Using role play to explore energy perceptions in the United States and United Kingdom

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We present the methodology and results of a role-play game that explored energy preferences and decision making criteria for a hypothetical town. Six day-long, mixed-methods workshops focussing on public perceptions of shale gas and oil development were held with highly diverse groups in four urban locations (Los Angeles and Santa Barbara, US; London and Cardiff, UK) and two rural locations (Hirwaun and Winford, UK), N=83. As part of the workshops, small groups of participants assumed the role of town council members and were asked to debate and rank six energy infrastructure proposals (wind, solar, nuclear, shale gas, shale oil, and coal) in order of preference; a task that stimulated energetic, in-depth discussions around preferences, decision-making criteria, conditions and trade-offs. We reflect on how role-play methodology can be used to elicit insights into the nature of complex decision-making, as well as affording participants clarity and efficacy about decisions, and providing a novel platform by which to engage with energy conundrums. We also elucidate the challenges posed by inevitable disparities between role play and reality, and those associated with materials, framings, and group dynamics. Finally, we make recommendations for extending and refining the methodology, including participant-led framing and cautious consensus building.

Keywords: public perceptions; energy; local governance; role play methods

1. Introduction

Major energy system transformations are required to address climate change and build secure and affordable energy supplies for the future, particularly in the global North. While research has begun to explore how individuals view the policy decisions, trade-offs and conditions associated with these energy system changes (e.g. Demski et al., 2015), less work has focused on how these decisions operate at a 'local' level. This is particularly important for energy developments, which may bring national-scale benefits but negatively impact a local area (e.g. Cotton, 2017) and elicit different concerns –and strengths of concern- on local and national levels (Evensen & Stedman, 2016). There have been calls for a more polycentric approach to the of governance of energy infrastructure (Goldthau, 2014) and some towns and cities are now developing visions for energy system change and/or assuming leadership roles in climate mitigation and energy development (e.g. Dall'O et al., 2013; Trutnevyte, 2014), including climate policies mobilised by the mayors of LA and London (Bulkeley, 2010).

At all scales of governance, energy policy is complex, multifaceted, and fraught with debate. For example, while some suggest that 'unconventional' sources such as shale gas and oil provide a means to reduce future dependency on imported fuels and facilitate a transition to a lower carbon economy, others argue that fossil fuel reserves must remain in the ground to limit global warming (McGlade & Ekins, 2015). Renewable energy sources are not without their drawbacks either and, particularly at the local level, proposals consistently face public resistance.

The acceptance or rejection of a given energy proposal has been shown to depend on the characteristics of the technology and a variety of psychological and social processes. The cost of the project, perceived riskiness, and potential employment opportunities have been cited as important characteristics (Ansolabehere & Konisky, 2012; Stokes & Warshaw, 2017; Ter Mors et al., 2012), while key psychological influences include place attachment, image associations and emotional evaluations (Oltra et al., 2012; Truelove, 2012). Social and institutional factors include trust in industry/government, equity, participation and procedural fairness (Baxter, 2017; Einsiedel et al., 2013; Oltra et al., 2012).

These aspects are in turn influenced by wider contextual factors (Oltra et al., 2012). They include regional legacies of natural resource extraction or energy generation, which have been shown to act as a sense-making tool (Bugden et al., 2017), with acceptance or opposition seeming to depend on whether past experiences have been positive or negative (Boudet et al., 2016; Wright & Boudet, 2012), and also upon whether this experience combines with current economic hardship (McAdam & Boudet, 2012). The factors influencing acceptance and opposition can change over time, often prompted by key events and associated social amplification (Pidgeon et al., 2003), which can have remarkably different effects in different settings (Poortinga et al., 2013).

Fluctuations in public opinion have been a topic of significant academic and policy research in North America and Europe for over 30 years (Freudenburg & Rosa, 1984; Keeney et al., 1990; Wynne, 1982), investigating in detail public attitudes towards issues such as nuclear power, radioactive waste storage, renewable energy proposals and shale development (Lis et

al., 2015; Slovic et al., 1991; Thomas et al., 2017b; Walker, 1995; Wynne, 1982). Engaging lay publics in energy decisions is important for a number of reasons. In democratic societies, potentially affected people have a right to be heard, and public participation can both increase legitimacy and improve confidence in decision makers (Beierle & Cayford, 2002; Fiorino, 1990). Furthermore, the existence of 'lay expertise' means that lay risk judgments may be as sound (or more so) than expert risk judgments. Local knowledge can add a valuable layer to risk understandings, thus improving the quality of decisions and ultimately leading to more sustainable choices and more effective governance (Centner, 2016; Fiorino, 1990; Irwin & Wynne, 1996; Renn, 1999; Stern & Dietz, 2008; Stern & Fineberg, 1996).

Methods for engaging the public with energy issues include traditional surveys, qualitative studies, and innovative approaches such as biogeographical methods (Henwood et al., 2016), narrative fictions (Raven, 2017), 'serious games' (Rai & Beck, 2017), future expert imaginaries (Pidgeon et al., 2009), storytelling (Moezzi et al., 2017) and scenarios (Butler et al., 2013; Demski et al., 2017; Pidgeon et al., 2014). Scenario methods in particular provide opportunities to think about alternative realities and possible futures, and in so doing a means to consider multiple viewpoints, prioritise key concerns and generate recommendations for action (Kosal, 2009). They are increasingly popular methods with which to elicit perceptions about complex and controversial issues such as energy transitions, providing a way in which to 'keep it complex […] to be plural and conditional when considering questions and options' (Stirling, 2010, pp. 1029-1030).

Role play is different in that it asks participants to imagine these alterative realities by adopting a particular role - by 'putting themselves in others' shoes' (Cabral, 1987, p. 471). They are 'group dramatic procedures that involve spontaneous enactment of either real or hypothetical social situations' (ibid, p. 470), where an emphasis is on 'doing' (Ruhanen, 2006, p. 37). In addition to the advantages offered by scenario methods, role play encourages participants to try to see the world from other peoples' perspectives, and think about how they would behave if in a particular role. Participants can find themselves freer to voice opinions (Ruhanen, 2006); and by immersing themselves in the subject, enhance their learning, interest, motivation and participation (Ruhanen, 2006), in part by making the situation more 'concrete' (Out & Lafreniere, 2001, p. 571).

Role-play is a fundamental aspect of participatory theatre, which has been used to engage publics with energy and natural resources (e.g. Guhrs et al., 2006; Osnes, 2013). Such methods have been shown to empower marginalised people, open communication channels, engage communities in lively discussions about abstract issues, and encourage critical thinking about energy options. Such research has tended to be used in a development context and with marginalised people, and we would argue that more could be made of role-play in other contexts. Furthermore, while we draw some parallels between our method and those that have asked members of the public to pretend they have been asked to provide the government with advice or energy preferences (e.g. Fleishman et al., 2010; Scheer et al., 2013); none to our knowledge has asked participants to assume the role of governmental decision makers themselves, as we do here.

2. Methods

2.1.Rationale

Here we utilise role play methodology to task participants with choosing between six energy infrastructure options for a fictional town. The main aim of this paper is to elucidate the ways in which our method helped us to gain insights into a) how people think about various energy technologies, including in relation to shale oil and gas, b) how they choose between these technologies, and c) how these decisions play out at a local level. Specifically, we included five elements that enabled this, as follows:

1. We asked each participant to assume the role of a council member
2. Participants were asked to individually rank the technologies in order of preference
3. Each option included a set of attributes, which were not directly comparable
4. In groups, participants were asked to reach a consensus ranking
5. We gathered and analysed qualitative data

Firstly, we asked each participant to assume the role of a council member. Although there is a substantial body of literature exploring perceptions of energy at the local level, this has predominantly looked at specific proposals and perceptions of the planning process (e.g. Devine-Wright, 2011; Zoellner et al., 2008), with less of a focus on strategic decision making and priority setting. With few exceptions, energy ranking tasks have also tended to focus on national or state-wide decision-making rather than local siting decisions (de Best-Waldhober et al., 2012; Einsiedel et al., 2013; Fleishman et al., 2010; Scheer et al., 2013). Those that have elicited local-level preferences have tended to elicit these from stakeholders rather than 'lay' publics (Bessette et al., 2014; Kowalski et al., 2009).

Asking participants to assume the role of a council member defines a relevant decision-context and scale. We anticipated that this would make abstract concepts and issues more concrete and help participants grapple with the complex issue of energy policy. As outlined in our introduction, we also felt it was important to focus on the local element because a) the negative impacts of energy infrastructures are often felt at the local scale, b) different concerns tend to emerge at local and national levels, and c) municipal and regional decision makers are increasingly making their own plans for climate change and energy policies. This focus complemented our other workshop tasks, which elicited more national level concerns (Thomas et al., 2017a). Furthermore, adopting the role of a council member means that not only do participants need to take on the perspective of the decision-maker, but they also, as that decision-maker, have to think about the broader public that (s)he serves. In this sense, participants needed to think about the broader perspectives that might influence a decision such as energy infrastructure siting.

Our second element involved asking participants to rank technologies in order of preference. Decisions require options to choose from (e.g. Einsiedel et al., 2013; Fleishman et al., 2010; Scheer et al., 2013), and we hypothesised that a ranking approach would enable us to explore how the technologies compared with each other, and prompt discussions of trade-offs. The third element involved providing a set of attributes that were not directly comparable (Table 2). This was in order to stimulate as much discussion as possible and avoid basing decisions

solely on pre-defined attributes; thus allowing factors such as pre-existing attitudes to emerge.

Fourth, each group was asked to reach a consensus ranking. The idea here was again to generate more deliberation, debate and discussion (c.f. Stagl, 2006), which can improve comprehension (e.g. Fleishman et al., 2010) and help participants grapple with complexity, uncertainty and ambiguity (Renn & Klinke, 2004; Stirling, 2010). It is true that forced consensus poses a risk of deadlocked discussions (Hastie et al., 1983) and can increase polarization (Mendelberg & Karpowitz, 2007); however, it can also lead participants to believe that deliberative discussions are more fair and comprehensive, and can foster more respect for the views of others (Davis et al., 1997; Delli-Carpini et al., 2004; Kameda, 1991; Kaplan & Miller, 1987). Consensus is not necessarily the primary goal of deliberation (Chambers, 2003), but consensus decision-making can allow participants to explore with one another other the trade-offs and conditions that themselves and others might place upon particular developments. The group setting means that participants need to negotiate and justify their choices, and deliberate and reflect on them in light of other people's opinions and arguments, and those who would be affected (Florig et al., 2001; Stagl, 2006). Results from real world deliberative forms have also shown that participants report significant approval of the recommendations of the group's consensus, even when the consensus recommendations were not consistent with their own preferences (Delli-Carpini et al., 2004). We positioned the consensus ranking at the end of the task in order to not limit more open deliberations earlier on.

The final element is our focus on qualitative data, which we hypothesised would allow us to explore the underlying values, attitudes, concerns and beliefs that shaped participants' choices. While eliciting ranks and preferences is not new in energy research, much has tended to focus on quantitative results, a trend that has been characteristic of energy research more broadly (Sovacool, 2014). Many ranking and preferences tasks have been carried out by means of online surveys (Bessette et al., 2014; de Best-Waldhober et al., 2012; Demski et al., 2017), whereby gaining an in-depth understanding of factors *underlying participants' choices* is difficult unless used in conjunction with a qualitative approach (Pidgeon et al., 2014). Furthermore, amongst ranking studies that have included qualitative elements, there has been a stronger focus upon the quantitative data (Fleishman et al., 2010; Scheer et al., 2013). While some participatory methods, such as structured decision making and deliberative mapping, prompt underlying factors directly by asking participants to explicitly rank their values or criteria (Arvai et al., 2001; Bellamy et al., 2013; Bessette et al., 2014; Burgess et al., 2007), these tend to use multi-stage frameworks. We were keen to keep the method as straightforward as possible on account of the task forming just one element of a full-day workshop; so instead we aimed to elicit wide-ranging discussions and analysed the range of ideas, concerns, beliefs and values that emerged. We should stress that while we present summaries of numeric rankings in Figures 1 and 2, this is predominantly a qualitative study to explore the underlying factors that shape participant's decision making about energy options. We are not attempting to generalize the specific results to broader populations of the US or UK, particularly when there is great heterogeneity in local level concerns around fracking (Thomas et al., 2017b).

2.2. Participants

Our study explores perceptions amongst diverse members of the public from six locations with varying demographics: large and smaller cities (Los Angeles and Santa Barbara in the US; London and Cardiff in the UK) and two rural locations (Hirwaun and Winford in the UK), N=83, Table 1. Each city is located in an area that has not yet experienced shale development activities and associated high degrees of social or media amplification of risk concerns (Pidgeon et al., 2003), but is close to prospective zones. The rural areas are also yet to experience shale development, but were subject to UK Petroleum Exploration Development Licenses at the time of the workshops in Autumn 2014. These licenses allow a company to pursue a range of oil and gas exploration activities subject to the necessary consents and permissions (UKOOG, 2017).

Whilst at a comparable level of *shale* development, the six locations have different energy infrastructures, policies and histories of resource extraction. They also have different characteristics and cultural geographies. Like much of southern and central California, Los Angeles and Santa Barbara have century-long histories with on- and off-shore conventional oil and gas development, but are also moving rapidly to incorporate renewable energy (solar and wind). Los Angeles is a global mega-city with a diverse economy and even more diverse population, best known as the centre of the world's entertainment industry. Oil wells and refineries dot the sprawling city in many of its industrial neighbourhoods. Santa Barbara is often identified as the origin site of the US environmental movement in response to a disastrous 1969 offshore oil spill. Today it is a thriving coastal university and high tech town with an international reputation for its Mediterranean climate and environmental beauty. Approximately 135km/84 miles up the coast from Santa Barbara lies California's last operating nuclear power plant, Diablo Canyon.

The UK's capital, London, is far better known for its financial services and melting pot of cultures than for energy development. Across the border, Wales' capital Cardiff has experienced significant urban development and regeneration since the 1980s, having grown as a centre for culture, arts and sports. Beneath its chic exterior, Cardiff has a proud historical association with coal, having grown prolifically as a centre of coal trade during the 19th and 20th centuries. The city still possesses strong links with many of the South Wales Valley towns and villages that supplied the 'black gold' to power the industrial revolution.

One such community is Hirwaun, which suffered widespread economic deprivation since the coal industry's decline during the 20th century. Hirwaun's hills are still home to the Tower Colliery, which was the oldest continually working deep coal mine in the UK until it closed in 2008, to be replaced by an open-pit mine. The village is also close to Wales' largest onshore wind farm at Pen y Cymoedd. Energy production is far less visible for the English village of Winford and surrounding Chew Valley. Characterised by arable and dairy farmland, the area is known more for its quaint villages than heavy industry, though it is relatively close (approximately 38km / 24 miles) to Hinkley Point nuclear power stations, which started generating electricity in 1965.

Each workshop involved between 10 and 16 participants drawn from within the four respective cities and the immediate areas surrounding the two rural sites. We recruited 'quasi-representative' samples, i.e. participants that are broadly reflective of the demographics of each case site, while recognising that true statistical representativeness of multiple demographic variables is impractical in small numbers. Groups were designed to be gender balanced and to match local demographics as closely as possible. This allows researchers and participants to explore a diversity of perspectives, drawing on different kinds of experience, vulnerabilities and identities; from which emerge varying outlooks (Conti et al., 2011; Strauss & Corbin, 1990). Final group composition was subject to unpredictable variance in attendance, leading to overrepresentation of some demographics and underrepresentation of others across the different groups (Table 1). Recruitment was carried out by neutral third parties and was topic-blind; participants knew only that the workshop would be about 'technology and society.'

Location		US urban		UK urban		UK rural	
		Los Angeles (LA)	Santa Barbara (SB)	London (LN)	Cardiff* (CF)	Hirwaun* (HN)	Winford* (WD)
Number of participants		16	15	10	14	13	15
Gender (female %)		50	67	50	71	39	33
Age profile (%)	18-34	44	27	40	43	30.8	27
	35-54	38	27	30	21	23.1	20
	55+	19	46	30	28	46.2	53
Ethnicity (non-white %)		75	53	30	7	0	7
Education (university degree or above %)		31	53	70	57	8	20

Table 1: Summary demographics. Percentages may not sum to 100 due to rounding effects; * one participant in Cardiff withheld age ethnicity and education information; one participant in Hirwaun withheld ethnicity information; three participants in Winford withheld education information.

2.3 Procedure

Following pilot workshops in the UK and US, we carried out six day-long, multi-task workshops focussing on public perceptions of shale gas and oil development. Here we focus on one element of the protocol: a 50-minute role play exercise, which we positioned towards the end of the day. We concentrate here on the methods we used for this task, and what insights these methods afforded us, particularly with regard to participants' decision making processes. See Thomas et al. (2017a) and Partridge et al. (2017) for details of the full workshop protocol, and detailed findings related to the perceived risks, benefits and societal implications of shale development, including in relation to climate change and energy systems.

Participants were split into two sub-groups (e.g. LN1 and LN2 in London) and asked to imagine that they were each a 'councillor' [UK] and 'council member' [US], for a fictional town called Salston. We presented each with six energy proposal cards, in a randomly ordered stack to minimise primacy and recency effects, and because there is some evidence

that energy technologies are evaluated differently depending on what they are being compared with, and on what order they are presented (de Best-Waldhober et al., 2009).

The cards contained the information shown in Table 2. Whilst broadly based upon those associated with existing or proposed energy developments, the card attributes (e.g. jobs, climate targets) are fictional, and were chosen to prompt discussion around a range of factors shown to be important in the acceptance literature. Cards were adapted for the UK/US context, with monetary figures based on the dollar/sterling exchange rate at the time, and variations [shown in parentheses] tailored to localised information. Each energy technology was given a name (e.g. 'Cadence Shale Gas Co.'), which have been omitted from this paper to avoid any confusion with existing companies possessing similar names.

The attributes were presented on the cards together with the following text: 'You are a town councillor [UK] / a city council member [US] for Salston, which is on the coast in Thennelshire [UK] / Thennel County [US], and home to 10,000 people. Salston is a bit run-down in places and has suffered recent job losses due to the closure of an industrial plant. However, it has an historic town centre and attractive surroundings of farmland, ocean and rolling hills. There is a pleasant beach to the east of town, popular with tourists in the summer months. Six companies have approached the council with proposals for energy developments. Your task is to choose which proposal to accept.' Facilitators were briefed to provide minimal extra information about the setting, but were free to prompt with questions such as, 'why is this your favourite?', or 'what other criteria would you have?'.

Proposal name and map	**Attributes [UK/US]**
Wind 	• We propose to build a wind farm on the outskirts of town, consisting of 76 wind turbines (228MW) • In the first year of construction and operation, the project will employ 300 people • The wind farm will generate enough energy to power 58,000 homes • This proposal will help [Thennelshire/Thennel County] meet its climate change targets to reduce carbon emissions by 80% by the year 2050
Solar 	• We propose to build a solar farm on 60 acres of land on the outskirts of Salston • This solar farm will feature 70,000 panels with a total capacity of 10 megawatts, providing energy for 2,500 homes in the Salston area. • This project will create 90 construction jobs over a 3-year period • The proposal will help [Thennelshire/Thennel County] meet its climate change targets to reduce carbon emissions by 80% by 2050

Nuclear 	• We propose to build one small nuclear power plant at the mouth of the river. The site will also provide temporary waste storage (100 years). • The [Department of Energy and Climate Change (DECC)/Department of Energy] will issue a construction subsidy of [£5 billion/$8 billion] to the company to minimise impact on consumer energy prices. • The project will provide thousands of employment opportunities during the construction phase (5-10 years), and 300 jobs at the new power plant for more than 60 years. • We will also donate [£30,000/$50,000] to a local charity to be chosen by councillors. • This proposal will help Thennelshire meet its climate change targets to reduce carbon emissions by 80% by the year 2050.
Shale Gas 	• We propose to build three fracking sites within Salston; two on sites beside the river that are on brownfield sites (previously developed land suitable only for industrial use), and another in the suburbs south of town. • If this proposal is chosen, the company will make a major contribution to [Thennelshire Coummunity Housing Fund/ Thennel County Housing Incentive Fund] for affordable housing in the area. • We will also donate £60,000/$100,000 to the [Salston Memorial Community Centre/ Salston Memorial Healthcare Center]. • In the first 3 years of construction and operation, between 5 and 50 full time jobs will be created, as well as 270 jobs for contractors visiting from outside Salston.
Shale Oil 	• We propose two fracking sites, on private land located just outside of town. • If this proposal is chosen, the company will donate [£75,000/$125,000] to Salston Town Council, and [£30,000/$50,000] to [Thennelshire Housing and Community Development Trust/ Thennel County Housing and Community Development]. • We have an excellent environmental track record, and our proposal comes with assurance that any contamination will be cleaned up at our own cost. • 20 jobs will be provided for local people, with 300 jobs provided for people from elsewhere.

Coal	
	• We will keep the coal fired power plant operating as it has done for 25 years – providing power to all of [Thennelshire/Thennel County]. • The power plant employs [150/55] workers, many of whom live in Salston • Our proposal is to renovate the existing power station rather than build a new one – and so keep consumer energy prices as low as possible

Table 2: Information provided on proposal cards. Images have been replaced due to copyright issues, but closely resemble those used on the original cards. Map - Kraska/Shutterstock; wind turbines - © Can Stock Photo / smarques27; solar panels - © Can Stock Photo / teshimine; nuclear power station - © Can Stock Photo / teshimine Rigs - © Can Stock Photo / waveswebdesign; coal power station – Moini/OpenClipart. The company names have been deleted or replaced with 'the company'.

After quiet reading, individual ranking and group discussion, participants were asked to rank the proposals as a group. All discussions were audio- and video-recorded and transcribed by professional transcribers, anonymised and checked against recordings to ensure accuracy. Transcripts were thematically coded, first using a structured approach to code for the six energy options. This was followed by a second round of coding using a grounded approach to explore emergent themes in the data (Bowen, 2006; Glaser & Strauss, 1967; Turner, 1981). These themes, which included safety, familiarity and trade-offs, were then interrogated and refined during subsequent rounds of reading and analyses. All names are pseudonyms, following protocols approved by our US and UK university ethics committees.

3. Results

3.1.Preferences

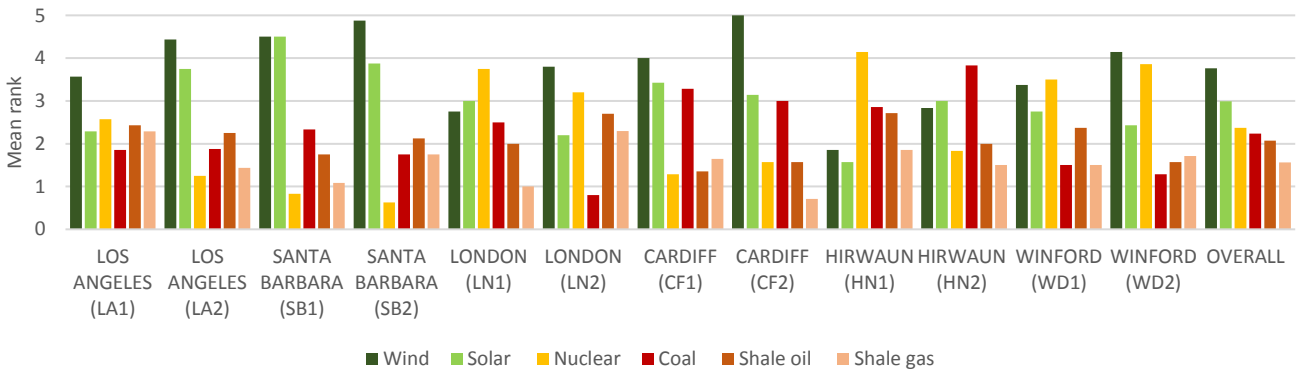

Figure 1. Mean individual participant rankings by group. Preferred options are assigned a score of 5, through to the least preferred assigned a score of 0. Categories are ordered by overall mean individual scores. N=80[1]

[1] Three participants (1 LA, 1 SB, 1 LN) did not complete the ranking sheets and are omitted from Figures 1 and 2.

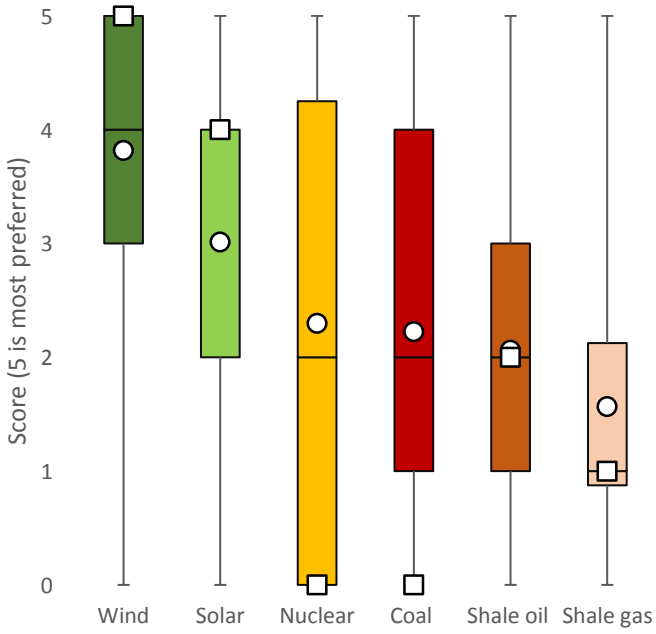

Figure 2: Measures of central tendency for proposal rankings across individuals in all groups, where 5 denotes most preferred option, and 0 denotes least preferred. Ordered by descending mean. Circles = mean; squares = mode; box = lower quartile, median, upper quartile; whiskers = min and max. N=80.

As illustrated in Figure 1, there was wide variation in preferences amongst participants. In summary: wind power was popular in most groups; shale gas and shale oil tended to be unpopular; the Welsh groups (Cardiff and Hirwaun) were the most favourable towards coal; and as found in previous research (Stagl, 2006) nuclear was polarised, being the most popular option for some groups and the least popular for others. Figure 2 shows measures of central tendency for each proposal, further illustrating the broad range of responses. It shows that each of the six proposals was most favoured for at least one participant, and most disliked for at least one. We now turn to our qualitative data to explore the reasons why each option proved popular or unpopular.

Proposal	Perceived advantages	Perceived disadvantages
Wind	• Renewable / carbon targets • High power generation • High employment • *Energy into the grid (vs. shipped away)* • *'natural', 'cleaner', 'gentler'*	• Temporary jobs • 'too much to build for that little town' • *Visual impacts* • *Risk to birds* • *Questionable reliability and cost-effectiveness*
Solar	• Renewable / carbon targets • Outskirts of town • Longevity of jobs • *Familiar* • *Long term low-cost* • *More popular for tourists than wind option*	• Large land area • Few jobs • Low power generation • *Reliability* • *Visual impact* • *Concerns over quality of land used* • *Concerns over bird safety*
Nuclear	• Jobs (number and longevity) • Charitable donation chosen by council • Meets climate change targets • *Tried and tested technology*	• Concerns over changes in employment levels • Charitable donation chosen by council • Too close to people & water • *Impacts on tourism, including visual impacts* • *Safety concerns*

		• *Long term environmental/economic unsustainability*
Shale Gas	• Incentives • *Better than oil for environment*	• Incentives viewed as 'bribes' • Low number and longevity of jobs • Location too close to people • *Fuel to be 'shipped somewhere' (vs. energy)* • *Unfamiliar* • *Environmental concerns*
Shale Oil	• Outskirts of town • Incentives • More guaranteed jobs than gas option • Acknowledges environmental risk	• Incentives viewed as 'bribes' • Low number and longevity of jobs • *Fuel to be 'shipped somewhere' (vs energy)* • *Unfamiliar* • *Environmental concerns*
Coal	• Proven technology • Keeping consumer prices down • Stable employment, number of jobs • Staying the same • *Not wasting materials / land* • *Cheaper to renovate than build new* • *Familiar, part of 'heritage'*	• No new benefits for the town • *Old, 'time for a change'* • *Non-renewable, doesn't meet climate targets* • *Dirty, air pollution* • *Short term, future uncertainty* • *Impacts of transporting the coal*

Table 3: Summary advantages and disadvantages associated with each energy option. Those that were not included as card attributes are shown in italics. The order in which they are presented does not signify the order in which they were raised nor their relative importance, which is discussed below.

Renewable sources were often viewed as the '*ideal'* option (Anwen, HN1; Nadia, LN2), being '*less invasive'* (Jess, CF2), more '*natural'* (Heather, CF2), '*cleaner'* (Samantha, CF2), '*environmentally responsible*' (Diane, SB2), and '*kinder and gentler'* (Kim, SB1). The solar and wind options both offered renewable alternatives, and popular locations on the outskirts of town. Of the two, wind tended to be preferred because of the amount of energy produced and the employment opportunities offered. Indeed, wind was the most popular energy option overall, with a mean score of 3.8, and seen as a '*good balance*' (Ellie, CF2) between low environmental impact and high power generation. Unlike with the solar option, the number of jobs was also viewed positively (although their temporary nature was not). On the negative side, some participants were concerned that wind turbines do not generate enough energy, are unreliable and costly. The solar option was problematic from a council point of view due to the low number of jobs and relatively small amount of power generated, which participants felt would be unpopular amongst constituents. Other concerns included the amount of land covered by the solar panels, and potential impacts upon visual amenity.

The nuclear proposal elicited strong reactions. For Joe (CF1), it was a '*no brainer'* that nuclear should be the first choice; for Ron (SB1), it was a '*no brainer'* that it was his last. One participant initially ranked nuclear as her favourite, and then on further deliberation changed it to her least favourite: '*reading through again, it was the nuclear issue that hit me then and I thought no, I would not like to be living anywhere near a plant like that*' (Heather, CF2). In some of the consensus rankings, nuclear was '*vetoed'* (Nadia, LN2), or pro-nuclear participants were '*outvoted'* (Kim referring to Miriam, SB1). Nuclear was characterised by ambivalence between the card attributes (which were generally viewed positively from a council perspective) and negative pre-existing attitudes. Participants stated that they were '*a bit scared'* of nuclear (Nadia, LN2), and had heard '*a lot of horror stories'* in the media about its safety (Jess, CF2). While some participants felt this was scaremongering, many noted

accidents at Chernobyl, Fukushima and Three Mile Island, and some described negative associations with the '*dirty word'* 'nuclear' (Emma, WD1; Anwen, HN1).

On average, shale gas and oil were the least popular options, but for some offered a middle ground between renewables and more controversial coal and nuclear options. Some viewed monetary incentives as an advantage, but conversations were dominated by potential disadvantages, including the low numbers of jobs, environmental concerns, and the concept that the fuel would be shipped somewhere rather than used locally to generate energy. While gas was perceived as better for the environment, a number of participants preferred the oil proposal due to its location on the outskirts of town. Dennis (CF1) for example felt that as a councillor, rigs in the middle of the town and next to the river '*would be the thing that would give you the most agro'*, whilst those on the outskirts would '*get less opposition'*. The shale oil company's assurance that any contamination will be cleaned up at their own cost was controversial: some participants appreciated the '*accountability'* (Isabel, SB2), but others commented that such an assurance '*makes me suspicious'* (Frank, LA1).

While the coal option was problematic due to associated health risks and for not contributing to climate change targets, for many it proved popular from a council perspective. This was because it was perceived to be a safe option, which '*isn't a gamble'* (Dylan, HN2) and would increase chances of re-election. Some participants noted a trade-off between the dirtiness of coal and maintaining the status quo, stating that '*we know what we hate about this, but it's been providing power to this community and it's a known quantity'* (Miriam, SB1). Coal proved particularly popular for participants in the two Welsh workshops, where they assigned considerable importance to local history and heritage. Here, Ellie (CF2) noted that '*if I was a local person, who had lived in that place and […] had previously worked there and it's always been there, something that you're used to in your local community, it could be part of your heritage'*.

3.2 Decision making criteria

As illustrated in Table 3, participants based their decisions on a mix of card attributes and other criteria. A particularly important attribute was employment, and council members often viewed it as their role to provide jobs in order '*to keep people happy'* (Denise, HN2), '*to create wealth'* (Dylan, HN2), and so '*I was re-elected the next time'* (Ellen, LN2). The number, longevity, locality, stability, quality and immediacy of jobs were all important. Generally, the more employment the better, but outsourced jobs were mainly viewed negatively. It was felt that '*if it's the local area that's going to be having these things put in place, then it's the local people that should benefit from them and get the jobs from them'* (Anwen, HN1), especially if the local environment will be negatively impacted. Outsourced jobs were also concerning due to a potential for increased crime, and some raised concerns about changing demographics. Sally (LA2) asked, '*what kind of people are they bringing in and what kind of ruckus are we going to be exposed to?' […] 'we don't know who these people are, you know?*'

The amount of energy produced, and perceived energy efficiency, were also important. Participants tended to view the energy generated by the wind proposal (enough for 58,000

homes in a town of just 10,000 people) as a positive, but questioned where any excess would go, and sought assurance that it could be sold to benefit the council and community. However, some participants felt that the wind proposal generated '*too much energy for [the] small quantity of people'* (Wayne, HN2), and that it was '*too much to build for that little town'* (Ray, SB2). Energy production (as opposed to resource extraction) was preferable, and Ken (CF1) noted that '*shale gas with some form of energy producing vehicle, be it a gas powered power station or an oil fired power station, wrote into the equation, for me may have moved up the list slightly […] all they're doing is producing a fuel'.* Laurel (CF1) was also concerned that gas or oil would be '*shipped somewhere'*, whilst wind and solar are '*more likely to power the town itself'*. While the nuclear option was viewed as particularly efficient, concerns were raised about the efficiency of wind and solar power.

Monetary incentives were viewed positively by only a minority of participants. A more pervasive feeling was that the incentives were suspicious, even '*weird'* (Julia, SB2). Indeed, in almost every site, at least one participant commented that they constituted a '*bribe'*, especially if it was being donated to the council rather than directly to the community. The only exception was Hirwaun, where some residents were familiar with a community fund provided by the local colliery. Generally, incentives were viewed as stemming '*out of guilt'* (Sally, LA2) or as a public relations exercise, and Jess (CF2) noted that, '*obviously, you need to give money for the land and everything, but you shouldn't have to pay large sums to convince them that it's a good idea'*. While a few participants felt that the incentives constituted a large amount of money, more felt that they were '*miserly'*, '*a pittance'*, '*peanuts'* and '*chicken's feed'*. Some favoured increased amounts of money, but for others this was '*distasteful'* (Joyce, SB2). There was also debate within council members over where the money should be spent (e.g. local charity, housing, youth, the elderly), with some noting that they would not want the money to be donated to the council at all, preferring it to go straight to the community.

During this task, concerns over health and safety centred on issues of water contamination, nuclear accidents, radioactive leaks, coal-related air pollution, gas explosions and potential risks to reproductive health. Environmental health, sustainability, and climate change were also key concerns, rendering renewable options popular. There were however concerns over the safety of wind and solar power as well, particularly for bird life, as shown in the discourse from SB1 below. As an aside, this dialogue is also interesting for the participants' interchange about what they should be focusing on as decision-makers, and also the use of humour, which can be a marker of deeper anxieties that may be difficult to otherwise express (Henwood & Pidgeon, 2016).

> RON: Yeah, but [the nuclear option is] a lot of work for a lot of folks.
> SUSAN: Well, it is, but then do you want to then consider what kind of environmental ramifications…
> RON: Oh, you can't consider that.
> SUSAN: Well…
> RON: Yeah, you've got to take that off the table, you know?
> SUSAN: Well, that's what I'm saying.
> KIM: Lots of deformed birds. Sorry.

> SUSAN: Deformed birds. Instead of whacked birds by the wind, you're going to get deformed birds!
> KIM: [Laughing]
> RON: Or crispy crinkly birds from solar. [Several laughing] Yeah, that's amazing. They just blow up in the air.

Some participants relied on the maps and a '*siting process'* to rank the proposals (Ellen, LN2). This was mainly based on human health, visual and noise concerns, as well as considerations for the tourist industry and land-use. The location of the shale gas wells and the nuclear power station were particularly problematic, perceived as too close to water bodies and to homes. Concerns were raised over the aesthetics of all of the proposals, including the wind and solar options. Participants expressed little *personal* dislike for the visual impact of these structures, with some describing turbines as aesthetically pleasing - as '*maidens dancing in the breeze'* (Heather CF2), and preferable to the alternatives. Isabel (SB2) noted, '*I'd rather see wind turbines than drills'*. However, many commented that *other* people find them ugly, and therefore in the position of a council member, wind *'might be a real hard sell*' (Tony, LN2). Solar was generally seen as less obtrusive, although there was concern over glare from the panels.

While trade-offs were thought to be inevitable, some were more acceptable than others. For example, Andrew (LN1) accepted that the tourist industry may suffer: '*nuclear power plant wins it all for me. You're going to lower your carbon emissions. They get several different subsidies and things like that. Tourism's going to have to go: bye, bye tourism*'. Health, on the other hand could not be traded for any benefit, including jobs, because '*you think about death over jobs. You think about survival and like water and all these major things that have major ramifications because if you don't have water, you don't need a job because you're freaking dead*' Kim (SB1). Nuclear risk was a red line issue, and Rhiannon (CF1) summed up a number of participants' responses: '*I thought it sounded brilliant as well on paper, but knowing that, how risky it can be… as like I just ticked it off straight away*'. Criteria and trade-offs varied a great deal between different council members. This is captured in the interchange below from LA1, in response to some participants wanting to accept four of the proposals, rather than just one:

> ERIC: We'll maximize our ability to generate money.
> FACILITATOR: So okay. How about--
> NATALIE: He's all about generating money. I'm about bearing some money and then still protecting the town.

4. Reflections on method

4.1. Role playing as council members

Our role-play methodology provided an engaging platform with which to grapple with a complex issue. It also provided an opportunity for lay publics to explore their own views regarding local level priority setting, and the ways in which council members make decisions. Indeed, for some, their '*personal position could be significantly different'*, (Tony, LN2).

Participants complained of short-term thinking, as well as cronyism and corruption, and felt that bribes were commonplace, joking that '*mama needs a new car!*' (Brenda, SB2) and that '*that's just the way local authorities work'* (Irene, WD1). Some felt that donations should not be made to the council because '*they'd just make a shambles out of it'* (Malcolm, HN1). However, participants also spoke of the pragmatism required in a council role, and the challenges decision-makers face without the '*luxury'* of being ideological (Tony, LN2). Sanvi (LN2) described '*trying to make myself think like a councillor, trying to get the best of everything rather than just one part of it'*.

Indeed, when assuming a council member's role, many expressed a reluctance to change the status quo or take risks, particularly for '*the unknown evils'* of unfamiliar technologies (Joel, SB2). '*You've got to put yourself in a position of a town councillor, do you want the windmills up on the hill in the countryside that you've been at for, you know, forty years, probably not. Do you like the coal fired power station? No but it's been there and I've got used to it, type of thing […] let's stick with what we know'* (Ken, CF1). This reluctance to take risks was at odds with a widespread preference for a transition away from fossil fuels, as described in other research (Demski et al., 2015; Greenberg, 2009). This was the feeling that '*it's time for a change'* (Laurel, CF1), and that coal '*keeps you stagnated. You're not growing'* (Susan, SB1). For these participants, other options provided an opportunity. Joe (CF1) asked, '*Do we want to go with just what we've had for years and not progress at all? Or do we want to invest in new technologies, bringing skills and all of that into the region?*' The conflict is illustrated in the following discourse from SB2:

> ISABEL: I see the coal as kind of a temporary… I don't see it as a long-term solution.
> RAY: Well, see that's in place now.
> OLIVIA: I don't think it-- I don't see it advancing us to…
> FACILITATOR: Coal is five, five, five, four, five…
> RAY: The way I see it, the coal's already there and these have problems that haven't been dealt with.
> OLIVIA: Yeah. Yeah.
> RAY: So I don't want to trade off something I've been using for something with unknown problems.
> OLIVIA: Yeah, because we already know that's not working. [Laughs].

We found that a local focus afforded participants a level of personal efficacy and clarity to an otherwise abstract topic, especially considering that shale gas and oil extraction in particular is not underway in the sample locations. Julia (SB2) stated, '*that was really different for me than like the poster [task], because I felt like it was like my town as opposed to like the whole world […] that was so interesting*'. In the same group, Joel commented that '*It feels like […] your responsibility is worth more*' and that '*it's a little bit less abstract*'. Likewise, Kim (SB1) commented that '*it makes you come to a point in your thinking […] it makes a lot more sense*'. This might also be related to the accessibility of the materials, and through allowing participants to explore these as a group and discuss them openly.

Our approach also brought into sharp focus the benefits and risks of each technology on a local rather than national scale. For example, while previous research shows strong support for solar, particularly in California (Carlisle et al., 2014), we found that in our groups wind tended to be prioritised over solar because of the *local benefits* it afforded (jobs, power generation and land cover). Many of the conditions that participants wished to place upon development were oriented towards local issues. These included recruiting a percentage of the workforce from the town, enforcing a local tax for employees, providing opportunities for re-training, and profit sharing. Others stated stringent regulations on sleeving for the shale options, banning fracking beside the river, camouflaging rigs, funding energy efficiency schemes, and implementing public engagement and education programmes.

Finally, a focus on the local level, combined with varying local contexts in each site, helped us to explore the ways in which participants drew upon their own experiences to make sense of the proposals. Particularly evident was the popularity of the coal option in the two Welsh workshops, where participants assigned considerable importance to local history and heritage, as well as to the importance of local employment, complimenting findings by Williams et al. (2015). Notably, participants from large cities and small villages alike engaged equally enthusiastically with making decisions for Salston, a town of 10,000 people. Even those attributes that did not translate fully to different country contexts (e.g. incentives, see below) were still considered in a thoughtful and meaningful way.

4.2. Deliberation, ranking and consensus

The main aim of asking participants to deliberate a number of energy options and rank them in order of preference was to generate discussion and explore how participants made their decisions. Whilst the numeric rankings presented in Figures 1 and 2 graphically show the wide variety of responses and favourability of each option, we believe the qualitative data are much more enlightening. In summary, we were able to explore why each option proved popular or unpopular: we found that participants based their decisions on a multitude of criteria, some of which were provided in our materials, while others were not. Further, participants discussed various trade-offs and placed certain conditions upon development, reiterating findings relating to the conditionality of public acceptance and preferences, particularly in advance of development (Bickerstaff et al., 2008; Pidgeon & Demski, 2012; Pidgeon et al., 2008).

The consensus task encouraged participants to explain their reasoning to others, and allowed them to re-evaluate their own rankings in response to others. For example, Dennis (CF1) noted, '*during the debate I changed my mind*', and Sally (LA2) remarked that, '*Peter and Victoria changed my mind*'. As discussed in 3.1, in some of the consensus rankings nuclear was vetoed or outvoted, reflecting that some technologies may be more suited to consensus than others (Trutnevyte 2014). It would be expected that the make-up of our groups introduced different experiences, and that these may affect the dynamics of the role play (Conti et al., 2011; Henwood & Pidgeon, 2015). Indeed, consensus rankings were at times disproportionately influenced by more vocal members, as they may be on a real council. Such group dynamics act to shape the decision making environment and potentially the decisions themselves, reiterating the need for individual as well as consensus ranks, and the need to

position consensus ranking at the end of the task to allow ample room for discussion beforehand.

4.3 Challenges

There are a number of challenges associated with our methodology, posed by inevitable disparities between role play and reality, as well as limitations associated with materials and framings.

There are of course differences between a role play game and the reality of making decisions on a council, and our participants were constrained by their knowledge, resources and time. Designed to be one short task in a day-long workshop, participants were provided with limited information, and some pointed out that council members would be provided with many more facts and figures. More detailed information, like that provided by Fleishman et al. (2010) during their 2-3 hour workshops, could afford a greater deal of clarity for decision making. A learning point here is that this additional information could also include specific references to real-life projects. This is because although we based attributes broadly on existing projects and proposals, participants felt that some elements were unrealistic: particularly, the amount of energy generated by the solar and wind farms, the low number of jobs provided by the shale options, and monetary incentives. The latter posed particular difficulties: firstly because when the materials were designed, it was not clear how such incentives would be implemented in the UK (see Cotton, 2017; Vaughan, 2017); and secondly because the concept is not relevant in the US, where local landowners can instead benefit from selling mineral rights.

A few participants also criticised the lack of direct comparability between attributes. They commented that it would have been both more realistic and more useful to provide a matrix or spreadsheet with '*like for like*' information for each, to enable easy comparisons across different energy options (Bea, LN1). Unlike DeKay et al. (2001) and Fleishman et al. (2010), we purposefully provided attributes that were not directly comparable. Providing like-for-like comparisons would have been beneficial if the main aim of the role play task was to draw direct comparisons between energy technologies, but we were more interested in the reasoning behind decisions, and as Ken (CF1) remarked, 'like for like' information '*may make it too easy and lack a debate*'. Indeed, rather than constituting a limitation, this element of our design generated much fruitful discussion around *other* alternatives and criteria, many of which were not part of the original attributes (Table 3) and would likely have been neglected from discussions if participants were presented with a matrix of directly comparable attributes.

Another learning point involves the modification of cards to suit US/UK contexts (see Table 2). While some modifications did not seem to influence discussions (e.g. Thennelshire versus Thennel County), a couple may have done. Namely: the 150 jobs offered by the UK coal option was revised down to 55 to better reflect the limited number of jobs associated with the singular, small, and subsequently decommissioned coal-fired power plant within California; and the donation by the shale gas company to the 'Salston Memorial Community Centre' (UK) was modified to the 'Salston Memorial Healthcare Center' in the US because a

community centre is not relevant in the US context, and vice versa. Interestingly, although the coal option prompted valuable discussions around the importance of maintaining high numbers of jobs amongst UK participants, three of the UK groups ranked coal *lower* on average than any of the US groups. The donation to the US healthcare centre also prompted an interesting discussion around bribery and remediation: *'the healthcare is paying because they're sick because they're drinking the water!'* (Diane, SB1). Making comparisons between groups was not the aim of our role play task. Where direct comparisons are sought, researchers might wish to standardise information across groups, but should remain cognisant of the need for translation and/or contextualisation in cross-cultural research.

Our task was inevitably framed to an extent by the information participants received prior to the task (see Partridge et al., 2017; Thomas et al., 2017a). There was also a potential framing effect from the background information, which stated that Salston had suffered recent job losses. This may in part explain why employment was a key decision making criterion, although other research has also shown the importance of maintaining and creating jobs in energy transitions (Butler et al., 2013). Furthermore, responses were framed by a restriction to six predefined energy proposals, when our analyses highlighted that participants also wanted to consider alternatives such as hydropower, tidal and carbon capture and storage. They also raised possibilities of consortium proposals and community ownership options, both of which would have implications for local governance.

Any role play task will be framed by participants' prior beliefs, the brief they are given, and any decision-making structure imposed. These all add another dimension to deliberations and should be reflected upon when designing materials and analysing results. We note that like our participants, council members are constrained by information, time pressures, framings such as local plant closures, and the information they receive prior to decision-making (e.g. lobbying). Local governments may also lack the expertise, staff and financial resources to manage development activities (Ellis et al., 2016). Furthermore, councils in the US and UK are faced with considerable pressures from national and regional/state governments that limit their decision-making powers. In Lancashire (UK) and Denton (Texas, US) local democracy has been superseded by national/state government with regard to shale gas development (Bradshaw & Waite, 2017; Maqbool, 2015). Contrast this with windfarm proposals, which in the UK are subject to much more oversight from local decision-makers (Hilson, 2015).

5. Conclusions

We utilised role play methodology to learn how individuals think about various energy technologies, how they choose between them, and how these decisions play out at a local level. We found that while some proposals tended to be more popular than others, preferences varied widely between groups, showing there is never going to be one 'acceptable' option, and that a range of preferences will stem from a variety of experiences, outlooks and contexts. Understanding these underlying dimensions is essential in facilitating legitimate and robust decisions in the face of future development; and our focus on the rich, qualitative data that emerged from the role play discussions contributes towards such an understanding.

The use of a hypothetical town setting prompted discussions of site-based questions, including issues of familiarity and heritage, and concerns about the local ramifications of the technologies. A local framing also enabled us to discover the ways in which our participants perceive council members to make decisions, and the types of criteria they think decision-makers should use from a local perspective. While we found a modicum of distrust in these decision makers, we also found an understanding of the pragmatic and complex nature of their decisions.

The role play task, which took just 50 minutes to complete, was easy to grasp and provided a quick, novel and '*interesting'* way (Julia, SB1; Kim, SB2) to engage participants with what can be confusing and difficult policy questions. In this sense, the method could be used to engage with other 'conundrums' such as climate change adaptation and mitigation, as well as to explore perceptions of other local governance issues such as housing. Furthermore, the method is flexible, and can be extended and adapted depending on the research question. For example, it could be based on a real town or country, use different energy options and/or portfolios (e.g. Fleishman et al 2010), or impose decision making frameworks based on relevant governance structures. Similar methods could also be used as a learning tool in educational settings, as has been conducted with topics such as teen pregnancy (Out & Lafreniere, 2001) and HIV/AIDS (Thomas, 1992).

Future role play studies might consider providing additional information (e.g. carbon emissions) associated with each technology, along with specific references to real life projects. They might consider larger, fully representative samples if aiming for representativeness; and fully standardise materials where the aim is to draw comparisons between groups – although this brings with it its own limitations, as discussed above. Researchers might also wish to encourage participants to frame their own decision context and set their own criteria (e.g. Bellamy et al., 2013). We also reiterate the role for individual as well as consensus ranks, and the need to position consensus ranking at the end of the task to allow ample room for discussion beforehand.

Here, role play was employed as part of a wider deliberative workshop. In this sense, it can be used to triangulate findings from other tasks, to challenge assumptions, or offer alternative explanations. Indeed, the most effective participation strategies will draw on multiple methodologies rather than rely on just one (Pidgeon et al., 2014; Raven, 2017); and we suggest that role play offers a very adaptable and engaging method with which to do this.

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