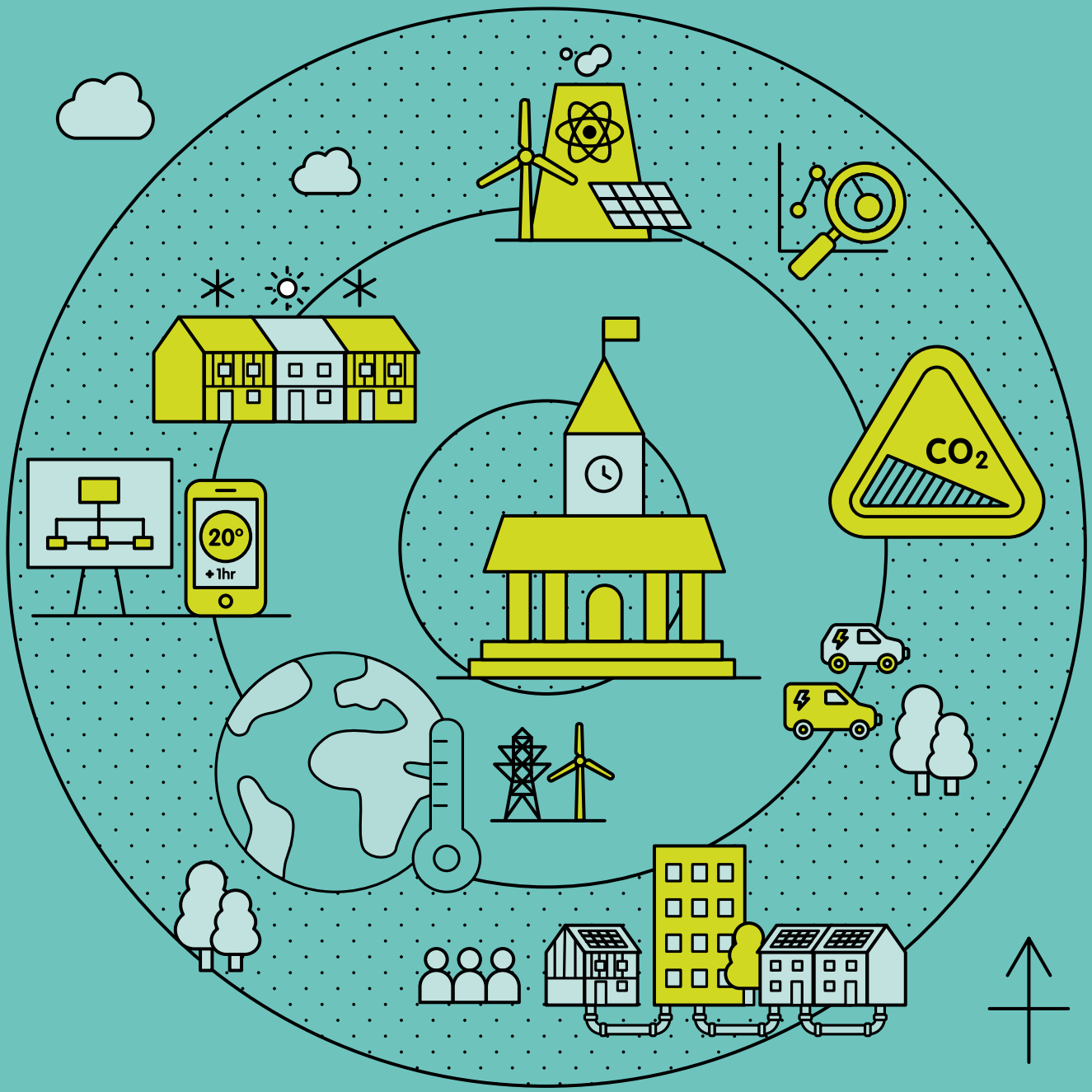
CATAPULT
Energy Systems



Local Area Energy Planning:
Guidance for local authorities and energy providers

energy technologies institute

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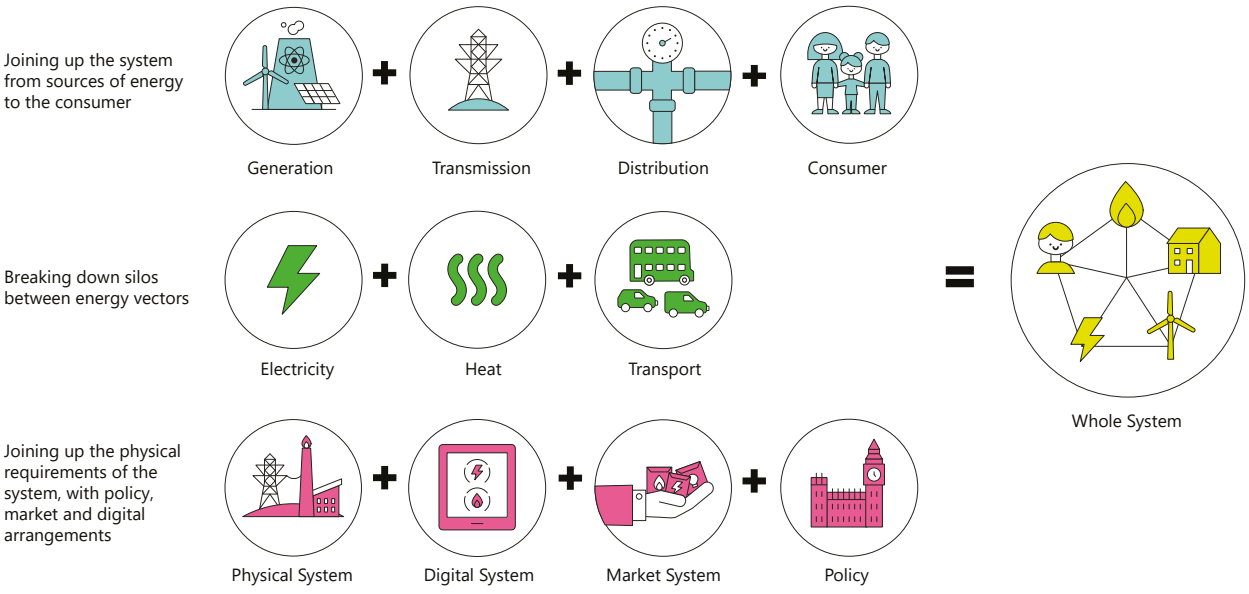
About Energy Systems Catapult

Energy Systems Catapult was set up to help navigate the transformation of the UK's energy system. We work across the energy sector to ensure businesses and consumers grasp the opportunities of the shift to a low carbon economy. The Catapult is an independent centre of excellence that bridges the gap between business, government, academia and research. We take a Whole Systems view of energy markets, helping us to identify and address innovation priorities and market barriers, in order to accelerate the decarbonisation of the energy system at the lowest cost.

Our flagship Smart Systems and Heat (SSH) Programme works with government, local authorities, businesses and consumers to identify the most effective means of decarbonising the UK's 27 million homes. As part of the SSH Programme, the Catapult has worked with Newcastle City, Bridgend and GMCA councils to develop Local Area Energy Plans that define how each of these local authorities will transition to a low carbon future.

With 160+ staff based in our Birmingham headquarters with a variety of commercial, policy and technical backgrounds, we act as an 'impartial broker', helping to open up new markets and promote British skills and capabilities.

What is Whole Systems thinking?

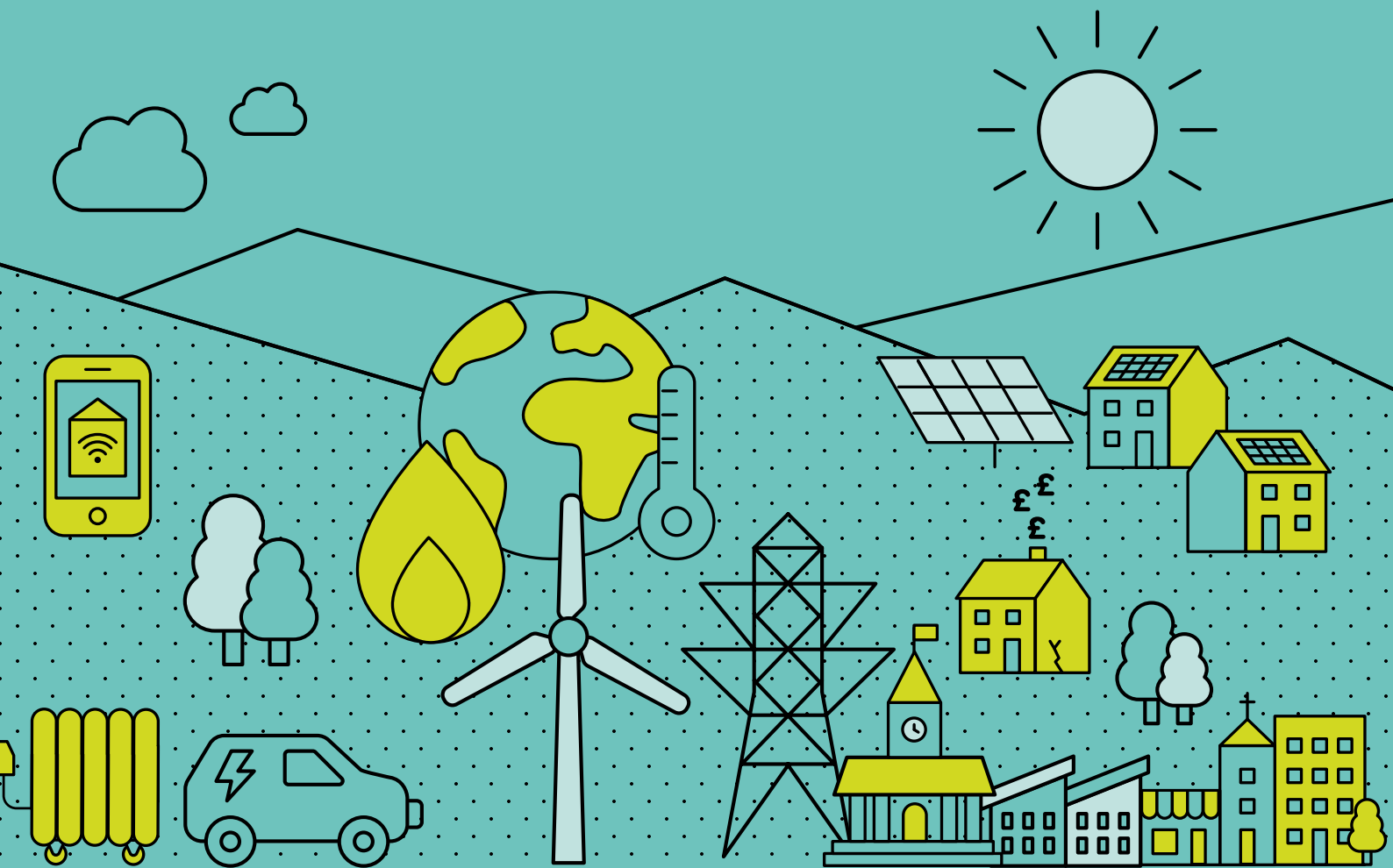


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- Our local area project partners, including Welsh Assembly Government and Bridgend County Borough Council, Wales and West Utilities, Western Power Distribution, Greater Manchester Combined Authority, Bury Council, Cadent, Electricity North West, Newcastle City Council, Northern Power Grid and Northern Gas Networks.
- Our project delivery partners including Baringa LLP, Element Energy, University College London, Newcastle University, Ove Arup and Partners Limited and Jones Lang LaSalle Ltd.

1. Introduction



1.1 Background and introduction

Why do we need Local Area Energy Planning?

1.1.1 The case for addressing climate change is overwhelming. It is one of the defining issues and biggest challenges of our time[1]. The UK is committed to cutting greenhouse gas emissions by 80% by 2050 (against 1990 levels). The UK is the first country to set legally binding carbon budgets to support achieving the obligation. These place a restriction on the total amount of greenhouse gases the UK can emit over future five-year periods. Some UK local authorities have adopted Climate Change Strategies and set aspirations for greenhouse gas and carbon reduction.

1.1.2 Energy use in buildings is a significant contributor to carbon emissions. Heating accounts for over 40%[2] of the UK's total demand for energy. Decarbonising heat is critical to clean energy ambitions and meeting the challenge of climate change. A very large proportion of domestic heating in homes is by natural gas, with little incentive for consumers to change. Heat related emissions need to be all but eliminated by 2050 and there has been little progress made to date. Just 4% of homes in the UK having low carbon heating[3] although the decarbonisation of the electricity used in buildings is well underway[4].

1.1.3 Delivering a cost effective and socially accepted low carbon transition for the UK will require significant transformational change to existing energy infrastructure and markets, along with the types of energy that are used as well as how, and when, they are used. There is a need to switch from natural gas fired boilers to other forms of energy and heating systems. This major transition needs to be thought about alongside the whole energy system, as transport and industry also decarbonise.



1 Ofgem. Future Insights Paper 2: The decarbonisation of heat, 14 November 2016.
2 October 2016, Next Steps for UK heat policy, Committee on Climate Change.
3 ETI 2015 Consumer Insight.
4 https://www.gov.uk/government/publications/decc-single-departmental-plan-2015-to-2020/single-departmental-plan-2015-to-2020.

1.1.4 Therefore, focus is needed to work out how heat can be decarbonised in parallel with transport and industry. It is a local and national challenge. It will involve major changes to energy infrastructure and buildings in local areas, providing an opportunity for local areas to influence and benefit from the transition. To date many local authorities have been involved in the planning and delivery of district heating and more recently a number have established local energy companies: this good practice and experience can be built upon.

1.1.5 Related to this challenge, government has placed high priority on improving economic performance and has established broad policy objectives through the Industrial Strategy published in November 2017[5]. The strategy aims to improve the UK's sluggish productivity growth and to focus on four major 'Grand Challenges' facing the UK: artificial intelligence and big data; clean growth; the future of mobility; and meeting the needs of an ageing society.

1.1.6 'Clean growth' is one of the four Grand Challenges that make up the core of the Industrial Strategy. It highlights the potential for low carbon and resource-efficient technologies, and related expertise and techniques, as a major industrial opportunity as part of the move to cleaner economic growth. As a way of advancing the clean growth challenge, the Industrial Strategy strongly endorses the idea of taking a Whole Systems approach to the decarbonisation of energy. The government's approach to meeting the clean growth grand challenge has been articulated in depth in the Clean Growth Strategy[6].

1.1.7 As well as being used to address climate change, Local Area Energy Planning could become a key implementation tool for clean growth by helping to meet the challenge of decarbonising the energy system. Within the Clean Growth Strategy there is a strong emphasis on local leadership which states:

"Moving to a productive low carbon economy cannot be achieved by central government alone; it is a shared responsibility across the country. Local areas are best placed to drive emission reductions through their unique position of managing policy on land, buildings, water, waste and transport. They can embed low carbon measures in strategic plans across areas such as health and social care, transport, and housing".

1.1.8 Local Area Energy Planning is therefore vital to create resilient, local low carbon energy systems for the future, whilst also benefitting from the *"greatest industrial opportunity of our time"*, which will bring a smart, clean energy revolution.

1.1.9 The transition will require decisions on energy network choices to be made, influenced by the different characteristics of local areas, as there will be no 'one size fits all' solution. This will require a new and collaborative approach that better informs and connects building and energy network decisions.

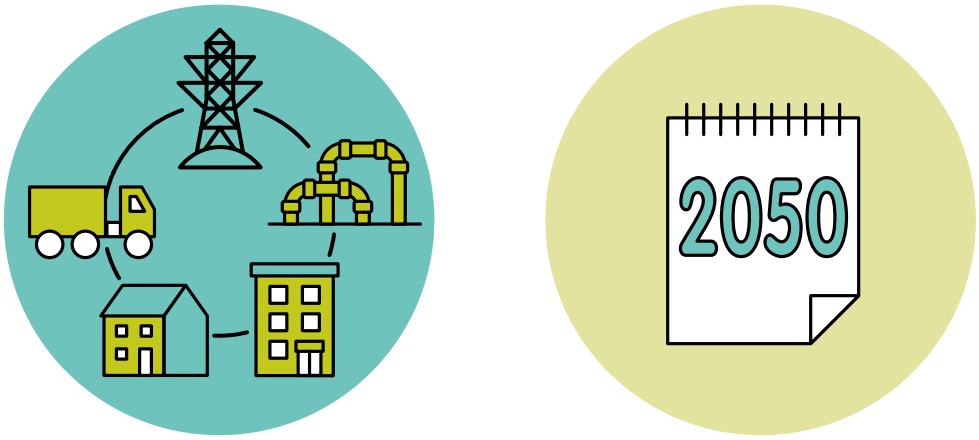
5 HM Government, Industrial Strategy: building a Britain fit for the future, 27 November 2017. https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

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

1.1.10 The transition is likely to involve:

- More decentralised energy;
- Energy storage;
- Greater uptake of heat networks;
- Electrification of heating;
- Electrification of vehicles;
- Upgraded electricity networks;
- Smart and better-connected energy networks;
- Repurposed or decommissioned gas grids;
- Improving the efficiency of homes and buildings; and
- Advances in connected home technology and domestic energy services.

1.1.11 Whilst 2050 may seem far away, in infrastructure terms, with long lead times and operational lifespans over decades, the scale of transformation needed is huge. This requires decisions to be made such that by 2030 the country is on track for wide-scale deployment of low carbon heating and transport[7]. Key stakeholders need to plan effectively to meet this challenge and deliver the transition. Whilst national government is expected to set out further policy in the period 2020 to 2025[8] to support decarbonising heat, Local Area Energy Planning can act as a key implementation tool for local action.



7 Royal Academy of Engineering A critical time for UK energy policy what must be done now to deliver the UK's future energy system A report for the Council for Science and Technology October 2015 https://www.raeng.org.uk/publications/reports/a-critical-time-for-uk-energy-policy

8 HM Government, Government Response to the CCC,2017 Report to Parliament - Meeting Carbon Budgets https://www.gov.uk/government/publications/committee-on-climate-changes-2017-progress-report-government-response

1.2 About this guide

1.2.1 This guide provides advice and recommendations to local government and other local organisations on undertaking objective, evidence based and data driven Whole Systems approach to Local Area Energy Planning.

1.2.2 In response to this local challenge and to support more effective Local Area Energy Planning, the Energy Technologies Institute's (ETI) Smart Systems and Heat Programme[9] has developed and piloted a Local Area Energy Planning tool - EnergyPath Networks. This has involved a new, 'Whole Systems' approach to planning and design of local energy systems and has been piloted with three UK local authorities:

- Newcastle;
- Bury in Greater Manchester; and
- Bridgend in Wales.

1.2.3 The pilots identified decarbonisation pathways and network choices based on the geography, buildings, energy infrastructure, energy demand, resources, urban growth plans and decarbonisation ambitions for each local area.

1.2.4 This guide draws extensively upon the experience of the Energy Technologies Institute and Energy Systems Catapult working with these three areas, which also involved collaborating with the relevant electricity and gas network operators, sharing knowledge and creating best practice.

1.2.5 The guide provides the following:

- A description of the policy imperative which supports Local Area Energy Planning;
- An assessment of how this fits in with energy planning already being undertaken by various local authorities and energy network operators across the UK;
- An explanation of the steps to be taken in adopting a Whole Systems approach to Local Area Energy Planning, outlining how local areas can follow an approach which reflects: local circumstances to achieve decarbonisation goals, clean growth and other local drivers such as energy security and affordability, reflecting government advice.

1.2.6 A list of additional resources supporting Local Area Energy Planning is provided at the end of this guide.

9 Energy Technologies Institute LLP 2017 An ETI Perspective - The importance of local area planning to the decarbonisation of heat http://www.eti.co.uk/library/an-eti-perspective-the-importance-of-local-area-planning-to-the-decarbonisation-of-heat

"All places are different – the people, housing stock, energy networks and opportunities for change are all unique to an individual local area – there will be no 'one size fits all' solution"

2. Local Area Energy Planning: Overview



2.1 What is Local Area Energy Planning?

2.1.1 National planning policy recognises the important role of spatial planning in addressing climate change, where planning can make a major contribution to both mitigating and adapting to climate change, through decision-making on the location, scale, mix and character of development[10]. However, there is little evidence to demonstrate that the current planning process is delivering the scale of intervention to existing buildings and energy networks that will be necessary for the UK to meet its legally binding emission reduction target of at least 80% by 2050 (against the 1990 baseline). For example, in 2016 an extensive survey by the Town and Country Planning Association found that local plans in England were not being used effectively to deliver climate change objectives[11]. Similarly the Committee on Climate Change state that "effective new strategies and policies are urgently needed to ensure emissions continue to fall in line with the commitments agreed by Parliament"[12].

2.1.2 In development planning, "master plans" are prepared to establish a long-term view of how a local area should be developed, providing a clear and robust framework for change, without stipulating exactly what is going to be built where and when at a micro level. Taking a similar, spatial planning approach to planning the type and interaction of an area's energy networks and building energy systems, can provide an enabling framework to cost-effectively decarbonise, whilst providing environmental, social and economic opportunities and benefits to a local area throughout the transition.

2.1.3 Local Area Energy Planning also provides the opportunity to enable a collaborative dialogue amongst local government, network operators and other stakeholders to help plan for the delivery of the changes needed to energy networks, homes and other buildings to deliver a low carbon and clean energy future.

2.1.4 The approach needs to consider the whole energy system, given potential changes to one part of the energy system can impact across the Whole Systems. To take an example, the electrification of cars could have a significant impact on electricity networks, which could affect the options for decarbonising heat using electric heating systems, where significant grid reinforcement and changes to supply and demand occur. Furthermore, as options for decarbonising all a local area's transportation and industry evolve, a whole energy system approach will be needed to assess the system impact of decarbonisation options being considered.

2.1.5 More effective Local Area Energy Planning is therefore needed to lead and coordinate the transition, ensuring that options brought forward in the near term, can support local ambition in the longer term.

10 Town and Country Planning Association 2018 Planning for Climate Change – A Guide for Local Authorities https://www.rtpi.org.uk/media/2852781/TCPA%20RTPI%20planning%20for%20climate%20change%20guide_final.pdf

11 Town and Country Planning Association (TCPA), Planning for the climate challenge, November 2016 https://www.tcpa.org.uk/planning-for-the-climate-challenge

12 Committee on Climate Change, 2017 Report to Parliament – Meeting Carbon Budgets: Closing the policy gap, June 2017

2.2 Who should be involved in Local Area Energy Planning?

2.2.1 There are a range of local organisations who can become involved in Local Area Energy Planning. However, emphasis on local government acting as a leader and enabler in conjunction with other stakeholders can help to achieve area visions and targets.

2.2.2 Local government is committed to a local area for the long term and is well placed to engage all relevant parties in decision-making about the necessary shift to a low carbon energy system. Their democratic status, statutory duties, responsibilities across the sectors of housing, waste, environment and transport, economic development and regeneration combined with planning and development powers, the scale and reach of operations and assets, and local government relationships with civil society and businesses, are all significant factors underpinning the important role local government can play in delivering Local Area Energy Planning.

2.2.3 In addition to local government, other organisations which may have sufficient leadership, resources and geographic reach to instigate, lead and play important roles include combined authorities and local enterprise partnerships (LEPs), as well as equivalent bodies in Scotland and Wales.

2.3 The role of local government

2.3.1 Long term effective action on climate change and more effective Local Area Energy Planning requires strong political leadership, ongoing commitment and continuity of policy approach.

2.3.2 Long term local strategies can contribute significantly to the implementation of decentralised energy opportunities, encouraging a Whole Systems approach and tackling the challenge of decarbonising heat and the energy system. Statutory duties, including planning and development powers are important in enabling cross-sector outcomes for clean and low carbon energy systems. Many local authorities in the UK and abroad have already made pledges to radically reduce carbon emissions and achieve 100% clean energy in their administrative areas or key cities by 2050.

2.3.3 The Mayor of London, through the London Plan, has various targets for carbon reduction, zero carbon new build, retrofitting and district heating. The Greater Manchester Combined Authority is working towards a new Environmental Vision and target date for carbon neutrality, which will eventually be applied across strategies and initiatives in the area.

2.3.4 Local government increasingly recognises energy provision and demand management as drivers for change in terms of local social, economic and environmental objectives. Some local areas are making energy infrastructure and services central to capital investment and creating municipal energy companies to manage new business.

2.3.5 This approach as noted, reflects strategic advice set out within the 'Clean Growth Strategy' and 'Industrial Strategy', which clearly set out the advantages of moving to cleaner economic growth in the UK through low carbon technologies.

2.3.6 Achieving a more local and distributed energy system, with scope for local innovation and flexibility in energy supply and use, and making buildings integrated with better connected, low carbon, energy infrastructure, will have system-wide benefits. Such benefits are unlikely to be realised without local government leadership.

2.3.7 Local Area Energy Planning recognises that local government alone could not enable the transition to a low carbon economy; as is the case with other forms of planning. Collaborative action with other stakeholders (some of which are discussed in Section 4) is also needed. This recognises that a sector-wide transformation is needed to consider and then enable the regulatory, policy and planning changes required to facilitate a low carbon future.

2.3.8 However, local government can take a lead role, as it is best placed to guide the transition so that it considers and benefits an area's residents and businesses, whilst considering local priorities. Local government is one of the very few organizations committed to a local area for the long term and their status makes them an effective route to engaging many different stakeholders in decision-making in all aspects of the local energy system.

2.4 Appropriate scale

2.4.1 Local authorities have relatively complex structures and varying populations – from a few tens of thousands (West Somerset), to over 100,000 in East Lothian, to over one million (Birmingham). In England, there are some 353 local authorities, mostly but not all in a two-tier (county and district) configuration[13], whilst there are 22, 32 and 11 unitary authorities in Wales, Scotland and Northern Ireland respectively.

2.4.2 Planning authorities overlap substantially with local government but are not always aligned. For example, national parks are distinct planning authorities, and in some areas planning responsibilities are split between tiers. In England, there are also 38 Local Enterprise Partnerships (LEPs) based on *economic* geography[14]. These and their equivalent bodies in Scotland and the Welsh Government could play a role, for example as hubs for expertise, but do not have the democratic 'public choice' credentials of local government and the planning system.

2.4.3 There are no hard and fast rules on the appropriate scale for Local Area Energy Planning. Larger scale may enable more practical engagement by energy network operators, smaller scale may allow for higher resolution and more specific decision making and engagement with communities and people. Alignment with LEP boundaries may allow businesses to become more engaged. However, given the linkages, there are good arguments for aligning with *spatial planning authority* coverage, better connecting the spatial aspects of Local Area Energy Planning as an additional dimension to the local plan.

13 Ministry of Housing, Local Government and Communities, Local government structure and elections, as at 27 April 2018. In Wales the are 22 and in Scotland 32 unitary local authorities, but with significant responsibilities resting with the devolved administrations. https://www.gov.uk/guidance/local-government-structure-and-elections

14 Local Enterprise Partnerships. Accessed 27 April 2018 https://www.lepnetwork.net/growth-hubs/

2.5 How does Local Area Energy Planning fit into the wider context of energy planning?

2.5.1 Local government throughout the UK already undertakes a wide range of energy planning activity:

- For England and Wales, there is a requirement in the Planning and Compulsory Purchase Act (2004) to account for energy and climate change mitigation in local development plans.
- For England, the guiding framework for local planning is the National Planning Policy Framework (NPPF)[15]. It sets out the overarching objectives and principles underpinning the planning system. It includes a commitment to support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change, and encourage the reuse of existing resources, including conversion of existing buildings, and encourage the use of renewable resources (for example, by the development of renewable energy) (Core Planning Principles, Paragraph 17).
- For Wales, Planning Policy Wales (PPW) sets out the overarching spatial planning policy for Wales. Section 4: Planning for Sustainability and Section 12: Infrastructure and Services, make a range of commitments to low carbon development, for example, planning policy at all levels should facilitate delivery of both the ambition set out in 'Energy Wales: A Low Carbon Transition'.
- For Scotland, the highest-level planning statement is the National Planning Framework, which sets the objectives for 'a low carbon place' and for spatial planning. Scottish Planning Policy states that the planning system should support the transformational change to a low carbon economy, consistent with national objectives and targets.

2.6 Pulling it all together

2.6.1 Whilst existing planning and energy planning practices exist, none of them will enable and guide the significant change and investment needed to decarbonise. A profoundly new Local Area Energy Planning approach fills this significant gap. It can also be used to coordinate local energy initiatives, aligning with the delivery of the Energy Company Obligation[16], community energy schemes[17] and housing retrofit programmes.

2.6.2 A new Whole Systems approach will therefore have valuable links to the current function of local government in terms of its statutory obligations in the planning system, in relation to decision making in relation to land, development and transport and in enabling the change to a low carbon economy and places.

15 HM Government (2018) Draft Revised National Planning Policy Framework https://www.gov.uk/government/consultations/draft-revised-national-planning-policy-framework

16 BEIS Energy Company Obligation: ECO3, 2018 to 2022 https://www.gov.uk/government/consultations/energy-company-obligation-eco3-2018-to-2022

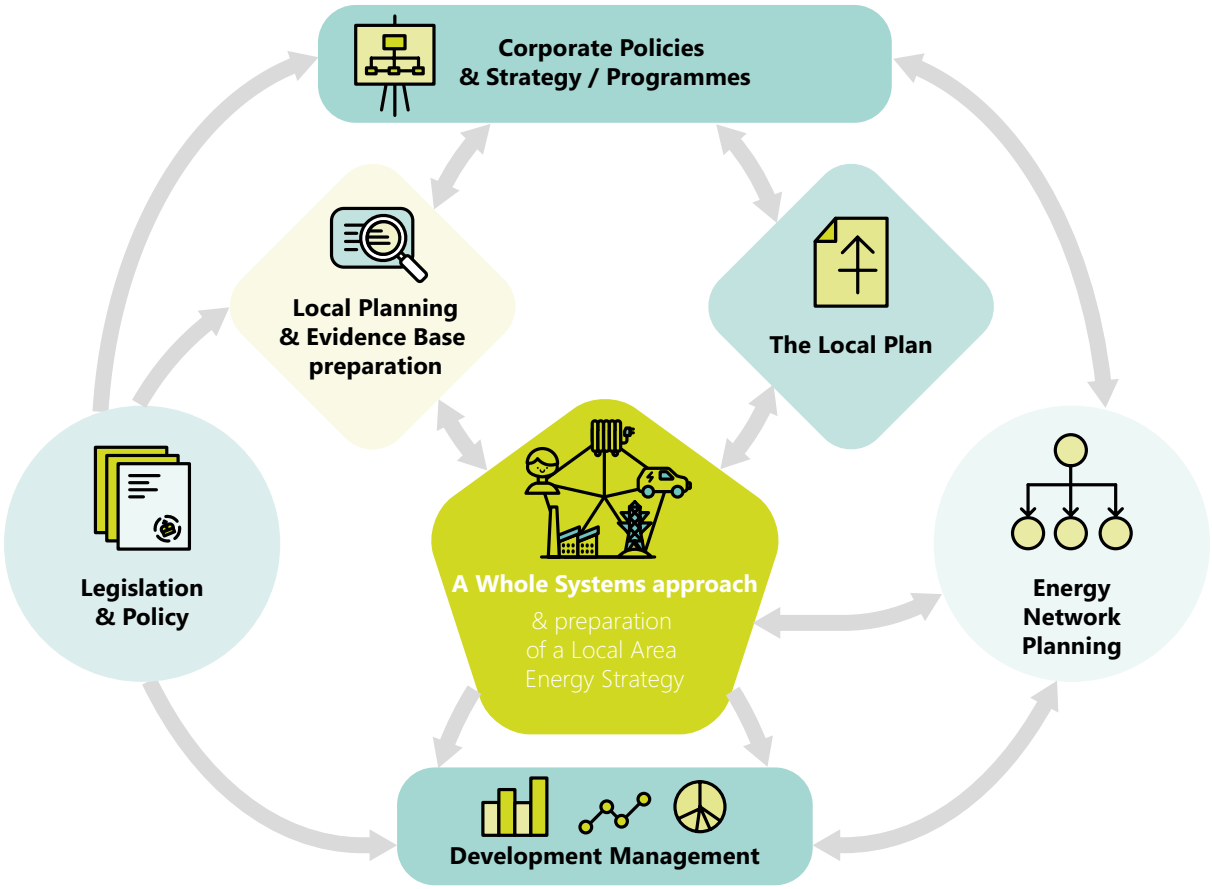
17 HM Government (2018) Community Energy 2015 https://www.gov.uk/guidance/community-energy

2.6.3 Gas and electricity networks are currently operated by separate organisations who conduct their network planning based on predictions of changes to current demand. These plans only consider the operators individual network and are generally focused on investments within their respective 8-year license periods under RIIO[18]. They do not consider interactions with other energy networks or whether investments in other parts of the energy system might provide better value to consumers than investments in their individual network.[19]

2.6.4 Local Area Energy Planning takes a longer-term view that considers how to achieve affordable and secure energy in the context of the whole energy system, including how different changes to buildings might influence the energy networks that serve them; the influence of decarbonisation on future choices; and the options to shift demand between different networks, providing an opportunity to improve and better connect energy network planning.

2.6.5 The figure below illustrates the relationship Local Area Energy Planning can have with the current planning and energy network planning systems.

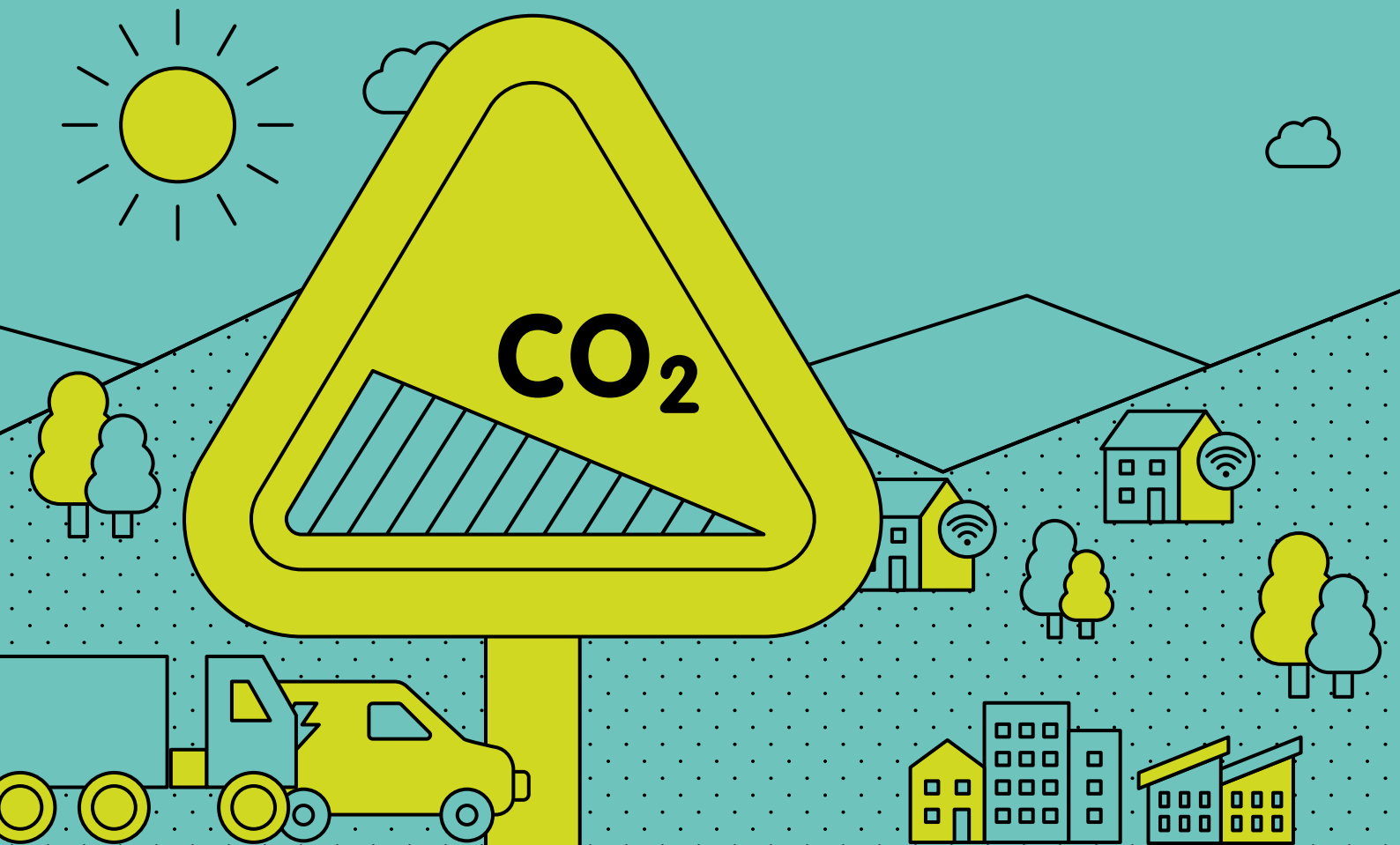
Figure 1: Local Area Energy Planning in the wider planning system



18 Revenues = Incentives + Innovation + Outputs

19 Note that this has been proposed to be reduced to 5-year periods under RIIO-2 with some proposals around strengthening the consideration of wider system factors in investment decision making. (https://www.ofgem.gov.uk/publications-and-updates/riio-2-framework-consultation)

3. The case for Local Area Energy Planning

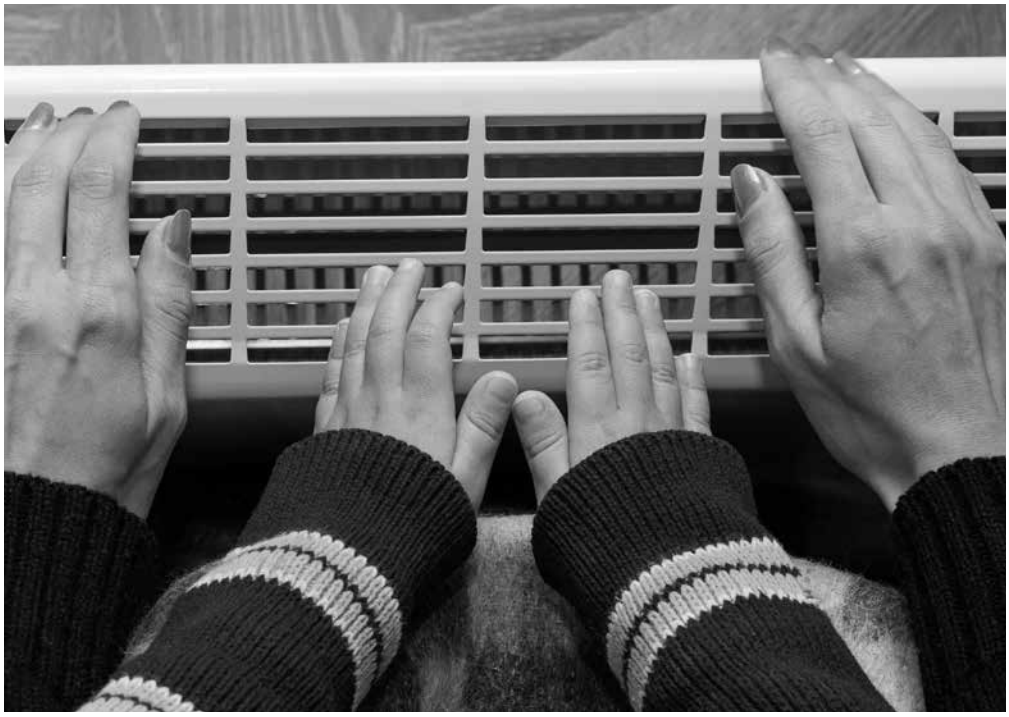


3.1 The policy imperative

3.1.1 There are several main policy drivers that underpin the case for Local Area Energy Planning, relating to environmental, social and economic considerations.

3.1.2 Environmental drivers resonate from the UK's commitment to cutting greenhouse gas emissions by 80% by 2050 (against 1990 levels). Focus has centred heavily and successfully on decarbonisation of electricity supply. The next phase of action on climate change inevitably demands a stronger emphasis on energy consumed as heat and for transportation. This will demand significant changes to buildings and energy networks, and this in turn requires better planning. The fourth (2023 to 2027) and fifth carbon budgets (2028 to 2032) mark the start of deep decarbonisation. These include challenging carbon targets, and the approach to meet each successive budget will draw on more complex and novel technologies and techniques.

3.1.3 Social drivers relate to improving the energy efficiency of the UK's housing stock and the impact of fuel poverty. Economic drivers resonate from the Clean Growth Strategy, which promotes growth using a low carbon economy and is intended to dovetail with the government's Industrial Strategy. The Clean Growth Strategy places significant emphasis on innovation and funding support. Improving energy efficiency across all sectors is also a major focus and the document reaffirms commitments to the UK's climate targets.



3.1.4 It is evident that there is a strong and compelling policy imperative driving the need to move towards a less carbon reliant economy and to take a "Whole Systems approach" to the decarbonisation of energy infrastructure systems: to position the UK as a leader in clean and efficient power, transport and heat through an integrated approach to decarbonising the systems.

3.1.5 The operators of gas and electricity distribution networks also have a potentially significant role to play in Local Area Energy Planning. The new price control process, RIIO-2, stresses "Whole Systems outcomes"[20]. The case for Local Area Energy Planning also emerges from Ofgem's recognition that Whole Systems outcomes should be pursued where these are in the consumers' interest. The purpose of Local Area Energy Planning is exactly aligned with this imperative – to identify the consumers' interest in a Whole Systems outcome at local level.

"Local Area Energy Planning can better coordinate and prioritise local energy initiatives and projects"

20 Ofgem, RIIO-2 framework consultation. 7 March 2018. RIIO is the price control framework used to finance network development paid for through consumers' bills. RIIO stands for (Revenue=Incentives+Innovation+Outputs) https://www.ofgem.gov.uk/publications-and-updates/riio-2-framework-consultation

3.2 The opportunities and challenges of Local Area Energy Planning

3.2.1 The **'opportunities'** provided by Local Area Energy Planning include:

- Decarbonisation will need national leadership but a 'top down' approach would not be able to **consider local priorities**; Local Area Energy Planning provides this opportunity. It can also help ensure local action aligns with and **informs national energy strategy**;
- Realising the significant advantages that can be gained from **shaping the future energy systems** of local areas, to improve the built environment and invest in low carbon infrastructure, and importantly to create a better, healthier and cleaner environment for all;
- It can give local influence over setting and meeting **carbon targets providing a clear pathway to meet both local and national decarbonisation objectives and** facilitate investment funding into local areas from central government (e.g. through devolution deals) and private investors;
- It can better **coordinate and prioritise local energy initiatives and projects**; including housing retrofit programmes, heat network development, decentralised energy generation, community energy projects and electric vehicle charging infrastructure. Current practice generally involves considering energy related projects/activities without considering their impact across the whole energy system; this can lead to selecting options that are more expensive to society;
- It can secure **value for money.** The investment in energy services and decarbonisation will be very substantial over the period to 2050. Better planning can manage the cost and better connect energy network planning and investment through strengthening dialogue between energy network operators and providing more certainty in investment decision making.

3.2.2 The **'challenges'** include:

- The cost to society, recognising that there will be a cost to decarbonise over a do-nothing approach;
- Profound changes to the way energy is provided and used today, such as the electrification of transport and moving away from the dominance of natural gas to new ways to heat buildings;
- Significant change to existing energy infrastructure and building heating systems, along with advances in technology, connectivity and digitisation;
- Local government having the support, resource and capability to lead and influence the transition.

4. The Local Area Energy Planning process



4.1 A structured and connected process

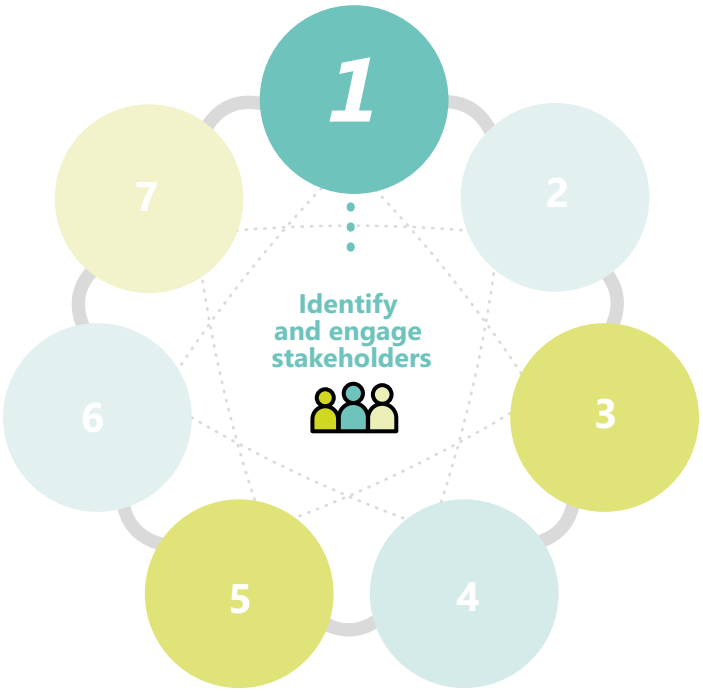
4.1.1 Local Area Energy Planning can help to focus effort and resources to ensure that every local area in the UK is on track to meet local decarbonisation ambitions and to clarify what energy network and system choices have been proposed to enable decarbonisation.

4.1.2 A Local Area Energy Strategy can both inform decision makers and be in place to guide the transition where uncertainty around technology and network choices exists. In the meantime, where there is certainty, the Local Area Energy Strategy can encourage the deployment of technologies, housing retrofit and energy systems that are the right option for the local area.

4.1.3 The seven steps in the Local Area Energy Planning process are illustrated below and described in this section.



4.2 STEP 1: Identify & engage key stakeholders



4.2.1 The Local Area Energy Planning process and its outputs will need to be owned and led by one organisation (defined within as the Local Lead Organisation), but formulating and taking strategies forward will require collaboration with or consideration of several key stakeholders. These could include:

- Local, regional and national government;
- Energy network operators;
- Local Enterprise Partnerships (LEPs);
- Local industry and academia; and
- Local area residents and businesses.

4.2.2 The first step in the process is to identify, prioritise and engage with relevant stakeholders, especially organisations or individuals that will be of value in planning the future energy system and its delivery. Stakeholder engagement should be a continuous process which starts early, continues throughout preparation and implementation and on through the monitoring period.

Table 1: Local Area Energy Planning process & key stakeholders

Stakeholder	Relationship with process and strategy
National government (including regulators)	Establish national level energy system policy, decisions and regulation that can influence an area's current and future energy system. It needs to be recognised that national government creates the national policy and regulatory framework in which the local energy system must operate.
Local government	Local government can support the transition by providing local leadership and guidance. It can also use its current planning function as LPA to make decisions on energy related aspects e.g. land allocation for new energy generation systems and infrastructure. Where appropriate local authorities should also work with other regional local government organisations to ensure a coordinated approach for a region.
Network operators	Network operators own and operate current energy networks. Consideration will be needed to plan what changes will be needed to energy networks (including potential new and adapted networks) and when and how residents, businesses and building owners are consulted to enable transition to a low carbon future.
Energy sector organisations (eg. energy generators, suppliers and service & product / technology providers)	These organisations make decisions on how energy is supplied to and used by an area's residents and businesses. Decarbonisation will require new and improved ways of providing energy along with new low carbon products and services.
Residents, businesses and building owners	Decarbonisation will mean that these key stakeholders will use energy differently (such as charging electric vehicles) and will need to use new low carbon types of products and services.

4.2.3 The process should be undertaken with these key stakeholders in mind, to provide a framework and evidence base to support their respective decision-making processes.

4.2.4 It may be helpful to: -

- **Undertake a stakeholder prioritisation appraisal** – this will allow stakeholders to be broadly categorised depending on their level of influence and interest;
- **Hold workshops** – these can be used to receive input and data, to discuss quantitative and qualitative criteria and to build support for individual and combined measures;
- **Prepare a Stakeholder Engagement Plan** – this is helpful for organising the process: it can be used to set out actions for engagement for the stakeholders that have been identified through prioritisation. The plan can set out types of communication to be used with different stakeholders, the nature of involvement they are expected to have and at what stage, and the overall aim of engagement which each relevant stakeholder.

4.2.5 The approach should be open regarding engaging with new stakeholders and could also identify work on strengthening engagement with sectors or stakeholders where previously it has been weak. By way of example, in the past, local authorities have generally had low levels of engagement with energy network operators.

4.2.6 A low carbon future can only be achieved through acknowledging that collaboration is essential. Key stakeholders will often make decisions in isolation that can impact the whole energy system. Local energy systems cannot be viewed in isolation from the wider national energy system as "*decisions taken in one locality can affect the interests of consumers in another*"[21].

4.2.7 The Local Area Energy Planning process can support the key stakeholders through providing vital insight into potential future energy infrastructure changes and investment needs from a Whole Systems perspective. Significant decisions regarding change and investment must be made and a wide range of stakeholders have important roles in making this happen.

4.2.8 Accordingly, to facilitate a collaborative and coordinated transition, it is essential that it is not undertaken in isolation from the plans and actions of each stakeholder. Success will depend on collaboration, including with parties responsible for the provision, maintenance and development of the local and wider national energy system. Local Area Energy Planning should:

- enable further consensus building between key stakeholders over time and in response to national energy system planning and changes in energy policy/markets, ensuring that progress is reviewed and updated;
- provide the context and evidence base so that key stakeholders and other relevant organisations can plan for, invest in and deliver the required energy infrastructure and decarbonisation solutions;
- address the opportunities to consider climate change in collaboration with adjoining authorities and bodies, as part of the "duty to cooperate".

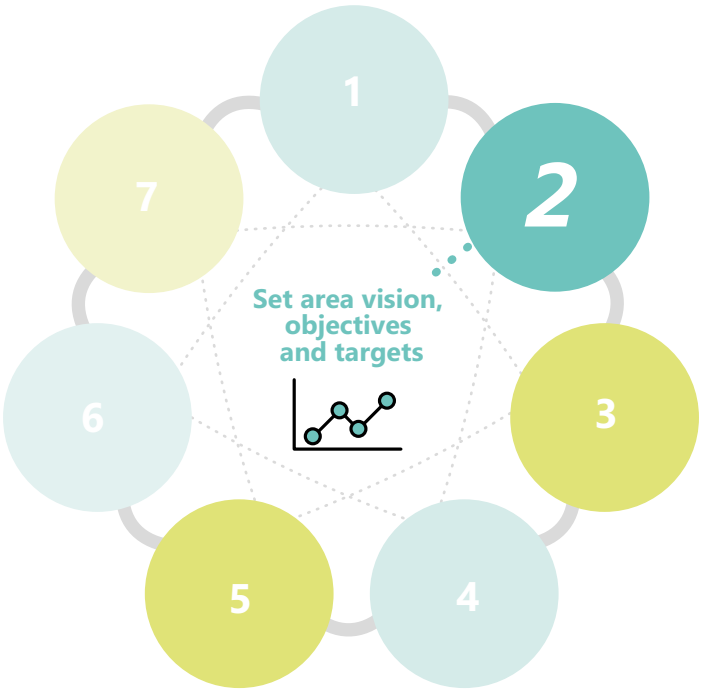


Have you...

- ❑ Identified and prioritised key stakeholders?
- ❑ Identified the Local Lead Organisation?
- ❑ Engaged with key stakeholders and identified roles and responsibilities?

21 https://www.ofgem.gov.uk/system/files/docs/2017/01/ofgem_future_insights_series_3_local_energy_final_300117.pdf

4.3 STEP 2: Set area vision, objectives and targets



4.3.1 Securing political support, commitment and leadership will be crucial for Local Area Energy Planning to be supported, effectively developed and implemented.

4.3.2 As noted, it will be important to work with all relevant stakeholders to understand their interests and priorities and to develop shared objectives for a low carbon future. Visions and targets may already be set for local areas or cities and these can be reviewed to ensure they remain appropriate for a local area and are consistent with national level decarbonisation objectives.

4.3.3 The overall aim should be to build a compelling, aspirational and realistic vision for a transition to a low carbon future for a specific area, supported by consensus amongst stakeholders. This will mobilise collective resources and ensure that realistic and deliverable targets and an associated strategy for delivery are established.

4.3.4 For example, a high-level **vision** could be:

"*To enable the local area to transition to an affordable and decarbonised energy system that works for its people, communities and businesses, supporting the aim of providing the area with 100% clean energy by 2050".*

4.3.5 The Mayor of Greater Manchester, Andy Burnham, together with local leaders, wants to bring Greater Manchester's date for achieving carbon neutrality forward by at least a decade to 2040[22].

22 Source from - https://www.greatermanchester-ca.gov.uk/news/article/290/green_summit_heralds_bold_green_future_for_greater_manchester

4.3.6 Setting **objectives** will be an important step to achieve the vision. It is assumed that focus will be given to carbon emission reduction; other objectives can then focus on local priorities, such as:

- **Focusing on innovation and creating jobs**;
- **Ensuring coordination with other local energy project activity** – which may be ongoing or planned within a local area, and being aware of other local policy and plans;
- **Encouraging economic growth and investment**;
- **Focusing on social aspects** e.g. the affordability of energy;
- **The need for implementation action and deliverable projects/ activities**.

4.3.7 It is also important to align energy/climate change to other corporate objectives.

The approach to setting targets

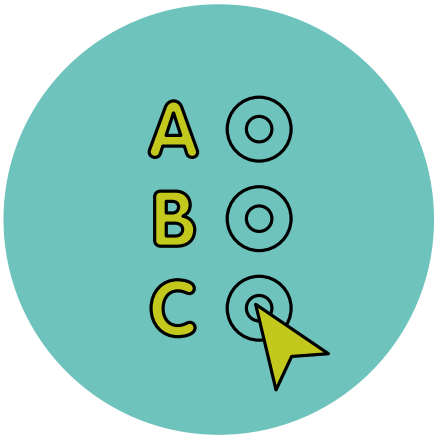
4.3.8 To meet commitments and challenges set, there is a need to reduce carbon emissions significantly using energy more efficiently, generating more local energy from low carbon sources and changing the way we plan for, manage and use energy locally. Targets in the medium and longer term are required to drive long-term decision-making and transformation.

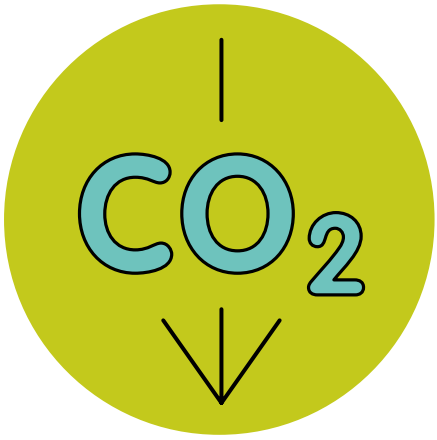
4.3.9 Different methods can be used to assist in setting and reviewing visions and targets and these include:

- **Workshops** – involving various stakeholders to discuss planned visions and targets, taking account of different perspectives, to consider options and to better understand likely levels of support;
- **Surveys** – to help draw out the opinions from a variety of stakeholders regarding existing and future targets.

4.3.10 Additional points to consider with regards to targets are:

- Data gathering and analysis is required for a local area to inform targets and timeframes. It will be essential to follow an approach that allows for review and adaption of targets as part of an ongoing process. Local Area Energy Planning involves taking a long-term view and current visions and targets may not remain appropriate with changes arising because of political, economic and technological factors;

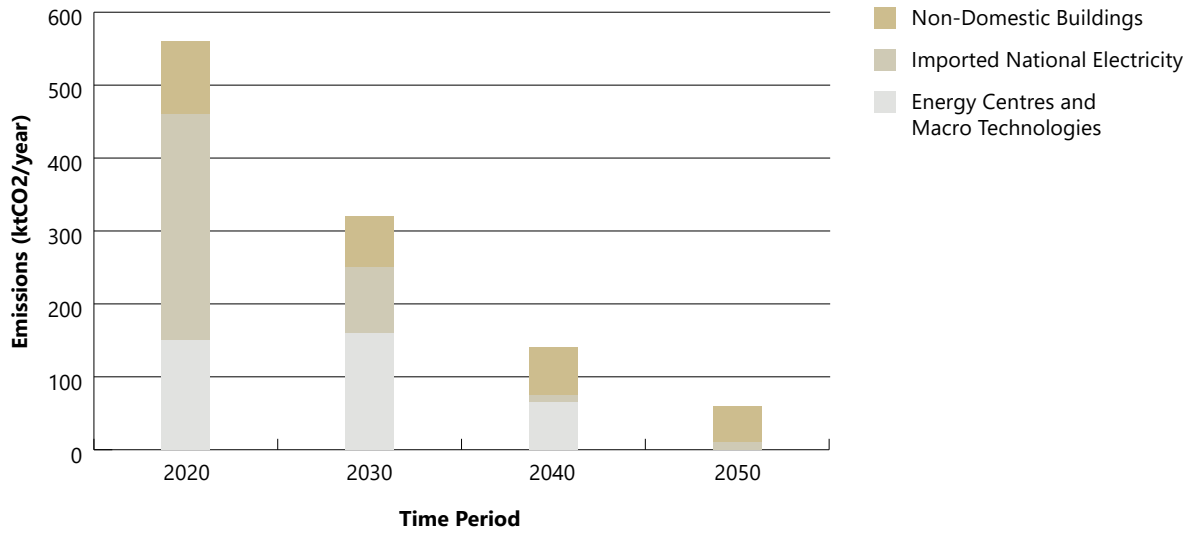




- Visions and targets should be developed consistent with relevant national strategy, objectives and targets;
- Including a wide range of stakeholder views in the process of setting and reviewing visions and targets, from politicians down to community engagement and individual residents.

4.3.11 The Local Lead Organisation should set a local carbon emissions target and develop supporting policy to achieve it by a defined year (say 2050), with ambitious but achievable interim targets. For example, to follow the carbon emission reduction illustrated in Figure 2 below. Once a local target is set the approach should also consider progress in meeting it.

Figure 2: Example carbon emission reduction trajectory



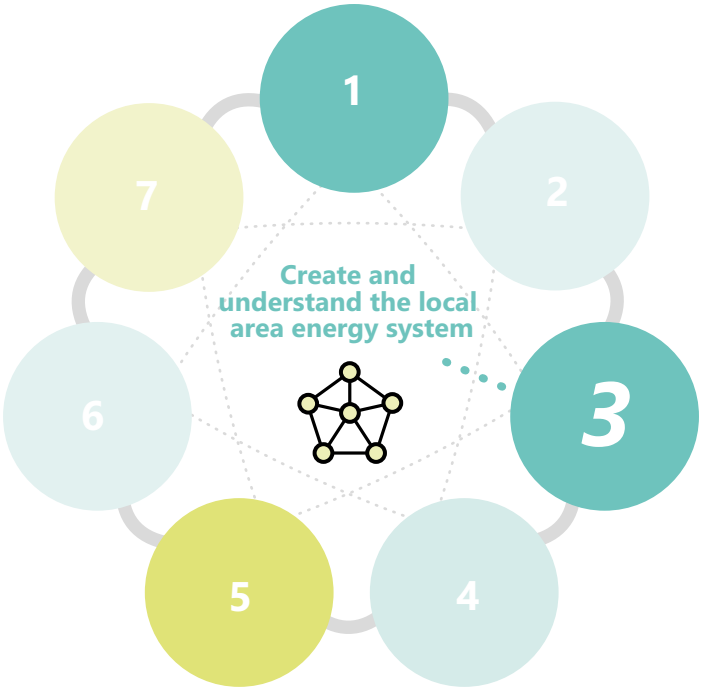
4.3.12 Setting local carbon targets aligned to national targets could be an effective means of incentivising local low carbon interventions.

4.3.13 The approach should include a mechanism for considering progress of domestic sector emission reduction alongside emissions for other sectors. To achieve the UK's 80% carbon emissions reduction and say a 100% clean energy city, both by 2050, there will be cross-sector emission interdependency.

Have you...

- ❑ Understood stakeholders' interests, priorities and existing energy related ambitions?
- ❑ Developed a compelling, aspirational and realistic vision for a transition to a low carbon future?
- ❑ Set objectives to achieve the vision?
- ❑ Developed a carbon emissions reduction target and methodology?

4.4 STEP 3: Create & understand the local area energy system



4.4.1 It is important to understand:

- A local area's current and future energy demand;
- The capacity of an area's future energy system to meet the identified vision, objectives and targets; and
- The changing expectations of local communities/consumers.

4.4.2 The first step is to understand the current situation (buildings, networks, current demand, current heating systems, etc.) to develop a local area representation. This is essential to inform what changes are required to make the necessary low carbon transition.

4.4.3 Identifying suitable and available resources and skills needs to be considered for completing this step (and step 4).

4.4.4 Building up a representation of an existing local energy system accurately can be challenging, as relevant data is often dispersed, sometimes not readily useable or may not exist.

4.4.5 Adopting a Whole Systems approach, for example by utilising a data framework such as that used in the EnergyPath Networks model, allows for the creation of a detailed spatial picture of a local area by collating the best available data in a structured format.

4.4.6 Understanding a local area energy system means identifying and quantifying various parameters, including:

- Current energy networks, their capacities and the buildings connected to them;
- Current domestic building types, numbers, locations and heating systems;
- Current industrial and commercial building numbers, locations and uses;
- Local constraints specific to areas such as conservation areas and listed buildings;
- Current and projected energy flows through the networks;
- Likely future energy demands;
- Assumed network demands from transport (e.g. electric vehicles); and
- Consideration of future growth.

4.4.7 By taking this approach, the local area and its future energy consumption and related emissions can be better understood. Potential issues and opportunities for action can be addressed. This also enables future scenarios to be developed and analysed (which is covered in the next step).

4.4.8 Building up a spatial picture of the local area energy system can be informative and can benefit various stakeholders as follows:

- **Building managers and local government** benefits can include:
  - Combine existing building and socio-economic data such as income levels to help identify areas of potential fuel poverty;
  - Identify high energy use public sector owned buildings to prioritise retrofit opportunities;
  - Gain a better understanding of the local building stock and its improvement potential;
  - Establish an improved representation of the carbon footprint of buildings in the local area.
- **District heat network developers and local government** benefits can include:
  - The modelling approach can better connect heat network opportunities with an areas energy network strategy. For example, focus on developing heat networks in areas where they are more likely to expand over the medium-long term, rather than in areas where heat could be electrified;
  - Identify publicly owned buildings that are suitable as anchor loads for heat networks;
  - Identify building stock for retrofit programmes and highlight synergies with future energy infrastructure choices, e.g. potential heat network locations;
  - Help build the evidence base for assessing community infrastructure contributions such as new energy centres or distributed generation.

- **Electricity and gas distribution network operators** benefits can include:
    - The area representation can be prepared as a common template across local areas: within a network operator licence area for reporting demand growth projections or identifying potential resources for demand management and local balancing;
    - The representation can help visualise, on a spatial basis, current network assets, e.g. capacity, location and relationship to connected buildings;
    - The representation can help identify potential upstream energy network constraints arising from new housing developments or heavy deployment of renewables;
    - The representation can also potentially provide information to help plan electric vehicle charge point locations.

4.4.9 Where data is used responsibly and following relevant protocols, it can be used to unlock opportunities.

4.4.10 The data gathered can be collated and presented graphically and spatially with the goal of helping the preparation of efficient energy data assets and build analysis capabilities: these can support a range of local government strategic objectives and services. Such structured data assets can benefit:

- Development planning activity by way of the preparation of an evidence base;
- Spatial energy planning exercises, including for retrofit action;
- Full Whole Systems decarbonisation pathway analysis;
- Stakeholder engagement exercises such as for network operator regulated price control submissions;
- Assist in forging significant innovation and technological development.

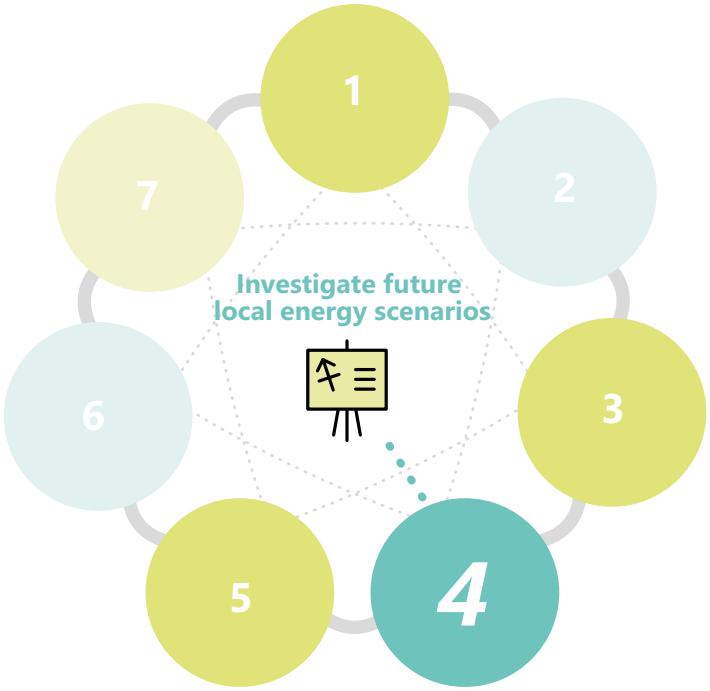
4.4.11 The picture of a local area provides the starting point from which to conduct analysis and the investigation of future local energy scenarios, and in turn the development of a Local Area Energy Strategy.



Have you...

- ❑ Understood the local area's current energy system, demands and other relevant characteristics?
- ❑ Identified the resources and approach to create a local area representation?
- ❑ Considered how data will be collated, assessed and utilised in the future to maximise its potential?
- ❑ Created a spatial representation of the local area's current energy system and future energy requirements?

4.5 STEP 4: Investigate future local energy scenarios



4.5.1 Step 4 sets out the process of creating cost effective and robust scenarios of future local energy system infrastructure. This is required to enable decisions to be made on energy network and system choice; to decarbonise heat and the local energy system.

4.5.2 These scenarios should:

- Achieve the Area Vision, Objectives and Targets defined in Step 2. For example, this could be based on achieving a specific decarbonisation target by a set date, facilitating economic growth or, increasing the proportion of local renewable energy generation etc.;
- Analyse energy system change from present day to an agreed end date (e.g. 2050). Be developed in collaboration with the key stakeholder group to ensure local priorities and constraints are central to the process. It is expected that the key stakeholder group will provide substantial input, particularly energy network operators;
- Be based on a robust view of the national energy system, from the present day forwards. This will need to consider variation from any assumed change to the national energy system and any impact on the local system;

- Be based on Whole Systems analysis. The analysis should explore and test a full range of potential options and their impact across the whole energy system before identifying preferred options. Different combinations of energy system and networks choices will be applicable for different places. Analysis must consider any potential change to one part of the energy system as a component of the whole energy system, as a decision on any one element could have an impact across the whole system. Current practice means that many energy systems/ projects are considered in isolation;
- Be based on a multi-scenario approach. This should explore enough potential scenarios and sensitivities to create a credible evidence base. This should provide confidence to the key stakeholder group that an appropriate number of future scenarios have been assessed. Outputs are used in Step 5, to identify recurring transition themes (in specific areas) across multiple scenarios. More confident choices can be identified where a dominant energy system and network choice (or combination of choices) is highlighted across a wide range of scenarios.

Current approaches are fragmented and led by technology rather than systems, resulting in isolated network planning and interventions. Working to a Whole Systems approach provides an opportunity to better connect energy system and infrastructure planning. For example, when developing a transport strategy, this wouldn't just explore options for one form of transport (e.g. rail), it would assess all options together to identify specific choices that are unique to the local area.

Generating a Baseline

4.5.3 In the first instance a 'baseline' scenario should be developed to set a reference point, providing a modelled view of the future energy system. This can be used to project input and output assumptions over the assessment period. This could provide a business-as-usual scenario. A business as usual scenario can estimate the cost and carbon emissions of continuing with the current energy system and be used to compare to the projected scale of change and associated investment required to achieve local decarbonisation.

4.5.4 The baseline scenario will have a significant cost as it would estimate the total energy system costs over the assessment period (e.g. energy consumed, network reinforcement & replacing building heating systems etc.) and should be used to enable debate with the key stakeholder group. For example, from reviewing the outputs, discussion with the key stakeholder group can identify local practicalities that should be reflected in subsequent analyses. This process should help identify what further scenario analyses are needed.

4.5.5 In short, generating the baseline can help quantify the cost of continuing with the current energy system and be used to compare to the projected scale of change and associated investment required to achieve local decarbonisation.

Consideration of Alternatives

4.5.6 Alternative low carbon scenarios should be developed, to illustrate options to achieve cost-effective levels of emission reduction. These scenarios should also achieve the Area Vision, Objectives and Targets. They also might explore other local preferences.

4.5.7 The scenarios will highlight energy system change, such as the transition from using natural gas to alternative forms of low carbon heating along with a projection of the associated transition cost.

4.5.8 The alternative scenarios should be based on the priorities of the key stakeholder group. For example, there may be interest in exploring:

- Scenarios that may have a higher cost (than a least-cost option) but involve less risk and complexity; and
- Scenarios that could create wider local benefit for an acceptable premium.

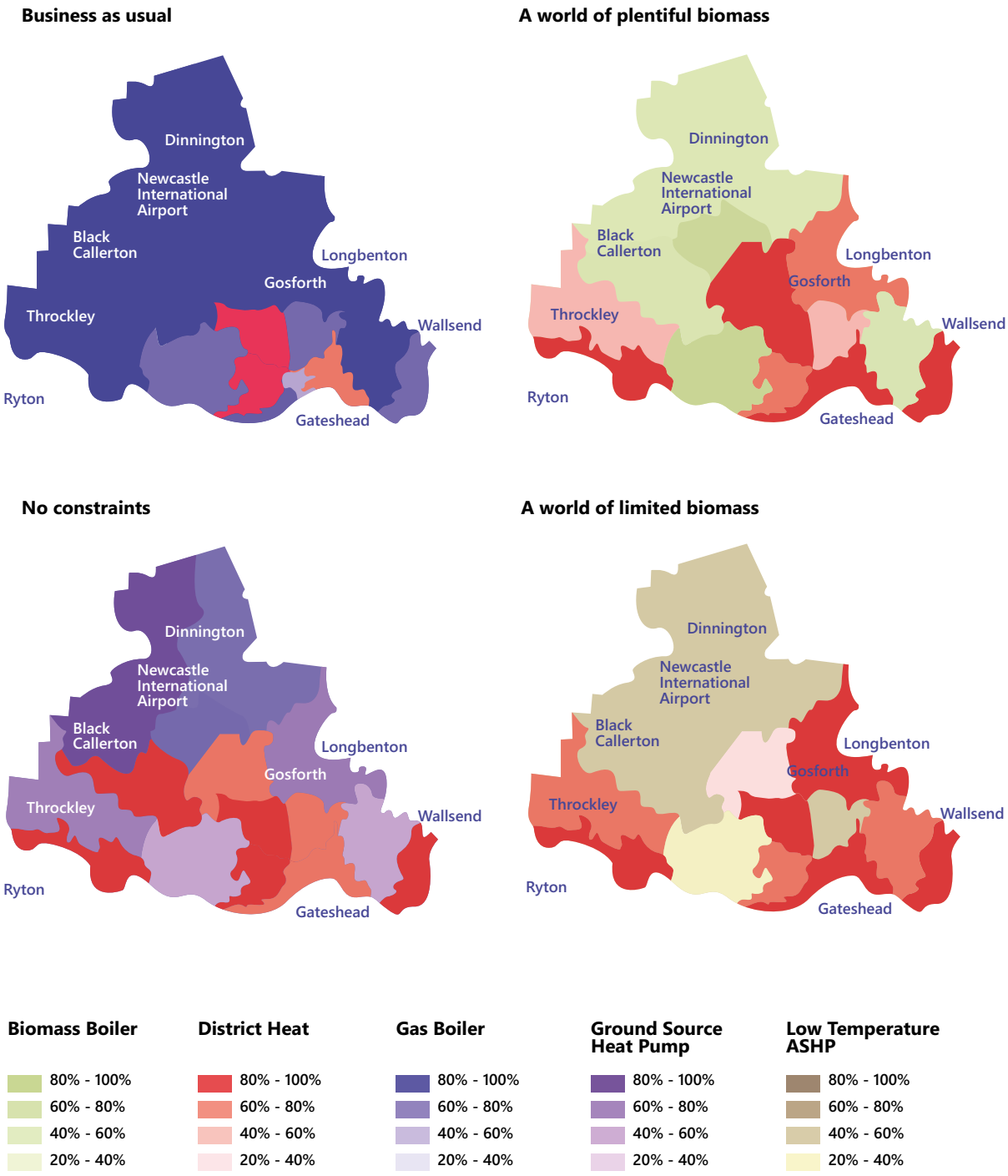
4.5.9 To assess the impact of alternative decarbonisation scenarios, they should be compared with the model baseline. Such comparisons provide an indication of the benefits of the proposed changes and their associated costs. This type of analysis is very useful as it provides an insight into the scale of change and costs that could be incurred from different potential pathways.

4.5.10 It is recognised that there are many possible energy system pathways to decarbonise a local area's energy system and it will not be practical to consider every possible scenario. The considered scenarios will not be a perfect forecast of the future. Their purpose is to provide an agreed evidence base to stimulate debate, look for recurring themes of cost-effective solutions that can be used to develop a strategy and facilitate an ongoing process of Local Area Energy Planning and decision making. They should illustrate the technologies and energy systems that are likely to be part of the local energy system and indicate the potential costs, benefits and risks of different options.



4.5.11 The following figure shows an example of a series of possible future local energy scenarios developed and investigated during the pilot project with Newcastle City Council, Northern PowerGrid and Northern Gas Networks.

Figure 3: Example future local energy scenarios for Newcastle



Sensitivity analysis

4.5.12 Sensitivity analyses should be applied to both inform the development of an area's potential decarbonisation scenarios and provide assurance that a suitable range of alternatives have been tested to provide confidence in the resulting analysis.

4.5.13 In recognising that there is significant uncertainty out to 2050, it is important to understand how potential changes in input data can influence the relative merits of future options. Sensitivity tests are important and help to understand the robustness of results. For example, in working with Bridgend County Borough Council, Welsh Government, Wales and West Utilities and Western Power Distribution sensitivity testing was undertaken to assess the effects of changes to:

- National decarbonisation pathways;
- Energy costs;
- Technology and network costs;
- Restricted domestic heat storage charging times;
- Green gas availability.

4.5.14 Sensitivity testing can identify risks and opportunities associated with potential transition scenarios. The process can help set new assumptions or a new baseline position on which to base further analysis. An important element of the sensitivity testing involves discussing the outcomes with stakeholders where insight into specific areas can lead to discussion and then consensus on the parameters that should be applied moving forward.

4.5.15 Sensitivity testing can also help to identify solutions that form a part of future pathways under a wide range of possible scenarios. These solutions are likely to be lower regret as they are robust to changes in other factors.



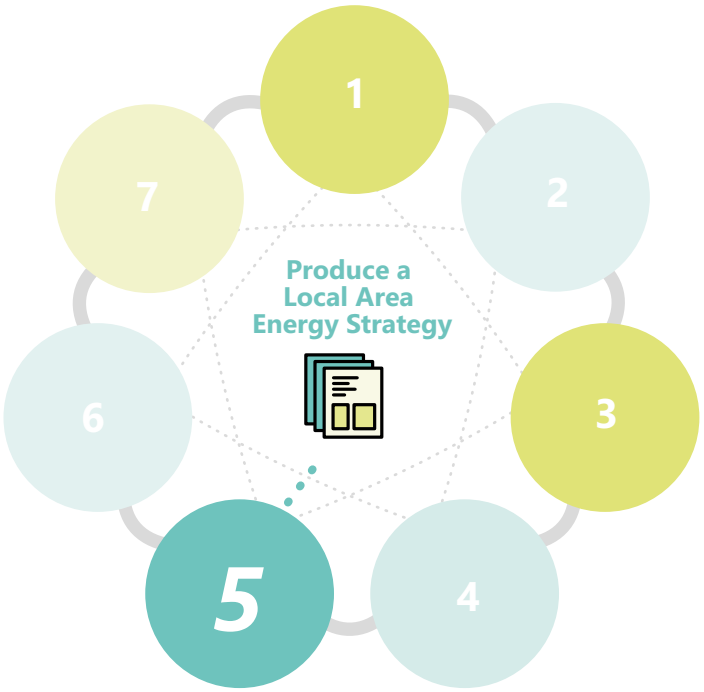
Have you...

- ❑ Identified a Whole Systems approach for generating future local energy system infrastructure and decarbonisation pathways?
- ❑ Generated a baseline scenario providing a modelled view of the future based on the current energy system?
- ❑ Developed alternative low carbon scenarios to illustrate plausible options to decarbonise?
- ❑ Undertaken appropriate sensitivity testing?





4.6 STEP 5: Produce a Local Area Energy Strategy



4.6.1 A Local Area Energy Strategy is the output from the Local Area Energy Planning process. It can provide a long-term framework for reducing carbon emissions. It should be based on a Whole Systems analysis developed specifically for the local area.

4.6.2 This should consolidate the findings and outputs of the evidence base (developed in Steps 3 and 4), through considering other essential interdependent factors that are central to the local area's future energy system design and delivery, such as consumer, commercial, policy and regulatory considerations, alongside the outputs of the modelling approach.

4.6.3 It should represent the output of the collaborative and open dialogue amongst representatives from local government, network operators and other stakeholders to help plan, with a Whole Systems perspective, for the delivery of the energy networks and changes to homes and buildings needed to deliver a low carbon and clean energy future.

4.6.4 The Local Area Energy Strategy should:

- Be based on the technical evidence base (developed in Steps 3 and 4) which provides the technical analysis and area specific evidence to support the strategy, summarising the Whole Systems optimisation analysis and the supporting information that has been assessed;
- Set out the proposed different combinations of energy system and network change (based on a Whole Systems view) for local the area;
- Include a spatial plan to illustrate the proposed energy system and network changes;
- Build on the evidence base, through setting out the activity to implement the strategy. For example, this could highlight where innovation is needed to provide more certainty before making network or building choices recognising that not all decarbonisation options are market ready. Currently consumers generally continue to buy and use carbon-based products over low carbon alternatives. For example, home owners are more likely to replace a gas boiler with another gas boiler, rather than buy an electric heat pump;
- Include short-term actions and priorities to make progress;
- Include a roadmap defining key milestones, outlining how near-term activity supports longer term decarbonisation and critical points at which progress and decision making is needed; aligning with other stakeholders related plans and investment cycles.

4.6.5 The purpose of the Local Area Energy Strategy is:

- To allow local areas to either accelerate or moderate energy system and network change dependent on local ambition;
- To provide forward visibility of potential/likely energy system and network change for the local area;
- To ensure this change best reflects and benefits the local area;
- To provide a wrap-around framework for other local energy and climate change initiatives;
- To better connect energy network decisions and provide an opportunity to align with energy network price control mechanisms;
- To provide forward visibility that can unlock new investment opportunities in local generation, networks storage and buildings;
- To help better target investment in existing energy networks and retrofit of existing building stock;
- To establish the activity that is required to have confidence in network choices.

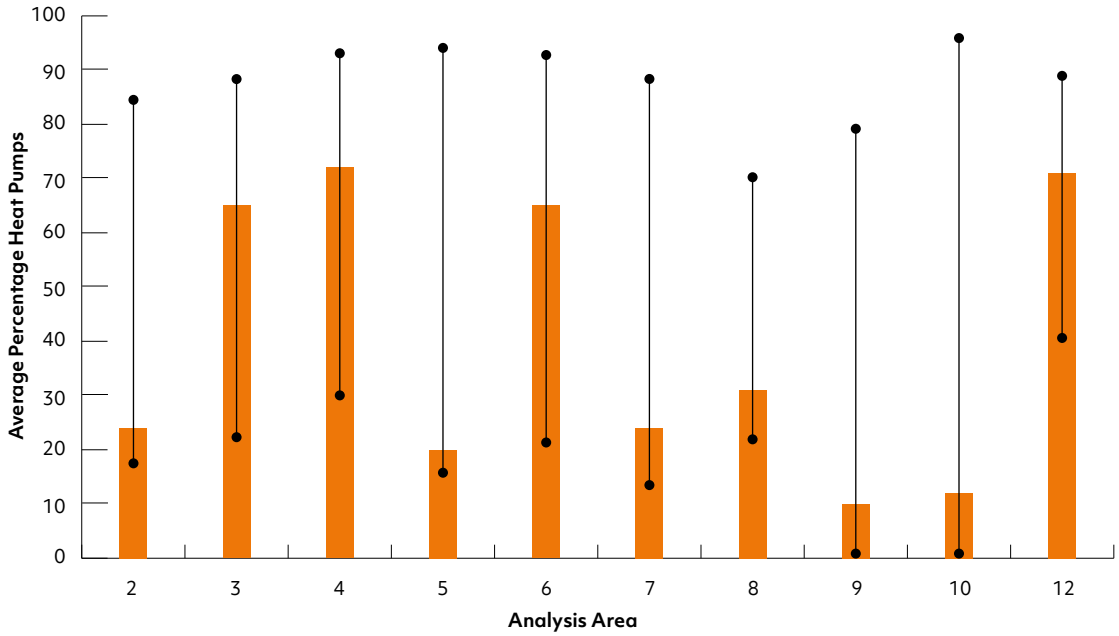
Identifying Consistent Transition Themes

4.6.6 The production of the spatial plan should be based on a multi-scenario approach, considering the scenarios and sensitivity analyses developed in Step 4 to identify recurring transition themes for specific areas. For example, heat networks may always appear in an area/zone regardless of differences in input parameters in the Whole Systems analysis process.

4.6.7 It is important that the strategy considers the outputs from testing numerous local energy system designs, analysing different system choices that result from adjustments to cost and performance characteristics (to understand the impact on the area's future energy system). Such an approach provides an understanding of the most valuable combinations of technologies under different conditions (e.g. high, medium, low future electricity price) and which blend of network choices occur consistently across a wide range of input assumptions.

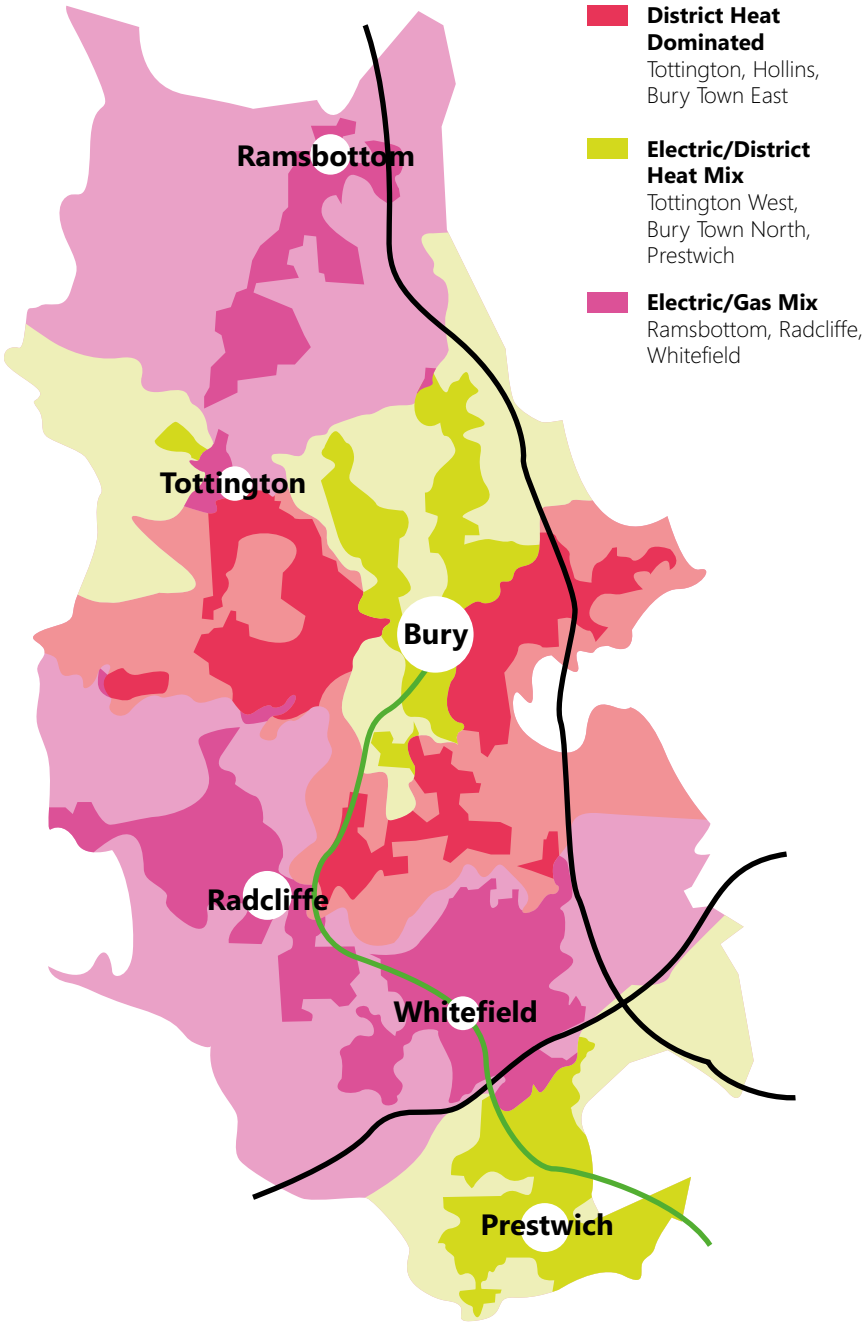
4.6.8 Figure 4 illustrates an example of the analysis undertaken in the Bridgend pilot project. This shows the average proportion of domestic buildings selected to transition to an electric heat pump across different areas of Bridgend under different future local energy scenarios[23]. This highlights where transition to electric heating is considered a cost-effective transition pathway across a wide range of scenarios in geographic areas and helps inform definition and planning of networks, building upgrades and heating systems in a given local area.

Figure 4: Number of heat pumps deployed across a range of scenarios for different areas of Bridgend



23 The solid bars show the average percentage of buildings across all the scenarios tested for each sub-area within the local area whilst the thin bars show the range of buildings selected.

Figure 5: A spatial energy plan for Bury



4.6.9 Figure 5 illustrates the spatial plan for the Bury pilot project, based on achieving a 98% CO2 reduction from 1990 levels by 2050 for the least cost. It highlights the most prevalent energy network and system choices identified across all scenarios in the Bury pilot to achieve the lowest cost transition.

4.6.10 Whatever future energy system is proposed, important decisions will need to be made regarding the adaptation of an area's electricity and gas networks along with the development of new energy infrastructure. This reinforces the need for Local Area Energy Planning to be centred on an open dialogue and building consensus amongst stakeholders to inform future local energy system designs and network choices.

Taking the strategy forward

4.6.11 Once the spatial plan is developed, focus should be given to considering how the spatial 'vision' can be progressed. The Local Area Energy Strategy should provide guidance identifying priority actions and activities to progress the future energy system. For example, this could focus on the following areas:

- Providing recommendations to collaboratively take forward with the key stakeholders, to continue the Local Area Energy Planning approach that will have been developed through the Local Area Energy Planning process, recognising that further activity may be required;
- Outlining recommended project related activity to progress, based on the following:
    - Deployment activity, where there is certainty that a decarbonisation option is the right solution and there is clarity on how it can be realised in the current consumer, commercial and policy/regulatory environment;
    - Development and demonstration activity, can reduce uncertainty and risk ahead of large scale deployment or major network investments. This can also provide opportunity for the local area to benefit from clean growth, for example, where a local area can to take a lead role in innovation, such as understanding potential for repurposing of the gas grid for hydrogen, retrofitting of heat networks or electrification of heat within a local area.

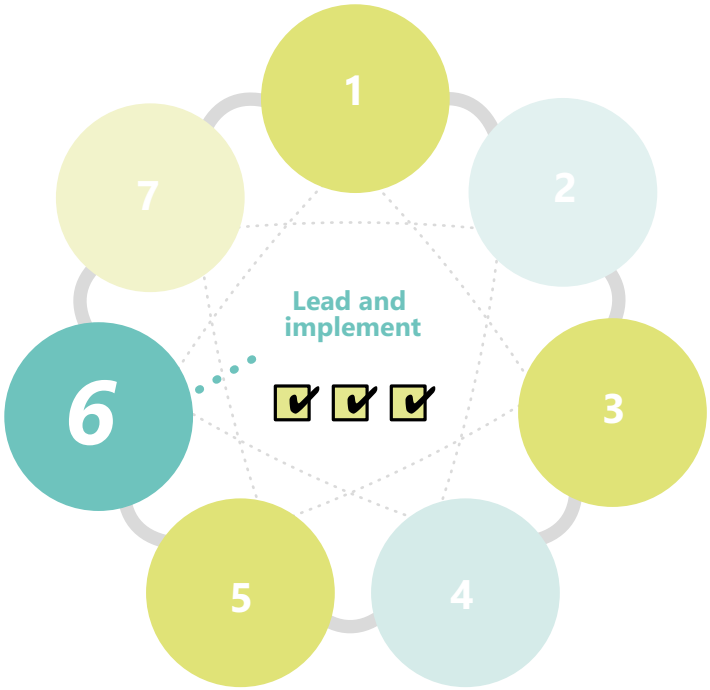
4.6.12 Where a local area wants to focus on clean growth, a programme of projects can be developed to build capability through practical demonstration and experience. Local leadership can be beneficial in helping to facilitate the establishment of industrial scale capability and stimulate innovation, investment and participation by the wider supply chain to develop the required capability. The Local Lead Organisation can determine what role it wants to play in this area (discussed further in Step 6), depending on its clean growth ambitions.



Have you...

- ❑ Considered the findings from steps 3 and 4 with stakeholders, identifying consistent transition themes for the local area?
- ❑ Produced a Local Area Energy Strategy that sets out a long-term framework for reducing carbon emissions?
- ❑ Produced a spatial plan highlighting energy system choices by area and a roadmap to take forward the Local Area Energy Strategy?
- ❑ Identified near term recommendations and project related activity?

4.7 STEP 6: Lead and implement



4.7.1 For Local Area Energy Planning to be effective it will need consistent support and strong leadership to deliver the local area vision and objectives 'on the ground'. To meet the significant challenges and realise the opportunities of a clean energy revolution it will require energy and enthusiasm from the various stakeholders to be directed into implementation projects: working effectively and consistently with organisations such as developers, local academia and communities, energy network operators and local businesses.

4.7.2 Implementation will need to be an iterative and collaborative process. A planning horizon over the next decade is likely to involve the need to consider several iterations of technological innovation and research-led development. Therefore, the Local Lead Organisation will need to continually evolve and develop the strategy, supporting initiatives and projects accordingly.

4.7.3 In the first instance, activities, roles and responsibilities should be developed that seek to continue the Local Area Energy Planning approach that has supported development of a Local Area Energy Strategy and related plans. Example activities include:

- **Determine the Local Lead Organisations** and supporting organisation's role in implementing the strategy from a:
    - Purely strategy making, monitoring and reviewing role;
    - Through to, developing supportive policies to enable;

- To an active delivery role (e.g. network upgrading or replacement, establishing energy services companies via public or public/private initiatives, installation of new heating system and controls).

- **Ongoing interaction with energy network operators**. To support delivery, continued collaboration is needed with energy network operators. Joint Local Area Energy Planning decisions will need to be made, along with agreeing the ongoing process to plan for transforming the local energy system, recognising that considerable investment is needed.

- **Coordinate interaction with and role of local academia and business in Local Area Energy Planning**. Recognising the importance of clean growth by government, where it has been described as one of the greatest industrial opportunities of our time, focus can be given to determine how local organisations can benefit from the clean growth opportunity. For example, local government can create the environment to support innovation and low carbon product and service developers.

- **Residents and businesses**. Consideration of how the transition will benefit, protect and improve the quality of the energy services to its residents and businesses over other market influences. The transition should be provided in a just, affordable, sensitive and inclusive manner. Fuel poverty should be considered so that those least able to pay are protected from the cost of decarbonisation.

- **Stakeholder collaboration**. Ongoing coordination with central government departments such as BEIS, relevant local government organisations and LEPs to both:

  - appreciate, support or influence the development of policy with respect areas such as the decarbonisation of national energy supplies and the development and expansion of new energy networks and low carbon and energy efficient solutions;

  - and understand other energy system activity, recognising that consideration of other local areas served by the existing energy system is needed. National system change can also impact the local energy system.

Short Term Implementation

4.7.4 Dependent on the approach taken to implement the strategy, a delivery plan supporting near term action, say, over 5-year period, to both deploy market-ready solutions, test and demonstrate new innovations and understand how decarbonisation of a local energy system could be progressed.

4.7.5 It is essential to consider project delivery, as this is a key test of effective policies and plans.

4.7.6 Whilst future delivery plans can look to the medium and longer terms, it is important that action is also taken in the short term, which can feed into the Local Area Energy Planning process. The Local Lead Organisation will need to develop the detail of a delivery plan with key stakeholders, developing specific objectives whilst retaining a focus on the rapidly evolving energy sector.

4.7.7 Consideration will be needed to determine how and who takes forward any activity. This will present many opportunities for various organisations across the public and private sectors.

4.7.8 Consideration can be given to existing local capability (in industry and academia), regional collaboration and local ambition for clean growth, whilst also maintaining an ongoing understanding of other regional and UK (and any relevant international) development and demonstration-type projects. Such an approach should facilitate partnering, funding and innovation opportunities that could lead on to more focused clean growth activity.

4.7.9 There are many potential activities that could be needed to enable a local area's energy system transformation. Activities could be based on:

- Subjects that are the drivers and priorities of the stakeholder group involved with the production of the Local Area Energy Strategy;
- Prioritising activities informed by the Whole Systems analysis and evidence base;
- Addressing the challenge of decarbonising heat, in relation to both energy demand and supply in the context of the wider local energy system; and
- Implementation and delivery of a combination of deployment and innovation projects.

4.7.10 There is no one size fits all solution, however the three pilot studies undertaken found some common aspects to the least cost and most desirable pathways to decarbonise heat across different local areas:

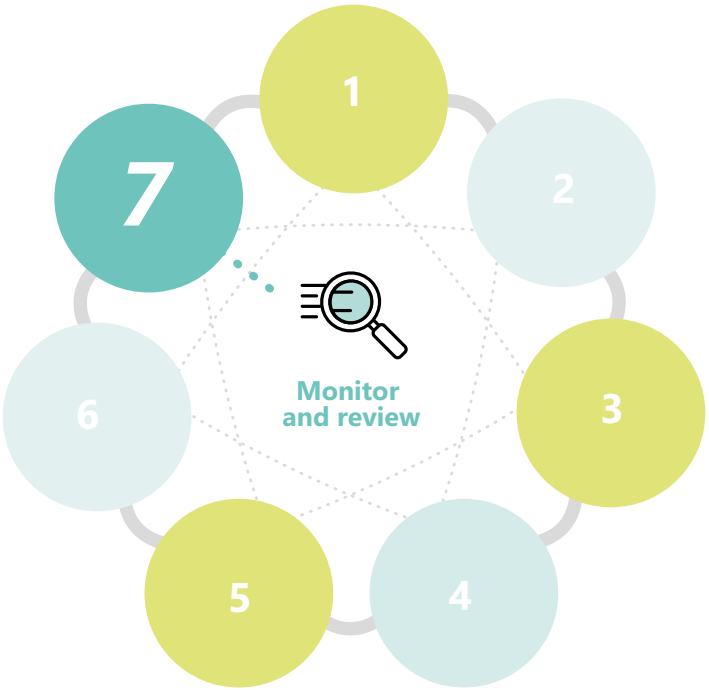
- Effective planning and targeting of domestic retrofit schemes informed by an understanding of Whole Systems costs and benefits to decarbonising heat;
- Development of smart heat storage solutions at the domestic and network scale as a valuable component of future local energy systems;
- Development and demonstration of integrated electric heating solutions supported by better control to deliver more appealing low carbon heating for consumers;
- Demonstration of hybrid heating solutions as a potential transitional technology, particularly for hard to heat homes and areas needing significant investment in electricity network reinforcement;
- Planning and development of solutions for the delivery and growth of local heat networks to connect existing homes and buildings over time.



Have you...

- ❑ Determined roles and responsibilities to progress the Local Area Energy Strategy amongst stakeholders?
- ❑ Determined whether the Local Lead Organisation has an advisory through to active implementation role?
- ❑ Determined an approach for ongoing collaboration and coordination with key stakeholders?
- ❑ Developed a short term implementation delivery plan?

4.8 STEP 7: Monitor and review



4.8.1 In taking any strategy or plan forward it will be essential to manage, review and update it over time. For example, it could be formally reviewed (and updated where necessary) every 5 years.

4.8.2 Factors that may impact a Local Area Energy Strategy include:

- major political, policy and regulation change;
- market forces and consumer behaviours;
- technology developments
- national and local emissions targets, which may evolve.

The importance of ongoing review & monitoring to ensure successful delivery

4.8.3 The review and monitoring process needs to acknowledge that the design of local energy systems will likely evolve gradually in the coming years and will need to be flexible to a range of different factors.

4.8.4 Where cost-effective transition choices are identified in a local area with political, business and consumer support, large-scale pilot projects in local areas will still be needed to establish real-world examples of how a future low carbon system will work and give confidence for large scale deployment.

4.8.5 Revisions to Whole Systems modelling as part of an ongoing structured Local Area Energy Planning review and monitoring cycle can enable and support both effective monitoring and course corrections to the Local Area Energy Strategy where these are needed. For example, if hybrid heating solutions in combination with low carbon forms of gas such as hydrogen are found to offer major transition benefits and a more cost-effective and desirable decarbonisation pathway for a local area.

Have you...

- ❑ Developed and agreed a monitoring and review process?
- ❑ Identified aspects of the Local Area Energy Strategy that should be tested or investigated further before making energy system choices?
- ❑ Agreed how outcomes of the monitoring and review process will be considered with key stakeholders?



5. Further reading

Committee on Climate Change (2016) Next steps for UK heat policy, Committee on Climate Change.

Committee on Climate Change (2017) Report to Parliament – Meeting carbon budgets: Closing the policy gap, June 2017

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Royal Academy of Engineering (2015) A critical time for UK energy policy what must be done now to deliver the UK's future energy system A report for the Council for Science and Technology https://www.raeng.org.uk/publications/reports/a-critical-time-for-uk-energy-policy

Town and Country Planning Association TCPA (2016) Planning for the Climate Challenge https://www.tcpa.org.uk/planning-for-the-climate-challenge

"Local Area Energy Planning provides an open, data driven, Whole Systems spatial planning approach to identify the energy network and system choices to decarbonise a local area"

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Contains University of Exeter data, Centre for Energy and Environment

Contains information provided by the Valuation Office Agency under the Open Government Licence

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

For further information please contact:
Richard Halsey
Innovation Business Leader
Energy Systems Catapult
+44 (0)7773 472854
+44 (0)121 203 3700
richard.halsey@es.catapult.org.uk

7th Floor, Cannon House, The Priory
Queensway, Birmingham, B4 6BS

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