Aberdeen Heat & Power

Delivering affordable warmth to Aberdeen through district heat networks

Seaton Energy Centre, Aberdeen

Aberdeen Heat & Power (AHP) is an arm's length not-for-profit company limited by guarantee established in 2002 by Aberdeen City Council to address fuel poverty in the 59 high rise residential blocks it owns. Heat in these blocks has been provided by all electric night storage heaters that are expensive for residents to operate, difficult to control and have a high carbon content. Consequently, they are unpopular with residents, there has been a high incidence of underheating resulting in poor health and a high level of fuel poverty. The Council commissioned an options appraisal from external technical consultants who identified that heat networks with CHP would give the residents lower operating costs and more control over their heating systems as well as reduce carbon emissions.

The Council lacked the knowledge and expertise internally to manage the design, installation and operation of such systems as well as access to capital. By creating an arm's length company, it was able to harness such expertise within it as well as allowing the company to raise external capital anchored by a medium length contract (10 years) with the Council for the provision of services.

Many the blocks are laid out as clusters. The Council has a rolling capital programme for the maintenance and refurbishment of its housing stock. AHP has shadowed this capital programme

and installed the new energy systems during the refurbishment. Funds earmarked within the Capital Programme for the normal upgrade of the energy system were ringfenced and provided to AHP. The company augmented this money with funding available from regulatory mandated programmes operated by mainstream utility companies as well as raising debt finance itself. Clusters were addressed one by one resulting in a series of heat islands around the city, each served by its own plant room. There are now four distinct networks. These are shown below with the CHP and boiler capacity in each plant room. It also includes two thermal stores at Seaton and an absorption heat pump on the back of the chiller at the Linx Ice Rink.

City Centre Network	Generators kWh	Boilers kW	Total kW	Max Demand Feb 19
Seaton	2 x 1,200kW	2 x 2,000kW	6,400kW	5,750kWh
Linx	1 x 1,400kW		1,400kW	
Beach Leisure		3 x 1,000kW	3,000kW	
Town House		3 x 340kW	1,020kW	
2 x Thermal Storage	2 x 2,200kW		4,200kW	
Total	**3,800/8,200kWh**	**8,020kWh**	**16,220kW**	**Availability 10,470kW**

Stockethill E.C.	Generators kWh	Boilers kW	Total kW	Max Demand Feb 19
Stockethill	1 x 1,200kW 1 x 330kW	3 x 1,000kW	4,530kW	1,700kWh
Total	**1,530kWh**	**3,000kWh**	**4,530kW**	**Availability 2,830kW**

Tillydrone E.C.	Generators kWh	Boilers kW	Total kW	Max Demand Feb 19
Tillydrone	1 x 1,200kW	2 x 2,000kW	5,200kW	1,174kWh
Total	**1,200kWh**	**4,000kWh**	**5,200kW**	**Availability 4,026kW**

Hazlehead E.C.	Generators kWh	Boilers kW	Total kW	Max Demand Feb 19
Hazlehead School	1 x 440kW	3 x 1,000kW	3,440kW	1,500kWh
Total	**440kWh**	**3,000kWh**	**3,440kW**	**Availability 1,940kW**

				Max Load in Feb19
TOTAL	**6,970kW/4,400kWh 11,370kWh**	**18,020kW**	**29,390kWh**	**10,124kWh Avail: 19,266kWh**

In the early days of the company these projects was seen as a series of '*one off's*'. But as each heat island gradually expanded it became apparent that connecting the them together with a ring main would enhance the security of supply, technical resilience and improve the financial case overall. Consequently, **a strategic vision** was developed and this is shown in the attached map.

The first cluster to be addressed was Stockethill. As rxplained above, this was perceived as *'one off'* and the plant room was sized appropriate to the Stockethill cluster. As the network subsequently expanded to the neighbouring cluster of Cairncry and beyond it was found to be inadequate to accommodate the expansion. Consequently, a lesson learnt was to adopt a **flexible engineering philosophy** to allow for expansion. In particular, heat mains and plants on the path of the strategic ring main need to be oversized in order to accommodate expansion. The picture below shows the interior of the Tillydrone plant room. Ample space is allowed for the installation of additional capacity at a later date.

As described above, the expansion strategy closely shadowed the Council's Capital Programme and fulfilled the Council's aim of addressing fuel poverty in the 59 high-rise blocks. As such, AHP has now installed heat networks in 49 blocks and is currently working on 2 blocks. In total 3,309 flats are now connected to the heat networks served by the 4 energy centres identified above. Tenants of the Council are given the option whether to connect or retain the current heating system. Residents who have purchased their flats are required to pay for the installation of the internal wet system and connection to the heat network. Despite it being optional, 83% of occupants (tenants and residents) have chosen to connect in the most recent project whilst 97 – 100% have connected in the earlier projects. This demonstrates confidence in AHP to deliver a valuable heat service to its customers.

In order to deliver the installation and maintenance of the heat network projects AHP has developed a core of 5 staff positions comprising of 4 experienced project managers and one administrative support person. Additionally, the development programme has created 16 jobs in contracting companies in the supply chain. This has created a platform of local **management and expertise in Aberdeen that is able to respond rapidly and flexibly to changing circumstances and opportunities**.

In June 2017 a disastrous fire occurred in the Grenfell Tower in London 72 people lost their lives. Subsequently, an inquiry was mounted into the causes of this fire and what recommendations could

be made to mitigate the risk of it re-occurring in other high-rise blocks or a similar age. Such mitigation measure could cost considerable amounts of money. Until the inquiry concludes it is uncertain how any such measure will be funded. Consequently, Aberdeen City Council has paused its Capital Programme for the refurbishment the remaining 8 high-rise blocks. This has created a challenge for AHP to sustain its current level of expansion and provide a pipeline of work for core staff and the local supply chain. Consequently, the company has pivoted to focus on retrofitting connections to non-residential buildings and new build residential properties. In turn a secondary challenge was that non-residential building owners we deterred by having to pay upfront connection charges. However, many of these projects were commercially attractive with high returns of capital a relatively short payback periods. Therefore, a policy was put in place to allow the company's Chief Executive Officer to negotiate with building owners for potential connections in which the company will invest to defray the cost of connection. To date 29 non-residential building have been connected. These are listed below:

Connection	**Energy Centre**
Beach Leisure Centre	Beach
Lynx Ice Arena	Beach
Beach Ballroom	Beach
Aberdeen Sports Village	Seaton
Aberdeen Aquatic Centre	Seaton
Hazlehead Academy	Hazlehead
Denseat Court	Hazlehead
Aberdeen Town House	Beach
Lynx Ice Arena	Beach
Frederick Street Health Centre	Beach
Riverbank School	Tillydrone
Hanover School	Beach
Marischal College	Beach
Constitution Court	Beach
Victoria House x 2	Beach
Aulton Sports Pavilion	Seaton
Frederick St Business Centre	Beach
Middlefield Community Centre	Stockethill
Aberdeen Lads Club Community Centre	Tillydrone
Hanover Community Centre	Beach
Hazlehead Sports Pavilion	Hazlehead
Pets Corner	Hazlehead
St George Church	Tillydrone
St Machars Academy	Tillydrone
North East Scotland College	Beach
Muirfield School	Stockethill
Tillydrone Nursery	Tillydrone
Aberdeen Science Museum	Beach

A further 3 connections are currently in progress.

Aberdeen is the regional hub for the North East of Scotland and has a vibrant economy based on servicing offshore hydro-carbon extraction and renewable wind generation. This creates a demand for housing. There a range of developers in the market including private developers, housing associations (social housing) and the City Council itself. AHP has engaged with this market at a leading developer level and with contractors undertaking the construction. AHP has now secured a forward pipe line of approximately 1,000 new build home over the next few years. These include:

- Summerhill Housing Development - 369 flatted dwellings for Aberdeen City Council
- Stoneywood Housing Development – 383 flatted dwellings for CBRE
- Kincorth Housing Development – 261 flatted dwellings for Aberdeen City Council
- Tillydrone Housing Development - 103 flatted dwellings for Aberdeen City Council
- Wellheads Housing Development – 283 flatted dwellings for Aberdeen City Council

These projects were paused during the pandemic. But are now proceeding.

Many of the non-residential connection projects with high returns on capital and short paybacks will rapidly produce a surplus. This provides the opportunity to cross subsidise other projects that have a low return on capital and long payback periods including many of the new build housing projects. However, this should only be done if such projects either contribute to the strategic expansion or serve the core aim of addressing fuel poverty. To provide guidance on assessing the different classes of connection the company has a developed a **Connections Policy** to provide guidance to the Chief Executive Officer in his negotiations with potential customers. This document is attached.

In order to ensure that the company is achieving its objective of addressing fuel poverty it recently undertook an exercise to analyse the charges incurred by all residential customers to check that these fell below the threshold definition of fuel poverty set out by the Scottish Government. This is defined as less than 10% of disposable income spent on energy costs. The methodology for this analysis is contained in the attached Fuel **Poverty KPI paper**. This found only one out of a total of over three thousand customers was breaching threshold. Intervention has been arranged for this customer to support her in operating her heating system correctly and potential referral to other support agencies.

Conclusion

After 17 years since its establishment Aberdeen Heat & Power has learnt from its experience of developing heat networks in the high-rise blocks for the City Council. This has allowed it to develop project management expertise internally and a local supply chain of skilled contractors. Together with an evolving policy structure this has allowed it to flexibly address the challenges of a changing market and secure a pipeline of future projects. This provides a model for other UK cities with ambitions to develop city-wide networks. Furthermore, the City Council together with neighbouring local authorities of Moray and Aberdeenshire County Council is presently building an Energy-from-Waste facility on the southern edges of the city. The provision of heat from this plant is a condition of its planning permit. It will be available from 2023 onwards. As Aberdeen Heat & Power continues its expansion it is well positioned to handle this heat available and distribute and retail around the city. Consequently, the network is anticipated to grow to 3 – 5 times its current size.