Nuclear Free Local Authorities
briefing

Date: June 2nd 2014 **No.122**

Subject: **Towards Decarbonising Heat: Maximising the Opportunities for Scotland**

1. Overview of report

This report has been developed by the NFLA Scotland Policy Advisor for the NFLA Secretariat following a decision of the NFLA Scotland Forum. It provides a model response for Scottish local authorities to respond to the Scottish Government's draft Heat Generation Policy Strategy. It also provides a generic overview of ways forward to develop district heating systems in Scotland and the potential benefits of developing geothermal energy; component parts of the NFLA's preferred energy policy – a wide renewable energy mix, community microgeneration and district heating schemes and energy efficiency programmes – in order to decarbonise energy sources without recourse to nuclear power.

2. Responding to the Consultation

The Scottish Government published its Draft Heat Policy Generation Statement in March 2014. (1) The consultation closing date is **9th June 2014**. Responses should be either sent by email to **eem@scotland.gsi.gov.uk** with "**Heat – HGPS – Response**" as the subject of the email; or by post to 'Consultation on the Draft Heat Generation Policy Statement', The Scottish Government, Energy Efficiency, Heat and Low Carbon Economy Unit, Area 1D South, Victoria Quay, Edinburgh, EH6 6QQ.

If a NFLA Scotland member responds to the consultation it needs to make clear whether or not it wishes for the response to be made public. A respondent information form is available on page 73 of the consultation document. (See http://www.scotland.gov.uk/Resource/0044/00445639.pdf)
The response below will be adapted for the NFLA's generic submission to the consultation.

3. Background to Scottish Policy

In 2009, the Scottish Parliament unanimously set Scotland's ambitious climate change targets, including an 80% reduction in greenhouse gas emissions by 2050. To help realise this ambition the Scottish Government wants to move to a largely decarbonised heat sector by 2050, with *significant progress* by 2030. An interim target has been set for 11% of total heat demand to be supplied by renewable heat by 2020. This will require 6.42TWh of renewable heat supply. According to the Renewable Heat Action Plan, the bulk of this (45% - 2.89TWh) is expected to come from the industrial sector, with 33% (2.12TWh) and 22% (1.41TWh) from the commercial and domestic sectors respectively.

In addition, the Scottish Government has set a linked target to reduce Scotland's total final energy consumption by 12% (against a baseline of the average final energy consumption in 2005-07).

c/o NFLA Secretariat, Level 5, Town Hall Extension, Manchester, M60 3NY
Tel: 0161 234 3244 E-Mail: s.morris4@manchester.gov.uk Website: http://www.nuclearpolicy.info

The Scottish Government's Draft Heat Generation Policy Statement details some very welcome measures and proposals to help achieve these targets including:

- A proposal to set a target of generating 1.5TWh of heat from district heating (not necessarily powered by renewable energy) by 2020. This would include a target of supplying 40,000 homes with affordable, low carbon heat through heat networks and communal heating by 2020. Around 10,000 homes are currently connected to district heating networks, with 0.2 TWh of heat being provided to domestic and non-domestic users through district heating.

- Making £8m available for the District Heating Loan Fund over the two years 2014-16.

- Developing a call for geothermal demonstration projects.

- Providing nearly a quarter of a billion pounds of funding to tackle fuel poverty and improve domestic energy efficiency, including providing heating systems, over a 3 year period.

- Drafting minimum standards for energy efficiency in private sector housing.

However, decarbonising heat by 2050 will mean providing all of Scotland's 2.5 million households with zero or low carbon heat over the next 36 years. To do this, Scotland needs to be converting a minimum of 70,000 homes every year between now and 2050. The current proposals do not appear to be anywhere near ambitious enough to achieve this.

Whilst the £8m District Heating Loan Fund available over the two years 2014-2016 is welcome, it compares with the cost of, for example, two adjacent proposed schemes in Edinburgh – Pennywell and the Granton Waterfront – of £10m each.

4. The Heat Hierarchy

The consultation document sets out the Scottish Government's vision for heat decarbonisation by 2050. The new concept of the heat hierarchy is introduced which will undoubtedly command widespread support. Demand reduction is at the top of the hierarchy and will therefore be prioritised.

This is followed by efficient supply, such as district heating (DH) which has "*been shown in appropriate circumstances to offer a viable alternative to individual solutions and can offer lower cost low carbon heat to consumers*."

Thirdly, renewable and low carbon heat resources, such as electric-powered air source heat pumps and biomass boilers should be used to deliver low carbon heat efficiently to individual buildings.

The heat hierarchy, therefore, appears to require maximising the contribution to renewable heat targets from district heating, as opposed to individual building installations. Many existing district heating schemes in Scotland have reduced householders heating bills by almost a half, so NFLA Scotland members particularly welcome the recognition in the consultation document of the opportunity to tackle high heating bills for households by considering communal heat supply, particularly in the case of multi-storey blocks where there are limited alternatives for affordable low carbon heat.

According to the Scottish Government's Expert Commission on District Heating (DH), (2) DH: "*represents a significant opportunity to decarbonise the heat sector as heat networks can remove any requirement for individual adoption of low or zero-carbon technologies by end users … district heating networks can support the development of renewables by allowing the flexible integration of conventional and/or a variety of renewable heat sources in one system, allowing cost-effective incorporation of intermittent or cyclical sources of heat, for example from wind turbines, solar thermal arrays etc*."

Given the long timescales for DH projects the Expert Commission recommended setting reasonably long-term targets. It therefore seems sensible to support the Scottish Government's proposed target for 2020, but also to set an ambitious target for 2030.

5. Towards a Renewable Heat Decarbonisation Road Map

The Housing Sector makes up over 50% of Scotland's heat demand. The industrial and commercial sectors are already making progress towards the government's 11% by 2020 renewable heat target. But, in NFLA Scotland's view, the housing sector will need extra support if it is to make the necessary headway towards decarbonisation. Research carried out by Element Energy and the Energy Saving Trust for WWF Scotland looked at various scenarios for heating Scotland's homes with renewables. (3)

These scenarios assume that domestic heating demand will be reduced from approximately 35TWh/year in 2011 to 26.5TWh by 2030. On a practical level this means upgrading around 200,000 dwellings per year to 2020 which would be consistent with the government's climate action plan, the Report on Proposals and Polices. At present there are 600,000 homes with cavity walls which remain un-insulated alongside 32,000 lofts. And 546,000 homes are without solid wall insulation, so there is plenty of scope to reduce domestic heat demand by 28% down to 25.5TWh by 2020. (There would then be a slight increase to 26.5TWh over the subsequent decade as 400,000 new houses are built.)

In Element Energy's High Abatement Scenario, the Scottish Government's ambition to achieve significant progress towards decarbonisation of heat by 2050 is interpreted as meeting half of Scotland's domestic heating demand from renewable sources by 2030. Under this scenario, the bulk of the renewable heat required (13.2TWh/yr) by the domestic sector in 2030 would be supplied by Air Source Heat Pumps (ASHP) (10.4TWh/yr). Only 2.23TWh/yr is provided by renewable district heating.

According to Element Energy the additional annual electricity demand caused by high ASHP uptake is likely to be no more than 9% of total forecast electricity demand in 2030 under any of the scenarios considered. Similarly, the maximum increase in generating capacity required due to domestic heat pumps is estimated to be no more than around 800MW (16% of total peak demands) in 2030. However, high heat pump uptake could cause excessive strains on local electricity networks, and without a capital grant scheme fuel poor households are unlikely to be able to afford the capital expenditure. Communal heating systems are likely to be more affordable for low income households.

Under Element Energy's District Heating (DH)-led pathway the contribution from renewable district heating rises to almost 4TWh/y - just under a third of the renewable heat from the domestic sector would come from DH. This corresponds to around 350,000 Scottish dwellings being connected to (renewables-fed) district heating by 2030. Meeting this level of district heating uptake is equivalent to 50% of all households in Aberdeen, Dundee, Edinburgh and Glasgow being connected to district heating systems by 2030. This level of uptake would require strong leadership from the public sector and firm commitments to develop large scale schemes connecting a mix of building types.

While 4TWh would be an ambitious target for 2030 it could be achieved by, *inter alia*:

- Implementing the recommendations of the Expert Commission particularly supporting district heating champions with appropriate skills in local authorities which have a demonstrable commitment to district heating.

- The Expert Commission. For instance recommends setting subsidiary targets for a set proportion of the public sector estate being connected to a district heating system by 2020 and 2030 and for conversion by a medium-term deadline of all multi-storey social housing to district heating where there is a viable business case.

- Development of regulatory powers to require public buildings to connect to district heating networks and for households to connect where technically feasible when heating systems are changed

- Planning authorities should require district heating in new developments where appropriate.

NFLA Scotland believes that the Scottish Government should introduce a target of 4TWh/yr for renewable district heating by 2030.

6. The role of geothermal energy

In August 2013 the Scottish Government published a study which showed that as much as a third of the heat needed to keep Scotland warm could be provided by tapping geothermal energy from old coal mines across the central belt. (4)

Warm water piped up from abandoned mine shafts between Glasgow and Edinburgh and in Ayrshire and Fife could help heat many thousands of homes and other buildings for decades. The report urged Scottish ministers to embark on an ambitious attempt to make geothermal energy a major new source of clean, renewable power within a few years starting with the development of a national geothermal energy strategy, and two major new "demonstrator" projects, at the Clyde Gateway in eastern Glasgow and at Shawfair just outside Edinburgh, by 2016. It points out that two small geothermal schemes in Scotland that tap the warmth of mine water have been running since 2000. One is at Shettleston in Glasgow and the other at Lumphinnans in Fife, each serving fewer than 20 homes. (5)

Now a new study from engineers at Glasgow University has calculated that there is roughly twice the amount of untapped thermal energy in hot rocks deep underground as there is in abandoned mine workings nearer the surface, which means Scotland has enough geothermal energy to provide green heat for almost the entire country. (6) NFLA Scotland supports the swift development of geothermal energy in the country.

7. Conclusions of the NFLA

It is clear from the modelling exercise carried out for the Scottish Government that cost-effective delivery of an increasingly decarbonised heat system is possible but that it will require action on both the supply and demand side for heat. Energy efficiency will continue to have a central role in the delivery of low carbon heat.

The new concept of the heat hierarchy will undoubtedly command widespread support, and there will be widespread agreement that demand reduction should be the priority.

Maximising the contribution to renewable heat from DH is also welcome, as is the target to provide 1.5TWh/yr from DH by 2020.

However, NFLA Scotland doubts that the Draft Heat Generation Strategy is ambitious enough to meet the demanding targets for 2050. It is therefore recommended that the Scottish Government should introduce an ambitious target of around 4TWh/yr by 2030 and set out a road map to achieve that.

NFLA Scotland also urges the Scottish Government to aim to meet 50% of heat demand from renewable sources by 2030.

This corresponds to around 350,000 Scottish dwellings being connected to (renewables-fed) district heating by 2030. Meeting this level of district heating uptake is equivalent to 50% of all households in Aberdeen, Dundee, Edinburgh and Glasgow being connected to district heating systems by 2030. NFLA Scotland’s vision is of local authorities giving strong leadership and working in conjunction with the Scottish Government and the public sector to develop large scale schemes connecting a mix of building types. Although DH schemes may start off being powered

by gas boilers, these would gradually be converted to being powered by a variety of renewable and waste heat sources, especially geothermal.

8. References

(1) Towards Decarbonising Heat: Maximising the Opportunities for Scotland: Draft Heat Generation Policy Statement for Consultation, March 2014 http://www.scotland.gov.uk/Resource/0044/00445639.pdf

(2) Expert Commission on District Heating, Recommendations to the Scottish Government, 14th November 2012. http://www.scotland.gov.uk/Resource/0040/00408383.pdf

(3) The burning question: What is Scotland's renewable heat future? WWF Scotland February 2014 http://assets.wwf.org.uk/downloads/rh_web.pdf and Scotland's Renewable Heat Future, Element Energy, EST, November 2011 http://assets.wwf.org.uk/downloads/scotland_s_renewable_heat_future___final_report_05_11_11.pdf

(4) Study into the potential for deep geothermal energy in Scotland, Scottish Government, August 2013 http://www.scotland.gov.uk/Resource/0043/00437977.pdf

(5) Herald 17th Nov 2013 http://www.heraldscotland.com/news/home-news/water-from-coal-mines-could-heat-our-homes.22719673

(6) Times 20th Feb 2014 http://www.thetimes.co.uk/tto/business/industries/naturalresources/article4010595.ece