Project Leo workshop 1 - Enabling and facilitating smart energy systems within the existing planning system

Workshop outputs

Project LEO

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centre for sustainable energy

Local Energy Oxfordshire

Contents

1. Introduction and context

The Centre for Sustainable Energy was commissioned by Project LEO to run two workshops for Oxfordshire planners with the intention of stimulating greater understanding of Smart Local Energy Systems (SLES) by the local planning community and gathering recommendations on how the statutory planning system can integrate and facilitate both locally and nationally. Specific objectives were:

A. To raise awareness of Project LEO amongst the local planning community in Oxfordshire.

B. To inform local planners of what a Smart Local Energy System could look like and to review the potential social, economic and environmental benefits of Smart Local Energy Systems.

C. To ask planners to consider barriers and opportunities for implementing SLES within the existing planning system.

D. To allow the planners to make connections between SLES and the array of local policies, plans and priorities including, particularly, targets for net zero, climate emergency resolutions and the delivery of respective local plans.

E. To inform the design of engagement with this group for the remainder of the project, developing understanding of the needs and priorities of planners and the data and tools that would be helpful in their work.

F. To inform planners of current approaches and frameworks for planning for SLES including Local Area Energy Planning[1], the use of energy related digital tools and maps in the planning process and stakeholder consultation/engagement and any other relevant guidance. Specifically this will include capturing feedback on the land use and energy mapping tool being developed by Project LEO.

This is a record of the first Zoom workshop, run on 24th May 2021, concentrating on how Smart Local Energy Systems could be enabled through the existing planning system. The second workshop, yet to be scheduled, will look at how smart local energy systems can be enabled through the reformed planning system, once the nature of these reforms becomes clearer.

2. Methodology

The workshop consisted of a mixture of presentations and breakout sessions. In brief the first workshop covered:

- An introductory presentation to Project LEO and an introduction to the common features of Smart Local Energy Systems
- A breakout session during which workshop participants were asked about barriers and enablers in the current planning system for SLES in each of these policy areas:

[1] Local Area Energy Planning: https://www.cse.org.uk/downloads/file/LAEP-method-final-review-draft-30-July-2020.pdf

- Standalone renewable generation and battery storage (big batteries connected at LV or transmission level, solar farms, wind farms, hydro systems such as Sandford)
- Smart technology and systems incorporated into new developments: energy efficiency technologies, batteries (big communal or smaller individual ones serving one household/ commercial building) and smart appliances and tech to flex demand, heat pumps, solar panels, combined heat and power).
- Smart travel infrastructure installed into new development – charging stations, design of housing and streets to have spaces for electric car club vehicles, driveways for off-street charging etcetera

- A presentation introducing and explaining the concept of local area energy planning, the functionality and potential use of Project LEO's Local Energy Mapping tool and exploring the introduction of smart energy systems into areas of existing development.
- A second breakout session exploring the planning issues that arise when implementing a smart local energy system into a conservation area where there are also proposals for new development or regeneration.
- Plenary discussion on the potential for the planning system to facilitate and enable smart energy systems

This document summarises the most important discussion points from the workshop based on contemporaneous notes from breakout sessions which are included in full in appendices 1-3. Where we thought it beneficial, we have also given our initial view on the issue being discussed in italics, and at the end set out our reflections on the participants understanding of the different components of Smart Local Energy Systems, and how they could be delivered or enabled through planning as a whole, with suggestions for next steps. I would however stress that these views are based primarily on the workshops, our knowledge and limited background reading and that we have not been funded to carry out a literature review.

3. Breakout session 1: What are the barriers and enablers in the current planning system for Smart Local Energy Systems in each of these policy areas?

a) Standalone renewable generation and battery storage (big batteries connected at LV or transmission level, solar farms, wind farms, hydro systems such as Sandford)

General summary and key points

Discussion in the plenary session predominantly covered conventional planning issues relating to landscape impacts and public support. Full contemporaneous notes from breakout session 1 are attached at appendix 1. Key barriers raised which should be highlighted, where their resolution could necessitate going beyond existing practice were:

<u>Grid constraints</u>

Greater engagement between the DNO and Local Planning Authorities (LPAs) at forward planning stage could help anticipate, plan for and overcome these, and outline priorities and support a possible business case for SLES. This engagement could explicitly consider the inter-relationships between spatial planning and grid planning, and between local planning policies and existing and future grid constraints. This could include scenario planning, with scenarios developed to match the council's intended spatial strategy, their renewable energy and EV policies and the outputs from climate emergency action plans e.g:

- What would be the implications (in terms of grid planning) if renewable energy deployment quadrupled / EV rollout happened faster, additionally referencing different national scenarios for renewable energy / EV's?
- If the renewable energy capacity that has been mapped were to be developed (for example suitable areas for onshore wind), where are the grid constraints likely to be?
- How could existing and expected constraints be eased at least cost / what would the DNO's preferred solution be, and how can the Local Plan help deliver that, for instance forward planning grid level battery storage?
- Where will large strategic developments necessitate grid reinforcement? Could the inclusion of smart local energy systems and smart technology in specific strategic developments resolve grid constraints at less cost and less carbon? Could requirements be included in strategic allocations?

Building and leveraging public support for renewable energy

The committee on climate change predict that with the electrification of heat and transport and the decarbonisation of grid electricity we will need to quadruple renewable energy generation from existing levels. To radically increase deployment we need to secure meaningful public consent. Not covered in the session itself, but CSE's experience is that moving public debate on renewables 'upstream', away from planning applications, and carrying out detailed energy planning as part of policy development is vital to build the informed consent needed to significantly increase renewable energy rollout, with greater public discussion on the trade-offs between renewable energy development and landscape and other impacts.

This year CSE will be running a renewable energy community consultation project with three local authorities which seeks to do this building upon and scaling up a previously successful approach[2]. Bath and North East Somerset Council are experimenting with a different approach which moves in this direction, carrying out a "call for renewable energy sites", similar to a call for housing sites, and opening this up to local communities, parish councils and community energy groups, in additional to landowners and the commercial renewable energy sector.

Key enablers which should be highlighted, where further work could help boost standalone renewable energy are as follows:

Sharing data and identifying suitable locations for renewable energy within policy

[2] *www.cse.org.uk/projects/view/1315*

Mapping renewable energy potential, sharing data to better identify sites and identifying locations for renewable energy. This data could also be shared between LPA's but also with community energy and neighbourhood planning groups, to facilitate action by community energy groups and civil society. One of the key outputs of Project Leo will be online mapping of renewable energy potential, energy (& related) statistics, planning constraints & growth. This will be made available as soon as possible.

b) Smart technology and systems incorporated into new developments: energy efficiency technologies, batteries (big communal or smaller individual ones serving one household/ commercial building) and smart appliances and tech to flex demand, heat pumps, solar panels, combined heat and power).

General summary and key points

Discussion in the plenary session circled around a lack of understanding of smart energy technologies and systems, both on the part of developers and council staff, and the inability of slow moving policy to keep pace with fast moving technology. Key barriers raised which should be highlighted with additional commentary from CSE, were as follows:

Complexity and speed of technological development versus policy development.

It is unlikely that planning policy will be able to keep up with the pace of technological development in smart energy technology. In the absence of an externally validated standard for "smartness" (similar to the BREEAM standard for sustainability), this suggests that policy around smart energy technology should be outcome oriented, rather than fixed to one particular technology, though classes of technology (e.g energy storage and demand shifting technologies) are unlikely to be superseded quickly. There is a role for the DNO on how this could be expressed and/or measured. The LETI standards[3] make suggestions as to how this could be achieved.

In the interim, a no-regrets option would be to include wording within net zero carbon policies which encourages the incorporation of smart energy technologies and allows the resultant carbon emission reductions to be counted towards net zero standards, provided that a robust methodology is provided. Where such an approach is developed, LPA's will need assistance from the DNO to assess proposals and the methodology for estimating carbon savings, and conditions should be attached to allow post-installation monitoring. Such an approach should be seen as experimental, and there is a potential role for Project Leo in evaluating any proposals which come forward, in terms of their actual carbon savings, flexibility services offered, cost and methodology for calculating carbon savings. The Innovation Framework currently under development, led by the County Council with input from each authority, sets out this type of approach.

[3] LETI Climate Emergency Design Guide (2020) - https://b80d7a04-1c28-45e2-b904-e0715cface93.filesusr.com/ugd/252d09_3b0f2acf2bb24c019f5ed9173fc5d9f4.pdf

Business model.

The complexities of securing, monitoring and enforcing the installation of smart energy technology through the planning system, and getting a strong flexibility policy through local plan examination in the first place are such that that using the planning system to deliver smart energy technology may not be successful, and therefore other levers could be explored. Additionally, with energy supply being peripheral to developers' core interests and incomes, they are unlikely to adopt SLES on their own without a defined service from the market. Therefore unless such a service already exists, there is a potential role for Project LEO exploring 3rd party installation of smart technology within new developments, with the 3rd party taking on the capital costs and risks of installation in exchange for the income from flexibility services. Such an approach would also help address viability arguments, and ensure that once installed smart energy technology delivers the benefits promised.

Lack of early integration of renewables into proposed developments

This suggests a need to tighten up policies and include a requirement for on-site renewable energy within binding zero carbon policies. Leading authorities often create a standardised template for energy statements to follow which sets out how the carbon reductions secured (beyond building regulations) from building fabric, on-site renewable energy and heat are to be expressed, and within their validation list to require an energy statement to be submitted upfront with the application.

This places local planning authorities in a stronger position to refuse non-compliant schemes and not allow planning applications into the system without the right information. As much as possible, inputs from developers, and the process of assessing proposals against policy requirements should be standardised, to reduce the expert input required in assessing applications.

Energy efficiency and zero carbon policies

The workshop did not explicitly ask questions about planning authority's energy efficiency or zero carbon policies, but the impression given was that there was a variety of approaches, from supportive policies requiring high levels of energy efficiency in new developments to binding policies setting out objective measureable standards for carbon emissions from new development. The Oxford Local Plan and South Oxon Local Plan both set requirements for new development to be net zero within a set timeframe. Likewise the Salt Cross Area Action Plan within West Oxfordshire includes a requirement that new development should be net zero and fossil free, with 100% of the energy consumption met from on-site renewable energy generation.

The Policy Playbook[4] (UKGBC) provides links to a variety of net zero policies and supporting evidence planning authorities can use to aid policy development.

[4] The New Homes Policy Playbook - UKGBC (Feb 2021) https://ukgbc.s3.eu-west-2.amazonaws.com/wp-content/uploads/2021/01/05144257/New-Homes-Policy-Playbook-January-2021.pdf

The LETI standard[5] (an architect led net zero standard) suggests a new approach to achieving net zero emissions in new buildings and gives advice for clients and developers setting briefs, policymakers and designers. It comprises binding standards for energy use for different types of development, expressed in Energy Use Intensity (kWh/m2/yr), forbids the use of fossil fuels in space and water heating, and requires any renewable energy not generated on-site to be met by investment into renewable energy off-site. Thus a net-zero operational energy balance is achieved within new development.

c) Smart travel infrastructure installed into new development – charging stations, design of housing and streets to have spaces for electric car club vehicles, driveways for off-street charging etcetera

General summary and key points

Key barriers raised which should be highlighted with additional commentary from CSE, were as follows:

- Knowledge about EV charger specification + speed of technical innovation
- Uncertainty about ongoing management and operation of EV charge points in public realm and private developments
- Lack of guidance for developers

Attendees raised good detailed questions about the practical implementation of EV charging in different contexts, about the inadequacy of national regulation to deliver smart EV charging and a lack of guidance for developers on what they needed to do. The Oxfordshire Electric Vehicle Infrastructure Strategy recently published by Oxfordshire county council sounds as though it will seek to answer many of these questions.

The plenary discussion also touched on the pros and cons of including passive or active charging infrastructure. Passive infrastructure (just the cable ducts and conduits) is cheaper and avoids the risk of technology being fitted which becomes out of date, but it does necessitate further work being done before an EV can connect to be charged. A further factor that could be taken into account is the council's climate emergency declaration. If action plans have been produced, they may well include data on baseline emissions from surface transport, and of the emission reductions needed from surface transport. This modelling might include assumptions as to the rate of EV take-up, which could inform how ambitious your policy needs to be and provide evidence to support this approach.

A final point is that there is a danger that changes to standard housing layouts to enable EV charging (greater on plot parking or garaging) could be counter-productive in terms of wider de-

[5] LETI Climate Emergency Design Guide (2020) - https://b80d7a04-1c28-45e2-b904-e0715cface93.filesusr.com/ugd/252d09_3b0f2acf2bb24c019f5ed9173fc5d9f4.pdf

carbonisation, driving densities and the potential for walking, cycling and driving down. The committee on Climate Change advise that a significant modal shift to sustainable transport modes and reduction in overall vehicular mileage should come first. Simply replacing our petrol and diesel cars with electric vehicles will not deliver the carbon emission reductions needed. This is at the core of the new local transport and connectivity plan currently out for public consultation, and planning policy and emerging guidance on EV charging should explicitly consider this point.

4. Breakout session 2: "What are the planning issues that arise when implementing a smart local energy system into a conservation area where there are also proposals for new development or regeneration?

General summary and key points

Within the plenary sessions, the group discussed detailed issues arising from the installation of smart energy technology within historic or listed buildings, including the visual impact of smart technology, the archaeological impacts of trenching for EV cabling and impacts on historic flagged floors. These are all relevant, but well within the scope of conservation officers to advise on and policy or written guidance to capture. Full contemporaneous notes from breakout session 2 are attached at appendix 2.

Conservation officers as retrofit advisers

Discussion also covered a more pro-active role for conservation officers as retrofit advisers, assisting homeowners in getting to the right, "whole house" solutions which reduce their carbon emissions without detracting from the fabric of their historic home. This could involve referring them to appropriate sources of information and detailed advice and potentially, linking them with trust-worthy contractors. This extends beyond the regulatory role which conservation officers have traditionally occupied.

Barriers to conservation officers carrying out this role include funding work not connected to statutory responsibilities and ensuring that staff have the necessary skills and expertise to advise on the detail of historic retrofit. One option is to create locally specific guidance promoting measures

and approaches more likely to be suited to the local historic building stock, designed to be accessible and readable by the public[6] as trialled by Bath and North East Somerset Council.

A related issue is how to get this advice to owners of historic homes which carry no designation, where there is no requirement to talk to the planning authority. Such householders, not receiving advice and support from historic building professionals, are vulnerable to fitting measures which are inappropriate to the construction or heritage significance of their properties. Also of was discussion of non-planning levers to encourage householders to install smart energy technology in existing properties and of the role of community groups and initiatives to support this.

5. Final Plenary discussions and close: "Overall what are your thoughts about the potential for the planning system to facilitate and enable smart energy systems?"

Within the final plenary session, the group discussed the need for more technical training, support and better resourcing to enable planning officers to consider these issues more thoroughly. Full contemporaneous notes are attached at Appendix 3.

6. CSE reflections on the workshop and possible next steps

Below are set out some overall reflections on the workshop as a whole, with possible next steps which could be taken to facilitate smart energy systems through the existing planning system. These are actions which could be undertaken variously by the Project LEO team, the Scottish and Southern Electricity Network and Oxfordshire Planning Authorities.

Standalone renewable generation, grid capacity and battery storage

<u>Lack of early integration of renewables into proposed developments.</u>

The group discussed a lack of proper integration of renewable energy into proposed developments, suggesting a need to tighten up policies and include a requirement for on-site renewable energy within binding zero carbon policies.

[6] Sustainable Construction and Retrofitting Supplementary Planning Document https://www.bathnes.gov.uk/sites/default/files/sitedocuments/Planning-and-Building-Control/Planning-Policy/Sustainable-and-Retrofitting/scrf_adoption_draft_spd.pdf

Possible next steps

- Oxfordshire planning authorities could review their planning policies, guidance and validation lists - to require developers to integrate renewable energy into proposed site and layout plans from application submission. As much as possible, inputs from developers, and the assessment process against policy requirements should be standardised, to reduce the expert input required in assessing applications.

Grid constraints

In common with the planning profession as a whole, the group as a whole also seemed to have a reasonably low awareness of the role of DNO's, the relevance of grid capacity to renewable energy and EV rollout and how planning authorities, and how DNO's could work more closely together.

Greater engagement between the DNO and Local Planning Authorities (LPAs) at forward planning stage could help anticipate, plan for and overcome these, and outline priorities and a possible business case for SLES. This engagement should explicitly consider the inter-relationships between spatial planning and grid planning, and between local planning policies and existing and future grid constraints. This could include scenario planning, with scenarios developed to match the council's intended spatial strategy, their renewable energy and EV policies and the outputs from climate emergency action plans.

Possible next steps

- SSEN / Project Leo to set up a joint workshop with LPA forward planners to explore greater and deeper engagement at plan making stage and a more nuanced understanding of how their plans intersect, exploring issues around grid capacity planning, renewable energy and electric vehicle rollout

Building and leveraging public support for renewable energy

CSE's experience is that moving public debate on renewables 'upstream', away from planning applications, and carrying out detailed energy planning as part of policy development, is vital to build the informed consent needed to significantly increase renewable energy rollout with greater public discussion on the trade-offs between renewable energy development and landscape and other impacts.

Within the session we also discussed the role for civil society (community energy and neighbourhood planning groups) to accelerate the rollout of renewable energy.

Possible next steps

- Oxfordshire planning authorities could consider how they can engage local communities in more detailed and nuanced energy planning at plan preparation stage.
- Share the Project LEO renewable energy capacity mapping and technical studies with communities and neighbourhood planning groups (ideally as interactive mapping that they can interrogate), to facilitate community energy projects and supportive nuanced policies in coming forward

Smart technology and systems incorporated into new developments: energy efficiency technologies, batteries (big communal or smaller individual ones serving one household/ commercial building) and smart appliances and tech to flex demand, heat pumps, solar panels, combined heat and power).

Policy Development

Whilst energy efficiency and energy performance standards are well understood within the planning system, as are renewable heating systems, we're at an early stage in terms of understanding how the planning system can integrate requirements for smart energy technologies which flex demand into new developments. We're at the stage where the main task is to understand whether we're asking the right questions rather than necessarily jumping to ensure we have the right answers. Consequently, mirroring that of the planning profession as a whole, this is where the group seemed to have the lowest knowledge levels:

1. What to ask for in the first place,
2. How to justify that in policy and viability terms to a planning inspector in terms they will understand and see as being relevant to the statutory planning system,
3. How to assess the adequacy of what's proposed,
4. How to word conditions and skill up enforcement to ensure that it is actually fitted,
5. How to ensure that once fitted this technology is actually satisfying its purpose, delivering the flexibility the grid needs to decarbonise. Local planning authorities will require access to new data on how the smart technology installed delivers the flexibility required to ease grid constraints and decarbonise the energy system.

Without answering these questions and in general simplifying and codifying requirements or giving planning teams additional expert support, there seems little prospect of the planning system being able to integrate smart energy technology within new developments.

The LETI standard[7] (an architect led net zero standard) suggests a new approach to achieving net zero emissions in new buildings, framed around energy use intensity. The LETI standard also encourages the use of demand response to support flexibility and grid decarbonisation, and has a chapter exploring the key components of this and how flexibility might be measured. The LETI publication could assist in answering question 1 and 3 set out above (what to ask for and how to assess the adequacy of what's proposed) but further development seems necessary to address the remaining questions, which address how smart energy technology or demand response approaches can be required through the statutory planning system.

Possible next steps

- Project Leo with the DNO should review the LETI standard, and explore in greater detail how policies should be expressed, what they should ask for and monitoring and enforcement. How far could policy requirements be simplified so as to be easily operable by non-energy specialists, yet still add value in terms of flexibility and easing grid constraints?

[7] LETI Climate Emergency Design Guide (2020) - https://b80d7a04-1c28-45e2-b904-e0715cface93.filesusr.com/ugd/252d09_3b0f2acf2bb24c019f5ed9173fc5d9f4.pdf

- Project Leo could explore whether there is an externally validated standard for "smartness" (similar to the BREEAM standard for sustainability) so that smart technology which delivers flexibility can be simplified and codified or whether this is being or will be picked up through existing certification systems such as BREEAM.
- Alternately SSEN could increase its capacity to offer technical advice and support at plan formulation, development management and enforcement stages
- In the interim, a no-regrets option would be to include wording within binding net zero carbon policies which encourages the incorporation of smart energy technologies and allows the resultant carbon emission reductions to be counted towards net zero standards, provided that a robust methodology is provided. LPA's will need assistance from the DNO to assess proposals and the methodology for estimating carbon savings, and conditions should be attached to allow post-installation monitoring. Such an approach should be seen as experimental, and there is a potential role for Project Leo in evaluating any proposals which come forward, in terms of their actual carbon savings, flexibility services offered, cost and methodology for calculating carbon savings.

<u>Speed of technological development</u>

Although classes of technology (e.g. energy storage and demand shifting technologies) are unlikely to be superseded quickly, it is unlikely that planning policy will be able to keep up with the pace of technological development in smart energy technology.

Possible next steps

- Policy around smart energy technology should be outcome oriented, rather than fixed to one particular technology. There is a role for the DNO in detailing how this could best be expressed and/or measured.

<u>Alternative levers to deliver smart energy within new developments</u>

The complexities of securing, monitoring and enforcing the installation of smart energy technology through the planning system, and getting a strong flexibility policy through local plan examination in the first place are such that that using the planning system to deliver smart energy technology may not be successful, and therefore other levers could be explored. Additionally, with energy supply being peripheral to developers' core interests and incomes, they are unlikely to adopt SLES on their own without a defined service from the market which offers them financial value or without some other external driver.

Therefore unless such a service already exists, there might be potential for 3rd party installation of smart technology within new developments, with the 3rd party taking on the capital costs and risks of installation in exchange for the income from flexibility services.

Alternatively might the DNO might be able to encourage the installation of smart energy technologies in new developments through pricing signals on connection agreements, where the grid is constrained?

Possible next steps

- Explore business models and business models for the inclusion of smart energy infrastructure within new developments as a service to developers.

- Explore whether DNO's would be able to secure the incorporation of smart energy technologies and flexibility services within new developments through pricing signals on new connections and conditional connection agreements.

Smart travel infrastructure installed into new development

The group had a good understanding of how EV charging would be secured and managed. These issues all seem largely within the scope and skill set of planners, albeit acknowledging that training and time is needed to get up to speed in these areas.

There seemed to be uncertainty as to whether policies should require active charging infrastructure or passive charging infrastructure (with just the cable ducts and conduits with the actual charger to be fitted later). Climate Emergency action plans might provide evidence to inform this discussion, if they include modelling of the emission reductions needed from surface transport and the required rate of EV take-up.

Possible next steps

- Disseminate the recently published Oxfordshire County Council guidance on EV charging infrastructure
- Develop standard conditions and text for inclusion within S. 106 agreements.

In drafting policies, LPA's to consider recommended policies and actions from their climate emergency action plans, regarding EV charger role-out.

Retrofitting smart local energy system into historic buildings and areas and Historic Building retrofit

The group had Discussion also covered a more pro-active role for conservation officers as retrofit advisers, assisting homeowners in getting to the right, "whole house" solutions which reduce their carbon emissions without detracting from the fabric of their historic home. This could involve referring them to appropriate sources of information and detailed advice and potentially, linking them with trust-worthy contractors. This extends beyond the regulatory role which conservation officers have traditionally occupied.

Barriers to conservation officers carrying out this role include how to fund outside the authorities statutory responsibilities and ensuring that staff have the necessary skills and expertise to advise on the detail of historic retrofit. One option is to create locally specific guidance promoting measures and approaches more likely to be suited to the local historic building stock, designed to be accessible and readable by the public[8] as trialled by Bath and North East Somerset Council.

A related issue is how to get this advice to owners of historic homes which carry no designation, where there is no requirement to talk to the planning authority. Such householders, not receiving advice and support from historic building professionals, are vulnerable to fitting measures which are

[8] Sustainable Construction and Retrofitting Supplementary Planning Document https://www.bathnes.gov.uk/sites/default/files/sitedocuments/Planning-and-Building-Control/Planning-Policy/Sustainable-and-Retrofitting/scrf_adoption_draft_spd.pdf

inappropriate to the construction or heritage significance of their properties. Also of was discussion of non-planning levers to encourage householders to install smart energy technology in existing properties and of the role of community groups and initiatives to support this.

Possible next steps

- Develop best practice guidance on retrofitting domestic electricity storage + heat pumps within historic buildings or request this from English Heritage.
- Assemble a list of trusted, suitably qualified contractors to refer homeowners to for retrofitting works.[9]
- Local planning authorities to consider how they might fund a domestic retrofit advice service, and how such a service might be structured.

Training and support

Workshop attendees desired technical training on all issues covered within the workshop. There is definitely a role for training, however a decision should be made first as to the breadth of knowledge planning policy and development management officers can be expected to have themselves, the degree to which written guidance and standardised inputs and approaches can make up for a lack of specialist knowledge and the degree to which planning generalists should be reliant on support from specialist staff and / or external consultees. Additionally some areas, such as planning policies requiring the inclusion of smart energy technology offering, and to a lesser extent the detail of EV charging infrastructure requirements is relatively new, and mature, tested policy approaches may not be available to follow. In these areas a discovery process is necessary, piecing together the initial policy approaches which have been tried elsewhere, understanding how they could be improved and further developing policy fit for the local circumstances. Below are the two areas (EV charging infrastructure and Retrofit advice service) where training would be most obviously beneficial.

Possible next steps

- Local planning authorities to consider how development management officers are to be given technical support across the different policy areas considered – access to a shared Oxfordshire wide expert consultee, assisting with policy development and supporting development management functions?
- Local Planning authorities to consider planning and sourcing training - conservation officers as retrofit advisers
- Oxfordshire County Council to deliver training on EV charging infrastructure once complete

[9]The CSE project Future proof operates on this basis, offering domestic customers full (whole house) energy surveys, retrofit planning and offering builders specialist training and referrals from the “able to pay” domestic retrofit market. https://www.futureproof.uk.net/

Appendix 1 - Contemporaneous notes from Breakout session 1: What are the barriers and enablers in the current planning system for Smart Local Energy Systems in each of these policy areas?

a) Standalone renewable generation and battery storage (big batteries connected at LV or transmission level, solar farms, wind farms, hydro systems such as Sandford)

Below are contemporaneous notes from the breakout sessions, including bullet points entered by the participants themselves into a googledoc together with comments which capture wider discussions that took place during the workshop. We have edited the bullet points for clarity, and have captured participants more nuanced responses made during the plenary discussions, which followed the breakout sessions and which were recorded. CSE contributions within the plenary discussions are shown in italics.

Barriers	Enablers
Landscape impacts • Finding suitable locations - e.g. large solar, and how to work around protected landscapes etc. • Valuing landscapes - whether we consider solar to be acceptable in sensitive landscapes - this discussion needs to be had more. Grid Constraints • Lack of strategic planning for grid constraints carried out between planners and Distribution Network Operators (DNOs). Councils do engage with DNOs now, from the very beginning and throughout. Also councils prepare infrastructure delivery plans in collaboration with DNOs. *The CSE facilitator explored whether the conversations with DNOs extended to discussion of what the DNOs needed in order to create smart grids, to meet future electricity demand arising from planned development in the smartest, cheapest way, or what was needed (in terms of grid*	Forward planning renewable energy • Conveying opportunities to mix land uses. • Ability to map renewable energy potential and then sharing data to better identify sites. • The Oxfordshire Plan 2050, which provides enabling opportunities: the plan could be used to identify locations for strategic renewable energy schemes akin to housing allocation sites – although a level of certainty at the plan making stage will require viability evidence. [10] • *CSE question: Are renewable energy policies supportive and nuanced enough to give developers confidence to come forward* – yes, they are getting there.

[10] An assessment of the countywide potential for solar and wind generation has been undertaken through Project LEO. Data will be made available to planning teams as soon as possible and is currently being used in the development of the Oxfordshire Plan 2050.

capacity and flexibility) to increase renewable energy generation in line with climate emergency declarations. The response was that engagement is quite basic at present, for example DNOs tell us where their high voltage cables are but generally standard responses are used. Public Sentiment • Public sentiment - there are groups who are vocally opposed (and loudly) to, e.g. solar farms, with concerns around visual impact cited as the key issue. Onshore Wind • The de facto ban on onshore wind. • Lack of early stage feasibility studies on wind power. Knowledge and skills • Skills and knowledge of planners - strong in terms of planning system, but less so in terms of energy system and the changes to come.	Public sentiment • Positive public support – as indicated by Low Carbon Hub's very successful local fundraising efforts. • *CSE question: Is there public support for renewables that can be leveraged?* It's there, until a planning application comes in next to your house![11] • 'Norming' and public acceptance as a result of permitted development rights for small scale renewables – they can often go ahead without needing planning permission – and help people to get used to the visual impact of renewables, in the way people are used to TV aerials. • Other enablers – neighbourhood planning and community-led initiatives for small scale renewables.[12]

b) Smart technology and systems incorporated into new developments: energy efficiency technologies, batteries (big communal or smaller individual ones serving one household/ commercial building) and smart appliances and tech to flex demand, heat pumps, solar panels, combined heat and power).

Barriers	Enablers
Integration of on-site renewables • Insufficient input from developers – this relates to integrating renewables into other developments and encouraging	Policy development • Policies much better – our policies require a 40% CO2 reduction (beyond building regulations) and Electric Vehicle (EV) charging infrastructure.

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[12] Through its low carbon neighbourhood planning programme, CSE supports communities to embed climate policies (including supportive and nuanced renewable energy policies) within their plans: www.cse.org.uk/local-energy/neighbourhood-plans

developers to integrate into site plans earlier • Developers - not integrating these things into site plans/designs early on - it's often an afterthought. Viability considerations in justifying policies • In Local Plan examinations, local authorities need to demonstrate the economic viability of requiring smart technology and flexibility, which is challenging, particularly when these requirements will come in addition to requirements for new development to be net zero carbon. Is it about the council providing the evidence to show that this infrastructure is cheaper or cost neutral? Should this be our role if we want this to happen? e.g. Oxfordshire Innovation framework includes detail on smart homes and smart buildings and demonstrates this is viable; requirement for developers to prove why smart tech not included in development proposal. • The new viability rules have not yet kicked in – the current local plan came in through the previous system. The ultimate test on viability is whether the developer builds them. • Technology not accounted for in re-sale value of housing. West Oxfordshire - Salt Cross is an exemplar demonstrator we're trying to promote. Anecdotal evidence from North West Bicester, that selling point works for the first time buyer, but is not necessarily carried on when they are re-sold, or reflected in the price. The price of the house is the price of the house. • Affordability. There are people keen to have energy efficient homes, but if they can't afford it they can't afford it. Policy Development • Lack of specificity / rigour in policies - they may refer to % of energy to be generated on-site/renewables, but there is little in policy terms on smart / storage factors	• 'Aspirational checklist' (West Oxfordshire) - which can encourage developers to adopt technologies/design features which support SLES. Developers will be required to produce a sustainability statement with every application; but the issue is without an actual local plan policy to support refusal, there is more pressure on the negotiation process. • The critical factor is adhering to the energy hierarchy - so energy efficiency of buildings is the most important first off. Energy efficiency is a critical part of SLES - educating developers on what options are. Climate adaptation • Climate adaptation - policies need to become more explicit on how buildings need to be more resilient to more extreme weather - will this push greater smart-ness and a move from traditional building styles (for example white walls rather than traditional building styles) and how buildings are valued by building surveyors if they look different to traditional norms.

• Need for fabric efficient buildings and encouraging residents to use less energy in the first place. There's a little bit more work to do on energy efficiency policies within local plans – not yet on par with the London Plan policies for example. Complexity, and speed of technological development versus policy development • Planning system moves much more slowly than technology development therefore difficult for effective policies to keep pace with technology development. • Lack of understanding of smart energy tech - can it simplified? More training and knowledge building needed Business models for smart energy technology • Business models for smart infrastructure which can be seen by developers as an added expense (and which they want to pass onto buyers). Are there longer term partnerships etc. which would make these approaches more feasible and mean cost isn't passed onto the buyer? *It isn't quite clear what is meant here. It could mean establishing whether there are income streams from offering flexibility services to the DNO which could offset the capital costs of installation. Alternately it could mean developing a business model for 3rd party installation of smart technology within new developments at no costs to the developer, with the 3rd party taking the income from the flexibility services.* Resources and time • Workload + backlog within planning departments. A solution could be ring fencing time specifically for these issues. • Lack of technical support for Development Management officers - difficult to fund.	

c) Smart travel infrastructure installed into new development – charging stations, design of housing and streets to have spaces for electric car club vehicles, driveways for off-street charging etcetera

Barriers	Enablers
Implementation and ongoing maintenance • Unanswered questions re integration and long term operation of EV charge points and how this is provided for through the planning system. How are they managed going forward? Who manages if in public realm – is it the local authority? Who manages contracts? What policies are in place, and how are these licensed? If in private realm it's not so clear in terms of managing, and how to integrate within existing developments. Needs to all be considered early on! These questions all need answers and Oxfordshire County Council want to put this into a guidance document, but not easily secured at present. • Lack of provision of Electric Vehicle (EV) charge points in public areas for those without off street parking. • Need for provision for the management of spaces + EV charging - e.g. shared chargers. Lack of knowledge / complexity /speed of change / lack of guidance • Lack of knowledge/skills of SLES amongst planners - importantly the whole system, so not just e.g. on EVs, but how EVs sit within whole Smart Local Energy Systems. • Access to tech specs for Developers. *CSE question: Do planners and enforcement officers know enough about the difference between a standard charger, a fast charger and a smart charger, and how do you enforce that?* Oxfordshire County Council: It is challenging – it's an area of fast moving technologies and lack of knowledge for planners. Oxfordshire County Council is working together across the councils to develop guidance on types of EV chargers + standards we want, including smart charging. Any home should	• EV infrastructure policy, (the Oxfordshire Electric Vehicle Infrastructure Strategy?). • Using Section 106 agreements to subsidise EV installation in developments. • Permitted development as an enabler for small scale development - needs to be improved: EV on driveway under permitted development, but the same is not clear for homes without off-street parking. • Repeatable templates and approaches. • Making the connection to benefits for other issues - e.g. air quality. • Congestion charging as a stick and carrot for EVs. Active vs passive charging infrastructure • Policies about making new developments EV charging point ready – no requirement to install the actual charge points, but a requirement to install the conduit and cable routing to save costs down the line. • Importance of passive and active enablers - e.g. cabling that will enable future SLES factors, but where they might not be connected straight away. Also different costings - what is the cost benefit of different options? If the costs and benefits were clearer it would be an enabler.

have smart charging. Not legally enforceable, but good practice guidance. Its early days for smart charging products, in particular bi-directional chargers. • Lack of comprehensive guidance for developers. National Regulation • Requirements in Building regulations don't go far enough - not talking about smart charging. The requirements are low, not going as far as the Oxford Local Plan, or how EV charging infrastructure is managed. • Permitted development rules are not clear when combining different technology types (for example combining storage solutions with EV charge points). Legal agreements • Legal agreements for specific park and ride sites - need better hooks at all levels of policy to ensure appropriate low carbon energy generation measures are used where grid constraints prevent connection. • The complexity of land agreements + section 106 agreements when there are three parties that need to be signed into it (assumed to be the LPA, Developer and Smart Tech energy provider). Could we get template tripartite agreements? Design implications • Accessibility barrier in terms of street design - clutter - conflict with blind people. • The design and layout implications of providing charging hubs within multi-occupancy buildings / developments. Other • Electric Vehicles are not the solution to transport decarbonisation. In terms of achieving net zero targets, greater impact could be achieved with improving	

infrastructure for cycling and walking and encouraging modal shift.	

Appendix 2 - Contemporaneous notes from Breakout session 2: "What are the planning issues that arise when implementing a smart local energy system into a conservation area where there are also proposals for new development or regeneration?

Below are the responses from participants, grouped around the most common issues discussed:

Levers to install smart energy and flexibility infrastructure

- What are the levers that can be used in the existing planning system to install in existing properties which don't have a designation? Currently only where there is a designation is there an interaction with the planning system (i.e. when a change wants to be made), but this interaction doesn't happen with a non-designated building/area. Traditional buildings also that don't have a heritage status.
- Strategic SLES planning - how does infrastructure development planning integrate with the local plan - in terms of development coming forward, as well as existing development? Infrastructure development planning is triggered with new development - so where do we capture infrastructure needs relating to wider locality of existing development. Could conservation area appraisals be a tool to consider this? They look at a wider area.
- S106 - on renewable energy applications - could this be used to increase energy performance of local buildings?
- Could community benefit funds attached to large scale renewables be allocated to improving energy performance of properties/support SLES? Maybe some neighbourhood plans are already addressing this? *CSE comment – many community energy groups (including the Low Carbon Hub in Oxfordshire) already seek to do this. Set up as non-profit Community Interest Companies (CIC's) their articles of association prevent them from withdrawing profits. Once capital and borrowing costs are covered they have to apply remaining surpluses to their defined charitable purposes, frequently the alleviation of fuel poverty. Community benefit funds are also sometimes used in this way*[13].
- Neighbourhood plans - could this be a mechanism more broadly for tackling SLES requirements? (but obviously dependent on skills and resources of neighbourhood planning groups) - needs further resourcing to up skill groups that are under-resourced. *CSE response – it seems doubtful whether neighbourhood plans can require the installation of smart kit, as neighbourhood plans tend to be more poorly resourced that Local Plans, with less expert knowledge, and have slightly less flexibility to apply technical standards through planning policies. However they can do much to promote other preconditions for smart local energy systems: including renewable energy rollout, responsible retrofitting, EV charging, see CSE*

[13] For instance the Thrive Renewables Community Benefit Programme www.thriverenewables.co.uk/our-mission/community-benefit/

Neighbourhood Planning guidebook. In respect of smart technology and flexibility services, in parallel with neighbourhood plans, communities could pursue their own smart projects in partnership with distribution network operators, as illustrated in these case studies: https://openlv.net/case-studies/.

- Difficulties and complexity around land and infrastructure ownership (e.g. areas of high level of rental properties, people living in the area do not have a stake in building retrofit).
- There is also no incentive for Landlords to engage with Smart Local Energy Systems. *CSE comment – This perhaps points to the need to further extend the Minimum Energy Efficiency Standard Regulations. These regulations set minimum energy efficiency standards for private rented properties, and enable tenants to request landlord's consent to the tenant making energy efficiency improvements. Could this be extended to a right to install smart energy technology (though currently the costs would likely far outweigh the benefits)?*
- Trial retrofitting on large scale housing - e.g. social housing, which the government should invest in - then that can support wider market and bring costs down. *CSE – perhaps the business case might be there for registered social landlords to retrofit smart energy technology. They own and manage significant property holdings and take income from rent rather than sales, and reducing energy costs for tenants can reduce rent arrears and create social benefits for tenants. Many registered social landlords already invested in rooftop solar through the Feed in Tariff.*

Visual Impact

- Public perception and public buy-in of new development in terms of visual and noise impact.
- Consistent approach to visual impact mitigation of infrastructure. The Energy Superhub (a project of large scale storage batteries in Oxford) is an example of where there has been no public backlash against infrastructure installation.
- Visual impact of air pumps, charging points, solar panels, and kit in grey boxes – A need for design guidance involving conservation teams.

Managing risks from retrofitting: heritage fabric / setting / archaeology

- Heritage impacts of retrofitting domestic electricity storage + heat pumps, for example where plant is being installed outside in visible locations, or within listed buildings. Need support or guidance from English Heritage.
- Whole building approach - supported by English Heritage. This approach balances all the different needs - so understanding significance of heritage, but also users' needs for it to be comfortable, affordable, maintained etc. This needs to be applied to all buildings, not just heritage assets but all buildings including traditional buildings.
- Policies - on retrofitting heritage assets - opportunity to be more joined up/take whole building approach.
- Solar PV - can be installed on outbuildings - whole site options - are there alternatives that mean that the historic significance of a main building wouldn't be impacted?
- Archaeological and arboricultural impacts from trenching for heat pumps, EV cables etcetera. *CSE comment – for consideration at layout and planning stage? To be integrated into service routes (like lighting) where archaeology and trees are a constraint?*

- Conservation officers need to be skilled up to advise on retrofitting.
- Added cost of skilled contractors is a factor
- No underfloor heating in listed buildings (if historic flagstones).
- Replacing gas central heating with hydrogen heating in historic buildings which are not suitable for heat pumps
- Smart tech compatible with historic buildings - often using electricity more smartly, and based on Wi-Fi.
- New building in the setting of a listed building. Possible conflict between the carbon and heritage requirements in local plans - e.g. in the setting of a listed building, whether to create a highly sustainable and modern Passivhaus or a stone fronted pastiche, including detailed issues like ground works for ground source heat pump, visual impact from rooftop solar etc.
- Finding materials and technologies appropriate for buildings. Two issues:
    - Subjective interpretation of listed building legislation, providing certainty to manufactures that there is market for historically sensitive heat pumps (for example). Needs to be strategic level engagement with manufacturers.
    - Technologies and materials for upgrading U-values are improved, including hydroscopic building materials.
- With regards to listed buildings - issue arising between planning permission and listed building consent.
- Tensions between conservation area legislation and local planning policy with regards to public benefit vs impact to heritage assets (e.g. higher speed internet vs damage to paving stones) - (outputs from Oxford City Council workshop may be relevant here).
- Finding appropriate solutions to renewable heat provision for listed and historic buildings.

Planning reform

- Planning reforms - new national infrastructure levy (so doing away with s106) - so perhaps less scope for requirements being set at the local level.
- Oxfordshire EV strategy - this was a big issue in discussions when developing this strategy.

EV charging + cabling

- EV charging - where needed archaeological consents for ground works.
- EV systems - an understanding early on of the existing make up of cabling, connections etc. in buildings. The fine grained detail of making a scheme actually viable - if not considered early on can lead to higher costs/schemes being delayed. So good discussion needed between engineers, planners, building users, other professionals who have this expertise.
- EV cabling, charging points - who has jurisdiction where this is installed on public roads? Does this engage the planning system or is it highways?

Approach to policy formulation

- Creating policies with flexibility - no one size fits all approach - future proofed to new technology
- Perfect heat solution is less important where the heat demand has been driven right down through energy efficiency improvements.
- Noise considerations generated by domestic RE installations.

Appendix 3 - Contemporaneous notes from final plenary discussions: "Overall what are your thoughts about the potential for the planning system to facilitate and enable smart energy systems?"

Below are the responses from participants, plus in italics, comments made by CSE during the session:

- From our conversations, it needs work. We have the start of a supportive planning system, but there are definitely areas for improvement.
- *CSE comment – I feel there's a difference between heat and electricity. Planning form smart energy networks and heat decarbonisation is highly place specific – whether the optimal solution is district heating or heat pumps or in certain circumstances hydrogen boilers? But planning for smart electricity systems, it feels like you could standardise requirements for smart features across a district council area which could assist with easing grid constraints without it being disastrous, and that very local finely grained spatial specificity isn't there for electricity in the way it is for heat.*
- Inherently in thinking about the local energy system we're thinking about a business case across multiple assets and how the whole picture fits together, and that's where viability conversations are quite challenging anyway. You're really getting into quite bespoke conversations for that development. That's where tools like that introduced by Inga can have utility, looking at what it means in a particular environment.
- *CSE comment – Is the thing we need for smart energy systems a way to simplify it and make it digestible for planners, because you can never expect town planners to know all of this in the detail, and you would need to know in order to pin it down. The equivalent for smart energy systems as BREEAM or the Code for Sustainable Homes is for sustainability – an external measure of how smart a development is or needs to be. Also thinking through the implications for enforcement. Imagine you've adopted policies requiring smart technology to be included, have secured it within your development through conditions, how do you actually know whether it's been fitted? If you're talking about smart energy systems it might be a black box in a cupboard that's talking to lights or appliances, or delaying when you're appliances turn on or off. How are enforcement officers to know whether that's been fitted, and whether it's actually being used, or whether a smart or dumb EV charger has been fitted, and lastly whether the smart technology fitted and being used is actually delivering the flexibility services the grid needs to decarbonise the energy system. There's a big question as to whether the planning system has the knowledge to actually do that.*
- A massive question as to how the planning system can be used to get smart technology into existing buildings. I can't see the mechanisms to allow that to happen through the planning system. You could make it a condition for a large new solar farm to go ahead, if it were in an area of network constraint, that it would need to subsidise installation of flexibility technologies in the local area. Using the planning system in that way would be one way of getting smart energy technology into existing housing.

CSE comment – This might be a case where the planning system isn't the right tool to achieve this. Perhaps this would be a role for the DNO making that conditional to agreeing to a connection in the first place… Some sort of charging mechanism, where if you subsidise demand side flexibility to reduce and move peak demand below such and such a point, then your connection fee will be this, and if you don't, we will have to reinforce the system and your connection fee will be this. "E.g. You can only connect if peak demand is reduced by x between the hours of a. and b. at substation c., with flexibility being demonstrated for a full year following connection". (I expect this would be a complex technical expression or even an algorithm to express this correctly, and to measure whether the condition was being met.)
The DNO has stronger levers within its control and much more granular data as to what the peak demand is, how that relates to the capacity of their sub-station. Would planners and planning have sufficient knowledge / understanding / finely grained data to see whether energy retrofitting funded had done enough to create "headroom" to allow RE to connect, given that it is a dynamic issue changing through the seasons? Could there be another mechanism to achieve this more simply / effectively?

- More 'dot joining' needs to be done between heritage legislation and low carbon planning.
- Technical training is needed for planning officers, delving into some of the questions we went into today.
- How do we better resource planning officers? There are not currently resources there to support planners to deliver these new additional requirements.

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