offers free heat to Northampton homes in battle over public opinion (Northampton Chronicle) 4 May 2016
Developers of the £120 million new power plant in Northampton have held back submitting a planning application and are offering free heat to homes. …"A district heating network could significantly improve the situation for many homes and we would be generating enough heat for 2,000 households." The company has mapped out provisional areas the heat network could reach via www.northamptoncommunityenergy.co.uk.

Renewable Heat Incentive (HoC Library Note) May 3 2016
The aim of the Renewable Heat Incentive is to support households and businesses **to** generate renewable heat for their buildings. The first phase of the Renewable Heat Incentive, non-domestic RHI, was introduced in 2011. The domestic RHI was opened to applicants in 2014.

Carbon Footprint of Heat Generation (POST Note) May 3 2016
Heat Policy takes into account the carbon footprint of different heating technologies. This POST note summarises evidence about the carbon footprints of current and emerging heating technologies in the domestic, commercial and industrial sectors. It then outlines wider considerations for heat policy and broad assessments of the 'best' way to reduce emissions from heating.

Using CO2 for heating and cooling in urban areas (phys.org) May 2, 2016
Commonly used as a 'clean' liquid refrigerant in supermarkets, carbon dioxide turns out to be an efficient vehicle for transporting the energy needed to heat and cool buildings, particularly in urban settings. EPFL researchers have demonstrated that a heating and cooling distribution network using CO2 could lead to over 80% in final energy savings. Their work is backed by a prototype and simulation run in the commercial district of Geneva.

International News

CHP, district heat for Munich urban redevelopment (decentralized-energy.com) 1 June 2016
E.ON is to supply heating, cooling and power to a sustainable urban redevelopment project in the heart of the German city of Munich.

Solar coupled with cogeneration and batteries could overcome any cloudy, cold winter day (PVBuzz) 1 June 2016
Known for snow rather than sun, Michigan's Upper Peninsula could still support a significant network of solar photovoltaic (PV) energy systems. Solar energy alone in the region is seasonally restricted. However, solar coupled with cogeneration and batteries could overcome any cloudy, cold winter day.

The power of heat (decentralized-energy.com) 23 May 2016
COGEN Europe's annual conference highlighted the issues and opportunities facing the industry today, reports Diarmaid Williams

Record Breaking Interest in Future District Heating and Cooling (4dh.dk) 18 May 2016
The interest from researchers and industry in 4th generation district heating and smart energy systems is growing. The 4DH Research Centre has received a record-breaking 110 abstracts for this year's conference on 4DH and smart energy systems in September. This is a substantial growth from last year, where around 70 abstracts were received. Consequently, the Research Centre is expecting 250-300 visitors discussing future district heating and smart energy systems at the conference this year. This makes it the biggest academic conference on district heating in Europe in 2016, notes Sven Werner, part of 4DH's management group and Professor at Halmstad University.

DOE researchers see Pittsburgh's progress on district energy (Pittsburgh Post Gazette) 4 May 2016
… On Tuesday, the tours took researchers to Duquesne University's combined heat and power facility in Uptown, which produces about 80 percent of the electricity and all of the heat consumed on the 50-acre campus; the Pittsburgh Allegheny County Thermal plant, which pumps heat to 59 buildings in Downtown; and NRG Energy's plant, which provides steam heat to more than 30 buildings on the North Side.

Events

ADE Event | Energy in London: Delivering the Mayor's Manifesto 3 June 2016
Following the recent election of Mayor Sadiq Khan, this event will offer attendees a first opportunity to better understand how his new administration will approach energy policy in Greater London, as well as hear expert feedback from industry attendees on how to best ensure he achieves his goals.

REHAU District Heating Workshop
Tuesday 14th June Museum of Science and Industry, Manchester, M3 4FP
REHAU is staging its third hugely popular District Heating Workshops at the Museum of Science & Industry in Manchester.

Scottish Renewables Low Carbon Heat Conference 2016 7 June Perth

Scottish Federation of Housing Associations Heat Metering in District Heating and Communal Heating Schemes 8 June, Glasgow

IDEA 26 Conference Building Capacity for Climate Adaptation and Community Energy Planning 20-23 June 2016 St.Paul Minnesota

The 2nd International Conference on Smart Energy Systems and 4th Generation District Heating takes place in Aalborg, Denmark on 27-28 September 2016. Register for the conference here.