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Making Combined Heat and Power District Heating (CHP-DH) networks in the United Kingdom economically viable: a comparative approach

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This research suggests that under the present regulatory and economic paradigm, the infrastructure required for DH (District Heating) networks remains financially prohibitive; the implementation of government policies are complicated and impose high transaction costs while engineering solutions are frequently not implemented and economically optimised. If CHP-DH is going to play any part in meeting climate change targets then collaboration between all parties involved in all three of these key areas will be required. This then highlights a major barrier related to the co-ordination of implementing CHP-DH networks in general and highlights the need for entrepreneurial development in major infrastructure. It is clear from the analysis presented that within the present regulatory and policy regime in the UK strong Local Authority involvement is required for the co-ordination, leadership and infrastructural deployment of CHP-DH.

Scandinavian countries have a history of supporting CHP-DH. For example, district heating now forms the backbone of the Danish energy system with almost all heating networks served by CHP plant with the majority owned by local authorities and co-operatives. Sweden and Finland are also leaders in this regard but instead of the regulatory route imposed in Denmark a more market based, municipally lead approach was implemented to great success. In Sweden upto 47% of domestic energy demand is met through CHP-DH. In the UK, central government are beginning to realise the important role that renewable heat will play in meeting carbon targets as indicated by the heat and energy saving strategy. Yet, despite this renewed interest, the number

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of operational CHP plants have stagnated since the year 2000 and today only contribute less than 1% of heat demand to the domestic sector.

From the six UK based CHP-DH schemes compared in this study, total heat and electrical capacities varied considerably. Sheffield has the largest electrical capacity; while Nottingham has the largest heat generation capacity and both schemes are powered from municipal waste. The overall profitability of these schemes appears to be marginal and largely depends on how the engineering and economic operating principles were originally established. A more thorough analysis of these critical success factors for CHP-DH networks is included in this analysis.

It is also shown that ESCO's (Energy Service Companies) provide a number of organisational, legal and economic benefits (by reducing risk) that are advantageous to the development of CHP-DH. In all the schemes studied, ESCO's contribute an important part to the organisational structure of managing, owning and protecting the interests of contractual parties. Several different models exist for establishing an ESCO but in general they are used as an entity to hold a contractual relationship between a municipality (or non-profit organisation) and a profit motivated company.

In conclusion it is shown that CHP-DH has good potential to meet at least part of the UK's long term energy goals. Such heating networks have the potential to future-proof the delivery of energy through versatility, energy efficiency and the alleviation of fuel poverty. Realising these goals will ultimately require the development of a robust regulatory environment, consisting of rigorous market based instruments that support the future development of ESCOs. Policy measures, which foster the development of relationships between public bodies and private companies are also necessary. An advantageous environment for CHP-DH networks will include an open market for heat, adequate support for decentralised energy and the internalisation and appropriate pricing of externalities such as carbon emissions. In sum, CHP-DH can make a lasting contribution towards improving resource efficiency, reducing fuel poverty, minimising pollution, improving energy security and providing increased competition for the delivery of energy.

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