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TITLE A critical and empirical analysis of the national-local ‘gap’ in public responses to large-scale energy infrastructures

ABSTRACT

A national-local ‘gap’ is often used as the starting point for analyses of public responses to large scale energy infrastructures. We critique three assumptions found in that literature: the public’s positive attitudes, without further examining other type of perceptions at a national level; that local perceptions are best examined through a siting rather than place-based approach; that a gap exists between national and local responses, despite a non-correspondence in how these are examined. Survey research conducted at national and local levels about electricity transmission lines in the UK confirm these criticisms. Results do not support a gap between national and local levels; instead, both differences and similarities were found. Results show the value of adopting a place-based approach, and the role of surveys to inform policy-making are discussed.

KEYWORDS: large-scale energy infrastructures; transmission lines; national-local ‘gap’; public responses; community acceptance.

MAIN TEXT

1. Introduction

Several governments worldwide are trying to streamline the deployment of low carbon energy technologies and associated infrastructures such as transmission lines (Cowell and Owens 2006; Ellis 2008), following increasingly binding legislation to tackle climate change (Kyoto Protocol 1998; Renewables Directive 2009). In most countries, that task is being performed within the prevalent centralised model of electricity systems (Graham and Marvin 1995), based on large-scale infrastructures for power generation (e.g. coal fired power plants), usually located in remote areas, and on a national grid of pylons and power lines that transports electricity to sites of consumption (Butler 2001).

However, the siting of new energy infrastructures is often contested by local communities (Wustenhagen, Wolsink, and Burer 2007). Thus, over the past few years a considerable amount of academic social science and market-research has attempted to better understand the reasons for these conflicts (Bell, Gray, and Haggett 2005; Ellis, Barry, and Robinson 2007; Haggett and Futak-Campbell 2011; Aitken 2010; Blake 1999). This body of research often takes as a starting point a national-local ‘gap’ in public responses: whereas national opinion polls show positive public attitudes towards low carbon energy infrastructuresⁱ, when these are to be deployed in particular locations, they are often opposed by the communities living nearby (Ellis, Barry, and Robinson 2007; Wustenhagen, Wolsink, and Burer 2007; Zoellner, Schweizer-Ries, and Wemheuer 2008). For instance, Zoellner and colleagues (2008) say that “despite the fact that representative **public** opinion polls show considerable **support** for sustainable energy policies as well as for a growing percentage of renewable energies in power generation on an abstract level, many residents on the

local level feel severely limited in their quality of life by renewable technology systems nearby” (emphasis added, p.4136). Regarding wind farms, Jones and Eiser (2010) highlight that “what is perhaps more puzzling for developers is the level of **local opposition** encountered when compared to reported levels of **support for wind development within the UK**” (emphasis added, p.3107; see also Haggett & Futak-Campbell, 2011)ⁱⁱ.

These definitions of the problem to be researched share three common assumptions. First, the way in which the national in the national-local gap is assessed and presented – as support or positive attitudes for renewable energy infrastructures (in general), neglecting other types of public or national perceptions towards those, apart from attitudes. Second, the way in which the local in the national-local gap is assessed and presented – as local opposition, based on a definition of ‘local’ as the area surrounding a given project taken as a whole, instead of ‘local’ comprising the distinct places – or settlements - affected by that energy project. Third, the very definition of the national-local gap – as the paradox between public or **national support in general**, and **local opposition** for specific projects to be constructed near the place where people live. This diagnoses that a gap exists based on the comparison of national and local responses at two different, non-correspondent levels: energy infrastructure in general vs. specific projects to be constructed near the place where respondents live. Therefore, a first goal of this paper will be to critically discuss these assumptions and how and why they should be overcome.

We also argue that research on public responses to large scale energy infrastructures needs to be more critical of the “ cursory references to opinion poll findings” that are often taken as a starting point (Aitken, 2010, p.1835) and to recognise the relevance of adopting other epistemological and methodological

approaches - such as more critical-constructivist and qualitative ones - for a better understanding (Batel, Devine-Wright, and Tangeland, 2013; Ellis, Barry, and Robinson, 2007; Devine-Wright, 2007). However, existing critiques of opinion polling and surveys often depart from the assumption that these methods can only be used within a positivist, decontextualised approach, whereas qualitative research is always informed by a critical-constructivist one, even if this does not have to be, and is sometimes not the case (Bauer 2008; see Batel, Devine-Wright, and Tangeland 2013; Castro and Lima 2001).

This paper will use survey methods to support the critical appraisal of the national-local ‘gap’. Therefore, a second goal of this paper will be to illustrate that it might be useful not to abandon survey methods entirely, namely, for two reasons. First, since opinion polling/surveying is still the main approach used by policy-makers to reveal public responses to energy issues and to inform the development of specific policies (e.g., Department of Energy and Climate Change 2012), this makes it relevant to discuss how such methods might be better designed to incorporate a more contextualised and socially-driven approach. Second, if we consider that surveying might be performed in ways that are mindful and transparent in relation to “the questions which are asked” (Aitken, 2010, p.1835), then survey methods can provide us with information about public responses to energy infrastructures which other methods arguably cannot. As Bauer (2008) has argued, “the misuse of an instrument does not exhaust its potential (...); the ‘interpretive flexibility’ of instruments” (p.124), and thus survey research, can still be “a powerful and ‘movable immobile’ representation of public opinion” (p.125).

In this paper we have then two main goals. First, to discuss how and why the abovementioned assumptions that are still embedded in some current conceptions of

the national-local ‘gap’ need to be overcome. Second, to empirically research these issues, and by doing so illustrate how survey methods can be productively used to research public responses. In sum, we will critically discuss and empirically illustrate, through survey methods (a) the value of examining other factors besides only attitudes towards energy infrastructures at a national level; (b) the value of adopting a place-based approach to local responses to energy infrastructures instead of a siting approach; (c) to what extent a national-local gap exists in people’s responses to energy infrastructures. Having addressed these, we will also discuss how these issues might help to deconstruct representations of local communities as ‘NIMBYs’ (see also Aitken, 2010) and have important implications for policy-making.

2. The importance of examining project- and place-related factors at a national level

Studies on public responses to large-scale energy infrastructures often begin with an assumption of national level support – for example for renewable energy (see also Demski 2011; Aitken 2010) - in order to then investigate local responses (e.g., Zoellner, Schweizer-Ries, and Wemheuer 2008; Jones and Eiser 2010). Widespread public support has become reified as a starting point for research in this area and, with it, has dismissed the need to further investigate perceptions at a national level (see also Demski 2011, for a review). This has been largely based on the assumption that “national polls (...) encourage respondents to look at an issue as related to their country – rather than directly applying the issue closer to home, in their own community” and, in that vein, “national polls rarely tap people’s limits of acceptability” (Pidgeon and Demski 2012, p.5; see also Demski, 2011).

As a result, the literature is skewed, having a predominant focus on the local side of the national-local ‘gap’, with a primary goal of developing alternative explanations to ‘NIMBY’ opposition. Research on local acceptance has examined the importance of project-related factors (e.g. trust in the developer; perceived impacts), or place-related factors (e.g. disruption to place attachment), or both, to explain local communities’ responses to energy infrastructures (e.g., Devine-Wright and Howes 2010; Upham and Shackley 2006). However, embedded in this research is the assumption that publics will only be concerned with issues of fairness and transparency in decision-making processes, trust, impacts and so forth, if a large-scale energy infrastructure project is or will be constructed near the place where they live, and not with distant places and energy infrastructures (Devine-Wright 2013), an assumption which might be read as implicitly supporting the representation of protestors as NIMBYs that this literature purports to critique (see also Batel et al., 2013). As Bell and colleagues (2005) recognise, “many public opinion surveys merely ask if people support wind energy in general. They do not give respondents the opportunity to enter qualifications” (p.463). In other words, what is lacking in research at a national level are questions about perceived impacts of those technologies, mitigation measures or other types of issues that might act as qualifiers to people’s responses (e.g., Devine-Wright & Batel, 2013).

We argue then that it is necessary to open up the study of the ‘national’ by broadening the kinds of questions put to representative samples of national publics to encompass a wider set of issues and questions. If we assume that for a more sustainable deployment of low carbon energy infrastructures, these have to be accepted by both national populations *and* local communities (Wustenhagen, Wolsink, and Burer 2007) and because national/local spatialities are relationally

intertwined (Paasi 2004; Owens and Driffill 2008), then we should move from defining those affected by energy infrastructures as *only* being the surrounding local communities, to defining them as potentially *all* publics when conceived as energy citizens (Devine-Wright 2007). In sum, research with national samples should move beyond capturing only general attitudes towards energy sources or infrastructures, to encompass other factors such as trust, procedural justice, perceived outcomes of energy infrastructures', and relation with place (e.g. with the country, with Europe).

3. The importance of adopting a place-based approach

Electrical energy systems are interconnected and interdependent, involving the simultaneous matching of demand and supply at the national level. It is, therefore, not straightforward to identify any 'local' aspects of energy generation, supply and use (Devine-Wright and Wiersma, 2013) Despite this, the literature has mainly addressed 'local' responses to the siting of energy infrastructures based on the assumption that "a feature of large-scale energy systems is that they have a material reality that is unique to each community – a particular physical, social and economic footprint" (Pidgeon and Demski 2012, p.5). While this is unquestionable, the ways in which most of the research has been conducted may not actually allow that 'material reality' to be grasped.

Studies often examine 'local perceptions' without taking into account that any 'local' area may be composed of distinct settlements or communities of locality (Cass, Walker, and Devine-Wright 2010) that have potentially different characteristics and associated meanings, which can shape people's responses. The 'local' has typically been defined unproblematically through a 'siting' perspective (Devine-Wright, 2011), that is, purely in terms of physical proximity - how the people who happen to live

near a given energy project perceive it (Firestone, Kempton, and Krueger 2009; Zoellner, Schweizer-Ries, and Wemheuer 2008). This is close to a NIMBY perspective (see Devine-Wright 2011) or, as Bell and colleagues (2005) put it, to the ‘self-interest’ explanation of the social gap in energy infrastructure siting decisions.

This way of thinking is particularly evidenced by research aiming to reveal the effect of physical proximity upon community acceptance (e.g., Jones and Eiser 2009; Swofford and Slattery 2010), which separate out residents according to spatial ‘zones’ (e.g. within 5km or 10km of the site). Instead, a ‘place-based’ perspective would focus upon how individuals and groups living in different settlements or places affected by a given energy infrastructure make sense of it and respond to it, in addition to taking account of their feelings or relationships to those placesⁱⁱⁱ, taken as referring not only to specific sites where developments are proposed, but also wider ‘energy landscapes’ that might be cumulatively affected by several low carbon infrastructure proposals (Bridge et al. 2013).

As Bell and colleagues (2005) highlight “national guidelines must provide a framework for consistent yet place-sensitive local decision-making” (p.472). A more contextualised, emplacement approach (Devine-Wright 2011; Cresswell 2003) would allow both similarities and differences in beliefs and practices to emerge between and within residents and groups living in different places affected by a given project and, arguably, to better understand the reasons behind the so called ‘individual gap’ in people’s responses to energy technologies (Bell et al., 2005) . This emplacement perspective highlights the “socially constructed, symbolic attributes of places, and how these are interpreted by residents to ‘fit’ with development proposals” (Devine-Wright & Howes, 2010, p.272; see also Bonaiuto, Breakwell, and Cano 1996; Cresswell 2003) and, in this vein, acknowledges that the acceptability of new

technologies depends not just on the technologies in themselves but on how those are seen as fitting (or not) with previous people-place relations or social practices in place (Spaargaren, 2011). Moreover, a siting perspective may perpetuate conventional representations of publics affected by developments, notably an information deficit approach (see Devine-Wright 2011; Owens 2000).

4. The national-local ‘gap’ – To what extent does it exist?

Embedded in the national-local ‘gap’ is a flawed diagnosis that draws upon two non-correspondent levels or dimensions. Attitudes towards energy sources or infrastructures **in general**, are examined at a **national/public** level, and then compared with a **local** level where (oppositional) attitudes and corresponding behaviours are diagnosed towards infrastructures to be constructed **near the place where people live**. In other words, we argue that prior to trying to understand the national-local gap in people’s responses to energy infrastructures, we need to investigate to what extent that ‘gap’ actually exists^{iv} (see also Huijts, Midden, and Meijnders 2007; Terwel and Daamen 2012). If we are to do this, it is crucial to compare in a systematic and articulated way, national and local responses at the same level of specificity, that is, either regarding those infrastructures in general or infrastructures to be hypothetically or actually constructed near the place where respondents live (for an example, see Wolsink 2000).

To sum up, we argue that a better understanding of public responses to large-scale energy infrastructures requires researchers to critically reflect upon and actually examine the abovementioned assumptions. This can be achieved by broadening research at the national level to encompass a wider set of questions, and by deepening research at the local level to sample people living in specific places or settlements. To empirically illustrate the value of taking these criticisms into consideration, we

report the results of surveys that were conducted at both national and local levels. Each employed similar questions to assess public beliefs and attitudes towards energy infrastructure in general and to be constructed near the place where respondents lived, as well as their understandings of project-related factors. In this process we aim to illustrate how a more complex and context-sensitive analysis of public responses can usefully be achieved by means of survey methods.

5. Method

5.1. Infrastructure focus: High voltage power lines

Intense opposition to proposals to construct new transmission power lines from local communities near where they are constructed has occurred in many countries, including the US, Norway, Germany, the UK and Ireland (e.g., Save Our Valley 2012; Pidgeon and Demski 2012). Yet despite this, the study of public responses to these infrastructures has been rather neglected (see Devine-Wright and Batel 2013). The sparse research that does exist suggests that, as with electricity generation projects, public responses towards high voltage power lines tend to be more favourable at a general level than when they are to be constructed near the place where people live (Huber and Horbaty 2010; Schweizer-Ries 2010). When thinking about power lines generally, people tend to perceive them as necessary to transmit power and guarantee security of supply; on the other hand, locally, they are perceived as impacting negatively on landscape aesthetics, upon health due to electro-magnetic fields, wildlife, and associated issues such as on tourism and property values (Elliot & Wadley, 2002; Devine-Wright & Batel, 2013; see also Montgomeryshire Against Pylons, 2013). In these senses, public responses to high voltage power lines bear

similarity to responses to wind farms, bioenergy power stations or other large scale low carbon energy projects.

In the UK, several projects for upgrading or constructing new transmission lines have been proposed (National Infrastructure Planning 2012), and large investments are forecast over the next decade, estimated at over £100 billion (Department of Energy and Climate Change 2011). However, recent cases of local opposition to the construction of new high voltage power lines in England, Wales and Scotland (Save Our Valley 2012; No Moor Pylons 2011) suggest that this will not be an easy task.

5.2. Participants, contexts of research and procedure

A survey tool was used to examine people's responses to high voltage power lines, and was applied at two levels. At a national level, an online survey was used in January 2012 to collect data from a sample of 1519 UK residents (aged 18+) that were representative by age, gender, socio-economic classification and region, according with the 2001 Census. A similar survey was conducted in February and March 2012 with representative samples of four settlements (three towns and one village) that were affected by two specific projects of new high voltage power lines: the Hinkley Point C (HPC) connection in South West England that aims to connect a new nuclear power station to the national grid, and the Mid Wales (MW) connection that aims to connect new wind farms to the grid area^v. Informed by the place-based approach, two settlements in the vicinity of each project were identified and researched: the town of Nailsea ($N=125$) and the village of Yatton ($N=125$), in the context of the Hinkley Point C connection; and the towns of Welshpool ($N=127$) and Shrewsbury ($N=125$) in the context of the Mid Wales connection. The 'local' survey was conducted through

face-to-face interviews, and the representativeness of the sample in each settlement was guaranteed through a quota sampling process derived from census 2001 data regarding gender, age group, tenure and working status. All respondents had to be aged 18 or over and only one person was interviewed in any one household.

5.3. Measures

The surveys included questions to tap into several aspects of people's responses, including attitudes towards new overhead power lines both in general and to be constructed near the place where respondents live, and project-related factors, namely beliefs about who is usually involved in decision-making processes and perceived local impacts. For the national sample, participants were informed that the survey wanted to examine what people think about the development of high voltage power lines. For the local samples, participants were also asked about their awareness of the proposal to build a high voltage power line near the area where they live. For those who were not aware of it, information was given that "There are plans to build a new high voltage power line near to (name of town or village)". No information was provided to participants about the justification or need to construct the high voltage power lines.

Attitudes towards new power lines in general were similarly accessed in the national and local surveys, through the item 'I am in favour of overhead powerlines generally' answered through a 5-point Likert scale from 1=Strongly disagree to 5=Strongly agree. Attitudes towards power lines to be constructed in the places where respondents live were accessed through the following questions: for the national sample, it was asked "To what extent would you support the building of a new high voltage powerline in the area near to where you live (i.e., within 3 miles)?"; the local

samples were asked “To what extent do you oppose or support the building of a new high voltage power line in the Somerset/Mid Wales area?”. In both cases, questions were answered through a 5-point Likert-type scale from 1=Strongly oppose to 5=Strongly support. These measures were based on previous research examining support for high voltage power lines and other energy technologies (Devine-Wright 2013; Devine-Wright and Howes 2010).

Regarding beliefs about who is involved in decision-making processes for high voltage power lines (Gross 2007; Firestone et al. 2012), we asked participants in the national and local surveys “To what extent do you think each of the following are involved in decision making about new powerlines?”. We identified a range of actors including a) Local residents; b) Local politicians; c) Government/government ministers; d) Ofgem (Office of Gas and Electricity Markets)^{vi}; e) Energy companies; f) Environmental organisations; g) Outdoor recreation organisations; h) National Grid Plc.

We then asked participants about expected local impacts of new high voltage power lines, based on previous studies (Devine-Wright and Batel 2013; Devine-Wright 2013), and through the following question: “The following are statements about possible benefits and drawbacks that overhead powerlines might create locally. Please indicate to what extent do you agree or disagree with each statement... a) Reduce the quality of the landscape; b) Provide jobs in construction and maintenance of the powerline; c) Ensure safe and stable delivery of electricity; d) Reduce the value of nearby property; e) Endanger people’s health from electric and magnetic fields; f) Damage tourism in the vicinity; g) Provide income for the local authority and landowners; h) Affect local birdlife negatively; i) Reduce people’s enjoyment of being outdoors in the landscape; j) Impact negatively on wildlife; k) Hinder the sale

of property; l) Safeguard the delivery of electricity; m) Represent a threat to people's health. All the items were answered through 5 point Likert-type scales from 1=Strongly disagree to 5=Strongly agree. For all questions, scales also had a "Don't know" (=6) possibility.

5.4. Results^{vii}

5.4.1. The 'national' in the national-local gap

As already argued, one of the main shortcomings of research examining the 'national-local gap' is that it assumes public support at the national level, associated with the idea that people will only be concerned with energy issues if they are affecting them locally. With that, research tends to dismiss the investigation of other beliefs besides attitudes at the national level. To overcome that, we included questions in both national and local surveys about perceived local impacts of high voltage power lines and about who is involved in decision-making processes (see Figure 1).

Figure 1 – Descriptive statistics (%) for perceived involvement in decision-making of National Grid, energy companies, the government, environmental organisations and local residents regarding new power lines, at national and local case study levels

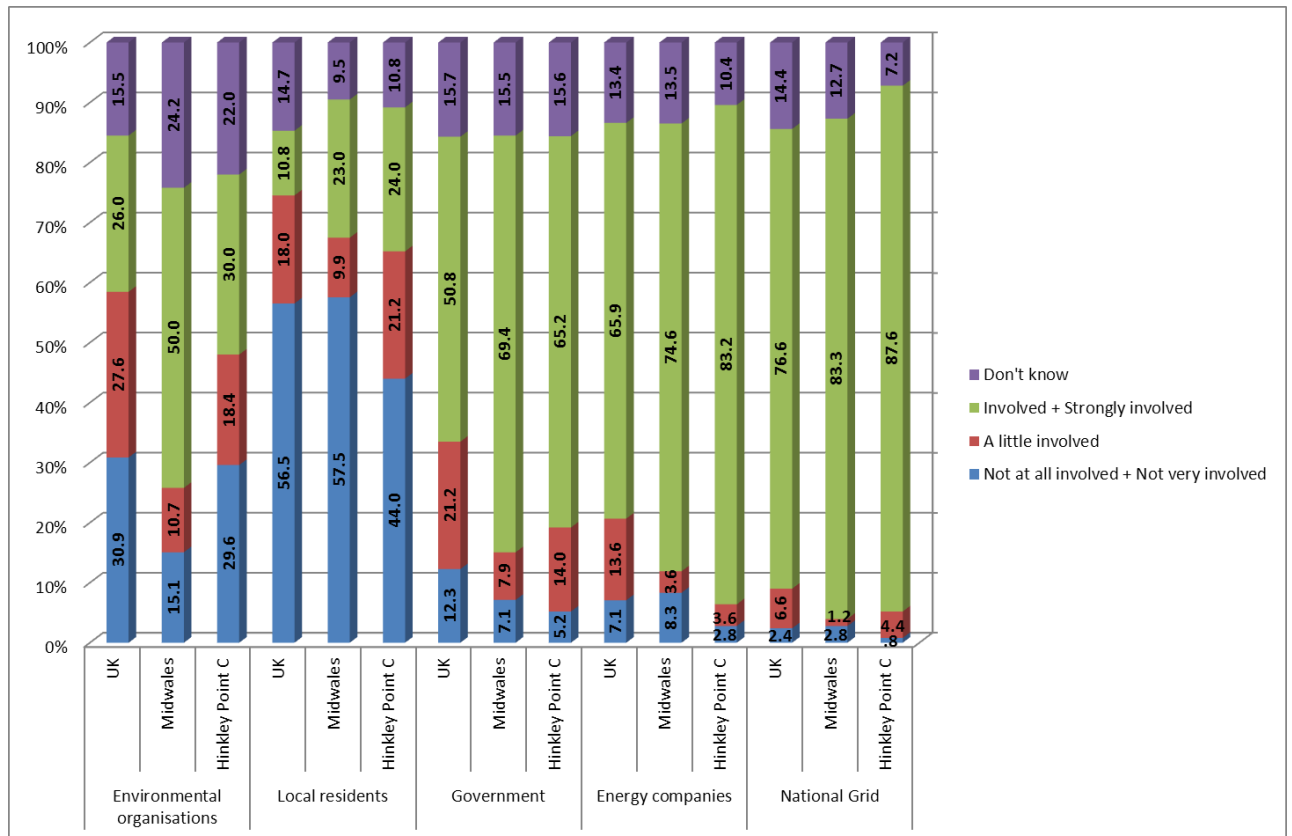
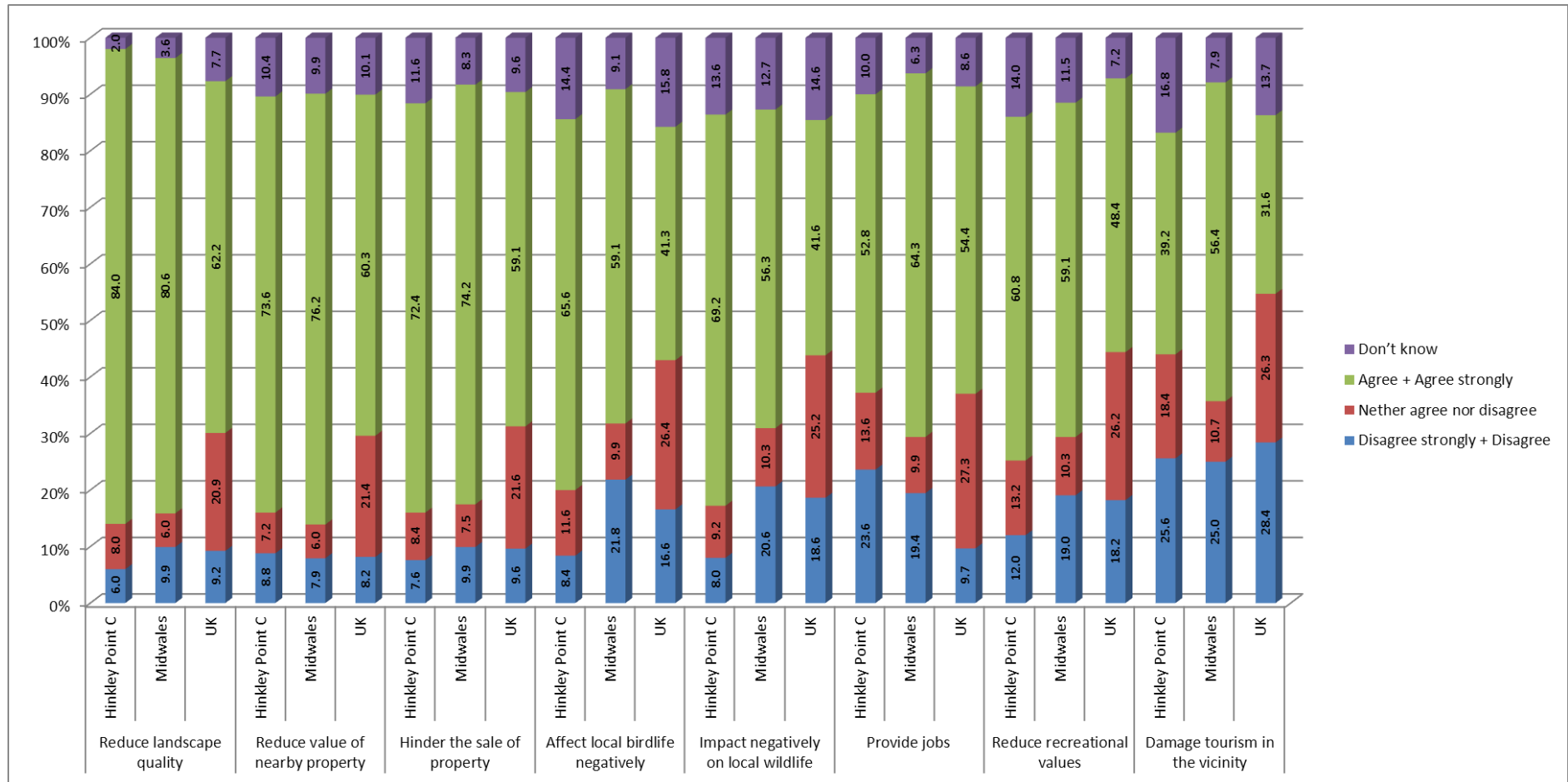


Figure 1 reveals two main aspects regarding perceived involvement in decision-making. First, there are clear similarities between the national and local survey samples^{viii}: regarding the actors they perceive as being more involved (institutional actors: National Grid Plc., energy companies, the government) and as being less involved (local residents and environmental organisations) in decision-making processes. For instance, regarding National Grid, the pattern of responses is more similar between the Mid Wales and UK samples, than between the Mid Wales and Hinkley Point C samples. For energy companies, in turn, there does not seem to

be much difference between the responses of the three samples. A second aspect is the low percentage of “Don’t know” answers in the national sample compared with the local samples, which suggests that, generally, participants in the national sample were as much able to think about and provide answers on who they believe is involved in decision-making on transmission lines, as participants in the local samples who are being impacted by real projects to be constructed near the place where they live.

Figure 2 illustrates the descriptive data for the five most expected local impacts^{ix} of new high voltage power lines broken down by the responses to the national and local surveys, and the latter with responses given across the specific projects. Results show two similarities between national and local levels. First, the three most expected local impacts of new power lines are similar for both national and local samples, both in the HPC project context and in Mid-Wales: new high voltage power lines are expected to reduce the quality of the landscape (UK-62.2%; HPC-84%; MW-80.6%), to reduce the value of nearby property (UK-60.4%; HPC-73.6%; MW-76.2%) and to hinder the sale of property (UK-59.1%; HPC-72.4%; MW-74.2%)^x. Second, results indicate that the degree to which those impacts are expected to happen is quite similar for the national and local survey respondents, even though at the local level, people agree slightly more strongly that those impacts will be felt and at the national scale the proportion of “Neither agree nor disagree” responses is slightly higher. These results highlight the similarities across national and local levels regarding involvement in decision-making and expected local impacts; and suggest that citizens at a national level can also think about these issues even if they are not affected by them ‘directly’.

- Figure 2 – Descriptive data (%) for the five most expected local impacts of new power lines, broken down for national and local case study survey samples



5.4.2. The ‘local’ in the national-local gap

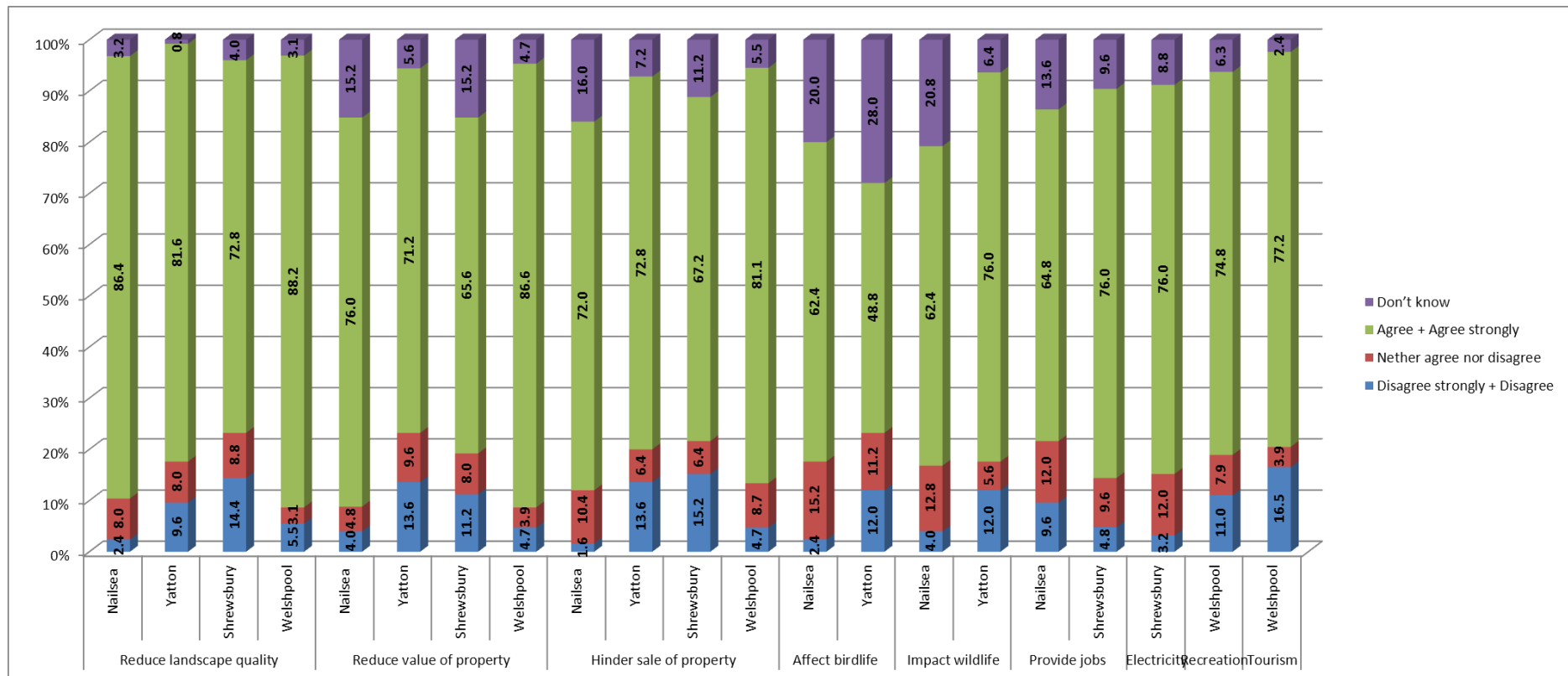
Another shortcoming of research on the ‘national-local gap’ is the fact that the examination of local responses tends to be based on a siting approach rather than on a place-based approach. In other words, analyses tend to just look at how people living around a given project perceive it, without taking into account the places or settlements where they live. If we look again at the ‘local’ data presented in Figure 2, we see that those results suggest that perceived local impacts of power lines are similar in the two places or settlements in each of the two project contexts, that is, in the town of Nailsea and the village of Yatton in the context of the HPC connection, and in the towns of Shrewsbury and Welshpool in the context of the Mid-Wales connection. Nevertheless, this may not be the case – it is therefore important to disentangle the perceptions of residents in each of the places that are affected by each project.

Figure 3 presents descriptive data (%) for the five most expected local impacts in Welshpool and Shrewsbury (Mid-Wales) and in Yatton and Nailsea (Hinkley Point C). Results show that in Shrewsbury the five most expected local impacts, based on the % of “Agree” and “Strongly Agree” answers, are “Provide jobs”/“Ensure safe and stable delivery of electricity” (both 76%), “Reduce landscape quality” (72.8%), “Hinder the sale of property” (67.2%), and “Reduce the value of property”/“Safeguard the delivery of electricity” (both 65.6%). On the contrary, in Welshpool, the five most expected local impacts are “Reduce landscape quality” (88.2%), “Reduce the value of property” (86.6%), “Hinder the sale of property” (81.8%), “Damage tourism in the vicinity” (77.2%), and “Reduce recreational values” (74.8%). In the same vein, in Nailsea, the most three expected local impacts are the

same as for Welshpool (with 86.4%, 76% and 72.8%, respectively), but these are then followed by “Provide jobs” (64.8%), and “Affect local birdlife”/“Impact local wildlife” (both 62.4%). Finally, in Yatton, the most five expected impacts are, in this order, “Reduce landscape quality” (81.6%), “Impact local wildlife” (79.1%), “Hinder the sale of property” (72.8%), “Reduce the value of property” (71.2%), and “Affect local birdlife” (68.8%).

These results indicate both similarities *and* differences between the residents of the different places directly affected by the power line projects regarding their expected local impacts. These are probably shaped by the particular characteristics of each place and the way residents relate with and represent those places. These results highlight that the differences and their potential impact for a better understanding of local communities’ responses to new high voltage power lines would be overlooked if responses were aggregated by case study or separated according to their residential proximity/spatial zone in relation to the project - what we have described as a ‘siting perspective’ - as performed in Figure 2. Using surveys to go beyond the aggregation of the communities of locality affected by a given project allows us then to have more specific, context-sensitive information about people’s beliefs regarding those projects.

Figure 3 – Descriptive data (%) for the five most expected local impacts of new power lines, at the local scale, separating out each settlement sample



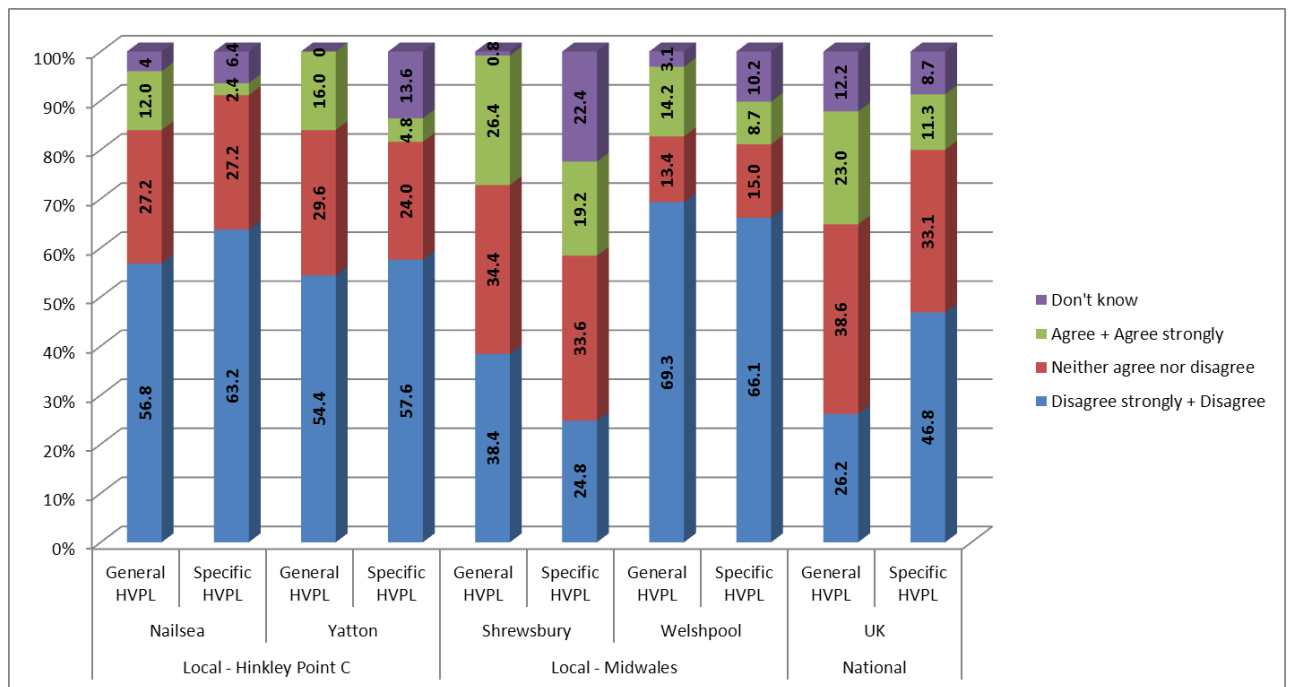
5.4.3. The national-local ‘gap’: To what extent does it exist?

The national-local gap has been defined as public support for low carbon energy technologies and associated infrastructures in general and local opposition against real project proposals. But what Figure 4 suggests is that if we ask the right questions, at the same level of specificity, across national and local samples, a national-local gap, at least as it is usually defined, might not be found. In fact, having in mind only the idea of ‘public support for energy technologies’, Figure 4 shows that for the national sample the proportion of disagreement with high voltage power lines to be hypothetically constructed near the place where respondents live is actually quite high (nearly 50%), and clearly higher than regarding power lines in general - something which is not consistent with the conventional definition of the ‘national’, in terms of presumed positive attitudes, in the national-local gap.

Second, and now having in mind the presumption of stronger opposition by ‘local communities’ against technologies to be constructed near the place where they live, Figure 4 shows that actually Nailsea, Yatton and Welshpool residents are more objecting both towards those projects and power lines in general when compared with the national sample. However, if we take a look at the data for Shrewsbury, a different pattern is found - we see that for the national sample attitudes towards (hypothetical) power lines to be constructed near the place where respondents live, are more negative than in Shrewsbury. In sum, these results do not support in a consistent way the definition of the ‘local’ in the national-local gap diagnosis, that is, as always involving situations where local communities indicate higher levels of disagreement with energy infrastructures to be constructed near the place where respondents live, as compared with the public at a national level. Finally, it is notable that the proportion

of responses disagreeing with power lines to be constructed near the place where respondents live, does not differ much between the national and local samples.

Figure 4 – Descriptive data (%) for attitudes towards new power lines in general and to be constructed near the place where participants live, at National and Local scales, separating out each settlement samples



6. Discussion

In this paper, we argued that research examining the national-local ‘gap’ in public responses to large-scale energy infrastructures is based upon some assumptions which not only may prevent a better understanding of those responses, but also maintain to some extent a ‘NIMBY’ representation of publics (see also Aitken 2010). Specifically, we proposed that more attention should be given to three aspects in this area of research. First, overcoming the already reified assumption of positive attitudes towards energy technologies by broadening investigations into national level

responses to those infrastructures. Second, deepening research into local communities' responses to energy infrastructures by moving from a siting to an emplacement perspective, which allows the disentangling of how individuals and groups resident in different places perceive the same project. Third, examining to what extent the national-local gap exists, through comparing responses to large-scale energy infrastructures at the same level of specificity, that is, either regarding energy infrastructures in general, or energy infrastructures to be hypothetically or actually constructed near the place where people live.

We then empirically demonstrated the importance of considering these aspects by presenting results from a study of high voltage power lines, with data collected through surveys conducted with a national sample – representative of UK residents – and with local ones – representative of four settlements (three towns and one village) in England and Wales that are affected by proposals for high voltage power lines to be constructed nearby. Bearing in mind recent critiques of the use of opinion polling and surveys (e.g., Aitken 2010; Ellis, Barry, and Robinson 2007), we also aimed to illustrate how surveys may be used in a way that allows for a more complex and context-sensitive approach and can inform this literature in articulation with other methodologies, namely qualitative ones.

Results suggest that it might be as important to examine project-related factors at a national as at a local level – the similarities found between national and local responses to different aspects of high voltage power lines suggest that even when energy issues are not ‘directly’ affecting respondents – i.e. at a national level – individuals can also think about and relate to these issues, something which contests the prevalent representation of the energy user as irrational, selfish and parochially minded - only concerned with energy issues when they affect people directly, in their

own backyard (see also Wolsink 2000). It seems to be relevant then to adopt a more relational perspective between scales in this area of research (Paasi 2004), since these can hardly be assumed as separated by neat boundaries (Owens and Driffill 2008): residents of communities of place are both local *and* national citizens affected by nationally significant projects that happen to be sited close to where they live. Therefore, broadening research at the national level by increasing the number and complexity of the questions asked regarding project-related factors, as we have begun to do in this study, may contribute towards a better understanding of the national-local gap, or to what extent it really exists.

Second, the results emphasize the relevance of adopting a place-based approach rather than a siting one (Devine-Wright 2011). Results highlight that if, instead of just aggregating all people living locally or artificially categorising individuals based upon residential distance to the construction site, we examine responses based on communities of locality at the local level, this can allow us to have more in-depth and context-sensitive information about people's beliefs regarding energy infrastructures. This approach might enable a better understanding of why there are distinct responses to energy infrastructures in different places and this, in turn, can impact on policies for their deployment and on their acceptance or support (Bell, Gray, and Haggett 2005; Batel, Devine-Wright, and Tangeland 2013). In the settlements considered in the present research, different responses towards the power line proposals emerged, regarding attitudes and expected local impacts. To understand these different response patterns, it is important to take into consideration the different characteristics of each place and how it is constructed by the residents (Pidgeon and Demski 2012). However, the present study could be criticised for failing to tackle emplacement in sufficient depth. To do that more effectively, it would be useful to

combine surveys with qualitative methods, such as ethnography, in-depth interviews and focus groups, which enable a better understanding of how the specific history of each place impacts upon responses to change in those places, as well as differences within different places, and not only between those (Castro and Mouro 2011).

Finally, the results highlight the importance of examining to what extent the so-called national-local ‘gap’ actually exists. Specifically, the comparison of national and local perceptions regarding high voltage power lines at similar levels – either concerning those infrastructures in general or to be constructed near the place where people live – revealed that similarities between participants at national and local levels may be greater than differences: there was no clear pattern distinguishing attitudes towards power lines at the local level from attitudes at the national level. Moreover, and as already mentioned, in some specific places at the local level, attitudes towards real power lines were more positive, or at least less negative, than at the national level, where respondents were asked about a ‘hypothetical’ power line to be constructed near the place where they lived and not about a real one.

Addressing these assumptions has important implications, not just for future research but for policy. If academic research in this area continues to reify the national-local gap as incoherent and contradictory, it contributes, even if unintentionally, to reinforce the idea that something is wrong, irrational and illogical with local communities’ opposition to energy projects (see also Aitken 2010). In the future, research looking at how project- and place-related factors affect public responses to energy infrastructures should integrate proposals from conceptual approaches that aim to understand how people make sense of (new) social objects (e.g., the deployment of large-scale energy infrastructures) and are active and strategic in doing so (Batel and Devine-Wright in press). The Theory of Social

Representations (Moscovici 1961/76), for example, recognizes that social change often implies the co-existence of different, and apparently contradictory, attitudes, beliefs and practices, at least for a certain period of time. Several studies have demonstrated how that co-existence may be instrumental and strategic for individuals and groups to adapt to social change and to resist it (see Castro and Batel 2008), and that this co-existence should not be portrayed as paradoxical or incoherent. In fact, it might just be expressing a type of qualified support (Bell, Gray, and Haggett 2005) - or qualified resistance -, or an “imperfect correspondence between agreement and action”, recurrent when social change is becoming generalized throughout society (Castro and Mouro 2011, p.369).

The practice of surveying public perceptions at the national level on energy and climate change issues has long been used to inform policy making. In the UK, Government-funded large scale “Public Attitudes Tracking Surveying” (Department of Energy and Climate Change 2012), includes questions about renewable energy in general, but fails to tap other important factors, such as beliefs, perceived impacts, beliefs about decision-making processes, among other project and place related factors. Moreover, the questions included about renewable energy do not assess in a systematic way positions about both energy infrastructures in general and energy infrastructures to be constructed near the place where respondents live, across different scales, and do not enable identification of beliefs about distinct models of infrastructural development, such as large or smaller scale energy infrastructures (see Devine-Wright and Batel, 2013, for a discussion). The results presented here provide concrete suggestions for policy-makers to improve the ways that they draw upon “empirical evidence and analysis to help understand and explain the nature of human

behaviour, social structure and cultures” (see Department of Energy and Climate Change 2012).

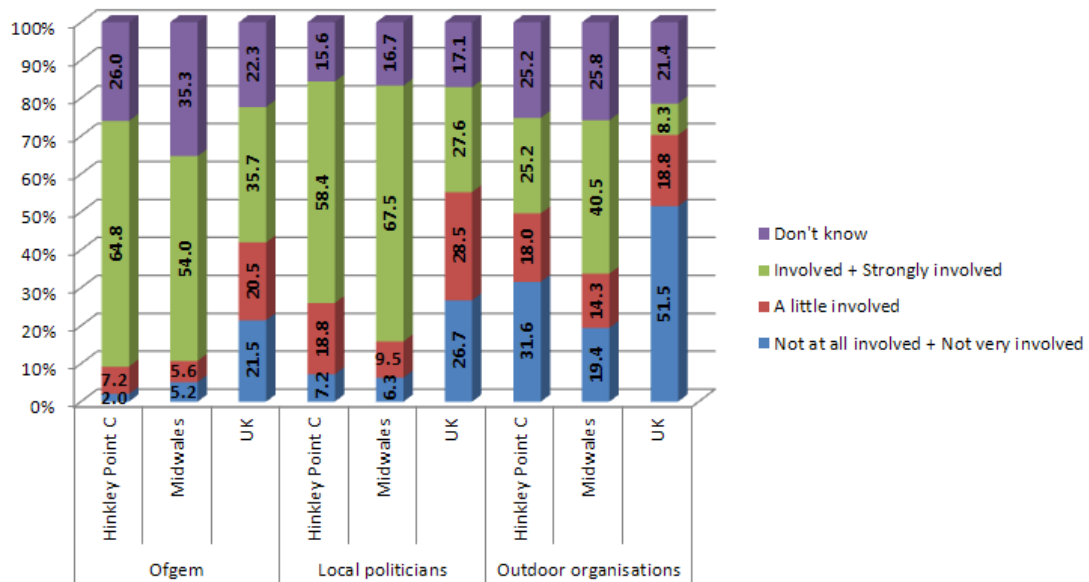
The present research has some limitations and leaves several questions unanswered. One of the issues that should be better explored and controlled for in future studies is to what extent the differences or similarities between national and local levels are associated with the type of area where people live, namely, urban vs. rural and representations of and relations with those different types of areas (Halfacree 1993). In other words, it is worth discussing further what we are talking about when we talk about ‘national’ and about ‘local’, specifically when we discuss their differences and similarities. It would also be important to make use of qualitative methods to more thoroughly understand people’s understandings, beliefs, attitudes, and emotions about energy infrastructures and particularly how specific meanings related with those - such as national, local, general - are constructed (see also Ellis, Barry, and Robinson 2007; Haggett and Futak-Campbell 2011). For instance, what are people thinking about when we ask them their attitudes towards renewable energy or renewable energy technologies? What does renewable energy mean to them? More specifically, it would have been important in the present study to get more information about each specific place that could afterwards influence the construction of the surveys and allow the latter to more fully incorporate an emplacement perspective. Finally, it would be very relevant to enlarge the scope of project-related factors researched at a national level in order to include, for instance, public perceptions about the participation of citizens in decision-making processes for new energy infrastructures, and their views on the benefits and risks of the deployment of those at different scales, such as local, national and global. It would also be of interest to further examine relations with place at different scales (e.g. local, regional or

national, see (Devine-Wright 2013), so that research on public responses could be informed by knowledge of participants' strength of belonging at each of these levels.

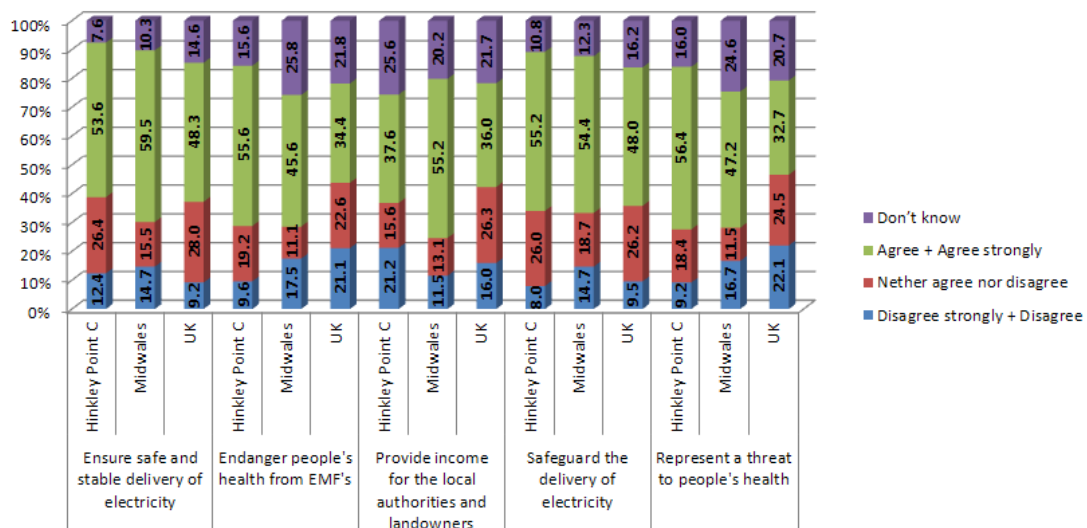
In conclusion, future studies of public responses to large scale energy infrastructures, whether instigated by academic social scientists or by government funded market researchers, should examine in a more systematic way people's responses by comparing general and specific beliefs across multiple spatial scales and by taking into account different types of factors such as project- and place-related ones. Pursuing this more systematic analysis would provide a better understanding of public responses, and would enable research to be undertaken in a way which assumes a different representation of the energy user from the NIMBY concept, as someone that is potentially socially, environmentally and politically active, and both locally *and* nationally engaged. Finally, our analyses indicate the value of using survey methods, when informed by a contextualised, socially driven approach, for the study of public responses to large scale energy infrastructures.

Appendices

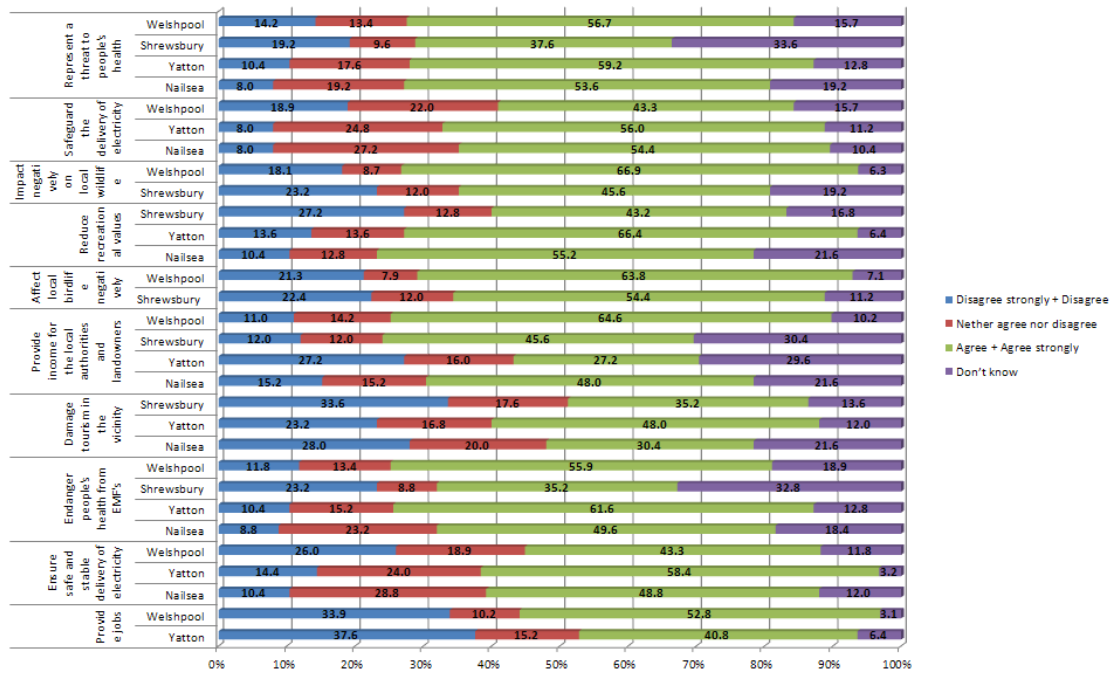
I. Descriptive data (%) for perceived involvement in decision-making of Ofgem, local politicians and outdoor recreational organisations regarding new power lines, at national and local case study scales



II. Descriptive data (%) for the expected local impacts of new power lines not reported in the main text, broken down for national and local case study samples



III. Descriptive data (%) for the expected local impacts of new power lines not reported in the main text, at the local scale separating each settlement sample



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ⁱ Even if nuclear power has (again) started to attract less support after the Fukushima accident in March 2011 (see Pidgeon & Demski, 2012).

ⁱⁱ Underline and bold added by the authors.

ⁱⁱⁱ And this includes as much places which are or will be physically ‘close’ to the infrastructure, as those which can be physically more distant but are still interested in and feel affected by the project. Or, in other words, includes as well the consideration of ‘communities of interest’ (see Bristow, Cowell & Munday, 2012) within, across and beyond communities of locality.

^{iv} Concurrently with what Bell and colleagues (2005) propose, we might be seen as discussing to what extent a ‘gap’ – either individual or social – exists at all, or if it is instead the result of the way in which research usually examines people’s responses to energy infrastructures (e.g., by not examining qualifiers to people’s support to energy technologies in opinion polls – Bell, Gray, and Haggett, 2005).

^v Despite the fact that nuclear power and renewable energy sources might be considered different taking into account public’s responses to them (Pidgeon & Demski, 2012), the analyses of the Hinkley Point C and Mid Wales case studies based on secondary data and namely on the websites from protest groups (e.g., Montgomeryshire Against Pylons, 2013; Yatton Against Pylons, 2012; Save Our Valley, 2012) suggest that positions regarding the high voltage power lines are to a large extent independent from positions regarding the energy generation infrastructures they are needed to connect with. Moreover, previous studies (see Devine-Wright & Batel, 2013) have suggested that the transport of electricity from renewable energy sources is not a very supported mitigation measure of the impact of high voltage power lines.

^{vi} Ofgem is the main regulatory institution for electricity and gas markets in Great Britain.

^{vii} It should be noted that in the results section we will often, for the sake of the arguments we are aiming to empirically support, present the local data twice: sometimes through an aggregated, case-study approach (presenting data for HPC project and MW project) and other times through a place-based, disaggregated approach (presenting data for Nailsea, Yatton, Shrewsbury and Welshpool separately).

^{viii} Even if some differences were also found between national and local scales for the perceived involvement of local politicians, Ofgem, and outdoor recreational organisations – see Appendix I.

^{ix} Due to space constraints, only the five most expected local impacts, calculated through the % of “Agree” and “Strongly Agree” answers, are reported here. However, we report descriptive data for all the other local impacts in the Appendices.

^x The fourth most expected local impact is, for both the UK and Mid Wales samples, “Provide jobs in construction and maintenance of power lines” (with 54.4% and 64.3% of, respectively); and for the HPC sample, “Impact negatively on local wildlife” (69.2%).