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RESEARCH
PAPER
APPENDIX

2019

PLANNING FOR A SMART ENERGY FUTURE

Appendix D: Online survey

THE **Landmark**
PRACTICE

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Introduction

Research approach

The research was informed by a review of academic literature (see appendix A) and a review of relevant policy concerning smart energy (see appendix B). In order to collect the views of a wide variety of actors, including planners and smart energy developers, an online survey was developed. While this sought, amongst other things, to gauge the level of understanding that these stakeholders had of smart energy, the survey was also instrumental in identifying potential attendees to a series of workshops that were also organised by the team. A number of these contacts were also personally interviewed. This appendix summarises how the online survey was designed and discusses the key findings that arose in response. This appendix also provides a brief summary of the workshops and personal interviews that were held.

Survey design

A survey was designed and distributed using the Online Surveys platform, a tool hosted by Jisc (the Joint Information Systems Committee). The survey was promoted via a range of channels by the research team, the project's steering group, and the Royal Town Planning Institute to ensure the involvement of planners and professionals working across the planning and energy sectors. Social media was used to publicise the research and to encourage involvement with the survey. The survey was structured around 69 questions. While all respondents were required to answer the first question, the questions respondents were subsequently steered towards depended on the identify that they most associated themselves with, from a list of eight options:

1. A planner working in the public sector (development management) (directed towards questions 2-15);
2. A planner working in the public sector (policy) (directed towards questions 2-15);
3. A private sector planning consultant (directed towards questions 16-21);
4. A smart energy developer (directed towards questions 22-31);
5. A developer (from other sectors) (directed towards questions 32-41);
6. Professional: such as lawyer, financier, engineer, sector expert (directed towards questions 42-51);
7. Community energy representative (directed towards questions 52-60); and
8. Other (directed towards questions 61-69).

A copy of the questionnaire is presented in appendix D1. Respondents were able to complete the survey anonymously but could leave contact details if they wanted to discuss their answers in person or had examples or case studies that they felt the project team should be aware of. The

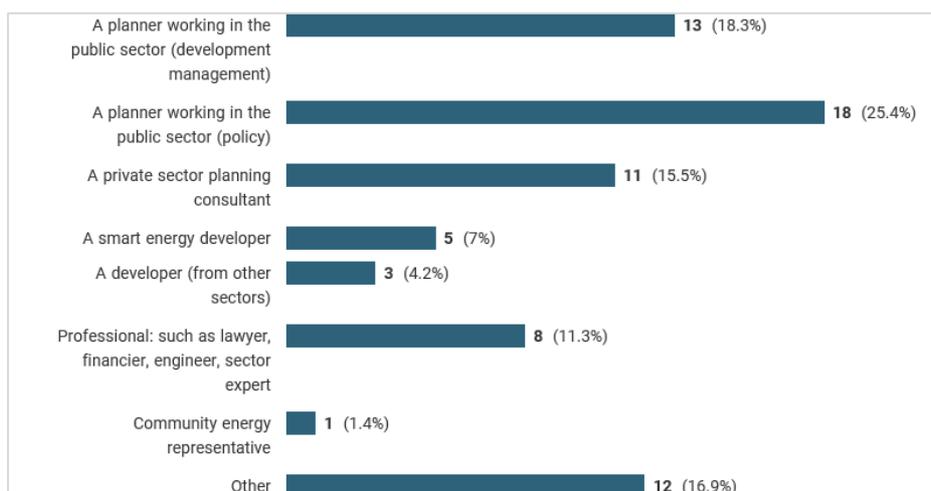
majority of the survey's questions were open and qualitative with respect to their design, allowing the respondents to enter text in response to the questions posed. The questions were ordered around four specific themes, namely communication, tools, engagement and case studies and examples. The focus of each theme varied with the respondent's role, with local authority planners being asked to comment, for example, on their:

- Understanding of smart energy;
- Understanding of the impacts arising from smart energy developments;
- Ideas for how their knowledge and understanding could be improved;
- Thoughts concerning the extent to which local authority elected members were aware of smart energy;
- Awareness of policy and the provision of appropriate tools for supporting smart energy;
- Thoughts concerning potential barriers to the planning and design of smart energy systems;
- Thoughts concerning the adequacy of national policy, and;
- Interactions with developers with respect to the delivery of smart energy.

Survey response

The survey was made available for completion between November 2018 and March 2019. A total of 71 responses were received. Figure 1, below, shows the distribution of respondents.

Figure 1: Composition of survey respondents



Survey results

Responses to the survey are presented through appendix D2. The comments are documented as submitted although some editing has occurred to preserve anonymity. The following text outlines some of the key messages arising from the survey. Particular focus is given to the responses provided by planners working in the public sector. While this group submitted the largest number of responses, they also have particular significance given the focus of the research.

Public sector planners

Understanding of smart energy amongst local authority planners

Through questions 2 and 3, the public sector planners were asked to rate their understanding of smart energy, and the impacts of smart energy, across a scale that extended from 1 (no understanding) to 5 (complete understanding). As Figure 2 shows, the majority of the 28 responding planners chose a mid-point of option 3, with other responses being broadly distributed on either side of this score. Only a single respondent claimed to have 'complete understanding', and no individuals selected 'no understanding'.

Figure 3 shows the distribution of responses with respect to the level of understanding public sector planners had of the impacts of smart energy. Again, the mid-point of option 3 was the most popular choice, with 11 of the 28 respondents choosing this option.

Figure 2: How would you rate your understanding of smart energy?

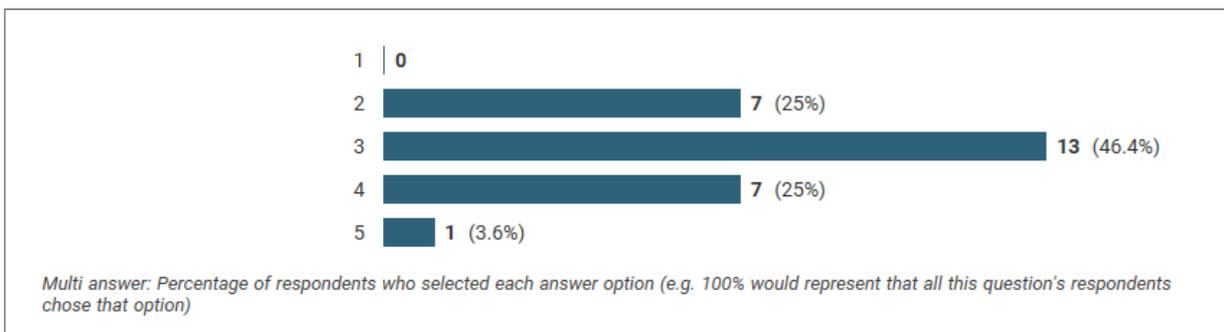
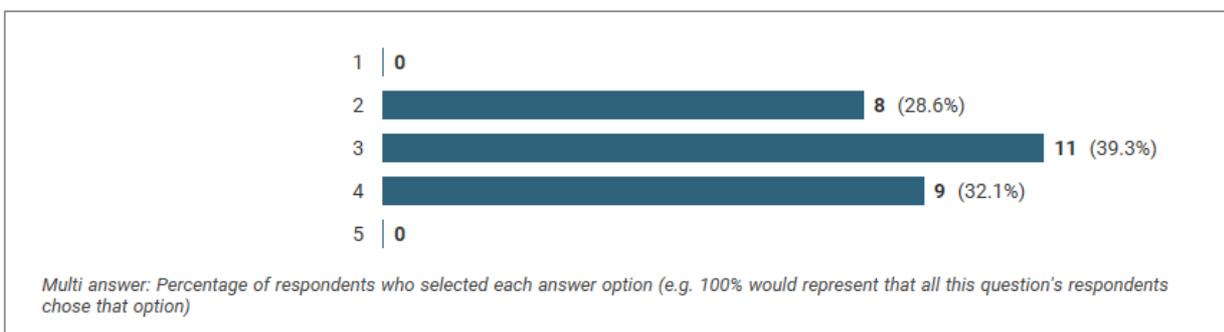


Figure 3: How would you rate your understanding of smart energy?



Steps to increase awareness

As a follow on to questions 2 and 3, question 4 asked the public sector planners to reflect on the type of steps that could be taken to make them more informed. Suggestions from the 25 responding planners included:

- Development and promotion of project case studies, informed by further research;
- Development of training material to help identify technical possibilities and potential barriers to adoption, led by the RTPi in collaboration with the energy industry;
- Providing access to peer-reviewed research articles, group based discussions and training seminars;
- Reports, brochures and /or video clips to help explain what smart energy comprises and to showcase the opportunities that local planning authorities have for incorporating it into their planning practices;
- Technical briefings, on such things as battery storage, electric car charging points;
- Greater prioritisation from government via policy and guidance; and
- Guidance to help contextualise smart energy with broader debates surrounding smart cities.

Understanding of smart energy by elected members

Planners working in the public sector were asked (via question 5) to comment on whether they thought their elected members were aware of the benefits and impacts of smart energy. In analysing the free text provided in response to the question, 20 of the 25 public sector planners felt that their elected members had limited understanding. The remaining responses noted a moderate level of understanding by virtue that some members would have encountered smart energy discussions as part of broader debates concerning sustainability, renewable energy and decarbonisation.

Existing policy coverage

Through question 6, public sector planners were asked whether their local authority had any local plan policy for addressing any element of smart energy. Of the 27 public sector planners who responded, 10 felt that they did not, while 9 said that they did (but few expanded on their answer).

A further 8 respondents were unsure on the basis that, while they were aware their plan contained policies on such things as climate change, sustainable construction, sustainable travel, and renewable energy, they were not clear as to whether this was fully encompassing the principles underpinning smart energy.

As a follow on, question 7 prompted the public sector planners to identify those local authorities who were demonstrating good practice in delivering smart energy through their policies and practices. However, only 5 of the 25 respondents felt confident enough to name examples with these including the authorities of Reading, Milton Keynes, Brighton and Bristol. Two of the respondents referred specifically to the London Plan.

Question 8 prompted the responding public sector planners to identify additional tools that could be used for incorporating any element of smart energy into planning. The majority of the respondents could not, but some did refer to supplementary planning documents that had either been prepared for specific sites, or for more general themes such as renewable energy and sustainable design and construction.

Barriers to including smart energy matters via local policy

Question 9 prompted the public sector planners to identify potential factors that were preventing them from including smart energy matters via their local policies. A total of 26 responses were received. Potential issues were identified to include:

- Limited understanding, amongst planners and elected members, on the principles surrounding smart energy;
- Limited involvement of planners in smart energy planning;
- A lack of evidence and direction as to what local policies should contain;
- A general absence of resources and experience in planning teams;
- Inadequate, or absent, national policy;
- The limited time given to scrutinise energy and infrastructure policies via a typical local plan examination;
- The length of time needed to produce plans and policy, in contrast to the dynamism and opportunism of the energy sector;
- Limited coverage of smart energy planning in the education of planners (together with professional development opportunities);
- Concerns over development viability, with the suggestion that smart energy interventions might be avoided, or argued away, to ensure the scheme happens or other infrastructure is delivered in place;
- The potential for energy to be over-looked when considered against other local 'priorities'; and
- Potential concerns about the costs and practices that might be needed to manage smart energy elements once development is complete.

Potential interventions to enable the deployment of smart energy technologies

Question 10 prompted the public sector planners to consider the most beneficial thing that the planning system could do to enable the deployment of smart energy technologies. The open question received 26 responses. Key suggestions included:

- Making smart energy a policy requirement;
- Engaging more proactively with energy companies early in the plan making process;
- Having a clear list of matters to consider (and potentially allocate) through plan making;
- Re-establishing a clear framework of standards for developments to be assessed against;
- Developing closer links with, and generating a better understanding of, building regulations;

- Developing and implementing a national infrastructure strategy to find suitable locations for the deployment of large-scale renewable energy infrastructure;
- Requiring the delivery of zero carbon homes;
- Increasing minimum standards to reduce energy requirements;
- Making smart energy infrastructure permitted development;
- Ensuring that national policy and guidance is clear about what should be provided in relation to smart energy infrastructure;
- Reconfiguring the planning system so its focus broadens beyond a perceived pre-occupation with housing and economic growth, and;
- Supporting the appropriate deregulation of consenting for smart energy infrastructure, i.e. not require planning approval, except for very large, obtrusive bits of 'kit'.

Adequacy of the national policy context

Question 11 invited respondents, via an open question, to comment on whether they considered the national planning context to support or hinder smart energy planning.

Although the question did not specify a particular geography, most of the respondents appeared to refer to the English system in making their points. A number of respondents considered there to be insufficient support in the NPPF because it makes no mention of smart energy, or the storage and management of energy. Some commented on whether smart energy infrastructure could, or could not, be considered under the NPPF's reference to 'renewable and low carbon energy and associated infrastructure', while another felt that the NPPF could offer sufficient support and flexibility. Another respondent noted how the national context was hindering the delivery of all forms of low carbon energy, while another considered it necessary for a national rethink about the broader approach to tackling climate change and decarbonisation. Clear leadership was seen as being important by one respondent, while another felt there was a need for clarity on what elements of smart energy infrastructure could be delivered via permitted development.

Engagement with developers and stakeholders on smart energy issues

Question 12 asked the public sector planners whether they had engaged with developers and / or stakeholders on smart energy issues. Open comments were received from 27 respondents, the majority of which came from those employed in development management. 12 noted that they had no previous engagement, while others noted moderate engagement through a variety of avenues. These included local plan consultations, agent and developer forums, and through discussions on specific development projects.

Question 13 built on this theme and asked respondents whether there was a need to broaden engagement. The overwhelming view from the 27 responding public planners was that there should be greater engagement. However, the responses also identified some barriers preventing their engagement, including:

- A lack of clarity with respect to the type of interventions that the energy industry was wishing to see;
- A lack of acknowledgement, on both parts, for why engagement would be helpful;

- A lack of national pressure to facilitate engagement between planning and energy interests;
- Inadequate resources, in terms of both time and money, to facilitate engagement;
- The perception that other issues have greater importance politically, such as on the delivering of new housing;
- A fear that engagement will inevitably result in developers paying more for site-level infrastructure that could ultimately affect their profit margins and stall development from coming forward; and
- The challenge of engaging with small-scale developers who may infrequently engage with the planning system and are often without specialist support or advice concerning the planning and design of energy infrastructure.

Other ideas for promoting effectiveness

Question 15 provided an opportunity for the responding public sector planners to provide additional comment with respect to how the planning system might be made more effective in promoting a smart energy future. Fifteen comments were received. While some of these repeated some of the key points that had made been earlier in the survey, additional points included:

- Scepticism with respect to how far the existing planning system could go in influencing the smart energy debate given the respondent's belief that it was failing to 'even achieve the basics';
- The need for tools and events to help bring stakeholders together and improve mutual understanding;
- The need for public engagement to help raise awareness and demand change with respect to the delivery of smart energy;
- That the market, and factors concerning commercial viability, will be the key overarching factor to delivery - the planning system might only have a management and enforcement role, and;
- The need for more exact requirements for home renewables and domestic storage.

Private planning consultants

Private planning consultants (totalling 11) were directed through questions 16-21 inclusive. The responses were far fewer and were broadly similar in content to the views expressed by planners working in the public sector. However, additional noteworthy points included:

- Recognition that the energy sector is dynamic and fast moving, creating a challenge for planning policy to keep up;
- Acknowledgement that some planning authorities were becoming more aware of smart energy, but that their desired actions were not being supported by policy;
- The need to keep policy simple and flexible. Application of smart energy policy should not rely on experts;

- Emphasis for more guidance and case studies to help counter the 'fear of the unknown', and;
- Recognition that written policy might not be enough - design guide might more appropriate.

Smart energy developers

Smart energy developers were directed towards questions 22-31. The number of respondents was low (5) but some useful comments were nevertheless made. Question 22 highlighted a similar level of activity across the five smart energy elements that the research team identified. Question 23 continued by asking respondents to identify both the positive and negative impacts of smart energy technologies that might need to be considered by the planning system. Only 3 responses were received with these highlighting:

- The need to plan for largescale, long-duration energy storage;
- The challenges attached to changing behaviour with respect to energy use;
- The need for homes and business parks to be planned close to rail, rather than roads;
- The need to maximise the functionality of roofs, both with respect to accommodating solar panels and for using as part of a greywater recycling system;
- The need to consider the aesthetics of heat pumps outside domestic homes (particularly those located in conservation areas); and
- The potential need to reconsider the current trend for integrating electric vehicle deployment with street lighting.

Question 24 asked smart energy developers to identify some of the technological innovations that planners will need to consider in the period to 2030. Again, the response rate was low (3), but comments argued that the roll-out of hybrid heat pumps/air source heat pumps, and alternatives to fixed storage, are needed in order to lessen the reliance on rare earth metals such as lithium and cobalt. Peer-to-peer trading and the roll-out of block-chain technology were also identified as shifts emerging in the sector.

Question 25 asked the smart energy developers to assess the extent to which local planning authorities seemed informed about planning for smart energy. Only two responses were provided. but were similar in that they felt planners often failed to look at the big picture, with many choosing to look at needs in isolation (in terms of both space and time). Rather than focusing on individual technologies, and gaining knowledge about potential trends and industry innovations, planners needed to look at energy, housing and infrastructure as one system.

Other developers

Again, the number of respondents falling under this category, and therefore being directed to questions 32-41, was low (3). Question 43 raised some interesting points with respect to the type of impacts that the planning system would need to consider with the delivery of smart energy infrastructure. These comments included recognition that:

- Smart energy elements should be planned at the earliest stage of the development process, i.e. at the grid connection stage, rather than through a subsequent retro-fit;
- There was a general lack of coordination between suppliers and the actors of the planning system;
- Proper consideration needed to be given to the compatibility and longevity of smart energy infrastructure, as well its cost, ease of use and maintenance demands; and
- The public needed to be told about the risks and impacts of not investing in smart energy, for instance, through the greater risk of black-outs.

Professionals working in the energy sector

Eight professional who working the energy sector responded and were directed towards questions 42 to 51. Question 45 explored perceptions about the extent to which local planning authorities appeared informed about smart energy. The number of responses was low (6) and two of the respondents acknowledged that their experiences had been limited to date. However, one of the respondents noted, anecdotally, that the general stance/approach tended to vary from authority to authority, and suggested whether some form of national guidance was required. Another respondent was far more critical and noted how authorities did not appear informed at all, and had no obvious joined-up approach or any proper understanding for the implications that could arise for national productivity and growth with any poor decision made locally. Only a couple of the respondents were able to give examples of where smart energy was being led by policy, or where its delivery was becoming frustrated by the actions of the planning authority.

Question 48 prompted the respondents to state the most effective thing the planning system can do better to enable the deployment of smart energy technologies. Seven responses were received with the majority of the comments reflecting the type of views noted by other respondents.

One respondent noted how decisions were not being taken by sector professions but by elected officials who were likely to have mixed knowledge about smart energy. Learning about each other's concerns and needs was recognised as being important for planners and those working in the energy field, while incentives were considered necessary to help the retrofit of existing buildings and areas.

Community energy representative and other respondents

Although a single respondent accessed the survey as a community energy representative, none of the questions directed to them were answered (52-60). Twelve responded to the survey as 'other' interests and were directed towards questions 61 to 69. Comments were broadly reflective of those that the other respondent groups had provided, but noteworthy comments included:

- Whether developers will be prepared to install the grid infrastructure to support smart energy;
- The need to build in flexibility through the design of development, for instance by

- incorporating soft verges alongside roads that can be used to support infrastructure;
- The need to steer housing development to sources of heat;
 - That there are some key strategic sites across the south west that can be used to showcase smart energy technologies, such as Gravity (the former Huntspill Energy Park);
 - That there needs to be greater certainty over the security and reliability of some smart energy technologies;
 - Concern about whether certain funding structures, such as those offered by Homes England, would support the push towards smart energy by covering installation costs;
 - That the push towards the use of electric vehicles will require reinforcement of the grid;
 - That many elements of the energy debate fall outside the typical comfort zone of practising planners, and that some form of coordinating body, operating across a defined area, could assist in ensuring that new technologies are properly considered, and subsequently incorporated, into plans and strategies; and
 - That there is a risk that planners take a reactionary stance to the application and deployment of smart energy when they can actually be proactive in terms of what can be achieved.

Survey summary

Role of the planning system

Overall, the survey responses recognised the role of the planning system in the planning and delivery of smart energy, although the importance of building regulations was also acknowledged. Respondents gave few examples of situations in which the planning system has facilitated the delivery of smart energy through policy, although some respondents did highlight the supporting role that certain policies played. These included those policies connected with renewable energy, low carbon development, and sustainable design and construction. Cited examples of best practice included the draft energy policies of the London Plan, the emerging Local Development Order that Exeter City Council is creating for a district heating scheme, and the emerging Cranbrook Plan that intends to address smart energy planning in the new town that is being developed on the east side of Exeter.

However, a number of barriers were cited with respect to the relationship between energy and planning, including:

- Lack of holism with respect to planning and development, with key issues and elements being considered in isolation (e.g. a lack of coordination in the planning of energy, transport and development). Viewing energy as part of an integrated system was identified as a core priority for future plans and strategies;
- Lack of coordination and direction in relation to strategic planning and infrastructure delivery;
- A lack of experience in dealing with smart energy projects;
- A considerable level of variation between the knowledge and experience of developers and local authorities;
- Public and stakeholder concern about the design and form of energy infrastructure, reactions that are often accentuated by the fear of the unknown;
- Under-resourced planning teams which limit the ability of staff to extend their professional knowledge or to recruit dedicated energy-focused staff;
- Knowledge gaps with respect to smart energy technologies, accentuated by the dynamism of the energy sector;
- The perceived complexity of energy planning that has led to discussions over provision being led by 'experts', rather than being considered more broadly by planners, developers and elected members;
- Limitations surrounding the ability to keep up to speed with the latest innovations and projected developments in the smart energy sector;
- The age and inflexibility of some development plan documents;
- A lack of clarity concerning the type of interventions that are needed to facilitate the

delivery of smart energy (e.g. how much land might be needed and where energy infrastructure should be sited);

- Inadequate policy and guidance at a national level with respect to planning for energy and smart energy systems (although these responses were framed in an English context where the National Planning policy Framework makes no reference to smart energy management or storage);
- Confused signals nationally about the importance of sustainability and energy systems (closure of the 'Code for Sustainable Homes' was noted as being indicative of this confused picture);
- Under-valuing energy as a policy topic, as compared with the policy directions and financial incentives for delivering housing;
- Lack of clarity concerning the cost of energy infrastructure, thereby impacting on the ability for relevant infrastructure to be assessed and properly considered in development appraisals; and
- Under-valuing energy as a strand of essential infrastructure, with elements surrounding transport, education, and health-care provision often being prioritised in both plan making and development management.

Improvements to the planning system

Survey responses helped to identify a wide-range of improvements that were felt to be necessary for facilitating the delivery of smart energy infrastructure:

- Clear identification of energy as an essential area for planning activity (with recognition at a national level being considered particularly important);
- Earlier and more constructive engagement between planners and the energy industry, supported by appropriate professional development (e.g. conferences and training sessions);
- Improvements in the flow of knowledge surrounding smart energy infrastructure, such as around cost, form and location;
- Planners need to develop a greater understanding of network capacity and engage more proactively with district network operators;
- Model policies to help embed smart energy into plan making, with relevance to different spatial and economic contexts;
- Development of project case studies to help show optimum energy/planning relationships and to showcase how smart energy principles can be implemented on the ground, both through new-build and retro-fit projects;
- Pilot projects to help initiate energy planning principles from the very start of a project;
- Insight into the costs and delivery options for delivering energy infrastructure to help identify the respective roles for public and private sector interests;

- Design guidance to help direct and advise on the form and location of energy infrastructure, such as electric-vehicle charging points and domestic heat pumps;
- Specific built-in design devices to help provide greater resilience and flexibility to energy infrastructure provision, such as the incorporation of soft verges and green corridors across a development;
- Formulation of some kind of checklist or benchmark to prompt thinking and to ensure energy needs and solutions are considered at all stages of a development; and
- Creating a bespoke national or regional team who can help to ensure that energy is properly considered in strategic/complex projects.

Workshops and interviews

Respondents to the survey were invited to provide contact details if they were interested in extending their involvement with the project. Some of these contacts were subsequently invited to the workshops convened by the team and/or approached for interview.

Workshops

Six workshops were convened by the team between October 2018 and March 2019:

- **19 October 2018:** Steering Inception Meeting. Held at the offices of TLT LLP, Bristol;
- **22 January 2019:** Electricity Storage Network Planning Group. Held at the offices of TLT LLP, London;
- **15 February 2019:** Decarbonisation of Heat Workshop. Held at the offices of Regen, Exeter;
- **7 March 2019:** Smart New Development Workshop. Held at the offices of Foot Anstey, Plymouth;
- **19 March 2019:** Electric Vehicles Workshop. Held at the offices of Burgess Salmon, London, and;
- **29 March 2019:** Recommendations Workshop. Held at the offices of TLT LLP, Bristol.

The workshops were attended by 79 attendees, in addition to members of the project team. All of the workshops took place under 'Chatham House Rules'.

Interviews

Interviews were held with individuals to follow up on particular issues that they had raised through the survey. Further respondents were approached on the basis of representing a particular group or interest. Interviews were conducted over the phone or in person with notes recorded for use by the research authors but not for wider circulation or publication. This was to ensure that responses were frank and detailed, without compromising individuals' professional opinions. Insights were discussed via the workshops and through the main project report. In total, 30 people were interviewed. Interviewees offered views from their role in planning practice, the energy sector, and from academia. As with the workshops, comments were used to inform elements of the report and its recommendations.

Copy of the Questionnaire Survey

Introduction

We are seeking your opinion on how the UK's planning systems can better facilitate the delivery of smart energy, to ensure an affordable, clean energy system for the future.

Our questionnaire is seeking your opinion, experiences and examples. It should not take more than 10 minutes, but please ensure you provide enough detail that your views, or prompts to us, are sufficiently clear.

This questionnaire is part of a research project funded by the RTPi (SW), being led by Regen, in collaboration with Pell Frischmann, The Landmark Practice and the University of the West of England. Through this research, we will consider the characteristics of a smart energy system and identify potential interfaces with planning regulation, policy and practice. We will provide an overview of the technological change that is likely to interface with spatial planning and consider the potential for this to impact on people and places.

Completed questionnaires can be submitted anonymously. Contact details are only requested if you opt to provide us with further details of an example or case study that you feel we should investigate further.

What do we mean by the term 'smart energy'?

Before you complete our questionnaire it is useful for us to explain how we are defining the term '**smart energy**'.

Our research is looking at the period to 2030 in order to sync with published scenarios and be capable of supporting current plan-making activities. Through our initial review of literature and policy, we have developed the following definition:

A smart energy system is a cost-effective, sustainable and secure energy system in which renewable energy production, infrastructures and consumption are integrated and coordinated through energy services, active users and enabling technologies.

We have also identified the smart elements of a future energy system that we feel local planning authorities can have significant influence on, namely:

- The widespread roll out of energy storage, particularly batteries
- Smart new homes and the retrofitting of existing properties
- The decarbonisation of heat, for example, through electrification, district heat networks and hydrogen networks
- The electrification of transport
- The design and configuration of smart infrastructure, namely grids, data and

communication

Local planning authorities also have a role, and can apply influence, in the planning and delivery of nationally significant infrastructure projects.

We have not included renewable electricity generation within this list for the purposes of this research. Although it is a strong element of a decarbonised and smart energy future, the generation technology is not what makes the system smart as such and there is sufficient existing evidence and knowledge on how to plan for renewables.

A smart energy future will also include the development of new business models, such as local supply models and demand side response. These are not included in the list as the models themselves do not have planning impacts.

Your experience

1. Are you:

1. *A planner working in the public sector (development management)*
2. *A planner working in the public sector (policy)*
3. *A private sector planning consultant*
4. *A smart energy developer*
5. *A developer (from other sectors)*
6. *Professional: such as lawyer, financier, engineer, sector expert*
7. *Community energy representative*
8. *Other*

1a. If you selected 'other', please specify:

Public Sector Planners

Public Sector Planners: Communication

2. How would you rate your understanding of smart energy?

Select from 1 (no understanding) to 5 (complete understanding)

3. How would you rate your understanding of the impacts of smart energy? Top of Form

Select from 1 (no understanding) to 5 (complete understanding)

4. What do you need to feel more informed?

5. Do you consider that elected members in your authority are aware of the benefits/impacts of smart energy? Please explain your response in brief.

Public Sector Planners: Tools

6. Does your authority have a policy that addresses any element of smart energy in its Local Plan?
7. Are you aware of other authorities with smart energy policies or practices that you consider to demonstrate good practice? Please explain your response in brief.
8. Are there other tools (such as Supplementary Planning Documents or Local Development Orders) that your authority is using to incorporate any element of smart energy into planning?
9. What, if anything, is preventing your authority from including smart energy matters in its local policies?
10. What do you feel would be the most beneficial thing that the planning system could do to better enable deployment of smart energy technologies?
11. How is the national planning context supporting and/or hindering smart energy planning?

Public Sector Planners: Engagement

12. How have you engaged with developers and/or stakeholders on smart energy issues? Please explain your response in brief.
13. Do you consider that there is need and/or opportunity to broaden this engagement? If yes, what is preventing this from happening?

Public Sector Planners: Case studies and Examples

14. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?
- 14a. If yes please provide us with your name, email address and / or phone number.
15. Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

A Private Sector Planning Consultant

A Private Sector Planning Consultant: Communication

16. Based on your experience as a private planning consultant, how informed about smart energy are the local planning authorities that you have dealt with? Can you identify any specific knowledge gaps within these authorities?

A Private Sector Planning Consultant: Tools

17. Are you aware of any specific local planning authorities that are adopting and implementing measures that positively encourage delivery of any element of smart energy in new and/or existing development? Please explain your response in brief.
18. Are you aware of any specific local planning authorities that demonstrate a negative stance to delivery of any element of smart energy in new and/or existing development? Please explain your response in brief.

19. What do you feel would be the most effective thing that the planning system could do to better enable deployment of smart energy technologies?

A Private Sector Planning Consultant: Case Studies and Examples

20. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?

20a: If yes please provide us with your name, email address and / or phone number.

21. Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

For Smart Energy Developers

22. What element of smart energy are you involved in?

- *Energy storage / batteries*
- *Smart new homes and the retrofitting of existing properties*
- *The decarbonisation of heat, for example, through electrification, district heat networks and hydrogen networks*
- *The electrification of transport*
- *The design and configuration of smart infrastructure, namely grids, data and communication*
- *Other*
- *Not currently involved in any element of smart energy*

22a. If you selected 'other', please specify

23. What are the potential positive and negative impacts of smart energy technologies that might need to be considered by the planning system?

24. What technology developments are likely to occur in this sector to 2030? What are the likely impacts of these that the planning system will need to consider?

For Smart Energy Developers: Communication

25. Based on your experience as a smart energy developer, how informed about smart energy are the local planning authorities that you have dealt with? Can you identify any specific knowledge gaps within these authorities?

For Smart Energy Developers: Tools

26. Are you aware of any specific local planning authorities that are adopting and implementing measures that positively encourage delivery of smart energy in new and/or existing development? Please explain your response in brief.

27. Are you aware of any specific local planning authorities that demonstrate a negative stance to

delivery of smart energy in new and/or existing development? Please explain your response in brief.

28. What do you feel would be the most effective thing that the planning system could do to better enable deployment of smart energy technologies?

For Smart Energy Developers: Engagement

29. How have you engaged to date with the planning system in your role?

29a. What would encourage you to engage on a more proactive basis – e.g. at plan making stage?

For Smart Energy Developers: Case Studies and Examples

30. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?

30a. If yes please provide us with your name, email address and / or phone number.

31. Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

For Developers (Other)

32. What element of smart energy are you involved in?

- *Energy storage / batteries*
- *Smart new homes and the retrofitting of existing properties*
- *The decarbonisation of heat, for example, through electrification, district heat networks and hydrogen networks*
- *The electrification of transport*
- *The design and configuration of smart infrastructure, namely grids, data and communication*
- *Not currently involved in any element of smart energy*
- *Other*

32a. If you selected 'other', please specify:

33. What are the potential positive and negative impacts of smart energy technologies that might need to be considered by the planning system?

34. What technology developments are likely to occur in this sector to 2030? What are the likely impacts of these that the planning system will need to consider?

For Developers (Other): Communication

35. Based on your experience, how informed about smart energy are the local planning authorities that you have dealt with? Can you identify any specific knowledge gaps within these authorities?

For Developers (Other): Tools

36. Are you aware of any specific local planning authorities that are adopting and implementing measures that positively encourage delivery of smart energy in new and/or existing development? Please explain your response in brief

37. Are you aware of any specific local planning authorities that demonstrate a negative stance to delivery of smart energy in new and/or existing development? Please explain your response in brief.

38. What do you feel would be the most effective thing that the planning system could do to better enable deployment of smart energy technologies?

For Developers (Other): Engagement

39. How have you engaged to date with the planning system in your role?

39a. What would encourage you to engage on a more proactive basis – e.g. at plan making stage?

For Developers (Other): Case Studies and Examples

40. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?

40a. If yes please provide us with your name, email address and / or phone number.

41. Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

Professional: such as lawyer, financier, engineer, sector expert

42. What element of smart energy are you involved in?

- *Energy storage / batteries*
- *Smart new homes and the retrofitting of existing properties*
- *The decarbonisation of heat, for example, through electrification, district heat networks and hydrogen networks*
- *The electrification of transport*
- *The design and configuration of smart infrastructure, namely grids, data and communication*
- *Not currently involved in any element of smart energy*
- *Other*

42a. If you selected 'other', please specify:

43. What are the potential positive and negative impacts of smart energy technologies that might need to be considered by the planning system?

44. What technology developments are likely to occur in this sector to 2030? What are the likely

impacts of these that the planning system will need to consider?

Professional: Communication

45. Based on your experience as a professional in the sector, how informed about smart energy are the local planning authorities that you have dealt with? Can you identify any specific knowledge gaps within these authorities?

Professional: Tools

46. Are you aware of any specific local planning authorities that are adopting and implementing measures that positively encourage delivery of smart energy in new and/or existing development? Please explain your response in brief.

47. Are you aware of any specific local planning authorities that demonstrate a negative stance to delivery of smart energy in new and/or existing development? Please explain your response in brief.

48. What do you feel would be the most effective thing that the planning system could do to better enable deployment of smart energy technologies?

Professional: Engagement

49. How have you engaged to date with the planning system in your role?

49a. What would encourage you to engage on a more proactive basis – e.g. at plan making stage?

Professional: Case Studies and Examples

50. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?

50a. If yes please provide us with your name, email address and / or phone number.

51. Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

For Community Energy Representative

52. What element of smart energy are you involved in?

- *Energy storage / batteries*
- *Smart new homes and the retrofitting of existing properties*
- *The decarbonisation of heat, for example, through electrification, district heat networks and hydrogen networks*
- *The electrification of transport*
- *The design and configuration of smart infrastructure, namely grids, data and communication*
- *Not currently involved in any element of smart energy*

- *Other*

52a. If you selected 'other', please specify

52b. What are the potential positive and negative impacts of smart energy technologies that might need to be considered by the planning system?

53. What technology developments are likely to occur in this sector to 2030? What are the likely impacts of these that the planning system will need to consider?

Community Energy Representative: Communication

54. Based on your experience as a community energy representative, how informed about smart energy are the local planning authorities that you have dealt with? Can you identify any specific knowledge gaps within these authorities?

Community Energy Representative: Tools

55. Are you aware of any specific local planning authorities that are adopting and implementing measures that positively encourage delivery of smart energy in new and/or existing development? Please explain your response in brief.

56. Are you aware of any specific local planning authorities that demonstrate a negative stance to delivery of smart energy in new and/or existing development? Please explain your response in brief.

57. What do you feel would be the most effective thing that the planning system could do to better enable deployment of smart energy technologies?

Community Energy Representative: Engagement

58. How have you engaged to date with the planning system in your role?

58a. What would encourage you to engage on a more proactive basis – e.g. at plan making stage?

Community Energy Representative: Case Studies and Examples

59. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?

59a. If yes please provide us with your name, email address and / or phone number.

60. Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

For Other Respondents

61. What element of smart energy are you involved in?

- *Energy storage / batteries*
- *Smart new homes and the retrofitting of existing properties*
- *The decarbonisation of heat, for example, through electrification, district heat networks and*

hydrogen networks

- *The electrification of transport*
- *The design and configuration of smart infrastructure, namely grids, data and communication*
- *Not currently involved in any element of smart energy*
- *Other*

61a. If you selected 'other', please specify:

61b. What are the potential positive and negative impacts of smart energy technologies that might need to be considered by the planning system?

62. What technology developments are likely to occur in this sector to 2030? What are the likely impacts of these that the planning system will need to consider?

For Other Respondents: Communication

63. Based on your experience, how informed about smart energy are the local planning authorities that you have dealt with? Can you identify any specific knowledge gaps within these authorities?

For Other Respondents: Tools

64. Are you aware of any specific local planning authorities that are adopting and implementing measures that positively encourage delivery of smart energy in new and/or existing development? Please explain your response in brief.

65. Are you aware of any specific local planning authorities that demonstrate a negative stance to delivery of smart energy in new and/or existing development? Please explain your response in brief.

66. What do you feel would be the most effective thing that the planning system could do to better enable deployment of smart energy technologies?

For Other Respondents: Engagement

67. How have you engaged to date with the planning system in your role?

67a. What would encourage you to engage on a more proactive basis – e.g. at plan making stage?

For Other Respondents: Case Studies and Examples

68. Would you be prepared to speak with us about the examples or case studies you have mentioned through this survey?

68a: If yes please provide us with your name, email address and / or phone number.

69: Please use the space below to add any further comments about how you consider the planning system might be more effective in promoting a smart energy future.

Thank you

Views and opinions provided via this survey will be anonymised and summarised for publication by us in early 2019.

- If you have any questions or comments about this survey then please contact:
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For more information and materials relating to the RTPI's work on smart energy systems, please see: www.rtpi.org.uk/smartenergy.

For more information about the RTPI's wider climate change research programme, please see www.rtpi.org.uk/climatechange.

Alternatively, you can contact the RTPI research team at: Research@RTPI.org.uk.

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