

Local Area Energy Planning: Supporting clean growth and low carbon transition

Executive summary

The decarbonisation of heat is arguably the biggest challenge facing UK energy policy over the next few decades. (Ofgem, 2016)¹

Short summary

This report argues that Local Area Energy Planning is a valuable activity that can assist in meeting the ambitious decarbonisation and housing energy performance commitments set out in the Clean Growth Strategy.

The next phase of decarbonisation will focus heavily on the challenges of heat and the energy performance of buildings, with costs measured in hundreds of billions of pounds by 2050. This will require a Whole Systems approach to help decide on the best mix of building improvements, low carbon heating technologies, power, gas and heating networks to deliver low carbon and affordable energy. A Whole Systems approach requires a deeper understanding of conditions at a local level as it is concerned with building stock, energy network capacity, spatial features and other local characteristics; assessed in parallel with the decarbonisation of other sectors such as transportation. Insights from Whole Systems analysis can then be considered alongside consumer, commercial and policy factors, in order to determine options for a future energy system.

Local Area Energy Planning enables stakeholders, led by local government, to interrogate different energy futures for an area and to develop the most promising, cost-effective options for decarbonisation. For network operators, it provides a foundation for justifying and planning network upgrades. Local Area Energy Planning develops a shared vision as a basis for targeting investment, encouraging innovation, securing value for money and gaining public understanding and support. A small, additional investment in planning future local energy systems, can leverage significant savings in the capital required to improve existing or build new energy infrastructure.

Key findings

- Central government has made ambitious, legally binding commitments to contribute to the global effort to tackle climate change through deep decarbonisation of the UK energy system by cutting 80% of greenhouse gas emissions by 2050, compared to 1990. The latest expressions of its plans to achieve this goal, while sustaining UK prosperity, are the Industrial Strategy and Clean Growth Strategy².
- One of the toughest challenges for UK climate and energy policy is the decarbonisation of *heat*. This will require a major overhaul of the energy system, extending into people's homes, including the building fabric and domestic heating system. Almost all heating systems in homes will need to be replaced with advanced low carbon technologies. The gas grid may need to be scaled back or converted to distribute low carbon gases like hydrogen. Choices made for heating technology will impact electricity networks, as will the introduction of electric vehicles – these significant developments require coherent Whole Systems energy planning.

¹ Ofgem, Future Insights paper 2: The decarbonisation of heat, 14 November 2016 <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-future-insights-paper-2-decarbonisation-heat>

² Department for Business, Energy and Industrial Strategy (BEIS), Clean Growth Strategy, 12 October 2017. <https://www.gov.uk/government/publications/clean-growth-strategy>

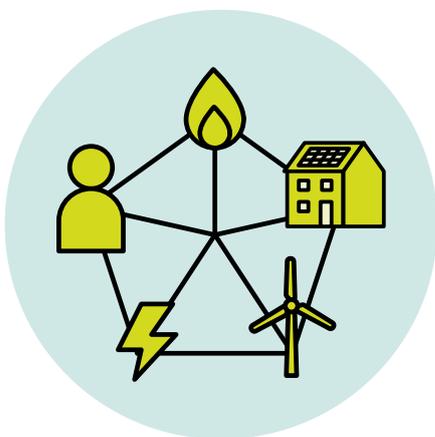
- Throughout the UK 2.5 million households are classified as in fuel poverty in England (2016), 649,000 in Scotland (2016) and 291,000 in Wales (2016). Upgrading home energy performance and improving heating is one of the most important and effective responses to fuel poverty, however, careful targeting and design is needed to maximise the cost-effectiveness of investment. The government's advisory committee on fuel poverty estimates that beyond March 2019, £15.4 billion of funding will be required to install the necessary energy efficiency measures in the 2.3 million fuel poor households living in homes with energy performance Band D or worse³.
- In addition, the energy performance of the general UK housing stock is still poor. 16.7 million homes in England, 70% of the total, have energy performance at EPC Band D or worse. In the Clean Growth Strategy, the government set out an aspiration to improve as many homes in England as possible to Band C or better by 2035 where this is cost effective, practical and affordable⁴. This is a potentially vast infrastructure programme, involving the assessment and possible upgrade of up to one million homes per year to 2035. Local Area Energy Planning could provide the framework for assessments and upgrades where practical, cost-effective and affordable in a Whole Systems context.
- Local Area Energy Planning is a means of exploring a range of different future local energy scenarios to achieve deep decarbonisation. The planning process takes a Whole Systems view, accounting for building energy performance, heating technologies, electrification of transport, the capacity of and potential for gas, power and heat networks, local spatial constraints and opportunities. It involves area-specific energy system modelling, embedded in a process of collaborative dialogue between stakeholders and local government.

“Local Area Energy Planning could become a key tool for the Clean Growth Strategy, by setting out possible and cost-effective options whilst highlighting where investment is needed”

³ Committee on Fuel Poverty, Annual Report 2017, 17 October 2017. <https://www.gov.uk/government/publications/committee-on-fuel-poverty-annual-report-october-2017>

⁴ Department for Business, Energy and Industrial Strategy (BEIS), Clean Growth Strategy, 12 October 2017. <https://www.gov.uk/government/publications/clean-growth-strategy>

- Local Area Energy Planning pilots conducted in Newcastle, Bridgend and Bury have shown that whilst there are similarities in the different decarbonisation options identified, the blend of options is highly specific to local conditions and that no single mix of options could be applied nationwide (however, over time, there may well be some trends appearing between similar local areas as more evidence is developed). The learning and experience gained from the development and deployment of the different mix of options will have benefits for dissemination across the UK regardless of the final mix contained in specific local plans.
- The total system cost⁵ for local energy systems increases even under business as usual, due to the assumed decarbonisation of the national electricity grid. In the three pilot local areas this was found to range from £6.6 billion to £10.4 billion to 2050; £24.1 billion in total.
- Under a balanced and well-planned transition reflecting local priorities and constraints (working to carbon reduction targets that achieve a circa 95% reduction from 1990 levels), decarbonising local energy systems to also decarbonise heat could be achieved for a further 12% - 15% increase in cost to 2050, where the forecasted future total system cost of providing decarbonised energy services to homes, businesses, public buildings and industry is £27.4 billion over the period 2015-2050. If not well planned, costs could be significantly higher. For comparison, the scale of the UK's largest infrastructure project, HS2, is £55.7 billion by 2033. Unlike a major rail project, heating technology and housing investment will be diffused over thousands of small and medium-sized investments. However, the need to secure efficiencies in a large but diffused programme is no less important.
- Local Area Energy Planning could become a key tool for the Clean Growth Strategy by helping to meet the challenge of decarbonising heat, in setting out possible and cost-effective options whilst highlighting where investment is needed. For example, a heat network may offer the best solution in some areas, but such networks are unlikely to emerge through market forces alone. They require a co-ordinated approach to determine the commercial proposition, engage householders, lay new heat networks, replace boilers with heat interface units and so on. Likewise, a major uptake of electric heat pumps would only work if there is sufficient electricity network capacity, planned with due consideration to other parallel changes such as increasing consumer uptake of electric vehicles.



⁵ The total systems costs include network reinforcement, energy network/infrastructure new build and operation, changes to individual homes (including heating system changes and fabric retrofit) and the cost of the energy consumed.

- Local Area Energy Planning provides many potential benefits:
 - ◆ A clear pathway to meeting ambitious national decarbonisation objectives, based on locally specific, viable and cost-effective plans;
 - ◆ A focus on Whole Systems and multi-vector planning that should realise system-wide efficiencies and secure value for money, whilst limiting increases in consumer bills;
 - ◆ A credible Local Area Energy Plan that establishes a basis for assessing or contesting energy developments in local spatial planning applications;
 - ◆ A framework for targeting investment and funded programmes directed at fuel poverty and improving building energy performance;
 - ◆ A way of providing evidence to target investment in network infrastructure upgrades, meeting an efficiency requirement of Ofgem's network price-setting process that provides the capital for network investment;
 - ◆ The potential to use Local Area Energy Planning as a basis for accountability, governance and performance management in this space and to coordinate with other local planning (e.g. transport and infrastructure);
 - ◆ A compelling and locally specific narrative for meaningful engagement with local citizens and businesses in the national effort to decarbonise, adding a democratic element to the significant changes ahead;
 - ◆ A framework for local areas to achieve local decarbonisation ambitions and assessing and setting local carbon emissions reduction targets;
 - ◆ The provision of a clear plan to drive local clean growth⁶ and job creation and to provide confidence to invest in new energy products, services and infrastructure.



⁶ The Clean Growth Strategy highlights that more than 430,000 UK jobs in low carbon businesses and their supply chains have already been created and "the UK low carbon economy could grow by an estimated 11 per cent per year between 2015 and 2030 – four times faster than the rest of the economy – and could deliver between £60 billion and £170 billion of export sales of goods and services by 2030".

The aggregation of insights from multiple Local Area Energy Plans developed over the next five years would provide valuable evidence (appreciating that these should be considered alongside top-down regional and national analysis) to inform local and national policy, including the major decisions that need to be taken by 2025 regarding UK heat policy and the future of the gas grid. Whilst acknowledging the complexity of such decisions, local evidence is essential to ensure that highly specific local characteristics are considered.

This report provides an overview of Local Area Energy Planning (section 1); an account of the key environmental, social and economic drivers underpinning the Clean Growth Strategy (section 2); a summary of the provisions of the Clean Growth Strategy that address heat, energy networks and energy performance of buildings (section 3); ten ways in which Local Area Energy Planning can address the delivery challenges of the Clean Growth Strategy (section 4); an observation on the planning policy framework for Local Area Energy Planning (section 5); and decisions for government and recommendations (section 6).

Recommendations

The Energy Systems Catapult (ESC) and Energy Technologies Institute (ETI) recommend an evolutionary approach to Local Area Energy Planning, with the initial emphasis on encouragement, facilitation and supporting funding. If the case is then compelling, moving to an obligatory approach in the mid-2020s should be considered.

- **Recommendation 1.** Integrate Local Area Energy Planning as part of the Local Plan process, encouraging a Whole Systems approach to meeting the challenge of climate change, fuel poverty and cost effectively transitioning local energy systems.
- **Recommendation 2.** Central government to support and co-fund local areas to undertake Local Area Energy Planning to help understand options and plan to decarbonise local energy systems. Considering the role of local government and other local bodies such as the recently established local energy hubs in facilitating this.
- **Recommendation 3.** Due to their fundamental role in the energy system, energy network companies should actively participate in Local Area Energy Planning, working with local areas, as part of their obligation to take a Whole Systems approach under the RIIO-2 framework.
- **Recommendation 4.** Utilise Local Area Energy Planning to target investment in housing retrofit programmes and heat network development, to ensure cost-effective decarbonisation of the whole energy system.
- **Recommendation 5.** Build up a knowledge base of insights from Local Area Energy Planning, so that local characteristics and options for decarbonisation can inform national energy strategy.
- **Recommendation 6.** To rationalise current practices, support and publish data-gathering standards and requirements for organisations (e.g. local government and energy network operators) responsible for the collation and spatial representation of energy use, assets and infrastructure.

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

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