



Local Energy **Oxfordshire**

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Policy and Regulatory Review

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Executive Summary

UK energy systems are changing in response to the urgent need to decarbonise and make good use of abundant renewable resources, public support for their use¹ and emerging technologies and business models. The country is thus at the start of a major shift in its understanding of energy transition at different operating scales and in relation to demand, supply and storage. The challenge involves a range of bodies that need to be considered in terms of policy and regulation, at local and national levels.

Project LEO is a major demonstration project funded by the Industrial Strategy Challenge Fund as part of the 'Prospering from the Energy Revolution' programme. It is a testbed for smart local energy systems (SLES) that incorporate information and communication technologies and work from the grid edge, harnessing local assets and community support to increase flexibility and the ability of network operators to manage a zero-carbon local energy system.

There is no single definition of SLES. However, this report identifies four characteristics:

Smart: technologically innovative, including the use of Information and Communication Technology (ICT) for communication and automation.

Local: generation and other assets are close to the people who participate in the system and are served by it; needs are met in ways suited to the local context.

Equitable: with access to affordable energy services for all.

Environmentally sustainable, especially in terms of transition to Net Zero carbon and resilience.

These characteristics are in line with those being explored in Project LEO and the related EnergyRev research programme.² They correspond with the main themes of this report.

Implementing a SLES can only be achieved with policy and regulatory support, but the regulatory framework for electricity was originally designed for centralised supply in a country where heating and transport services were largely supplied by gas and oil. While the framework is changing in response to the growth of distributed supply, storage and electrified heating and transport, it will have to change further, fast, if the UK is to reach its decarbonisation goals. Furthermore, energy is only now becoming a significant consideration in planning for land use, transport and the built environment.³

There is therefore a pressing need to develop our understanding of how flexible local energy systems might contribute to realising climate and social goals, and the changes that will be needed to make such systems viable. To give an idea of the scale of the challenge, the Zero Carbon Oxford Partnership set out substantial efforts and investment that will be needed to reduce carbon emissions from the city by 88% on 2018 levels by 2040.⁴

1https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/985092/BEIS_PAT_W37_-_Key_Findings.pdf, p.32

2 See, for example, https://www.energyrev.org.uk/media/1273/energyrev_paper_framework-for-sles_20191021_isbn_final.pdf

3 <https://es.catapult.org.uk/tools-and-labs/our-place-based-net-zero-toolkit/local-area-energy-planning/>;

4https://www.oxford.gov.uk/downloads/file/7685/zero_carbon_oxford_partnership_roadmap_and_action_plan_-_summary

This report reviews legal, policy and regulatory material, along with items arising directly from LEO partners' experience in developing Local Energy Oxfordshire. It does not claim to be a comprehensive review but offers evidence to the debate on energy policy and regulation from a fresh perspective: that of a major demonstrator project that develops and tests elements of future electricity systems in real-life conditions.

The main messages are that

- There are disconnects between instruments and tiers of law, policy and regulation (international, national, and local). The national-local disconnect has a higher impact on SLES, but there is also considerable variability in resourcing, technical capacity, Net Zero ambition and planning.
- Brexit-related legislative instruments on energy do not give a clear indication of what the energy market will look like post-Brexit. There is uncertainty over the details of energy system realignment and what impact that will have on SLES in the longer term. Uncertainties following Brexit have already had a disproportionate impact on SLES, which are more susceptible to market shocks because of their small size and novelty.
- The structure of the electricity market and its regulation can inhibit SLES and low carbon innovations, for example, when DNOs are restricted from holding a generation licence and, therefore, from operating electricity storage;
- The formation of the National Grid Electricity System Operator (by the National Grid) alters the upper structure of the UK electricity supply chain. It is not clear how the split of system operator and transmission operator functions will transform the market or what the effect on the business case for SLES will be.
- Storage assets have unclear legal status, with definitions that conflate storage with generation, this is a setback to their adoption. The 2020 Energy White Paper proposes new legislation to define electricity storage.
- There is a need for national strategic direction for local energy, comparable to that in the 2020 Energy White Paper for large-scale generation; the trend in recent years has been away from policies that support local energy.
- There are serious gaps between policy proposals and implementation mechanisms, nationally and locally. The academic and 'grey' policy literature shows a perceived urgent need for local and national policies that fit together better, building on what appears to be growing cross-party support for Net Zero, along with funding to ensure the policies can be implemented.
- Energy equity as a goal is inconspicuous in legal, policy, and regulatory documents, with policy rationale largely based on enhancing competition and consumer protection. The implication for SLES is that certain actors are more favoured than others e.g. The RIIO-2 Final Determinations appear more favourable to third-party innovators or aggregators than to DNOs; fuel poor customers will not be able to afford to invest in flexibility assets. There is a risk of creating 'new forms of unfairness', as SLES introduce new technologies, actors, processes and complexities. A market-based system will need regulating to secure inclusive participation and a safety net for those in danger of being left behind in energy transition.
- There is a need to bring together energy and planning policy and to continue developing Local Area Energy Planning, to integrate energy fully into the planning system so that citizens can be involved in developing zero carbon energy plans for their areas and take ownership of energy transition.

- SLES issues can be financial, legal or organisational in nature, for example, rules on investing in local energy and the governance of cooperatives.
- Regulation for the connection of new distributed assets needs to be compatible with local planning policy.
- There is a shortage of policy support, finance and planning tools for building retrofit (as opposed to newbuild). These are needed to prepare for heating electrification and Net Zero, as well as for relieving fuel poverty.
- Much metering and monitoring data is not shared or is underutilised; there is a need to mobilise it in the public interest, with appropriate privacy and security safeguards. Data-sharing restrictions and commercial confidentiality make the functioning of energy systems obscure, yet data protection, competition, and energy laws are siloed;
- The smart meter rollout needs prompt completion, with access to the necessary data to facilitate SLES. Metering arrangements fit for purpose in SLES need to be established – for example, rooftop PV owners at present need to install second meters in order to access the necessary data for verification of service delivery.

1. Energy transition and Project LEO

Humans have been harnessing energy in new ways for centuries, so transitions between sources, infrastructures and practices are nothing new. But the term ‘energy transition’ is now generally understood as a move away from fossil fuels, together with a drive towards accessible, affordable energy services, through changes in demand, supply and infrastructure.⁵

The World Energy Council (WEC)⁶ formulated the energy trilemma as ‘energy sustainability’ based on three dimensions – energy security, energy equity, and environmental sustainability.⁷ Its (later) 2017 World Energy Focus Annual report reinforced this and sought ‘*global consensus to act together in order to tackle the challenges we face in transitioning to a low-carbon economy. What we need is a blueprint for success.*’⁸ Studies commissioned by the International Energy Agency found that, even with plummeting prices of renewable energy technologies, low costs do not guarantee their accelerated uptake without regulatory intervention/ ‘decisions made by governments’.⁹ Internally, these decisions manifest through legislation, regulation and policy. Externally, government resolve is evidenced through their commitment to international legal instruments. This commitment is then seen internally in regulatory architecture and implementation.

⁵ UN Global Goals, ‘Goals 7: Affordable and Clean Energy’ <<https://www.globalgoals.org/7-affordable-and-clean-energy/>> accessed 8 August 2021.

⁶ The WEC is a UN-accredited global energy body, established in 1923. It has more than 3000 member organisations located in over 90 countries and drawn from governments, private and state corporations, academia, NGOs and energy-related stakeholders.’ (See ‘About the World Energy Council’ (WEC, n.d) <<https://www.worldenergy.org/about-wec/>> accessed 28 June 2021). Despite this, it is only in the last 4 years that ‘the energy trilemma’ and ‘the energy transition’ have featured prominently in the Council’s agenda.

⁷ WEC, ‘World Energy Trilemma’ (WEC, n.d.) <<https://www.worldenergy.org/work-programme/strategic-insight/assessment-of-energy-climate-change-policy/>> accessed 28 December 2018.

⁸ WEC, ‘World Energy Focus Annual 2017’ (WEC, 2017) <<https://www.worldenergy.org/publications/2017/world-energy-focus-2017/>> accessed 28 December 2018.

⁹ For example, Brent Wanner, (IEA, 6 February 2019) https://www.iea.org/newsroom/news/2019/february/is-exponential-growth-of-solar-pv-the-obvious-conclusion.html?utm_content=bufferb62f6&utm_medium=social&utm_source=twitter.com&utm_campaign=buffer> accessed 11 February 2019.

In the UK, there has been for some time a recognised need for major changes in distribution network management, as supply becomes increasingly distributed and demand patterns change. Local networks must be operated and regulated in new ways in order to encourage new renewable supply, make best use of storage and demand-side resources, avoid costly reinforcement and maintain high-quality energy services. The Low Carbon Networks Fund was set up by Ofgem in 2010 to support research sponsored by the Distribution Network Operators (DNOs) to test out new technologies and procedures; academic research programmes to develop and analyse low-carbon power systems were getting under way at the same time.

In 2018, the Industrial Strategy Challenge Fund (ISCF) set up *Prospering from the Energy Revolution* (PFER), with a fund of £102.5m for UK industry and academic research to develop systems to support the global move to renewable energy. £8m of the fund went into setting up the EnergyREV research consortium, led from the University of Strathclyde and tasked with driving research and innovation for smart local energy systems (SLES). These were to be characterised by the ‘four Ds’ of decarbonisation, digitalisation, decentralisation and democratisation. *£14m was awarded to Project LEO, with industry partners contributing a further £26m.*

LEO is thus a major demonstration project. Led by SSEN, the DNO for most of Oxfordshire, it brings together 10 partners from industry, local government and academia. Implementing a local system based on the four Ds is the central concern, one that brings many opportunities for experimentation and learning. LEO is a testbed for smart local energy systems (SLES) that incorporate ICT and work from the grid edge, harnessing local assets and community support to increase flexibility and the ability of network operators to manage a zero-carbon local energy system.

The closely-related TRANSITION project is designing and implementing trials to understand what is needed to move from working as a DNO to the more active and interactive Distribution System Operator (DSO) role. This too involves testing new market arrangements, equipment, contracts and communications.

Note on Transforming DNOs to DSOs

Local network plans (RIIO-ED2) by Distribution Network Operators (DNOs) for 2023 to 2028 have to be submitted to Ofgem by December 1, 2021. They cover Net Zero and distributed generation, which will require DNOs to commence operator functions associated with the role of Distribution System Operators (DSOs). Digitisation and enhanced data processing are expected to be improved. Ofgem expects DNOs to demonstrate that there will be improved data processing in their business plan submissions. It is anticipated that SLES ‘will allow these DSOs to have real time visibility into the operation of the network.’¹⁰ The business plan requires each company to provide a DSO strategy that sets out how they will meet the expectations set by Ofgem.¹¹ Ofgem has set an allowance to facilitate the companies’ investment in the network to meet the Net Zero policy goals.

10 Saqib Saeed, ‘UK Transition from DNO to DSO Model Amidst Changing Grid Landscape’, in Power Technology Research (Power Technology Research, *n.d.*) <<https://powertechresearch.com/uk-transition-from-dno-to-dso-model-amidst-changing-grid-landscape/>> accessed 17 July 2021.

11 See <https://www.ofgem.gov.uk/publications/riio-ed2-draft-business-plan-guidance>, p.22.

The move from our centralised, hub-and-spoke legacy electricity system to a far more decentralised and networked system involves a paradigm shift in thinking. However, this shift is far from complete, as can be seen at many levels, from the technical detail of implementing electric vehicle charging to high-level decisions on investment, regulation and infrastructure planning.¹² All are affected by policy and regulation.

The current LEO theory of change, in attempting to describe and analyse how change towards a SLES might take place, shows regulation and policy figuring prominently among the drivers, as in national and local policy support for Net Zero, smart meter rollout, electricity market reform, electrifying heating and transport, and affordable energy services for all. ‘Enablers’ for implementing SLES include regulatory, financial, commercial and governance innovation.

1.1 Purpose of the report

This report aims to describe how national and local policy and regulation shape prospects for SLES with their associated local energy markets. It reviews national and local policy and regulatory documents, with some reference to international frameworks, and is for use within Project LEO in the first instance, as the first of three planned evidence reviews. (The others will address capabilities to participate in and benefit from SLES, and commercial principles for replicating SLES.)

We have tried to complement rather than duplicate existing reports on policy and regulation. ‘Value added’ may come mostly from evidence from *within* a transition-oriented project with an emphasis on implementation, and from focussing on issues faced by LEO partners at a time when the stated aims of national and local government are not yet matched by provision for achieving their ambitions on the ground.

2. Method

The report is based on document analysis and evidence-gathering from LEO partners. Note that it is not an exhaustive or systematic review but an attempt to identify the main legal, policy and regulatory issues related to SLES, from the standpoint of a major demonstration project.

The focus is on national and local scales, with some reference to international agreements and regulations. We largely stay away from the operational issues attending SLES, although these can be significant (for example, standards for ICT hardware and software), to concentrate on the legal, policy and regulatory environment in which our energy system operates.

There was an initial request to project partners to identify themes for the review. It led to the list in the Appendix, which we shortened in order to make the exercise more manageable.

The review was then drawn from

12 Mirzania, P., Ford, A., Andrews, D., Ofori, G. and Maidment, G. (2019) The impact of policy changes: The opportunities of Community Renewable Energy projects in the UK and the barriers they face. *Energy Policy* 129, 1282-1296

- material from the LEO synthesis report for Year 2 of the project¹³
- legal material
- some recent Ofgem and BEIS policy papers and consultation documents
- reports and documentation from the public sector (including Oxfordshire County and District Councils), network operators, third sector organisations and academics
- local authority plans plus policy documents from local non-governmental organisations.

With regard to the legal material, the method of review involved doctrinal study (conceptual analysis) of the literature¹⁴, including semiotic reading¹⁵ of selected texts and legislative instruments, which assisted in analysing the research questions. These are all referenced in footnotes.

The material was reviewed in relation to four themes that emerged from LEO's stated aims:

1. How does a reviewed policy or regulation affect transition to **smart local energy systems**? [i.e., technical / operational frameworks]
2. How does a policy or regulation impact establishment of **local energy markets**?
3. What are the implications for **energy equity**?
4. What are the implications for **net zero**?

The remainder of the report follows these questions in turn, at international, national and local scales.

3. Policy and regulatory impacts on smart local energy system development

There are 99 listed energy regulatory instruments on the official government legislative portal.¹⁶ Whereas many of these instruments are not directly applicable to SLES, some of their provisions are interconnected or may have an impact on the establishment, functioning, and commercialisation of SLES.

3.1 International policy and regulation

This section recognises that energy systems are interlinked and that international regulatory concerns may have an impact on SLES, but does not cover international energy law, policy, and regulation instruments in any detail because of the scope of the review.

¹³ <https://project-leo.co.uk/wp-content/uploads/2021/08/D-6.3.4-second-annual-synthesis-report-070821-FINAL.pdf>; a shorter version is also available on the LEO website

¹⁴ Terry Hutchinson and Nigel Duncan, 'Defining and Describing What We Do: Doctrinal Legal Research' 17 (1) (2012) *Deakin Law Review*, 83-119.

¹⁵ See Susan W. Tiefenbrun, *Decoding International Law: Semiotics and the Humanities*, (OUP 2010), legal semiotics, 'attempt to identify, classify, and describe in a systematic fashion, and in standard language, modes of signification present in legal discourse that give rise to interpretation.'

¹⁶ <https://www.legislation.gov.uk/uksi/energy>

Domesticated EU Policy sometimes applies across the board. For example, the EU Energy Performance in Buildings Directive of 2018 requires new and thoroughly renovated residential buildings with more than ten parking spaces to be equipped with EV charging points.¹⁷ Commercial buildings will need to do the same for 20% of spaces. This is mirrored in the UK 2020 Energy White Paper: *'we are taking action on introducing new building regulations to require electric vehicle charge points in all new homes and in non-residential buildings'*¹⁸. The government final position on this was due to be reported in early 2021 on the basis of consultation that closed in 2019¹⁹. On 9th September 2021, the Transport Minister Rachel Maclean, announced in Parliament the government's intention "to lay legislation later this year".²⁰

3.1.1 Brexit

The Trade and Cooperation Agreement European Union (Withdrawal) Bill, is the primary legislation that sets the foundation for the UK position in relation to the current energy system and which EU legislation and practices will be retained. Apart from certainty about the European Atomic Energy Community, as well as what high-level principles will apply (like fair competition in energy markets and non-discriminatory access to networks), there remains considerable uncertainty over the details of post-Brexit realignment of energy systems and what impact that will have on SLES. Uncertainty adds regulatory and other risks to business planning. These have had a disproportionate impact on SLES, which are more susceptible to market shocks because of their smaller size and novelty.

Apart from the legislative overhaul necessitated by Brexit, there is certainty that SLES will no longer have access to European Investment Bank funding, which reduces their pool of financing options. Moreover, there is ambiguity on procurement rules which were subject to EU procurement directives. It is unclear what the position will be regarding procurement post-exit and post-transition period.²¹ The impact on municipalities and on what terms they may make procurement rules to encourage SLES is indeterminate.

Pursuant to the European Union (Withdrawal) Act 2018, there are seven Brexit-related legislative instruments on energy:

- Climate and Energy (Revocation) (EU Exit) Regulations 2021²²
- The European Union (Withdrawal) Act 2018²³
- The Climate Change Agreements, CRC Energy Efficiency Scheme and Energy Savings Opportunity Scheme (Amendment) (EU Exit) Regulations 2020²⁴
- The Ecodesign for Energy-Related Products and Energy Information (Amendment) (EU Exit) Regulations 2019²⁵

17 There will be a separate LEO report on barriers and opportunities for incorporating EVs in SLES.

18 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/94589/9/201216_BEIS_EWP_Command_Paper_Accessible.pdf p.103

19 The government's consultation on implementing smart charger components of the recast Energy Performance in Buildings Directive is here: <https://www.gov.uk/government/consultations/electric-vehicle-chargepoints-in-residential-and-non-residential-buildings>

20 See UK Parliament Hansard, <https://hansard.parliament.uk/commons/2021-09-09/debates/1BAEA2B3-28C0-413D-BDFF-57FB7CB2443E/ElectricVehicleChargingInfrastructure> .

21 <https://thelawreviews.co.uk/title/the-renewable-energy-law-review/united-kingdom>

22 <https://www.legislation.gov.uk/ukxi/2021/519/regulation/1/made>.

23 <https://www.legislation.gov.uk/ukxi/2020/1528/contents/made>.

24 <https://www.legislation.gov.uk/ukxi/2020/711/contents/made>.

25 <https://www.legislation.gov.uk/ukxi/2019/539/contents/made>.

- The Energy Savings Opportunity Scheme (Amendment) (EU Exit) Regulations 2018²⁶
- The CRC Energy Efficiency Scheme (Amendment) (EU Exit) Regulations 2018²⁷
- The Electricity (Guarantees of Origin of Electricity Produced from Renewable Energy Sources) (Amendment) (EU Exit) Regulations 2018²⁸

These instruments, jointly or severally, do not give a clear indication of what the energy market will look like post-Brexit, much less its effect on SLES. However, Brexit could have a positive impact on local energy systems in the unlikely scenario that there will be less energy integration between the UK and the EU. This is in general terms, as the circumstances of the four nations within the UK may vary.

3.2 National policy and regulation

The UK government is facing a paradigm shift in its understanding of energy transition and what this means at different scales of operation and in relation to demand, supply and storage. It is hard to underestimate the scope of the challenge. The LEO Y2 synthesis report points to the range of bodies that need to be considered in terms of policy and regulation, including those that *'design and operate infrastructures for utilities, the built environment and transport, e.g. the National Infrastructure Commission, National Grid, transport operators and housing developers'*.²⁹

The national body most directly involved in influencing energy policy and implementation is the Department of Business, Energy and Industrial Strategy (BEIS), and the most recent document from central government relating to smart energy systems is the BEIS/Ofgem report on *'Transitioning to a net zero energy system: smart systems and flexibility plan 2021'*, published in July 2021. It will be related to the forthcoming Heat and Buildings Strategy. The report sees transition to a smarter and more flexible system as an opportunity that will reduce system costs, create jobs and drive investment. It recognises the 'key role' of local authorities in delivery of SLES and notes the funding of decarbonisation through the (relatively small-scale) Local Energy Programme.³⁰ In terms of policy support for SLES, the report singles out four areas for action, seen largely from a technical and economic standpoint:

- making energy data more open and accessible
- improving locational signals from local flexibility markets and network charging
- reforms to the balancing and ancillary service markets
- taking measures to include smart technologies in energy efficiency policies and protect consumers.

The Ministry of Housing, Communities and Local Government (MHCLG) is responsible for the National Planning Policy Framework, last updated this summer, and its role in promoting and supporting conditions for SLES is already significant, as noted by some LEO partners.

²⁶ <https://www.legislation.gov.uk/ukxi/2018/1342/contents/made>.

²⁷ <https://www.legislation.gov.uk/ukxi/2018/1336/contents/made>.

²⁸ <https://www.legislation.gov.uk/ukxi/2018/1093/contents/made>.

²⁹ <https://project-leo.co.uk/wp-content/uploads/2021/08/D-6.3.4-second-annual-synthesis-report-070821-FINAL.pdf>, p.21

³⁰ <https://www.apse.org.uk/apse/index.cfm/local-authority-energy-collaboration/beis-local-energy-team/>)

The latest version of the Framework³¹ contains a general statement that the planning system should support transition to a low carbon future, supporting ‘renewable and low carbon energy and supporting infrastructure’ (para 152), while para 156 states that local planning authorities should support community-led initiatives for renewable and low carbon energy, including developments ...that are being taken forward through neighbourhood planning. But support is muted. For example,

When located in the Green Belt, elements of many renewable energy projects will comprise inappropriate development... developers will need to demonstrate very special circumstances if projects are to proceed. Such ... circumstances may include the wider environmental benefits associated with increased production of energy from renewable sources. (para 151).

There is no mention of the rapid evolution of electricity systems, smart energy development or the need for flexibility: there would seem to be plenty of room for dialogue between advocates of SLES, local authority representatives and the MHCLG.

Whereas there have been elaborate guidelines and cooperation between various government departments on planning for national energy infrastructure projects (e.g. regulations covering new power generating plants and wayleaves),³² it appears that SLES are not similarly contemplated on a national scale although the role of local authorities and other local agencies in transforming energy systems has been acknowledged.³³ The 2017 UK Clean Growth Strategy stated Government intention to ‘ensure that local communities and Local Enterprise Partnerships are empowered to make the best use of their local skills and resources, so that through the clean energy economy they can drive productivity, job creation and growth’.³⁴

In 2020, Ofgem proposed to ‘rewire Britain at a local level to deliver a greener and fairer energy system for British consumers’. Part of this transformation was the announcement of a new Strategic Innovation Fund (SIF)³⁵ ‘across all energy networks, worth an initial £450 million, to help drive more research and development into green energy.’³⁶ Ofgem also plans to encourage digitalisation, flexibility and grid-edge solutions while increasing coordination and planning across the energy system. On 25th August 2021, it was announced that the operational arrangements for SIF were being made with the issuing of the SIF Governance Document,³⁷ which provides for the regulation, governance and administration of SIF. The SIF-delivered in partnership with Innovate UK, part of UK Research and Innovation (UKRI), aims at

31 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf .

32 <https://www.gov.uk/guidance/consents-and-planning-applications-for-national-energy-infrastructure-projects>

33 Ofgem, ‘Ofgem’s Future Insights Series Local Energy in a Transforming Energy System’ (Ofgem Future Insights Series, 30 July 2020)

<https://www.ofgem.gov.uk/sites/default/files/docs/2017/01/ofgem_future_insights_series_3_local_energy_final_300117.pdf> accessed 26 July 2021.

34 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf , p.38

35 <https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/network-price-controls-2021-2028-riio-2/network-price-controls-2021-2028-riio-2-riio-2-network-innovation-funding/strategic-innovation-fund-sif>

36 Ofgem, ‘Ofgem Proposals to ‘Turn Your Street Green’, Transforming Local Electricity Networks’, (Ofgem Press Release, 30 July 2020) <<https://www.ofgem.gov.uk/publications/ofgem-proposals-turn-your-street-green-transforming-local-electricity-networks>> accessed 25 July 2021.

37 <https://www.ofgem.gov.uk/publications/sif-governance-document>

stimulating innovation, ‘making the UK the best place for high potential businesses to grow and scale in the energy market’. Four Innovation Challenge areas have been identified: Whole system integration; Data and digitalisation; Heat; and Zero emission transport. SIF will launch Innovation Challenges from September 2021. The roles that local authorities will play in land use, sectoral planning, permitting and rules for SLES in the SIF ecosystem are untested.

Local Area Energy Planning (LAEP) is a process that requires systems thinking and is gaining traction and support from, among others, the Energy Systems Catapult, Ofgem and the Centre for Sustainable Energy. It was supported in the Clean Growth Strategy and Ofgem’s 2021 Decarbonisation plan.³⁸ Whether the idea works through into the DNO business plans for ED2 is yet to be seen.³⁹

Below, we consider some national-level instruments, functions and commentaries that relate to the setting up and operating of SLES.

3.2.1 The CCC 2020 Annual Report and Sixth Carbon Budget

The Committee on Climate Change (CCC) was set up as an independent statutory body under the 2008 Climate Change Act, ‘to advise the UK and devolved governments on emissions targets and report to Parliament on progress made in reducing greenhouse gas emissions and preparing for and adapting to the impacts of climate change’.⁴⁰ While it has no legislative powers, it has considerable authority and is responsible for developing and recommending to government national carbon budgets at four-year intervals, as steps along the path to a net-zero nation by 2050. The CCC reports annually to Parliament on progress. The 2020 Sixth Carbon Budget report has five priority recommendations, of which two are directly relevant to SLES:

Develop (with [the Department of] Business, Energy and Industrial Strategy) a public engagement strategy for Net Zero which builds on the findings of the UK Climate Assembly by involving people in decision-making, providing trusted information on decarbonisation choices and the need to reduce emissions and adapt to climate change. The strategy should also identify preferred policy options to empower people to contribute fully towards the path to Net Zero...

Support local government (with Ministry of Housing, Communities and Local Government) to play a full role in the Net Zero transition, including through increased resourcing, guidance, involvement in local area energy plans, statutory reporting on the emissions from their estate and reforming the planning framework to enable delivery of low-carbon and climate-resilient measures. This is likely to require additional funding for staffing and resources for local delivery plans, alongside a ‘duty to collaborate’ to encourage authorities to work with local, regional and national partners to deliver their climate ambitions.⁴¹

³⁸ See, <https://www.ofgem.gov.uk/publications/ofgems-decarbonisation-action-plan>, page 17,

³⁹ See, for example, SSEN’s business plan (<https://ssenfuture.co.uk/>), which makes a few mentions, “We will provide dedicated support to the development of Local Area Energy Plans by local authorities and key groups”, page 98.

⁴⁰ <https://www.theccc.org.uk/>

⁴¹ <https://www.theccc.org.uk/wp-content/uploads/2021/06/CCC-Joint-Recommendations-2021-Report-to-Parliament.pdf> p.3

These recommendations highlight the urgent need to implement moves towards Net Zero not only ‘top down’, but by involving and empowering citizens in making necessary changes, directly or via established local government structures.

The full Sixth Carbon Budget⁴² proposes that the risk of localised impacts should be a focus for the Government (p.22). The overall target is to reduce emissions by 78% by 2035 and scenarios for achieving that have implications for SLES. For example, where buildings are concerned, it is projected that

- household and business renovations at scale occur through the 2020s, with high levels of pre-heating⁴³ and other change in homes,
- households adopt smart, flexible electric heating including hybrid heat pumps, as well as high-temperature heat pumps, and
- new business models are developed (e.g. heat-as-a-service) and new financial models for deep retrofits are mainstreamed.

These will be compatible with SLES but are scenarios rather than policy requirements. However, a more *flexible* electricity system is one of the goals (pp. 135-136). Storage (to cater for increasing ‘variable renewables’ and for backup generation when demand is high) and flexible demand (load-shifting, including pre-heating/cooling in buildings, and smart charging in transport) will make the system more able to cope with new challenges in both demand and supply. The report highlights that the UK is a leader ‘in digital optimisation, design and artificial intelligence to optimise the electricity system for integrating renewables into the grid’ (p 401). The trend is likely to continue as UK seeks to retain global leadership and gain export advantage, but success depends on global trends for deployment ‘at scale’.

There is an assumption that infrastructure disparities will continue as far as 2050 (p.212), affecting gas and electricity networks, housing stock and clusters of heavy industry. Those off the gas grid are expected to install low-carbon heating (heat pumps and smart storage heating) and bypass gas networks altogether. The report proposes demonstrations, pilots and pathfinder projects to establish some low-C technologies, business models and behaviours, from the early 2020s. It advocates improved flexibility in the energy system including mandatory half-hourly settlement for billing, supporting cost-reflective charging and smart tariffs at household level to reflect ‘how the electricity system is decarbonising and the savings which are accessible through load-shifting’ (p.403).

3.2.2 The UK 10-point Plan and Energy White Paper (2020)

The 10-point Plan for a Green Industrial Revolution⁴⁴ addresses both climate action and post-Covid recovery in general terms. Investment is promised for electric vehicle charging infrastructure (£1.3 billion) and the manufacturing of EVs. Heat pumps are also supported through a market-led demonstration programme and changes to regulations: gas boilers are not to be fitted in new dwellings

42 The Climate Change Committee, *Sixth Carbon Budget* (CCC 2020) <https://www.theccc.org.uk/publication/sixth-carbon-budget/>

43 Explanatory note on pre-heating. See page 75 of <https://www.theccc.org.uk/wp-content/uploads/2019/02/UK-housing-Fit-for-the-future-CCC-2019.pdf>,: “Homes which are better insulated and have high levels of fabric efficiency retain more heat in the building itself. This can be used to smooth out demand from heating systems or allow heating demand to follow variations in generation, known as ‘pre-heating’.”

44https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf

from 2025.⁴⁵ There is an aim to create a market where 600,000 heat pumps are installed per year by 2028.

However, some of the policy background to the 10-point plan is not encouraging from the standpoint of low-carbon energy transition. The flagship Green Homes Grant, with funding provision for heat pumps and insulation measures, was closed to new applications from March 2021 after only six months but continued to fund local authority programmes. The original timescale was extended (now moving into Phase 2) to run until Spring 2022. It is being delivered via the Energy Hubs. Heat pumps are still subsidised by the Renewable Heat Incentive but this scheme closes to new applications from 31st March 2022. This leaves the UK with no scheme to support low carbon and energy efficient retrofit for UK householders other than the Energy Company Obligation, which is solely targeted at improving fabric standards amongst householders on very low incomes and at risk of fuel poverty.

Key policy proposals in the Energy White Paper (EWP)⁴⁶, which followed close on the heels of the 10-point Plan, include continuation of the UK Emissions Trading Scheme; commitments to accelerate 'clean hydrogen', nuclear, offshore wind, solar PV, and Carbon Capture Usage and Storage (CCUS); competitive tendering in onshore electricity distribution and transmission; decarbonisation of buildings and transport; and a "transition deal" for the upstream oil and gas industry. The EWP is thus focused on 'big ticket projects' rather than SLES.

Although there is recognition of the need for flexibility and the savings that it can bring, the White Paper is thin on support for the necessary systems and technologies. Support seems confined to digital infrastructure, EV charging infrastructure and the heat pump demonstration project.

Smart flexible systems are enabled and made more effective where buildings are well controlled and energy efficient. Heat pumps also need a relatively tight and insulated building fabric to work well. However, there is very little support for energy efficiency and fabric measures in the White Paper.

Use of the term 'consumer' throughout the EWP – almost 200 times – appears to cast UK citizens in an essentially passive role in which they make 'choices' from what is offered to them and are protected from sharp practice. There are only two places where they are described as *contributing* to energy transition. In the first, as recipients of information via new technology:

Smart digital technology is not just giving consumers more control, choice and flexibility in their energy use. It allows consumers to make a personal contribution to delivering a clean energy system. (EWP, p.34)

There is also one comment on the potential for SLES and community-based approaches:

Some local communities are coming together to establish their own approach to managing energy demand in their areas. Smart local energy systems are community-based initiatives which bring together a range of energy issues, typically including heat, power and transport, to

45 This date may change to a later one; the PM is reported to have considered 2040

46 The Department for Business, Energy & Industrial Strategy, Energy White Paper (BEIS 2020) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

reduce emissions in an integrated way, while also promoting local jobs and businesses. Local Authorities are key to delivering these systems by combining energy into their wider statutory work on housing, transport, waste and planning, making delivery more cost-effective and preparing for a net zero future. Government provides funding for Local Authorities to deliver programmes that support decarbonisation and will continue to work with communities to enable projects to be tailored and delivered to meet local needs. (p.25)

The EWP proposes funding a £1bn Net Zero Innovation Portfolio (EWP, p.52) to accelerate commercialisation of low-carbon technologies; this sum is spread, however, over 10 'priority areas', most of which do not have an obvious link with SLES.

3.2.3 The Local Electricity Bill

This is a Private Member's Bill⁴⁷, which comes with some benefits (it is simply written, easy to understand, and only contains clauses). Such Bills are usually drafted by non-lawyers, which comes with the attendant challenges of interpretation. For example, it is not clear that 'smartness' was considered in the framing of the Bill. Emphasis is on 'local' aspects. It also does not specifically apply to renewable energy, which may be a huge oversight.

Should the Bill become law (it is still a fair way from having the force of law,) it will facilitate the transition to smart local energy systems by changing the dynamics of local electricity supply as follows:

- allowing licensed local electricity suppliers to be electricity generators (section 6 of the Electricity Act 1989),
- making provision for a new local electricity supply licence regime to allow this proposed arrangement, and
- granting powers to the Gas and Electricity Markets Authority to issue these licenses (this may be a hinderance as it still centralises the licensing process).

The legislation is too thin on detail to determine the extent to which it would have an impact on aggregators.

3.2.4 Market Regulation: RIIO-2 Final Determinations

This⁴⁸ and companion documents set out Ofgem determinations for company allowances under the RIIO-2 price control, which commenced on 1 April 2021. There are doubts as to whether the definition of a Distribution Network Operator (DNO) on p.180 is adequate and reflects how energy systems will evolve. Notably, there are different classification standards for the nations of the UK. In England and Wales, a DNO operates all parts of the electricity distribution network from 132kV down to 230V, whereas in Scotland the 132kV wires and deemed to be a part of transmission and distribution. This differentiated approach means that the operating conditions and functioning of the UK energy market are uneven. Notably, the next electricity distribution (RIIO-ED2) price control starts in April 2023 - two years after the other sectors.

⁴⁷ UK Parliament (House of Commons), *Local Electricity Bill* (UK Parliament 2020) <https://bills.parliament.uk/bills/2747>.

⁴⁸ Ofgem, *Decision - RIIO-2 Final Determinations - Core Document* (Ofgem 2020) https://www.ofgem.gov.uk/sites/default/files/docs/2020/12/final_determinations_-_core_document.pdf

There are challenges with the rationales of some provisions, data protection barriers to information, and trade secrets that make the functioning of energy systems obscure (and have an impact on smaller SLES actors). Overall, these affect what business models may be developed at local level and the grid edge. The knock-on effect is that incomplete or unreliable data on the functioning and costing of networks makes it even more difficult for SLES players to evaluate business and innovation funding opportunities. This makes business modelling a short-term exercise, as longer-term benefits are difficult to determine. Transparency would make finer, real-time detail on network loads, functions and pinch points more readily available and reduce the information asymmetry prevalent in energy systems. Opacity disproportionately affects SLES players, as they lack the capacity to collate information independently on the detail of network flows.

3.2.5 Data Protection Regulation

The Energy Data Taskforce,⁴⁹ commissioned by Government, Ofgem, and Innovate UK, pointed to the need for agile and risk-reflective energy regulation through accessing more and better data.⁵⁰ Five recommendations to modernise the UK energy system for net zero carbon future centred on an integrated data and digital strategy:

- digitalisation of the energy system
- maximising the value of data
- visibility of data
- coordination of asset registration
- visibility of infrastructure and assets.

However, one major challenge for business modelling, especially for SLES, would be access to data. If data protection, competition, and energy laws continue to be siloed, they will not align with the recommendations of the Taskforce.

3.2.6 Ofgem Targeted Charging Review

The 2020 Targeted Charging Review (TCR)⁵¹ introduced Fixed Residual (network) Charges (based on agreed connection capacity in lieu of network charges linked to grid usage) and withdrew Embedded Benefits, namely:

(1) Transmission Generation Residual Charges (TGR) a rebate for larger generators to the Transmission Network and

(2) Balancing System Use of System (BSUoS) charges that paid smaller embedded generators for services that help suppliers reduce their system balancing costs; and exempted smaller embedded generators from paying generation BSUoS that other generators connected to the distribution and transmission networks pay.

The review also introduced balancing charges based on gross demand at the Grid Supply Point. The rationale for the change was to remove distortions/ unintended consequences of the TCR, i.e. that larger generators started receiving tariff reduction credits in 2017 while other users of transmission

⁴⁹ Established by the Department for Business, Energy and Industrial Strategy (BEIS), Ofgem and Innovate UK. Run by Energy Systems Catapult.

⁵⁰ Energy Systems Catapult, *Energy Data Taskforce: A Strategy for a Modern Digitalised Energy System* (Power Technology Research, 12 June 2019) <https://es.catapult.org.uk/reports/energy-data-taskforce-report/> accessed 24 July 2021.

⁵¹ Ofgem, *Targeted Charging Review: Significant Code Review* (Ofgem 2020) <https://www.ofgem.gov.uk/electricity/transmission-networks/charging/targeted-charging-review-significant-code-review>

and distribution networks were being charged more for costs imposed on the electricity system. Arguably, Ofgem's rationale may be counter-intuitive in two ways:

- It seeks to correct a market distortion but operates against a key policy objective, decarbonisation. (It may be argued that Fixed Residual Charges discourage further renewable energy investment, especially in behind-the-meter renewable generation and demand reduction.)
- Withdrawal of TGR from larger generators to protect smaller players, then restructuring BSUoS to impose a bigger burden on smaller embedded generators, militates against the policy aims as well.

Concerns were raised (including by SLES actors) that the changes would have the following negative impacts:

- Fixed costs will penalise large energy users that have invested to reduce their energy demand in response to government policy.
- Incentives to invest in storage, on-site generation or demand side response will be reduced and the business case for such technologies will be less attractive.
- TCR and the postponed Significant Code Review (SCR) (Reform of network access and forward-looking charges) have different implementation timelines. This creates uncertainty on their collective impact to business models, which will in turn deter investment in SLES.
- Ofgem assumes that the changes would not fundamentally discourage investment in decarbonisation. The foundations of Ofgem's assumptions and numbers (consumer benefits of up to £4.1bn; system costs won't exceed £0.3 bn; and system benefits will increase by as much as £2.9bn by 2040) are not clear.

Note on legal definitions conflating storage with generation

In June 2019, Ofgem announced clarifications to the regulatory framework applicable to energy storage, with changes to the electricity generation licence standard conditions to include a definition of storage and storage facility and ensure storage providers are not subject to final consumption levies. The classification of electricity storage as generation (and therefore the application of the legal framework applicable to generators) has been seen as a significant hurdle to the development of energy storage projects in the UK. This has been acknowledged by Ofgem, which has committed to work with the government to provide greater regulatory clarity. Some of the key concerns are that certain licensed operators, such as distribution licence holders, are restricted from holding a generation licence and therefore from operating electricity storage. This hinders development of SLES storage technologies

Following a consultation in 2019, BEIS announced a proposal to change planning regulations to carve out electricity storage, except pumped hydro, from the Nationally Significant Infrastructure Projects regime in England and Wales. Under the proposals, this type of storage would generally be subject to consent from the relevant local planning authority in England and Wales.

3.2.7 Ofgem Access and Forward-Looking Charges Code Review (Access SCR)

The review is still under consultation; PFER and LEO representatives are among those responding. The Access SCR was closely linked with the TCR but their implementation was delinked. The Access SCR is a process led by Ofgem on three key areas: distribution connection charging, the definition and choice of access rights, and transmission charges for small distributed generators. The focus of this review is to review charges which ‘send signals to users about the effect of their behaviour on the Networks’.⁵²

3.2.8 Ofgem Priority Services Register

This is a register⁵³ of customers who are eligible for support from their supplier and DNO on grounds of age, ill-health, disability, or other special needs. It potentially affects local operation, e.g. if there is a cluster of vulnerable citizens in a substation area who will have priority status for connection to a reliable supply. The potential for V2G (and other battery systems) to supply emergency back-up power to those on the PSR is under investigation in the SSEN project, Equal EV.⁵⁴

3.2.9 Centre for Sustainable Energy ‘Smart and Fair?’ report

This is not a regulatory document but a report⁵⁵ from the Centre for Sustainable Energy, a leading NGO, with findings from a multi-stakeholder exploratory programme funded by SSEN and Western Power Distribution. The report deals mostly with grid edge issues, customer welfare and equity. These will affect public acceptance and adoption of SLES, and the report concludes that a market-based system will need intervention to secure inclusive participation, consumer protection guidelines and ‘safety net’ protection for anyone left behind. It recommends that BEIS and Ofgem work together on these issues and that BEIS ensure prompt completion of the smart meter rollout. (This would include rollout of the smart prepayment meters which are disproportionately used by low income/fuel poor households.) The current completion date for the supplier-led rollout is 2025.

The ‘Smart and Fair?’ Report formulated the *Capability Lens Concept* (see page 29-45) designed to ‘enhance understanding of the demands placed on domestic consumers by different smart energy offers, technology advances, and emerging energy market developments.’ **It aims to provide new insights into:**

- modification demands on domestic consumers before they can participate fully in the new benefits of smarter energy systems;
- consumer characteristics and capabilities (including aspects of vulnerability) needed for participation in smarter energy systems; and

52 Ofgem, *Access and Forward-looking Charges Significant Code Review - Consultation on Minded to Positions* (Ofgem 2021) <https://www.ofgem.gov.uk/publications/access-and-forward-looking-charges-significant-code-review-consultation-minded-positions>.

53 Ofgem, *Priority Services Register* (Ofgem 2021) <https://www.ofgem.gov.uk/consumers/household-gas-and-electricity-guide/extra-help-energy-services/priority-services-register>

54 <http://news.ssen.co.uk/news/all-articles/2020/november/23-million-disabled-motorists-at-risk-of-being-left-behind-in-the-electric-vehicle-transition/>

55 Centre for Sustainable Energy, *Smart and Fair? Phase One Report. Exploring Social Justice in The Future Energy System* (CSE 2020) <https://www.cse.org.uk/downloads/reports-and-publications/policy/energy-justice/smart-and-fair-phase-1-report-september-2020.pdf>

- potential mitigation strategies ‘either to change the offer so it is more inclusive or to address ‘gaps’ in consumer capabilities so that more are able to participate’.

The authors note that the Department of Culture, Media and Sport and Ofcom are responsible for the broadband and mobile telecoms needed to participate in local energy markets, with reliable service unevenly distributed.

3.2.10 UK Committee on Fuel Poverty

The committee is sponsored by BEIS and provides policy monitoring and advice on Government progress in implementing the 2015 Fuel Poverty strategy for England. *The latest full report*⁵⁶ makes no reference to transition to SLES, apart from a comment on the potential use of data-gathering and machine learning to assist in identifying fuel poor households. Relief of fuel poverty via more efficient buildings will make heat pumps more viable with their potential for flexibility; it may also free up some resources for investment in DER.

3.2.11 UK Environmental Audit Committee

A recent letter from the Chair of this Parliamentary committee to the Secretary of State for BEIS recommends that BEIS develop a Net Zero strategy with practical support measures for community energy (CE). The letter notes that Smart Export Guarantee offers no minimum price for CE and no certainty beyond 12 months, in contrast to Contracts for Difference with large renewables projects. There is also a need to reinstate or continue the Urban Community Fund (now closed) and Rural Community Energy Funds and reinstate Social Investment Tax Relief. There needs to be a 'Right to Local Supply', as enacted in the Community Energy Programme, to allow a community to sell their own supply to members without going via the Grid. This is a similar proposal to the local Energy Bill referenced above. Ofgem should give guidance to DNOs on how to incorporate CE and adjustments to National Planning Policy should be considered, to allow prioritisation of community-scale developments.

⁵⁶ Committee on Fuel Poverty, *Fourth Annual Report* (Committee on Fuel Poverty 2020)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/894502/CFP_Annual_Report_June_2020.pdf

The role of private law and contracts in energy regulation

Private energy law includes all the legal rules that govern private relationships in energy systems. This includes commercial and consumer contracts, actionable rights for civil wrongs, and other rights e.g. property entitlements that affect the functioning of energy systems.

One of the main examples of contractual arrangements in the UK that have had a huge impact is the Contract for Difference (CfD) scheme. The last iteration, the third CfD allocation of 2019, aimed to increase the overall renewable CfD capacity by 60% to 5.8GW of new capacity, with a heavy focus on offshore wind taking 95% of the capacity awarded.⁵⁷ The government reaffirmed this position in its November 2020 response to consultations on proposed amendments to the scheme.⁵⁸ It set even more ambitious targets to ramp up offshore wind to 40GW by 2030. While this is a move in the direction of decarbonisation, prioritising large offshore wind effectively demotes SLES, staying closer to the legacy model of large-scale, centralised generation. The upcoming fourth CfD allocation round⁵⁹ is likely to retain offshore wind as a major strategy for meeting Net Zero targets. This overlap between policy planning, regulation, and private contracting demonstrates the necessity for innovative private law mechanisms to promote SLES.

3.2.12 Smart charging and vehicle- to grid (V2G) briefing

These have been considered in recent parliamentary research briefing on Electric Vehicles (EVs), infrastructure and decarbonisation.⁶⁰ It refers to three government measures to encourage uptake of EVs; namely: the Road to Zero strategy, the Transport Decarbonisation Plan, and Ending the sale of new petrol and diesel vehicles by 2030. The parliamentary briefing is part of a wider plan and policy for encouraging EVs including, *inter alia*, the Energy White Paper and the Prime Minister's 10 Point Plan covered in other parts of this document.

3.3 Local Policy

In Oxfordshire the County Council, Oxford City Council and the four District Councils have all declared a Climate Emergency and are assessing what how to implement an adequate response. As noted in the 2020 White Paper, local authorities are crucial to the future of SLES, able to combine energy action with their statutory work on housing, transport, waste and planning.

Local authorities all face the question of whether central government will legislate and channel resources to enable them to decarbonise with the urgency that the situation demands. A priority

⁵⁷ See Ofgem (2019) *State of the Energy Market 2019 Report*

https://www.ofgem.gov.uk/sites/default/files/docs/2019/11/20191030_state_of_energy_market_revised.pdf

⁵⁸ BEIS (2020) *Contracts for Difference for Low Carbon Electricity Generation (November 2020)*

<https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/937634/cfd-proposed-amendments-scheme-2020-ar4-government-response.pdf> accessed 24 July 2021.

⁵⁹ <https://www.cfdallocationround.uk/>

⁶⁰ David Hirst, James Winnett, Suzanna Hinson, *Electric vehicles and infrastructure* (House of Commons Library, 23 June 2021) <<https://researchbriefings.files.parliament.uk/documents/CBP-7480/CBP-7480.pdf>> accessed 24 July 2021.

recommendation of the CCC regarding national-local coordination is relevant here.²³ In their most recent report to Parliament on progress in reducing emissions, the CCC note how the UK *'planning system and other fundamental structures have not been recast to meet our legal and international climate commitments'* (p.6). *Given that all levels of government have now committed themselves to ambitious climate action, 'better coordination and support is required across these levels, including ... an approach that enables sub-national action to complement action at the national level'*(p.17).

There is a strong view among local authorities that national legislation and regulation stand in the way of progress to Net Zero. For example, inadequate building regulations, along with insufficiently ambitious National Planning Policy Framework and planning regulations, were recently singled out for mention to the House of Commons Public Accounts Committee.⁶¹

Local policy documents illustrate the extent to which local authorities are coming to terms with climate emergency, along with some of the gaps between aspiration and reality. For example, the outputs of LEO Workshop 1, *Enabling and facilitating smart energy systems within the existing planning system* (August 2021) reflected on potential actions for the Project LEO team, SSEN and the Oxfordshire planning authorities.

Standalone renewable electricity generation, grid capacity and battery storage were the major themes that emerged. Various challenges were discussed, such as:

- Lack of early integration of renewables into proposed developments.
- Grid constraints and low awareness of the role of DNOs.
- Building and leveraging public support for renewable energy by focussing on detailed energy planning rather than planning applications.
- Policy Development (by 'asking the right questions') to build understanding on how the planning system can integrate requirements for smart energy technologies.

3.3.1 The Oxfordshire Plan 2050

This is the strategic vision for the county that will act as a framework for plans and strategies for Oxfordshire.⁶² The vision was published but the plan itself (including the policies) is still under development. As at the beginning of October 2020, the public consultation was still open.⁶³ It is broad in scope and has nothing specific to say about smart energy but foresees a carbon-neutral county by 2050 with 'energy efficient and affordable homes', a more equal, fair and inclusive society and transformed levels of connectivity. Guiding principles include 'embrace technological changes', and 'maximise the benefits of strong collaboration'

61 House of Commons Public Accounts Committee (2021) *Achieving Net Zero*. Forty-sixth report of Session 2019-21.

62 Oxfordshire County Council, *Oxfordshire Plan 2050. Strategic Vision* (Oxfordshire County Council 2021) <https://oxfordshireplan.org/>; <https://www.oxfordshiregrowthboard.org/wp-content/uploads/2021/05/Strategic-Vision-summary.pdf>

63 <https://www.oxfordshireopenthought.org/>

3.3.2 Cherwell District Local Plan (2011 – 2031)⁶⁴

Five policies have a direct bearing on prospects for SLES:

ESD1 commits the Council to promoting the use of decentralised and renewable or low carbon energy where appropriate, and distributing growth to the ‘most sustainable locations’, with promotion of non-car transport and use of decentralised and renewable / low-carbon energy where appropriate.

ESD 2 recognises the risk of focusing purely on supply-side solutions and sets out an ‘energy hierarchy’:

- reducing energy use
- efficient supply, with priority to decentralised supply
- use of renewable energy (RE)
- ‘allowable solutions’ (offsite carbon saving). This approach differs from the view of ‘allowable solutions’ in Oxford City Council, who require on-site measures to achieve necessary carbon reductions

However, there is no mention of flexibility.

ESD3 requires all new homes to achieve zero carbon, in line with Government policy. However, there is no mention of promoting building retrofit for efficiency or flexibility, although this is highly relevant to LEO plans for a Smart and Fair Neighbourhood flexibility service trial in Deddington and Duns Tew, using heat pumps and smart monitoring technology. Heat pumps are a more viable option for households in energy-efficient dwellings, but the rules governing Listed Buildings and Conservation Areas (Cherwell District has 60 such areas) can stand in the way of efficiency retrofits

ESD5 encourages applications for RE development, wherever any adverse impacts can be addressed satisfactorily. Visual impact and amenity considerations are prominent, and potential local environmental, economic and community benefits of renewable energy schemes will be a material consideration in determining planning applications. There is a clause regarding on-site renewable energy provision, over and above what is required by national standards, requiring a feasibility assessment for residential developments of 100+ dwellings (50 in off-gas areas) and for non-domestic developments of 1000m² or more. However, there is no mention of mapping the solar potential on existing roofs in the District.

Policy Bicester 1 relates to the NW Bicester Eco-town, a mixed-use development including 6k homes now under construction. The plan states that it is to be built to Level 5 of the Code for Sustainable Homes, with real-time energy monitoring and superfast broadband, with consideration to be given to supporting smart energy management systems.

National Infrastructure Commissions (NIC) work on the Oxford – Milton Keynes –Cambridge corridor was published in 2017; this will affect housing planned for Oxfordshire.

64 Cherwell District Council (2016), *The Cherwell Local Plan 2011*

<https://www.cherwell.gov.uk/downloads/download/45/adopted-cherwell-local-plan-2011-2031-part-1-incorporating-policy-bicester-13-re-adopted-on-19-december-2016>

3.3.3 Oxford City Local Plan, 2036⁶⁵

The Local Plan recognises a role for demand management, enabled by smart metering, in relation to energy, water and travel, and for bringing new technologies into use as part of climate and energy strategy. Given that buildings account for 31% of the City's emissions, there is support for retrofitting and the Council has developed a Heritage Energy Efficiency Tool to assess historic buildings for improvements. It notes and supports the formation of the Smart Oxford partnership to develop and promote Oxford as a smart city.

Policy RE1 (Sustainable design and construction) states that planning permission will only be granted for developments that follow the principles of maximising energy efficiency and the use of low carbon energy, and being flexible and adaptable to future occupier needs. There is nothing on smart local energy as such., However, it is worth noting there is the Zero Carbon Oxford Partnership Action Plan (Spring 2021), which explicitly supports engagement with LEO and with energy flexibility.

§8.35 of the plan notes that full fibre broadband and mobile infrastructure is a central government priority and that the City Council and has implemented complementary initiatives, including a digital infrastructure partnership with all Oxfordshire district councils and the County Council.

New developments over a certain size will only be granted planning permission if they have full fibre broad band connections. However, there is no policy to encourage fast internet in existing housing.

Proposals for Zero Emission Vehicles will be supported by introduction of a Zero Emission Zone. Policy M4 states that, planning permission for additional parking will only be granted for new residential developments if provision is made for electric charging points for each home with an allocated space and if non-allocated spaces are provided with at least 25% (minimum two) having charging points installed. Permission will only be granted for non-residential development that includes parking spaces if a minimum of 25% of spaces have charging points. The sustainability appraisal indicates why the EV charge point requirement is vague: "Technology is changing so much that it is not appropriate to be specific". Paradoxically, measures to discourage private car use could militate against acquisition of EVs and reduce the flexibility potential of the local system. However, the overall impact should be positive for Net Zero.

3.3.4 South Oxfordshire Local Plan, 2011-2035^{66,67}

There are provisions to reduce energy demand and associated carbon, e.g. policy DES7 'maximising passive solar heating, lighting, natural ventilation, energy and water efficiency and the re-use of materials;' but nothing on flexibility as such. On supply, p206 of the Plan states that 'the Council will promote the use of energy from renewable and low carbon sources, including community-led initiatives, and will develop policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts. The Council will support the inclusion of connection readiness for decentralised energy

⁶⁵ https://www.oxford.gov.uk/downloads/file/7380/adopted_oxford_local_plan_2036

⁶⁶ South Oxfordshire and the Vale of the White Horse are preparing a joint Local Plan to 2041. In the meantime, they work to their own plans.

⁶⁷ South Oxfordshire District Council, South Oxfordshire Local Plan, 2011-2035 (South Oxfordshire District Council 2020) <https://www.southoxon.gov.uk/wp-content/uploads/sites/2/2021/02/SODC-LP2035-Publication-Feb-2021.pdf>

networks and the use of decentralised energy sources in development. The Council will identify and publish a list of any areas considered suitable for wind energy development within the district.’

3.3.5 Vale of the White Horse Local Plan 2031⁶⁸

The designation of the area around Didcot as a ‘Science Vale’ may influence transition, by bringing new skills and new end-uses into both South Oxfordshire and Vale of the White Horse. There is support for the Oxfordshire Skills Strategy and for responding to climate change though this is expressed in very general terms: that the Vale will need to play its part in meeting Government targets for reducing...emissions through low carbon and renewable energy generation and improving the energy efficiency of development.

There are high levels of scientific expertise in the area and it has already provided a test-bed for an early trial of smart local energy⁶⁹; the joint 2041 Plan may reflect this more than the 2031 version.

3.3.6 West Oxfordshire Local Plan 2031⁷⁰

There is no obvious plan for transition to smart local energy systems – the plan is mostly concerned with housing development and protecting the character of the area – but there is support for superfast broadband access for all and for introducing more battery storage. There is qualified support for decentralised energy, including combined heat and power and district heating in policy EH6: ‘Where feasibility assessments demonstrate that decentralised energy systems are practicable and viable, such systems will be required ... unless an alternative would deliver the same or increased energy benefits.’ A key element of the West Oxfordshire Local Plan 2031 is the establishment of the Salt Cross Garden; a new garden village near Eynsham, which seeks to create ‘homes and jobs in a high-quality living environment’. It is intended to improve infrastructure, local transport links, and other social amenities. Environmental considerations and planned infrastructure improvements are taken into account.⁷¹ The garden village area action plan is cited by LEO stakeholders as going well beyond the local plan to require net zero development, with significant reference to local energy.

3.3.7 Friends of the Earth Oxford Report on climate action by Oxfordshire Councils⁷²

This is not a policy but a constructive commentary on all the local plans. As with the CCC, it notes the disparity between ambition and policy for implementation. It recommends that the Councils cooperate to

- set a zero-carbon standard for new homes and other buildings,
- establish an ‘Innovation Zone’ to link builders and developers with training providers and others in the supply chain,
- set up a Retrofit Task Force, and
- support development of further renewable energy.

68 <https://www.whitehorsedc.gov.uk/wp-content/uploads/sites/3/2020/10/Local-Plan-2031-Part-1.pdf>

69 <http://www.watchfield.org/weset-meeting-sustainable-energy-project/>

70 West Oxfordshire District Council, West Oxfordshire Local Plan 2031 (West Oxfordshire District Council 2018) <https://www.westoxon.gov.uk/media/fejympen/local-plan.pdf>

71 <https://www.westoxon.gov.uk/gardenvillage>

72 Friends of the Earth Oxford, *In Case of Emergency. Action by Oxfordshire Councils on the Climate Crisis* (FoE 2021) <https://www.oxfoe.co.uk/oxford-friends-of-the-earth/climate-action/climatesurvey/?fbclid=IwAR05e1ntYRskM8iAMyySB5IRIFUJJxBV14P5otT5EYs9VVNORmWoN6BuUU>

3.4 Feedback from LEO partners on the policy environment for SLES

It is not only energy policy that affects the prospects for SLES. The Low Carbon Hub (LCH) noted how access to and control of good-quality data is a key issue: ‘*We need policy and regulation to support open access to data, whilst respecting the right of individuals to privacy and delivered in a way that builds... trust.*’ The Hub is coming up against operational difficulties when they own rooftop PV assets and fiscal standard export meters but have to install second meters in order to get hold of the necessary data for verification of service delivery while meeting privacy requirements.

The LCH comment that, in general terms, it is extremely hard to point to any policy developments that have been helpful in recent years; rather the reverse. They point to the removal of long-term financial support and tax incentives for investment in local energy, raised VAT rates for energy efficiency measures, higher business rates for commercial buildings with solar PV. Taking these in turn:

- Social investment tax relief (SITR) is designed to help community interest companies, community benefit societies and charities to raise money and support their trading activities. It offers investors tax relief on shares they buy in qualifying enterprise or to loans that they advance to such entities.⁷³ In the March 2015 Budget, the government specifically excluded local renewable energy projects that relied on this favourable tax treatment. Solar and wind farms owned by community groups were disqualified from enjoying SITR tax benefits.
- The Enterprise Investment Scheme (EIS) is a government incentive initiative designed to help companies raise money (up to £5m p.a. with a £12m company lifetime cap) to help grow their business. It encouraged individual investors to buy new shares in a company by offering them tax reliefs.⁷⁴ Community projects and SLES could greatly benefit from such a scheme but ‘all energy generating activities and creating fuel’ (including energy storage) are specifically excluded by the scheme.⁷⁵ This has been the case from November 2015.⁷⁶
- In October 2019 the Government announced a VAT hike from 5% to 20% on solar panels and battery storage, unless the combined cost of panels and batteries is less than 60% of total installation cost (work plus materials). If each component is separately installed, it will be subject to the enhanced VAT 20% rate.⁷⁷ The impact is reported as rendering installation uneconomic⁷⁸ and the move was widely opposed. A recent survey indicates wide public support for VAT exemption on solar products.⁷⁹ This issue highlights the impact of international law and policy on SLES. Despite

73 See <https://www.gov.uk/guidance/venture-capital-schemes-apply-to-use-social-investment-tax-relief>

74 See <https://www.gov.uk/guidance/venture-capital-schemes-apply-for-the-enterprise-investment-scheme#how-the-scheme-works>.

75 <https://www.gov.uk/hmrc-internal-manuals/venture-capital-schemes-manual/vcm3160>

76 Adam Palin, Tax incentive Axed for Local Energy Projects (*FT* 11 November 2015).

<<https://www.ft.com/content/07f89b32-86f6-11e5-9f8c-a8d619fa707c>> accessed 27 August 2021.

77 See, <https://www.gov.uk/tax-on-shopping/energy-saving-products>.

78 Harry Cockburn, *Climate Crisis: Huge VAT Rise on Solar Panels Makes Installation ‘Entirely Uneconomic’, Say Experts* (The Independent 09 May 2019) <<https://www.independent.co.uk/climate-change/news/climate-change-solar-panels-vat-government-fossil-fuels-sian-berry-a8906361.html>> accessed 27 August 2021.

79 Molly Lempriere, *VAT Exemption or Solar Products Supported by Majority of Public, Survey Finds* (The Solar Power Portal 27 April 2019)

<https://www.solarpowerportal.co.uk/news/removing_vat_for_solar_supported_by_69_of_public> accessed 27 August 2021.

local opposition to the increased rate during the consultative process, Parliament declared that they were mandated⁸⁰ to implement the changes to conform to EU rules.⁸¹

4. Equity: policy and regulatory impacts on local energy markets

4.1 National policy and regulation

There is much to learn about what a fully-functioning local energy market (LEM) will look and how it may operate. The LEO Y2 Synthesis Report notes that

Policy/regulatory risk for SLES continues. The outcome of the Targeted Charging Review, in particular, has removed the financial viability of many potential plug-in projects that could, in favourable conditions, develop into elements of a SLES. The value of flexibility to actors at different locations and times needs to be clearly signalled, yet there are still many uncertainties about this. Settlement of transactions within a LEM, between local markets, and between local and national markets, still poses operational, policy and regulatory challenges.

As noted last year, necessary changes to network infrastructure can only be sustained if there are corresponding changes to the structure and functioning of the electricity market. For example, the value of flexibility to actors at different locations and times must be clearly signalled and tradeable, yet there are still many uncertainties about value. Settlement of transactions within a LEM, between local markets and between a local and a national market (e.g. the Energy System Operator balancing mechanism) still poses operational, policy and regulatory challenges.

There is still an open question as to who will facilitate such markets – the DSO, local authorities or some other body? Governance is clearly going to be an important issue. For example, LCH note that, in their discussions on setting up a solar farm, a positive outcome may hinge primarily on governance, given that it could rely on finance from a pension fund and these funds are under pressure to have social and environmental governance. Simply having a local institutional developer signed up to sustainability targets may not be enough if they are outsourcing developments to pension funds.

A similar barrier to investment arises through the Charities Act 2011, which obliges charity trustees to have an independent report on investments to demonstrate best value. An amendment that would exempt community energy from that property clause could resolve the issue. There is another challenge that may inhibit charities from investing their own money in Local Energy Projects. They are required to demonstrate that the decision is of economic value to them. Alternatively, they may be permitted to compromise financial return if the activity furthers (or avoids undermining) their objects. It may therefore be inferred that a SLES business case should either be clear, or that the value

80 House of Commons, *Briefing Paper Number 8602: VAT on Solar Panels* (UK Parliament 17 December 2019) <<https://researchbriefings.files.parliament.uk/documents/CBP-8602/CBP-8602.pdf>> accessed 27 August 2021, page 2 explains, ‘There are EU-wide rules limiting Member States’ discretion in setting VAT rates on individual goods and services. In brief, Member States must apply a standard VAT rate of 15% or more, and have the option of applying one or two reduced rates, no lower than 5% to certain specified supplies...’

81 See Council Directive 2006/112/EC of 28 November 2006 on the Common System of Value Added Tax, <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006L0112>.

proposition matches recognised charitable purposes (conservation, justice, equality, poverty reduction etc). The latter would still require the benefits or value proposition of SLES to be compatible with charities on a case-by-case basis. In general term, therefore, where regulations make the business case of SLES more obscure, they hinder potential investment.

A note on trusts and charities

Many community energy (and SLES) entities are established as Community Benefit Societies and a few are co-operatives. They are basically established in trust for the benefit of their members. Renewable energy projects are sited on 'real properties', which means that the rules that apply to conveyances and dispositions on land (as well as the rules that charities must adhere to) are part of the regulatory package that community energy projects must conform to if they are set up as trusts or seek to partner with a charity.

Trustees are required by section 117 of the Charities Act to obtain a written report from an independent surveyor for any transaction that deals with land. This is in addition to the ordinary surveyor's valuation report, which only advises on price. The Charities Act Surveyors Report imposes broader parameters on which a surveyor should give guidance to the Trustees.⁸² These include detailed issues, like whether it would be advisable to impose additional covenants or include an overage agreement (a provision that the buyer will pay more than the original purchase price, if the property is improved); terms of subsisting rental arrangements; the exact state of repair of the premises and whether it is advisable to make substantive repairs before 'improving' the property by installing the energy infrastructure; whether the new installations will enhance the value of the property; and whether that would necessitate another layer of planning permission.

These additional requirement under the Charities Act Surveyors Report lay additional cost, time, and procedural burdens on community energy enterprises. They also enhance the risk profile (Trustees risk being held personally liable if it is found that their decision making did not comply with section 117 to the detriment of the charity). They generally lengthen the land conveyance process. A practical barrier encountered has been that the regulation makes it difficult for a charity (who own a building) to place an array on their roof in partnership with other entities. It is hard for the charity to justify signing over their roof space for a 20-year lease to third parties because they struggle to prove best value and that -consequently- the trustees are working in the best interest of the charity.

Low Carbon Hub further note that a lack of 'whole system' governance and vision can undermine development of a local energy approach. As examples,

- intersection between DSO-procured and DSO-enabled markets can lead to network reinforcement being the default, rather than supporting local flex service provision.

⁸² See <https://www.legislation.gov.uk/uksi/1992/2980/schedule/made> .

- the process for securing a connection is opaque and appears to be based on an assumptions model that is often flawed, undermining the ability of system users to install local generation and storage. There is also no route for appeal. *'We need a timely, transparent connections process that includes a right of appeal'*.
- there is a set of issues with metering, where it can be difficult to get accurate readings, current smart meters lack standard protocols, and the ownership of meters is complex. There is a need for policy and regulation to support open and transparent protocols that allow people to support the transition.⁸³

Work on smart metering and data by the Public Interest Advisory Group is relevant here. Their latest report comments that

Ofgem will increasingly be looking to oversee a market in which time of use tariffs and other forms of flexibility are important... Ofgem's ability to make informed policy choices, monitor supplier behaviour in the market (including whether they are, as required, treating their customers fairly given what the suppliers know about their customers' demand patterns) and understand the distributional impacts of developments are all dependent on them having access to better data.... Ofgem ... look to make more creative use of data held by central bodies and others. However, it was clear that there was a major gap in terms of a database that links individual time-of-use consumption patterns with socio-demographic data. The Smart Energy Research Lab database does this but at 13,000 remains a relatively small sample and is only accessible to accredited university researchers.⁸⁴

4.1.1 UK Energy White Paper (2020)

With a move to electricity as the main energy source, the EWP seems to promote the idea of a unitary energy system, merging networks for electricity, gas, and EVs. It proposed the Smart Systems Plan (now available- see above), and new legislation to define electricity storage (no date set); also legislation for competitive tendering for onshore networks construction, ownership, and operation. (no timeline given), and the investment of £950m in EV charging infrastructure at petrol service stations and other stopping areas along the 'Strategic Road Network' (motorways and A roads). This is seen as a necessary precursor to the private sector expanding EV charge points.

On p64 of the EWP there is a commitment to 'work to minimise the costs to consumers of getting energy to homes and businesses, by promoting more innovation and competition in networks and in national *and local* energy markets' (our emphasis). There is a commitment to assess what market framework changes may be required to facilitate the development and uptake of innovative tariffs and products during 2021, prior to a formal consultation.

Some of the proposed Net Zero Innovation Portfolio is set aside for homes, energy storage and flexibility, and this may involve some indirect support for LEMs. However, as noted earlier, Government currently has more of a focus on offshore wind, hydrogen, nuclear, and CCUS. This does not obviously work in favour of LEM innovation, although there will be a need for new market arrangements to assist on-the-ground energy transition under any foreseeable supply scenario.

⁸³ Personal communication, 25th June 2021

⁸⁴ <https://www.cse.org.uk/downloads/file/PIAG-phase-2-final-report.pdf> , p.19

4.1.2 Ofgem, RIIO-2

The efficacy and impact of a separate Electricity System Operator (ESO) price control may shape the structure of the market. Also, fixed price control measures for five-year periods may be at variance with how SLES evolve. RIIO-2 provides for licensing of third parties and greater access to strategic innovation funding (p.100). Ofgem seeks to direct funds for energy transition through coordinated public sector innovation with third-party collaboration and direct financial access. This may reduce the legal and regulatory barriers of complex application processes and cost of an innovation licence for smart local energy system players.

Uncertainty over effects of the formation of the National Grid Electricity System Operator on SLES

The National Grid established a separate company within its group in 2019⁸⁵ to address conflicts of interest between its system operator and transmission operator functions. It is not yet clear whether or how the NGESO will promote or inhibit SLES. The recent BEIS/Ofgem ‘Smart systems and flexibility plan’ offers (p.51) a vision that ‘the Electricity System Operator will [in the mid-2020s] have delivered reforms to existing markets for flexibility services...flexible technologies will play an increasing role in contributing to security of supply through participation in the Capacity Market.

At the time of writing, there is a possibility that the ESO will be separated entirely from National Grid, with a consultation under way on the creation of a ‘Future System Operator’.

4.1.3 Ofgem Targeted Charging Review

Not all SLES actors are affected in similar ways and uniform treatment/redress/analysis is difficult. Examples of system stakeholders getting differential treatment under the TCR and producing different outcomes include:

- High-consuming non-domestic customers without onsite generation assets are now less likely to transition to SLES since centralised grid connection would be cheaper.
- Suppliers may be neutral (may charge customers more and pay embedded generators less). They might transition to SLES, depending on the business case. Tech-agnostic otherwise.
- Embedded generators will be most negatively affected as they will have reduced benefits and lower income from suppliers. The TCR will hamper their expansion and discourage transition by others.

There are other technical and financial concerns related to SLES rollout and profitability. What is the magic number (in terms of power, energy or money) where investment in SLES becomes profitable?

4.1.4 Ofgem Priority Services Register

The DNO/DSO will have data on PSR customers in their area – some of it acquired when customers register with them, some passed on from suppliers – and it will also be possible for the operator to know something of the likelihood of customers in that area owning and operating assets for trading into markets. PSR customers may be candidates for special tariffs. Data protection challenges arise, though, and there is a key limitation: if customers are on the PSR, one assumes that this is to ensure

⁸⁵ Application made under section 7A of the Electricity Act.

that they have security of supply. The DNO may then have information on customers that cannot be flexible, as they need to maintain a basic level of operation.

4.1.5 Centre for Sustainable Energy ‘Smart and Fair?’ report

The report notes that a market-based system will need intervention to secure inclusive participation, consumer protection guidelines and ‘safety net’ protection for anyone left behind. The authors recommend that BEIS and Ofgem work together on these issues and that BEIS ensures prompt completion of the smart meter rollout. This would include rollout of the smart prepayment meters that are disproportionately used by low income and fuel-poor households. CSE also note that the Department of Culture, Media and sport and Ofcom are responsible for the broadband and mobile telecoms needed for participation in LEMS, with reliable service unevenly distributed.

4.1.6 UK Committee on Fuel Poverty

Fuel poor people are unlikely to be able to participate individually in LEMs because of inability to invest in flexibility assets, though some may be equipped with ‘smartened’ storage heaters and/or water heaters⁸⁶. This raises the question as to whether funds aimed at relieving fuel poverty may be spent on investment in flexibility assets. It also points to the potential for community-level flexibility, an arrangement that could be more inclusive than reliance on individual actors.

4.1.7 The Local Electricity Bill

The Local Electricity Bill introduces a welcome simplicity to the energy regulatory space and has gathered some widespread support from MPs.⁸⁷ However, obtaining a licence to sell electricity and gas directly to consumers can be ‘fiendishly difficult’ under the Electricity Act 1989.⁸⁸ National energy policy is strongly influenced by economic thinking that is geared to centralised supply, to the detriment of emerging decentralised and community-based systems. An unfortunate side effect is that the regulatory blanket effectively continues to favour large-scale suppliers while keeping suppliers/retailers separate from the regulated businesses of the network operators.

The Bill has limitations in this respect: it appears to have provisions that are too simple to address current regulatory hurdles or lead to a shift from the prevailing structure of the UK electricity system (which still prohibits direct power sales to consumers or sets onerous and prohibitive licensing prerequisites). LCH stress the importance of making it possible for distributed generators to sell direct to local consumers, as this enables value to stay at the grid edge, encouraging greater participation in local energy activities. It would have minimal impact on system structures but could make a real difference in terms of local energy engagement.⁸⁹

86 Darby, S.J. (2020) Demand response and smart technology in theory and practice: customer experiences and system actors. *Energy Policy* 143, 111573

87 Drafted by Power for People, <https://powerforpeople.org.uk/the-local-electricity-bill>, and co-sponsored by 12 cross-party group MPs; numerous County and Local Councils; Parish, Town and Community Councils; National and Local Organisations. The introduction into Parliament was unopposed.

88 Stephen Cirell, ‘The Local Electricity Bill: A Solution to the local energy dilemma?’ (Current News UK, 11 May 2020) <https://www.current-news.co.uk/blogs/the-local-electricity-bill-a-solution-to-the-local-energy-dilemma>.

89 Personal communication, 25th June 2021

4.2 Local policy

Locally, LEO is demonstrating that there is considerable work involved in building system capability to set up and operate a LEM, e.g. establishing value of flexibility, metering and settlement, tariffing, data access and management, ability to aggregate and trade demand, enabling P2P trading.

LEO project partners have commented on how market conditions and actors can have very specific local impacts.⁹⁰ For example, DNO policy towards V2G connections assumes a worst-case (highly unlikely) scenario that militates against such connections, which may be conditional of paying for local grid reinforcement; but if there are aggregators in a LEM who understand how to optimise V2G value, the situation can be improved. There is therefore a case for policy support for aggregators, treating demand- and supply-side flexibility on more equal terms. Where small-scale demand response is concerned, similarly, regulation that offers financial incentives for behind-the meter technologies such as heat pumps can pave the way for greater flexibility and for SLES in general.

4.3 Feedback from LEO partners

Some LEO partners have noted that national energy policy seems to be driven by economic ‘rational actor theory’, which can be disconnected with the planning realities at community/local level; also that there seems to be a disconnect between the government emphasis on price signals and a market-based approach, and principles of energy equity.⁹¹

5. Policy and regulation for energy equity

Energy equity considerations are associated with energy justice, which has its own conceptual basis and tenets.⁹² Energy justice is not law but is gaining prominence as one of the principles of energy law. It is influencing policy, planning, and regulations to some extent, although the taxonomy appears more in academia than in Westminster or Whitehall - many of the government instruments reviewed do not mention ‘equity’ or ‘justice’ but allude to ‘price’, ‘affordability’, ‘cost to consumer’ etc. It is notable that the costs usually relate to unit costs of fuel or electricity, rather than the capital costs associated with energy transition, in order to increase energy efficiency or own flexibility assets.

What is the value of social considerations and energy equity for law, policy, and regulation? First, they should help us identify where there are disparities. Second, they should form the ethos that guide decision making to right those inequities⁹³ and third, they should inspire the enhanced integration of

90 See LEO quarterly interview report by Nick Banks, July 2021.

91 From a meeting with Zero Carbon Oxford, June 7th 2021

92 Conceptualized as having three principal tenets (distributional, procedural and recognition justice), ‘Energy justice’ concerns itself with identifying when and where injustices occur in energy systems and how best law and policy can respond. See, Benjamin K Sovacool and Michael H Dworkin, *Global Energy Justice: Problems, Principles, and Practices* (CUP 2014), 20.

93 Tedd Moya Mose and Mohammad Hazrati, ‘Is Energy Justice in the Fossil Fuel Industry a Paradox?’ in Geoffrey Wood & Keith Baker (eds), *The Long Goodbye? Managing the Decline of Fossil Fuels* (Palgrave Macmillan 2019), 529-550.

renewable energy into global energy systems as they offer the best chance for ‘supporting human development over the long term in all of its social, economic, and environmental dimensions’.⁹⁴

5.1 National policy and regulation

5.1.1 Consumer Protection in the UK Energy Market

Consumer protection is linked with competition law because the UK electricity market is liberalised and privatised. Also, national energy legislation and policy have been aligned with EU law. Broadly, the First,⁹⁵ Second,⁹⁶ and Third⁹⁷ Energy EU Packages introduced common rules for the internal electricity market including establishment of independent transmission system operators, regulatory authorities and enhanced (vulnerable) consumer protection measures.⁹⁸ Beyond EU legislation, these have been codified nationally⁹⁹ and are unlikely to be fundamentally altered because of Brexit.

Small-scale heat and power generators in the UK have adopted standards that espouse consumer protection provisions for domestic users; namely the Renewable Energy Consumer Code,¹⁰⁰ which is sponsored by the Renewable Energy Association.

5.1.2 The Sixth Carbon Budget (CCC 2020)

Greater funding (circa £4-7 bn by 2030) for low-C solutions is highlighted. This is largely aimed at industrial decarbonisation but there is also an intention to prevent household energy bill increases. Carbon taxes are proposed (p. 306) to incentivise transition to NZ and favour low-carbon options. Because of the regressive nature of charges on energy bills, there are several caveats on equitable distribution of these costs. It is suggested that equity should be at ‘the heart of climate change policies (which) need to be systematically screened for their impact on vulnerable and excluded groups and for the opportunity to address existing inequalities’ (p. 289).

5.1.3 UK Energy White Paper (2020)

The word “equity” does not feature in the 170-page document. However, Chapter 1 is focused on consumers. Protection of the fuel poor, providing opportunities to save money on bills, warmer, more comfortable homes and balancing investment against bill impacts are policy aims for ‘creating a fair deal for consumers’. Proposed equity-related strategies include

- assessing what market framework changes may be required to facilitate development and uptake of innovative tariffs and products,
- ensuring the retail market regulatory framework adequately covers the wider market,
- establishing a Future Homes Standard,

94 ‘World Energy Assessment: World Energy Assessment and the Challenge of Sustainability (2000)’, in Richard Ottinger, Nicholas Robinson, and Victor Tafur (eds), *Compendium of Sustainable Energy Laws* (Cambridge University Press, 2005), 2.

95 Directive 96/92/EC.

96 Directive 2003/54/EC.

97 Consists of two Directives (Directive 2009/72/EC & Directive 2009/73/EC) and three Regulations (Regulation (EC) No 713/2009, Regulation (EC) No 714/2009, Regulation (EC) No 715/2009).

98 The EU and UK electricity markets are driven by four common principles: free competition, transparency, free access to the network, security of supply.

99 See, Gas and Electricity (Internal Markets) Regulations 2011 in Great Britain; and Gas and Electricity (Internal Markets) Regulations (Northern Ireland) 2011 & 2013 in Northern Ireland.

100 <https://www.tradingstandards.uk/media/documents/commercial/codes-of-practice/recc.pdf>

- Consulting on regulatory measures to improve energy performance of homes,
- Requiring all rented non-domestic buildings to reach EPC Band B by 2030, and
- expanding the Energy Company 'Warm Home Discount' to £475m pa until 2026 (p. 20).

5.1.4 Ofgem RIIO-2

The RIIO-2 Final Determinations have a consumer focus, establishing a challenge group to enhance engagement with customer and user groups (p 11). This may be good for one aspect of energy equity, affordability. However, it is not clear whether the pricing model (the Capital Asset Pricing Model) proposed at p. 176 would advance this aim.

It appears that third-party innovators or aggregators are more favoured than the DNOs. Also, the policy and regulatory considerations are still driven by the logic that enhancing innovation and competition in network activities will, of itself reduce costs and transform the energy system. This does not necessarily address energy equity considerations, or smaller scale players at the grid edge.

5.1.5 Ofgem Targeted Charging Review

Ofgem's view is that fixed network charges are fairer than those based on usage, because larger/wealthier customers can avoid charges linked to usage, which transfers network costs to smaller and/or less sophisticated customers. This may however favour high-consuming non-domestic customers without onsite generation assets more than the energy poor. Ofgem's model projects £3.8 - 5.3 bn in consumer savings, £0.5bn - £1.6bn in consumer benefits, and £1.0bn to £3.2bn in system benefits. The exact assumptions/workings behind the calculations are unclear.

With more decentralised electricity being generated, consumer dependence on the high-voltage grid declines. Although residual charges (now scrapped by the TCR) incentivised the development of SLES through technology and asset development as well as behaviour change, they had unintended consequences, shifting the payment burden towards grid-connected consumers without generating assets. With the review, Ofgem predicts that households will pay less and non-domestic consumers will pay more. Consumers with their own onsite generation will, on average, pay more, whereas those without onsite generation will, pay less. The likely impact will be to discourage prosumers. With the regulatory implementation commencing in April 2021 more data (from billing cycles) and feedback from local energy initiatives will be needed to test Ofgem's rationale and projections.

5.1.6 Ofgem Priority Services Register

The PSR should help safeguard a minimum level of energy service for all citizens. But the onus is on them, or their neighbours/carers, to register with the PSR and the likelihood that some will not do so. To qualify, customers need to be of pensionable age / disabled or chronically sick, have hearing or visual impediments or 'additional communication needs', or be in a 'vulnerable situation'. Note that the DNOs are aware that new categories of vulnerability may be emerging, e.g. short-term, where a patient is discharged earlier from hospital than would have been the case a few years ago, with medical equipment that needs a constant power supply; people in remote areas with EVs who may not be able to get help in the event of a power failure.

5.1.7 Centre for Sustainable Energy 'Smart and Fair?' report

The report addresses customer welfare and equity on the basis that these will both affect public acceptance and adoption of SLES. *It notes that 'fairness will not reliably emerge from the market*

without deliberate ... action by policymakers and regulators to secure it...' A market-based system will need intervention to secure inclusive participation, consumer protection guidelines and 'safety net' protection for anyone left behind. The authors recommend that BEIS and Ofgem work together on these issues and that BEIS ensures prompt completion of the smart meter rollout. (This would include rollout of the smart prepayment meters which are disproportionately used by low income/fuel poor households.) They also note that DCMS and Ofcom are responsible for broadband and mobile telecoms, needed for participation in LEMs, with reliable service unevenly distributed. Price signals may need 'social policy mitigation' in order to lead to equitable distributional impacts of SLES.

This report contains perhaps the most stringent warning about energy system transition from an equity standpoint: that such a system risks 'creating new ways to generate unfairness', as it introduces new actors, processes and complexities.

5.1.8 UK Fuel Poverty Committee

The Committee produced an interim report in July 2021,¹⁰¹ expressing concern at the slow pace of progress in meeting fuel poverty/ energy efficiency targets. They recommend application of two guiding principles:

- *"Worst first" (focusing assistance on those in the deepest levels of fuel poverty).*
- *"Fabric first": install insulation and other energy efficiency measures to improve the energy performance of the home before any conversions are made to install new low carbon heating systems. If government programmes require renewable heating to be installed in a fuel poor home, the household must be protected from any potential increase in fuel bills. It would seem perverse if regulations allow other households to continue to install fossil-fuel burning appliances which are often cheaper to run, while those with restricted incomes face higher running costs for renewable heating installed under a government fuel poverty programme.*

5.1.9 House of Commons research briefing on fuel poverty

The latest research briefing on fuel poverty for the House of Commons library¹⁰² notes that 13% of households in England are classed as fuel poor under the 'low income, low energy efficiency' definition, that is, if their home has an energy efficiency rating of band D, E, F or G and their disposable income (after meeting housing costs and energy needs) would be below the poverty line. They cite the CCC view that energy efficiency to address fuel poverty is important as part of a just transition to a decarbonised society. The briefing points out that the Green Homes Grant, which had a budget of £2m and covered up to £10,000 worth of efficiency improvements for fuel poor households, was discontinued in March 2021. The budget has been cut to £300m, to be delivered through local authorities from 2021-23. £100m is to go via the Social Housing Decarbonisation Fund, which has funded energy efficiency demonstrator projects; the Government state that it will open for a new round of applications this autumn.

101https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/998436/committee-on-fuel-poverty-interim-report-2021.pdf

102 <https://researchbriefings.files.parliament.uk/documents/CBP-8730/CBP-8730.pdf>

5.2 Local policy

5.2.1 The Oxfordshire Plan 2050. Strategic Vision

The County Council envisages a county that ‘will be a more equal, fair and inclusive place for everyone’, with energy-efficient and affordable homes in the right number, location and tenure. Guiding principles include ‘Improve wellbeing and reduce inequalities’, ‘Support a prosperous and inclusive economy’, ‘Help people to help each other’.

5.2.2 Cherwell District Local Plan 2011-2030

The plan notes that wages are relatively low in the District and aims for more jobs in the ‘knowledge sector’ to improve the situation. Superfast broadband is to be sought as standard in new housing and commercial accommodation, and encouraged elsewhere in the District.

5.2.3 Oxford City Council Local Plan 2036

There is a background document for the plan dealing specifically with climate change and fuel poverty and setting out the regulatory framework for these. This is by far the most thorough document of those reviewed in bringing together policy and regulation issues facing attempts to alleviate fuel poverty while mitigating carbon emissions, and in listing relevant national and local policies and powers. It confirms that local authorities are empowered to set higher energy efficiency standards for housing than the national ones.

5.2.4 South Oxfordshire Local Plan, 2011-2035

The strategy supports new housing and economic growth, but there is nothing explicit about equity. Policy INF 2 states that ‘Proposals for all new development should ensure appropriate infrastructure is provided during construction, sufficient to enable all development to be connected to full fibre broadband without any post development works.’

5.2.5 West Oxfordshire Local Plan 2031

Again, there is nothing specific about energy equity. Policy EH6 states that renewable energy developments led by or meeting the needs of local communities will get particular support; applicants should submit agreements between them and the community energy enterprise demonstrating that benefits will flow to the community for the lifetime of the project. There is little or no comment on retrofit for energy efficiency. There is a target (Policy T1) of 100% superfast broadband coverage.

5.2.6 Friends of the Earth Oxford Report on climate action by Oxfordshire Councils

There is a recommendation for all Councils to carry out an Equalities Impact Assessment on their climate change plans.

6. Policy and regulation for a zero-carbon energy system

The need for greater law, policy and regulation for a zero-carbon energy system is apparent in light of the international sustainability discourse. However, there are limitations at international level because environmental and sustainability laws are *voluntarily assumed* by states through treaty

obligations.¹⁰³ This has an impact at other levels (national, provincial, and local) because energy systems transcend national borders and are interdependent. This means that there can be localised negative impacts from energy production but corresponding benefits from its consumption by populations that are detached from those unfavourable consequences. This may create a perverse incentive to maintain the *status quo* for those benefitting while less immediately impacted. Furthermore, in an increasingly globalised world, societies that are most dependent upon primary energy resources (like oil) mostly obtain their energy from other states.¹⁰⁴

6.1 National policy and regulation

6.1.1 The Sixth Carbon Budget (CCC 2020)

The Sixth Carbon Budget makes policy proposals that, if implemented over the 2020s, could meet the 2033-2037 targets. Under 'Risks of higher costs and unintended consequences' (pp. 263-264), the report explains that Net Zero transition will be a policy-led transition across the UK economy. The report recognises that policy needs to evolve to harness low carbon technologies, reduce costs, drive decarbonisation, give the best chance of realising and benefiting from cost reductions, and fairly share costs and risks of technology deployment (p 402). It notes that unclear direction and policy uncertainty could introduce a risk premium and significantly increase costs of capital, while poor policies and implementation could result in extra remedial costs.

Inadequate governance and poor coordination are highlighted 'across all levels and localities of Government...and across UK businesses and people' (p.30). There are other references to the need for Government policy to be harmonised with local, regional, and devolved policy on just transition and Net Zero (e.g. pp. 23, 29, 53, 207, 233, 280). The Policy Gap identified by Zero Carbon Oxford, illustrated below, is relevant here.

6.1.2 The UK Energy White Paper (2020)

The paper sets out policies for the UK's 'net zero future', building on plans and commitments set out in the earlier Ten Point Plan and National Infrastructure Strategy. Implementation hinges on successful consultations as well as on (more granular and specific) policy papers, laws and regulations. Legislative processes that are pending include:

- Legislation on competition in electricity distribution and transmission. Government promises to legislate 'when Parliamentary time allows' to enable competitive tendering in the building, ownership, and operation of onshore distribution and transmission assets.
- Review of the National Policy Statements on energy by the end of 2021.
- Setting up a Ministerial Delivery Group to 'oversee the expansion of renewable power in the UK, reduce consenting delays and ensure that planning guidelines and environmental regulations are fit for purpose'. This appears to be largely concerned with offshore wind generation.

These areas may present difficulties in achieving locally-based moves towards Net Zero because the government approach as expressed in the EWP is still focused on large-scale generation and a

103 Martha M Roggenkamp, Catherine Redgwell, Anita Ronne and Inigo Del Guayo (eds), *Energy Law in Europe 3rd edn.* (OUP 2016), 37.

104 Ian Smart, 'Energy and the Public Good', 36 (1981) 2 *International Journal*, 255-272.

relatively centralised model of supply and action. Some timeframes are also unclear, which are a major challenge for planning/ business models.

6.1.3 RIIO-2

The RIIO2 *Final Determinations Core Document* has Net Zero pre-construction and small projects re-opener provisions. It is suggested (p 92) that RIIO2 enables companies to progress small value, high impact Net Zero work in an agile way but it is not yet clear what this means in practical terms: for example, how much information does Ofgem have on business models? How much data do prospective SLES investors have on regulatory risk and other practical challenges to realistic business models?

6.1.4 Ofgem Targeted Charging Review

The TCR is likely to discourage prosumers and decelerate uptake of small renewable energy generating assets, as discussed above. However, generation is but one aspect of SLES. The impacts of the review will become clearer in due course.

6.1.5 UK Fuel Poverty Committee

Relief of fuel poverty may mean that consumption *rises* in some cases, as efficiency gains or financial help are used to improve comfort. And this may mean, if fuel poverty is alleviated via a new, more efficient gas boiler, more fossil fuel consumption during the lifetime of that boiler. The FPC therefore advise that, in such a case, the home should be made 'net-zero-ready' by fitting radiators suitable for use with a heat pump and lower circulating water temperatures.

6.2 Local policy

Local authorities can invest in their own or other renewable energy schemes, generally used to provide an income stream and often supporting work on affordable warmth. Under the Local Government Act 2003 s.1, a local authority may borrow money for any purpose relevant to or for the purposes of the prudent management of its financial affairs. It has a duty to set an affordable borrowing limit. For energy infrastructure, local authorities will need enabling powers, for example to insist on certain types of technologies (and ban others) in buildings in net zero heat zones.¹⁰⁵

Community Energy England stress the need for a long-term consistent and supportive policy environment after this loss of legislative backing, noting that community energy can be both smart and local. They call for resources for CE organisations and local authorities to work together to implement SLES and establish Local Area Energy Planning.¹⁰⁶

6.2.1 Cherwell District Council Local Plan (2011 – 2031)

This Plan demonstrates policy interactions between national and local government and the importance of having both aligned or distinct roles assigned to manage SLES more efficiently. The plan does not give a definition of zero carbon development – only that it should be 'in line with government policy' and noting that when the plan was written the government of the day had a zero-carbon regulation for new homes to come into force in 2016. This was scrapped by the Conservative

¹⁰⁵ https://www.uk100.org/sites/default/files/publications/Power_Shift.pdf

¹⁰⁶ https://communityenergyengland.org/files/document/523/1624438045_UKSOTSReport.pdf

government in 2015. The environmental sustainability policies referred to under Policy ESD 3 (Sustainable Construction) and Policy ESD 4 (Decentralised Energy Systems) (on page 67-68) still set out conditions for sustainable construction and assessment for district heating/SHP for larger developments, although there are no specific policies for retrofit beyond an expectation of high environmental standards and sustainable construction methods.

6.2.2 Oxford City Local Plan, 2016 - 2036

This¹⁰⁷ is the most recently approved of the statutory local plans (June 2020), and arguably the most thorough on matters of climate and energy. The overriding aim is to reduce carbon emissions completely from 1990 levels and to be using 100% renewable energy by 2050. Climate change policy is set out through specific issues or challenges facing the city: these are listed in terms of housing, land use, educational attainment, managing population and economic growth and accessing the benefits of the latter, heritage, biodiversity protection, traffic congestion and the need to shift to sustainable travel. Adaptation and mitigation measures both figure in the plan, sometimes together as in the policy to support green roofs.

6.2.3 Zero Carbon Oxford Partnership Roadmap and Action Plan

Oxford City is now home to the multi-stakeholder Zero Carbon Oxford Partnership (ZCOP), launched in February 2021. The Partnership has drawn up five-yearly carbon budgets to 2040, with a small amount of offsetting included in the final budget to reach a Net Zero figure. The ZCOP plan – a voluntary rather than a statutory document - identifies a ‘policy deficit’ between Net Zero goals and the national policies in place to implement work towards those goals. As the figure below shows, this is substantial. With only the government policies and local initiatives currently in place, annual emissions in Oxford are projected to fall by 54% between 2018 and 2040. This compares to an 88% decrease in the Net Zero 2040 scenario. ZCO conclude that Government support is crucial for Oxford, and other areas in the UK, to achieve their net-zero goals. This will mean developing policy to give local authorities and stakeholders the power and resources to implement their NZ strategies.

¹⁰⁸ Promising areas for this, in relation to SLES, are funding for heat pumps and building retrofit, grants for skills development and enabling energy stakeholders to raise finance from new sources. Relevant upcoming national policies will be the BEIS heat and buildings strategy, and EPC goals for 2030 and 2035. Overall, a need is identified for clear strategic direction for local energy (ibid., p74).

¹⁰⁷ https://www.oxford.gov.uk/downloads/file/7380/adopted_oxford_local_plan_2036

¹⁰⁸ https://www.oxford.gov.uk/downloads/file/7678/zero_carbon_oxford_partnership_roadmap_and_action_plan_-_full_report

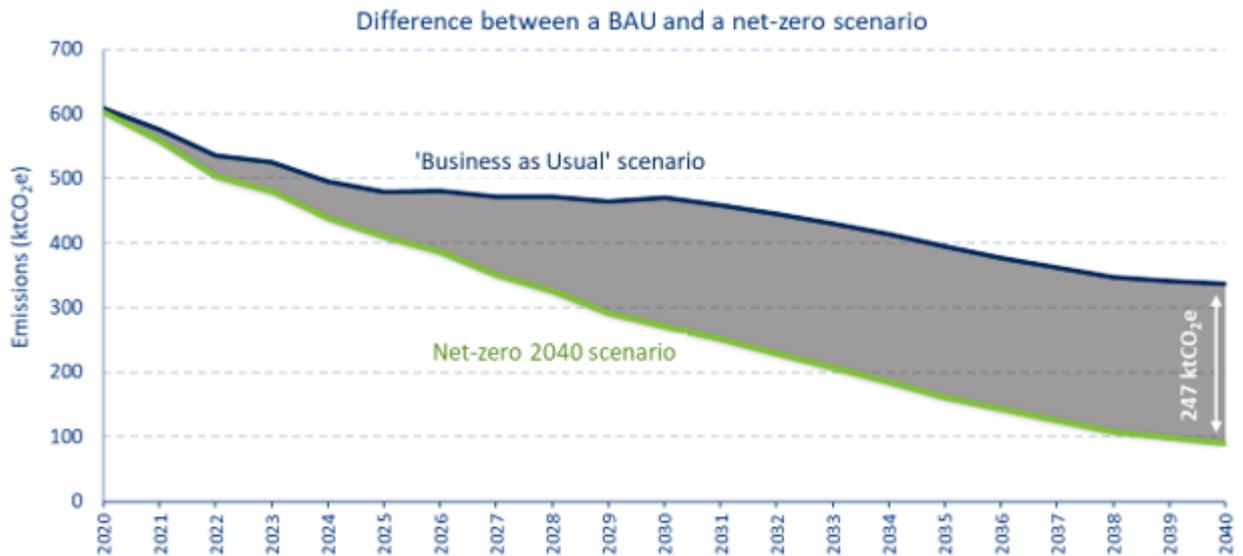


FIGURE 18: 'BUSINESS AS USUAL' SCENARIO (BLUE) AND THE NET-ZERO 2040 SCENARIO (GREEN), WITH THE POLICY DEFICIT REPRESENTED BY THE AREA (GREY) BETWEEN THE TWO SCENARIOS

Source: Zero Carbon Oxford Partnership Roadmap and Action Plan, p.41

6.2.4 South Oxfordshire Local Plan, 2011-2035

Appendix 16 of the Plan gives an account of 'How climate change is addressed in the Local Plan' in general terms. A highlighted objective is to, 'Minimise carbon emissions and other pollution such as water, air, noise and light, and increase our resilience to the likely impact of climate change, especially flooding. Lower energy use and support an increase in renewable energy use. Support growth in locations that help reduce the need to travel.' The date set for achieving Net Zero, 2030, is the most ambitious in the county but without much detailed guidance as to how this objective can be realised in conjunction with the others.

Development-related policies are presented with the comment that 'The policy requires each development to provide low carbon development and renewable energy which will directly reduce carbon emissions and help ensure that climate change actions have been considered in the planning of strategic and major development.' Policy DES 10 requires residential and non-residential developers to deliver proposals that demonstrate a reduction in carbon emissions through renewable energy, other low carbon technologies and/or energy efficiency measures. It also requires an energy statement to be submitted, setting out how the developer will demonstrate compliance to ensure that the carbon reduction is delivered.

There are policies to support active travel and public transport, but no mention of electrification. STRAT 11 (iv) deals specifically with density, with the comment that the policy 'requires higher density development in more sustainable locations on the development with more opportunity for active travel and public transport reducing carbon emissions generated through travel choices.'

6.2.5 West Oxfordshire Local Plan 2031

Current policy does not pave the way for Net Zero any time soon; there are no specific targets. For example, there are concerns about air quality in Witney and Chipping Norton, but no mention of EVs. Policy EH6 supports renewable energy development in principle, especially run-of-river hydro, biomass and batteries. All renewable energy development must minimise landscape impacts; any solar farm proposals on best-quality agricultural land need to be strongly justified.

6.2.6 Friends of the Earth Oxford report on climate action by Oxfordshire Councils

The report notes that the County Council has the ambition to create a zero-carbon transport network and has a Climate Action framework in place, while Oxford City Council has one of the best-established climate records in the country. The Salt Cross Village Area Action Plan (in WO) is an ‘excellent example of weaving climate action and sustainability through plans and policy’. Overall, though, FoE ask for more detail on implementation and for the Councils to *‘recognise their role as advocates for change. We ask them to support calls from civil society for a clear government plan that shows how they will enable (and fund) local councils to help deliver the UK climate change targets of cutting emissions by 78% by 2035 and to reach zero carbon emissions by 2050.*

7. In conclusion

This review has been a first attempt to scope the policy, legal and regulatory landscape in which embryonic smart local energy systems are being established, from the standpoint of a demonstration project – a pioneer SLES. It is unusual in the attention paid to legal material in addition to policy and regulatory issues, and the exercise has highlighted the importance of law at various levels in setting the boundaries within which regulation takes place and within which actors are free to develop new systems and practices.

The main findings are summarised in the Executive Summary; here, we simply draw three conclusions based on our experience of carrying out the review. One relates to the high levels of agreement on policy goals, as shown in national and local policy and planning documents. Ambition is high. The second concerns mismatches between ambitions – in this case, the widely shared aim for decarbonised and equitable energy systems – and the regulations and resources needed to achieve them. The third relates to the breadth of policy and legislation with a bearing on energy system development and the need for energy, finance, governance and planning policies to be analysed and developed in some sort of synergy – with due attention to one another – in order to create the conditions for viable renewables-based energy services.

APPENDIX

There was an initial request to project partners to identify themes for the review. It led to the list in the table below (paraphrased in places), which we shortened in order to make the exercise more manageable. For example, we left out several ‘operational’ items. While these are vital to a functioning SLES, our view was that they are best addressed through separate, more focused analyses such as the upcoming LEO report on vehicle-to-grid charging.

Note that topics *not* addressed in this report are in **grey print**. They remain as reminders of the many issues that can be identified as significant and could be covered in a more wide-ranging piece of work.

	Local or Regional (Oxfordshire local authority areas)	National or International
Policy Includes planning guidance	<ol style="list-style-type: none"> Local plans - all on different timelines. Interaction with regional and strategic planning, e.g. Oxford and Cambridge Arc, part of the Greater South East Energy Hub Do Area Action Plans have sufficient depth on energy issues? South Oxfordshire Local Plan - judicial review. Wallingford Low Carbon Plan - housing not needed – doesn’t match local plan. Oxford City. Technical Advice Notes give further guidance to support the City Council Adopted Local Plan 2036. Some still under development, on energy efficiency and EVs *(where chargepoints for new developments are not yet mandatory). Climate emergency resolutions Energy and carbon plans owned by local authorities County wide energy action plan? Eynsham – points of intervention in planning process. Local Area Energy Plans - e.g. at Eynsham. What is their status? Are they part of RII02; should they be? Deddington SFN focuses on how perceptions of planning influence process. County council developing an EV strategy Oxfordshire Growth Board long term strategic vision 	<ol style="list-style-type: none"> Energy White Paper and ‘10-point Plan’ Industrial strategy Clean Growth Strategy Automatic switching, fairness Housing policy reform – National Planning Policy Framework Climate Change Committee’s 6th Carbon Budget, 2033-37. Plan to achieve net zero carbon by 2050. Supporting EV uptake - Renewable Energy Association and Central Gov’t looking at a standardised charging price for EVs at public chargepoints. Could be included in their Public Consumer Code. OLEV are reducing grants for buying EVs - expected to have detrimental impact on uptake of private vehicles. Needs to be encouragement (maybe at local level) for a second-hand market. Electricity unit prices are expensive relative to gas - no economic case to e.g. replace gas boilers with heat pumps. ‘Green Levies’ are on electricity but not gas bills - seems to be the wrong way round.

	<p>13. Local hydrogen plans – County Council is developing something. Need to open the way for testing alternative fuels locally to build business cases.</p> <p>Oxford smart city https://oxfordsmart.city/oxblog/</p> <p>14. Neighbourhood plans</p>	<p>10. Energy bills only have 5% VAT whereas energy efficiency measures have VAT charged at full rate. Doesn't help retrofit and thus viability of heat pumps.</p> <p>11. Business rates – buildings with solar PV attract higher rates as it is a rateable asset, a disincentive for commercial PV.</p> <p>12. Smart metering – a note on policy and how close it is to realisation.</p>
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	Local or Regional (Oxfordshire local authority areas)	National or International
<p>Regulation</p> <p>Byelaws, enforced by local authorities. Could include planning rules</p>	<ol style="list-style-type: none"> 1. SSEN grid connection rules for Oxfordshire 2. Application of criteria for designing of areas suitable for wind or solar 3. Planning permission process 4. AONBs, Listed Buildings, SSSIs (dealt with by Natural England) 5. Hydro – Environment Agency, EU waterways directive. Abstraction licences have an impact on water source heat pumps 6. Houses in Multiple Occupation 7. Access to data for local use, GDPR. Ofgem consulting on this. 8. Minimum Energy Efficiency Standards. Local authority must enforce. Oxford has set higher than national standards. 	<ol style="list-style-type: none"> 1. Ofgem Targeted Charging Review 2. RII02 3. Consultation on planning reform 4. Building regs – future housing, e.g. prohibiting replacing gas boilers after a certain point. 5. Legislation on EVs and banning of fossil fuel engines 6. Fuel poverty legislation 7. Consumer rights legislation 8. Feed in Tariff / RoCs / RHI 9. Green Homes Grant 10. Implications of Grenfell for planning system? 11. Regulation for assets at the grid edge. 12. System operation reform, forward looking charges – put on hold. 13. Need for clear guidance from central government on responsibilities of DNOs;

		data needs; supporting local government to achieve national and local climate targets; accountability.
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