

CONSTRUCTION ENGINEERING MASTERS DISSERTATION ABSTRACT

Achieving a net-zero city: An exploratory case study into technical barriers

Global emissions of greenhouse gasses need to significantly reduce to limit damaging climate change. The UK Government is targeting net-zero greenhouse emissions by 2050, with this currently being achieved by a national top-down approach. Review by the Committee on Climate Change concludes that current progress with developing policies and implementing actions is inadequate. Over the past eighteen months many Local Authorities have declared 'Climate Emergencies' making commitments to local decarbonisation within much shorter timescales than national government targets, such as by 2030, but without yet defining how this will be achieved.

To make effective strategic decisions on the UK's path to decarbonisation there needs to be clarity on the technologies needed, their current fitness for purpose, and the required focus for targeted R&D and collaboration to overcome any technical barriers. The literature contains contradictory claims on current technology readiness. There are also varying perspectives on the optimum scales of decarbonisation implementation, and responsibility for leading this. Without a clear framework to assess decarbonisation pathways, technical barriers, scale of resolution and responsibility for leadership there is a risk of inefficient investment, misaligned action, and wasted time. This study used an exploratory case study to investigate these issues within the context of a single UK city, Leeds.

A framework was developed and data collected from three sources; a review of national-scale decarbonisation plans, a review of Leeds's decarbonisation plans, and survey of people working in sectors associated with decarbonisation in Leeds. The data was analysed drawing out within-case findings on technical barriers and their resolution, and cross-case themes.

The assessment framework developed demonstrated a method to identify, categorise and then score technical barriers to decarbonisation. The method was proved to be sufficiently flexible to undertake national and city-scale assessments. It is simple, modifiable and scalable, providing an objective basis on which to collate data on barriers which can then feed into decision making and action.

The study identified over 200 technical barriers to decarbonisation. Many of these require national leadership, but even where this is the case, Local Authorities have a critical role to play in enabling decarbonisation. The need for leadership at all scales, supported by good information based on rigorous and impartial engineering assessment was a key cross-case theme arising. The engineering community has a vital role to play in resolving the national and city-scale technical barriers to rapidly decarbonising the UK economy. It will necessitate reskilling and changes in the types of projects being delivered. However, it is essential for the future viability and integrity of the profession.

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July 2021