

**Research-policy workshop on heat decarbonisation**  
**Edinburgh Centre for Carbon Innovation**  
**14 and 15 October 2019**  
**Summary report**

## 1. Overview

This note<sup>1</sup> summarises the outcomes from a heat decarbonisation research-policy workshop held in October 2019 with an invited audience of research and policy makers representing UK, Danish and German institutions. The overall aim of the workshop was to share knowledge and insight between policy makers and researchers (see sections 3 – 5 for highlights) to help shape a forward research agenda on heat decarbonisation and to identify policy-relevant research gaps (Section 2).

## 2. Policy-relevant research gaps

The workshop concluded with a discussion on where the audience thought there were gaps in the research agenda which could improve policy making. Decarbonisation, being a whole systems problem, calls for multi-disciplinary research to identify and appraise socio-technical options and links to workable public policies. As well as being both societal and technical, research needs to balance technological innovation with application of existing solutions and analysis of governance and policy frameworks.

- **Comparative case study evaluations of effective projects:** Renewable and low carbon heat projects that have proved effective could be reviewed to analyse socio-technical factors influential to their relative effectiveness. Contextual conditions likely to enhance their outcomes could then be assessed to identify potential policy changes.
- **Back-casting model methodologies:** Using different back-casting models and methodologies from different countries would provide foundations for identifying and appraising options for Scotland. These models have an agreed endpoint, and can be used to identify future pathways, given the current status quo. The aim is to enable policy making to overcome inertia and avoid future regrets options
- **Deliberative research:** There is a role for deliberative research into technological constraints using social science methodologies. This would provide insights into the preferences of different types of heat users; interactions between preferences and different heat technologies/appliances; and, impacts of people's preferences on adoption. The financial element is also critical to understanding the impacts on equity and fairness.

The aims of the deliberative research would need to encompass structured evaluation of outcomes and policy maker interactions with findings. The deliberative research process, including data gathering, production, reproduction and analysis, also needs to be made transparent and accessible to independent scrutiny.

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<sup>1</sup> This workshop summary does not necessarily represent the views of the Scottish Government or Danish Energy Agency.

- **Flexibility of energy system and energy storage:** The extent and dimensions of system flexibility (temporal, spatial, social, technical, etc.) and storage, in relation to heat sources and systems, need to be understood. The current gas system provides large scale flexibility with low current costs derived from high levels of past investment. Research should examine the importance of flexibility and storage, in relation to carbon budgets, cost, convenience, comfort and heat sources. Dimensions of flexibility, and options for flexible management of demand, need to be systematically reviewed.
- **Long term scenario developments:** What are the differential rates of change in different places and why; how should costs and benefits of such differential change be shared; and how can these issues be addressed by policy makers?
- **Rural decarbonisation of heat:** How can long term investments be facilitated in rural settings to enable transition to renewable heat supply?
- **Economic policy research:** What are the options for managing costs of heat decarbonisation; what is the role of markets; what elements of costs could be socialised? How would decisions on socialisation of costs and beneficiaries be governed? What is the role of political leadership, and what are the routes to consensus building and decision making?
- **Renewable heat benefits:** These need to be researched, and results fed into policy making to allow different types of users to understand the reasons for, and urgency of, renewable heat developments.
- **Macro-economic:** Research examining the political-economic interconnections between global energy sources, technologies, markets and energy security and affordability is fundamental to developing net zero carbon heat systems.

### 3. Key challenges

Heat decarbonisation is a multi-faceted challenge covering technology, economics, culture and politics, but there are examples from the past to learn from, e.g. the growth and transition from manufactured town (coal) gas to 'natural' methane gas for central heating. Understanding the different historical context, legacy technologies, and energy taxation and policy frameworks of comparator countries is critical to policy learning for renewable heat.

One key theme that emerged in the workshop was the need for co-ordination at all levels and between different actors including civil society, local authorities, consumers, central government policy makers and businesses. The transition from a fossil fuel gas system to a renewable/clean heat system needs to be policy driven and solutions must protect consumers and support amelioration of fuel poverty. There are uncertainties about clean heat technology options and costs. It is commonly argued that 'best' solutions are likely to be regionally differentiated, as there isn't a "one size fits all" answer. All solutions will need to address the current skills gap, but this should have employment and local economic benefits.

Workshop participants argued that there is a requirement for more accurate and accessible data, but there is limited time to wait to decide on the best solutions. A strong defined policy direction is needed to begin the decarbonisation journey without precluding alternative solutions which may become available in the future; piecemeal strategies and a lack of funding would be detrimental to decarbonisation goals. Key factors identified in Danish research on public resistance to energy transition projects were a lack of trust

in commercial companies driving change, approval procedures not seen to be democratic and perceived injustice in distribution of costs and benefits.

#### 4. Models

The usefulness of different modelling solutions was discussed in detail. While models can inform policy by outlining the trade-offs likely to be necessary, decisions on complex trade-offs need to involve the public, and require public commitment and political leadership. Cost optimisation models can provide self-reinforcing solutions; technical-economic parameters and assumptions need to be subject to scrutiny and independent evaluation, as part of a dynamic, iterative decision-making process. Policy makers need to understand how models work in order to make effective decisions; often minor changes in the parameters of the model can produce major differences in options evaluation, raising questions about their value as decision support tools. Real world experiments are required to assess the feasibility of modelled solutions. Danish experience suggests that facilitating change remains difficult, even when there is clear policy direction.

#### 5. Possible solutions

Several potential solutions were discussed which addressed the technical and societal challenges. A portfolio approach to policy making would be appropriate, given the uncertainties for policy makers and publics; model outputs can be used as guidance, but are not solutions in themselves; decisions need to be made by the public and politicians. The available experience and expertise need to be co-ordinated for best value. Citizen assemblies could be used to identify key issues and options, and build a workable consensus, but will not necessarily be sufficient to guide practise.

Specific changes discussed include:

- Adapt energy performance certificates (EPCs) to support greater transparency, co-ordination and robust methodology
- Scale up 'already available' policies - e.g. energy efficiency incentives for the 'able to pay' sector; certification and training for the supply chain, capital grant funding
- Build long-term living labs to allow faster development of high-quality policies through real world testing
- Develop regional plans with local area solutions to support local authority strategies; central coordination and guidance will be essential for effective regional/local implementation
- Innovative thinking around provision of heat is required - e.g. there is potential for warm home prescriptions by GPs; options for heat as a service need to be explored; renewable heat alternatives to funding connection of low income households to gas grid, or installation of gas central heating, need to be evaluated
- Heat policies need to be implemented in a way that motivates businesses to make low carbon solutions as good as or better than high carbon heating

Solutions from Denmark and Germany

- **Local energy plans:** these focus on the overall energy system, but allow the development of different technical solutions for different areas

- **Energy academy:** connecting communities, governments, researchers, students, journalists/media allowing for co-ordination and dissemination of advice
- **Strategic development scenarios:** Improve communication and co-ordination between different levels of government and between different sectors. Profits given to local communities improve social engagement and acceptance
- **Policy packages:** e.g. tax incentives for retrofit, ban on new oil boilers, CO<sub>2</sub> pricing

