



# Local Area Energy Planning – A Scoping Study Executive Summary

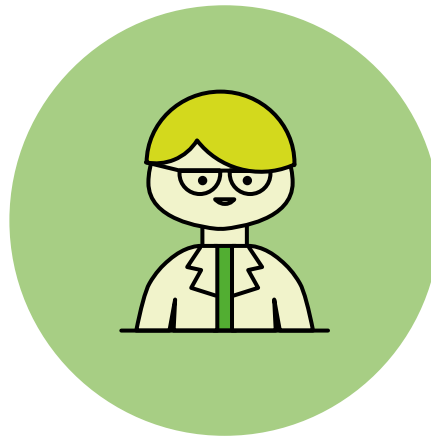
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# 1. Introduction

Accelerating action on low carbon heat is essential to the UK commitment to decarbonise energy consumption in buildings, but this presents an enormous challenge in terms of scale (affecting almost every building owner and occupant) and uncertainty. Local planning and coordination is widely regarded as critical for steering the demanding socio-technical changes required across diverse social, political and economic contexts. Given their powers and responsibilities, the pivotal body could be local authorities (LAs), but austerity budgets are limiting capacity and capability.

This is the problem space in which the Energy Technologies Institute (ETI) and Energy Systems Catapult (ESC) positioned the 'Local Area Energy Planning' (LAEP) initiative, as part of the 2011-2019 Smart Systems and Heat (SSH) programme. Whole systems modelling of local clean energy options is central to the LAEP concept, and a purpose-built whole systems model, EnergyPath Networks (EPN), was used to inform local strategy. Commencing in 2013, LAEP was taken forward through three pilots: Newcastle City Council, Bridgend County Borough Council and Greater Manchester Combined Authority with the Metropolitan Borough of Bury. By the closing stages of Phase 1 of the pilots in 2017, questions had arisen about the lasting impacts, including whether the work had delivered in the way intended, and whether the technical-economic dimensions of the LAEP innovations could be better integrated with the social-political context in which LAs operate, in order to support local decision making.

As a result this social science scoping study was commissioned, first to facilitate learning for use by ETI/ESC and LAs in the context of the low carbon heat challenge, and second to examine the future scope for more comprehensive investigation of local energy planning prospects. Research was conducted between August 2018 and March 2019, drawing on documentary evidence and interviews with the SSH team, the pilot LAs, and UK central and Welsh Governments.



# 2. Main findings

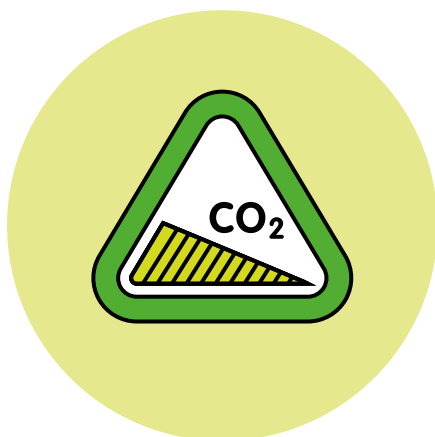
Findings are organised into four themes: structuring the problem of Local Area Energy Planning for future heat systems; the engagement process: local councils as ‘civic scientists’; making knowledge: what is useful knowledge for local energy planning?; making plans: different conceptions of local planning for energy.

## 2.1 Structuring the problem of Local Area Energy Planning for future heat systems

The different options for decarbonisation of heat, including energy sources, network infrastructures, governance and regulation, all interacting in myriad ways, create significant ambiguity about costs, benefits and their distribution, and deter the emergence of political or business champions. Different actors interpret ‘the problem’ and relevant domains of knowledge for developing solutions in different ways.

The LAEP component of the SSH programme aimed to generate significant technical innovations to address the problem. The ETI, drawing on its leading-edge energy systems modelling, proposed that heat decarbonisation was susceptible to whole systems engineering solutions, to support systematic local planning focusing on housing stock. EPN was developed as a technical-economic cost optimisation model to inform and support LA-enabled whole area strategies. The ETI was a public-private partnership with business members that could derive commercial advantages from SSH participation, creating concerns to protect Intellectual Property (IP). This approach to problem structuring sowed the seeds for potential dislocation between sites of knowledge production and use.

Detailed technical specification of the EPN modelling toolkit by the ETI preceded significant engagement with LAs, and insights into their priorities, regulatory frameworks and capabilities. In the three pilot settings, the EPN whole system modelling interacted with the highly complex, intersecting variables of local decision-making practices, resources, political-economic institutions, and UK energy market regulations geared to large-scale centralised systems. LA officers in some instances perceived the scenario modelling as ‘purist’ and ‘lab-based’, and questions arose as to how the knowledge generated would be used to inform problem definition and support solutions.



## 2.2 The engagement process: local councils as 'civic scientists'

Procedural lessons for technical-economic innovation to support local whole system energy planning can be derived from the five-year span of the three pilots. Analogies can be drawn with the engagement of the public as 'citizen scientists', and the need to foster goodwill while ensuring citizens meet the requirements of the science. However, important differences make the relationship distinctive: LAs are multi-sector, multi-purpose, democratically accountable organisations with major public responsibilities; there are time and opportunity costs to research participation which need accounting for and, where LAs are prospective users of research knowledge, then ownership and control enter the relationship.

Overall, the LAs maintained participation, providing data, drawing in other local actors and securing political buy-in, such that the LAEP pilots were delivered effectively. Nevertheless, there were problems to navigate. Most significantly, LAs were recruited competitively, with the expectation of significant capital investment in demonstrator projects, but these have not materialised in the way originally envisaged. More broadly, interviewees reported not always knowing where the LAEP work was heading, with lengthy timeframes and uncertain benefits creating challenges for maintaining local commitment. How well the LAs managed continuing involvement depended on local expectations, but also officers' ability to link the LAEP work to tangible, positive outcomes.

Do the inevitable uncertainties of the scenario development and testing process have lessons for the future of local energy planning more widely? Arguably yes, given that the uncertainties associated with charting the 'best' heat decarbonisation pathway will give any plan qualities of an experiment, and thus any such planning processes (and models) will need to be resilient and adaptable to shifting circumstances.

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## 2.3 Making knowledge: what is useful knowledge for local energy planning?

The LAEP pilots can be read as a struggle over what constitutes relevant and valuable knowledge for local decarbonisation strategies. At a methodological level, some LAs expected to extend their own energy planning capacity through access to new tools, but the complexity of the EPN model, which sought to provide a sophisticated analysis of options, militated against this. It also created challenges for integrating energy planning across LA regeneration, planning and finance specialisms, because of the difficulties of explaining the results and understanding the implications for current obligations and priorities. Different actors perceived these methodological problems as requiring different solutions; the SSH team regarded them as soluble with a more streamlined and structured framework for LAEP, while other parties regarded them as requiring simpler or more accessible models for local energy planning.

At a more fundamental level, there are differences between useful knowledge as represented by the ETI/ESC at the programme outset on the one hand, and by LA officers and politicians working with the pilots on the other. The former envisaged EPN as a tool to support local whole-systems planning, deriving analytical value from its multi-vector capacity for analysing cost optimal pathways. This pursuit of comprehensive technical-economic rationality encountered the limited powers and resources of LAs, and associated opportunistic local energy strategies and near term plans. Moreover at local, as well as national, level, action on the heating system choices of homeowners was badged as 'politically too difficult right now'.

Knowledge from the LAEP pilots needed to be commensurable with local political objectives for economic regeneration and welfare as well as decarbonisation. These wider objectives entailed their own interpretations of the problem and appropriate knowledge for decision-making. LA officers needed to translate the EPN outputs into terms more readily applicable to these objectives – a difficult exercise. This struggle explains why the LAEP work was appreciated for 'cutting edge' insights, but nevertheless officers found these insights difficult to 'use'.





## 2.4 Making plans: different conceptions of local planning for energy

What does the LAEP pilot work say about prospects for local energy planning drawing on whole system, cost optimising models? While planning more widely makes extensive use of models (flooding/drainage, transport, building energy performance), their role is often relatively narrow and sector-specific rather than 'whole system', and derives resilience from institutionalisation of policy goals and standards.

Such conditions do not (yet) apply to local energy planning. The scoping study revealed no clear, shared conception of 'local energy planning' to which the LAEP tools could attach, with local action being voluntary, incremental and opportunistic. There was support for, but also equivocation about, the need for compulsion through obligatory planning and target-setting.

This raises some underlying questions. While the scoping research affirmed the potential importance of LAs having increasing energy-relevant powers and responsibilities, and the locally-differentiated nature of likely decarbonisation solutions, questions remain about whether LAs should be a key actor in any local energy planning. Much depends on the object of such planning, as the role of LAs would be different depending on the main transition pathway. A focus on heat network development or area-based retrofit of buildings for example implies a very different LA role from a focus on the marketisation of 'heat/energy as a service', sold to individual households.

The other question surrounds the form of planning. The research suggests that LAEP, as originally conceived by the ETI, regarded planning in conventional linear, rational terms, where information is collated; modelling/analysis is used to assess the problem and appraise options, resulting in a plan which is then delivered. Given the lack of consensual solutions for heat decarbonisation, however, there may be merits in some form of 'adaptive planning' that is more open to experimentation and learning. Some of the Smart Energy Plans produced for the three LAs to build on the LAEP pilots exhibit these qualities, and recognise the need to cultivate reflexive relationships between local bodies and national-level regulators and strategy-makers. Importantly, the type of knowledges best suited to adaptive planning entail collaborative input to problem framing, and open access data to enable knowledge to be widely shared.

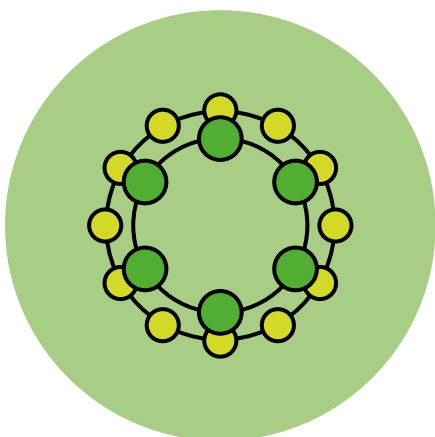




# 3. Conclusions and recommendations

The LAEP pilots were widely appreciated, and have helped to deliver beneficial outcomes, including improved knowledge about heat decarbonisation options in a whole systems context; networking between actors at local level; and local energy project plans. The uncertain prospects of Local Area Energy Planning as conceived in the SSH programme are a microcosm of bigger challenges of heat decarbonisation. The core challenge is conceiving of how problem framing, knowledge generation, innovation and action might productively co-evolve. To this end, this scoping study offers the following conclusions and recommendations for further investigation:

- It is unrealistic to expect that knowledge, embodied in technical-economic optimisation models for future heat systems, can be developed and applied locally in a linear, instrumental and uncontroversial fashion. Progress requires more organic models of knowledge, to ensure longer-term learning and innovation.
- Achieving this implies breaking away from overly-commercial interpretations of 'the problem' at exploratory stages of definition and knowledge development, and substituting boundary-spanning work across sectors and scales.
- Technical and economic propositions are unlikely to command support in isolation. If large scale change is to be achieved, then solutions need to command legitimacy across civil, state and market sectors, making politics and public engagement fundamental.
- Major questions about future heating systems, pricing, cross-subsidy and cost-sharing need to be addressed.
- Lack of consensus over the role, if any, of local energy planning, and LAs, is an obstacle to progress.



There is a need to develop an enduring, legitimate governance and societal framework to foster the heat transition, with the following institutional dimensions warranting investigation:

- There are a number of stand-alone local energy planning pilots across the UK, including the SSH LAEP pilot. These need to be independently evaluated as part of developing a systematic framework to foster shared learning, and strategic investment in low carbon heat transition.
- The LAEP pilots have provided a wealth of detail on the demands of planning for systematic decarbonisation of buildings. How could this knowledge be used to inform retrofitting plans for existing homes, the development of heat networks and performance standards for new homes, and to drive effective regulatory change?
- The impacts of structural divisions between UK Government BEIS, MHCLG and Treasury on progress in local whole system energy planning, need to be understood. How could these divisions be bridged to secure significant, at-scale, heat demonstrators designed to serve an integrated social, economic and environmental agenda? How do current hierarchical relations between central and local governments in the different UK nations work to facilitate or impede reflexive governance of heat and energy planning? Are changes needed to foster effective learning and contextual adaptation, and to address spatially uneven outcomes?
- Investigation of capacities and capabilities of local authorities, compared with other bodies, to contribute to energy planning is needed. This includes questions about the role of LAs in consensus building for low carbon heat transition, their engagement with network operators and forms of support needed from central and devolved governments. Further research could also provide lessons from comparative analyses of local energy planning and heat systems innovation in other countries. If LAs are defined as critical to effective energy planning for low carbon heat, then research is needed to identify necessary national regulatory changes, local resources and methods for integration of energy planning into land use, transport and waste planning.

The impacts of structural divisions between UK Government BEIS, MHCLG and Treasury on progress in local whole system energy planning, need to be understood.



Energy Systems Catapult supports innovators in unleashing opportunities from the transition to a clean, intelligent energy system.

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