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PARTICIPATION, POLITICS AND ACTOR DYNAMICS IN LOW CARBON ENERGY TRANSITIONS

Report of a Transition Pathways Project workshop, Norwich, 21-22 March 2012

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TRANSITION PATHWAYS

3S Science, Society & Sustainability

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1. INTRODUCTION

This report presents the background, rationale and findings of a UEA workshop on 'Participation, politics and actor dynamics in low carbon energy transitions'. The workshop formed part of the *Transition Pathways to a Low Carbon Economy*[1] project, a 4-year consortium project involving nine UK universities co-funded by the Engineering and Physical Sciences Research Council (EPSRC) and E.ON. Bringing together engineers, economists, historians and social scientists the project has sought to develop and evaluate transition pathways for a 60% CO_2 emissions reduction by 2050 focusing on the low carbon electricity system. Three different pathways have been developed, namely *Market Rules*, *Central Control*, and *Thousand Flowers*, each underpinned by a different form of governance logic (i.e. the underlying rationale that guides the system) (Foxon 2012). One of the three core research challenges of the project has been to understand "the changing roles, influences and opportunities of [social] 'actors' in the dynamics of energy transitions."

The workshop sought to contribute to this core research challenge within the *Transition Pathways* project, as well as making a broader contribution to the field of sustainability transitions research. Over the past decade the transitions literature has developed a multi-level and co-evolutionary perspective to both analyse and guide interventions in socio-technical systems. Recent critiques argue that existing approaches do not sufficiently account for the complexities of actor dynamics (Smith et al. 2010) or the issues of power and politics that are inherent in transition processes (Shove and Walker, 2007). By focusing on questions relating to both participation in transitions and the democratic implications of transition processes, the workshop provided an opportunity to explore issues which have been neglected in the literature hitherto (although see Hendriks, 2008, 2009). The framing of the workshop thus moved beyond existing analyses to open up a more comprehensive system-wide exploration of the diverse forms and sites of participation in low carbon energy transitions.[2] Not only does this stand to deepen our understanding of the processes of inclusion/exclusion, agency and the politics of transitions. This broader conception of socio-technical participation could also have important implications for sustainability transitions theory, research and governance.

The purpose of the two-day workshop was to explore these issues in greater depth. The workshop had two explicit and linked **aims**:

- To develop a more comprehensive system-wide exploration of the diverse forms and sites of participation in low carbon energy transitions.

[1] See: http://www.lowcarbonpathways.org.uk/

[2] This framing of the workshop built on and was inspired by an earlier seminar as part of the ESRC *Critical Public Engagement* seminar series (2009-2011) which explored diverse spaces of engagement in energy futures – ranging from government sponsored consultations and behavior change programmes through to forms of grassroots innovation and activism – including their interconnections as part of wider 'ecologies of participation' (see Chilvers, 2010b).

- To build on this broader conception of participation to explore actor dynamics, inclusion and agency within energy systems, with reference to the multiple sites of interaction and modes of intervention.

More specifically the workshop sought to address the following **questions**:

1. What are the diverse modes and sites of participation in low carbon energy transitions?
2. Which actors are involved, who/what enrolls them, and what gets excluded in these particular forms of participation (whose transition or vision counts)?
3. How do these forms of participation express agency and interact to shape the trajectories of low carbon energy transition pathways?
4. What are the implications of this broader conception of socio-technical participation:
    a. For theory?
    b. For research (and researchers)?
    c. For governance of socio-technical systems?

In order to address these aims and questions, given their rather exploratory nature in relation to existing literatures, we designed a workshop process that fostered creative, interactive and collaborative work as opposed to formal presentations. The workshop was held over two days at a venue on the outskirts of Norwich, UK. The 21 attendees (see Appendix 1 for details) were drawn primarily from academia but with also some representation from a non-governmental organisation (the Centre for Alternative Technology) and the private sector (E.ON). Researchers came from a number of different disciplinary backgrounds but their work was related to sustainability transitions or participation in some way.

A summary of the workshop process is shown in Box 1 (below) with a more detailed outline given in Appendix 2. The workshop was organised into four sessions over the two days. The first session on Day 1 mainly addressed question 1 (see above) through involving participants in a creative exercise to visually map the diverse forms of participation in low carbon transitions. The second session on Day 1 then went on to explore questions 2 and 3 by considering nine particular cases of participation in more detail – ranging from formal invited engagement processes organised by government and industry through to more spontaneous, 'bottom up', citizen-led processes. Both sessions on Day 2 were devoted to addressing question 4 (above). Here workshop discussions moved on to consider the implications of a broader conception of socio-technical participation for theory, research and governance.

Box 1. Overview of the workshop process.

Day 1 (21st March)

Session 1: Mapping engagement in the low carbon energy system (mainly addressed workshop question 1)

- Participants worked in 4 separate groups to create visual maps of the diverse forms of participation in low carbon energy transitions, each group adhering to a different system frame.

Session 2: Exploring the dynamics of participation (mainly addressed workshop questions 2 and 3)

- Participants explored the dynamics of participation in low carbon energy transitions in more detail through exploring nine case studies, each representing different form of participation in system change.

Day 2 (22nd March)

Sessions 3 & 4: Implications and research agenda (mainly addressed workshop question 4)

- Both sessions on day two were more forward looking in considering the implications of Day 1 discussions for theory, research and governance

The remainder of this report is divided into three sections. Section 2 outlines in more detail the rationale for the workshop, highlighting some of the possible intersections between theories of sustainability transitions and conceptions of participation. The core findings from the two sessions on Day 1 are then analysed and presented in Section 3, organised around three main themes. Building on this, Section 4 sets out key findings from the two final sessions on Day 2 in terms of possibilities for future research which seek to deepen the concept of socio-technical participation that the workshop has begun to develop.

2. PARTICIPATION AND ACTOR DYNAMICS IN SUSTAINABILITY TRANSITIONS

The nascent field of Sustainability Transitions draws on theoretical insights from science and technology studies (STS), evolutionary economics and sociology to explain the evolution of socio-technical systems. A notable feature of the literature is that it contains both an analytical and interventionist aspect, the two sides existing in a recursive relationship. One of the cornerstones of the approach is the multi-level perspective (MLP). This is most obviously reflected in the work of Geel's (2002, 2004) which has become a significant conceptual lens within the field (see Figure 1).

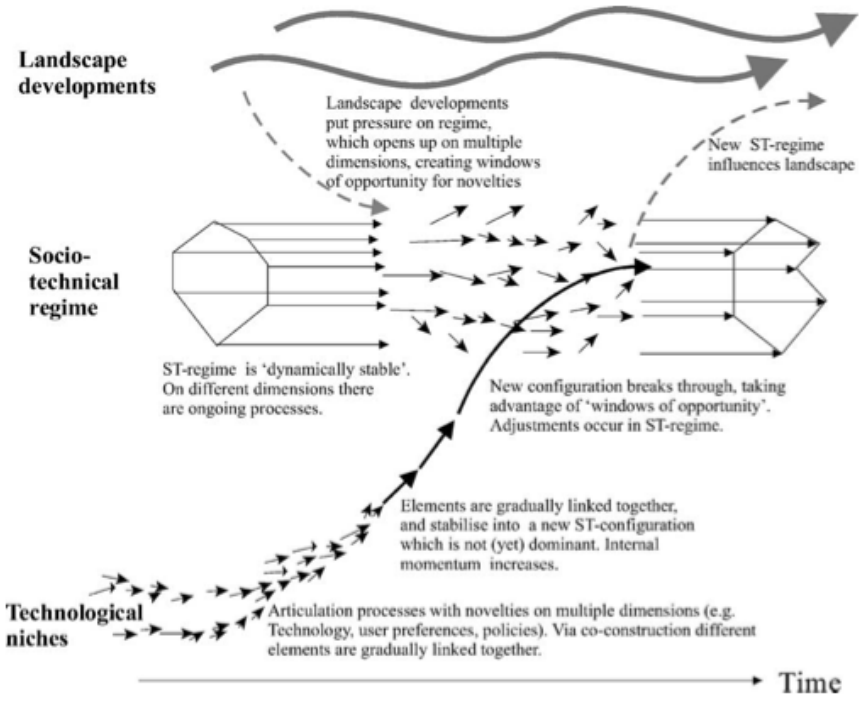

Figure 1. The Multi Level Perspective (Geels, 2002)

Central to the MLP is the concept of a *technological regime* which originally referred to

> the rule-set or grammar embedded in a complex of engineering practices, production process technologies, product characteristics, skills and procedures, ways of handling relevant artifacts and persons, ways of defining problems; all of them embedded in institutions and infrastructures.
>
> Rip and Kemp (1998: 340)

Whilst it has since evolved in meaning and become open to competing definitions, the *regime* remains integral as the *meso* level of multi-level analyses – reflecting the

dominant way of delivering particular societal functions (Smith et al 2010).[3] Within the MLP, the regime is distinguished analytically from the *niche* and the *landscape* levels. The landscape reflects the exogenous, macro context that is beyond the direct influence of actors (Schot and Geels, 2008). Changes in the landscape can put pressure on existing regimes, opening up 'windows of opportunity' for systemic change. Conversely, niches are spaces where it is possible to deviate from the rules of the regime (Geels, 2004, 912). Niches are therefore conceptualised the loci of system innovation; spaces where radical (system changing) innovation and learning take place. Consequently the purposive enactment of 'niches' has become a key focus of the sustainability transitions literature (see sections 2.1. and 2.2 below). In keeping with the significant focus on niches as sites of possibility, two models of purposive intervention have predominated within the sustainability transitions literature: Transitions Management and Strategic Niche Management. These are both attempts to 'modulate' socio-technical systems (Hoogma et al 2002; Kemp and Loorbach 2006). As such they have a close affinity with the aspirations of reflexive governance (Voß et al, 2006). These two approaches are briefly outlined below, along with the corresponding critiques that have emerged.

2.1 Transition Management

Transition Management (TM) is a form of governance experiment that is intended to contribute to the solving of complex societal problems (Rotmans and Lorbach 2010). Rather than one particular archetype, there are several different varieties, originating in the work of Rotmans and colleagues in the early 2000s in the Netherlands (Smith and Kern 2009; Kemp and Loorbach 2006). Kemp and Loorbach (2006) therefore describe it as an approach rather than a method. Loorbach (2010) goes on to suggest that whilst TM follows in the tradition of innovation in Dutch policy making (e.g. collaborative policy making, long term planning etc.) it also reflects a substantive break with the dominant approach by having the explicit objective of radical innovation through a selective approach which focuses on 'frontrunners'. Adopting a multi-actor, multi-level approach that focuses on the creation of 'Transition Arenas' it is an explicit attempt to intervene in the dynamics of socio-technical systems. A number of different transition management experiments have been implemented over the last decade (see Lorbach and Rotmans 2010; Rotmans and Lorbach 2010).

A set of critiques about the democratic legitimacy of transition experiments themselves has been developed, with a particular focus on the TM approach. The focus on frontrunners, and the way in which they are selected, has led to suggestions that the transition arena process is elitist (Hendricks, 2008). The selection process and small size of arenas raises questions about their ability to represent a diversity of views, and the extent to which certain actors are excluded (Lawhon and Murphy, 2011). Further concerns relate to the politics of TM. Firstly, from an internal perspective, there are concerns about the internal power dynamics

[3] We are aware that within the literature these terms have developed multiple meanings and indeed there are differences between their use in Strategic Niche Management and Transition Management (see Rotmans and Lorbach, 2010).

and the extent to which the arena might be 'captured' by a certain set of interests (Shove and Walker 2007; Lawhon and Murphy 2011; Voß and Bournemann, 2011). Secondly, it has been suggested that transition arenas are somewhat isolated and detached from wider political processes (Meadowcroft 2009). Thirdly, it has been argued that TM cannot avoid reflecting and reproducing implicit normativities about the desired direction of transitions (Shove and Walker 2007; Scrace and Smith 2009). If it is accepted that transitions are fundamentally political, then questions of how such politics unfold become increasingly pressing (Smith et al 2005; Meadowcroft 2007; Smith et al 2010). The way in which different actors participate in the governance of the system, their relationships and conflicts become a central analytical concern.

2.2 Strategic Niche Management

Strategic Niche Management (SNM) focuses on the analysis of technological niches, spaces that 'protect' emerging technologies from a 'selection environment' that would otherwise prove hostile to their development:

> For some promising technologies ... market niches do not emerge spontaneously. In such cases, proto-market niches might be created, what we call technological niches. In such technological niches specific advantages can be promised, but they are uncertain and not yet shared among the actors promoting the niches. Often, niche activities are geared towards identifying and testing assumptions about specific advantages. Technological niches come about in form of experiments, and pilot and demonstration projects.
>
> Hoogma et al (2002: 30)

The establishment of protective niches therefore reflects an attempt at *purposive* intervention in socio-technical systems. Academic research around SNM has therefore focused primarily on the processes that lead to the 'successful' scaling up of niche technologies leading to the identification of both a number of ideal niche characteristics and different mechanism by which they interact with existing systems (Geels and Raven 2006; Smith 2006; Raven 2007; Raven et al 2008).

Empirical research into SNM has traditionally focused on niche level activities and sites within industrial and state-led innovation systems. Recently this literature has begun to explore other sites and forms of innovation, such as the role of civil society groups and social movements (Verhuel and Vergragt 1995; Seyfang and Smith 2007; Longhurst 2012). This reflects an emerging, more distributed notion of innovation, recognising the existence of more radical forms of user and outsider innovation (cf. Lakhani and Panetta, 2007). Whilst SNM has not been subject to the same political critiques as Transition Management similar questions could be asked of the interventions that might be carried out in its name: Who decides what technologies should be supported? Who is excluded? What are the normativities that are underpinning the experimental niches? On whose authority do the niche 'managers' act? Therefore like Transition Management, the interventionist aspirations of

Strategic Niche Management are shot through with questions of democracy and equity.

More broadly, elements of the transition literature have, in general, exhibited what has been described as a 'bottom up bias' (Geels, 2011) reflecting a theoretical focus on the development of protective niches as sites of radical system change. This focus on purposively created niches potentially obscures the influence of a range of different other actors. Consequently, in both cases, the regime has remained somewhat 'blackboxed' (Genus and Coles 2008; Smith et al 2010). Related to this is the fact that the MLP is underpinned by a fundamentally market driven model of system change, whereby system shift occurs with the profitable scaling up of a new technology (Lawhon and Murphy 2011). A more distributed notion of innovation points to a range of innovators operating across the system (Seyfang and Smith, 2007).

Furthermore, the argument has been made that there is a bias towards innovation as the principle mode of intervention within the sustainability transitions literature (Shove and Pantzar, 2005). In some ways this is an expected consequence of its intellectual heritage but obscures the potential influence of a range of other actors. Thus, as Grin et al. (2010: 331) note, the role of consumers and grassroots initiatives in transitions is underrated and under-conceptualised. In other words, recognising the distributed nature of power within modern societies opens the door for multiple routes of intervention (Meadowcroft, 2007). This suggests a need for a better understanding of the way in which a wider range of interventions attempt to change the system and the roles that different actors have in either maintaining or disrupting the existing systems, as well as exploring the democratic implications of such interventions. It is here that the participation literature can provide some insights.

2.3 Participation in Transition(s)

As Hendriks (2009: 341) notes "[r]ecent debates on how to 'manage' policy transitions to sustainability have been curiously silent on democratic matters, despite their potential implications for democracy." Systematic analyses of the forms of participation, actor dynamics and processes of inclusion and exclusion in sustainability transitions have been largely missing from the literature. Hendriks' own work on Dutch energy transitions provides one notable exception (see Hendricks, 2008, 2009). The democratic criteria of inclusion (who is involved/participates?) and legitimacy and accountability (how should reforms be legitimised and accountable to the public?) are used to assess TM practice. As noted above, Hendriks shows transition arenas in this case to be distinctly technocratic. The emphasis was on facilitating partnerships between 'frontrunners', entrepreneurs and representing their elite/specialist knowledges, to the exclusion of many potentially affected actors in civil society and the wider public. While calling for the design of more inclusive sustainability transitions and opening up important questions of democracy in transitions, Hendriks' analysis to some extent narrows

down possible imaginations of participation and the public.[4] For example, the analytical focus on involvement in policy decision-making brackets out forms of participation associated with 'distributed innovation' (Felt and Wynne, 2007) and more active forms of citizenship. Furthermore, the implicit emphasis on how sustainability transitions should/could be made more 'democratic' forecloses wider appreciation of the diverse sites at which social actors are *already engaged* in sustainable energy transitions.

It was our intention in the workshop to explore these questions of democracy - such as who (or what) is included/excluded and who enrolls social actors into the process - in relation to the wider diversity of ways in which social actors participate in low carbon energy transitions. As a starting point for this system-wide exploration, and as a heuristic to aid workshop discussion, we proposed a topology that more comprehensively captures diverse forms of participation and public engagement in low carbon energy transitions.[5] A fuller sense of the meanings of participation in this sense can be arrived at by bringing together two distinctions increasingly made in development studies/STS and in writing on deliberative democracy. The first, based on who orchestrates the engagement of social actors in low carbon energy transitions, distinguishes between 'invited' forms of participation organised in terms of formal governance institutions and 'uninvited' engagement organised by citizens themselves (Leach et al. 2005; Wynne, 2007). The second distinction, increasingly popularised in writing on deliberative democracy, makes the distinction between forms of participation in low carbon energy transitions that are 'micro', highly structured and relatively small scale forms of deliberation and participation versus those which are 'macro', more open, informal, and take place in the wider public sphere (Goodin and Dryzek, 2006; Hendriks, 2006). Bringing these two distinctions together opens up a wide spectrum of possible forms of participation in sustainability transitions, of which the following categories represent distinct modes within this wider landscape (Chilvers, 2010a):[6]

- *Invited micro-level participation*: where members of the public and civil society actors are invited to participate in highly structured and managed group participation and deliberation organised in terms of a host decision-making institution – for example in consultations on government energy policy (e.g. Energy White Papers), in appraisals of energy options and possible transition pathways, in exploring public opinions and visions of the energy system, in online public dialogues to explore competing energy futures, and so on.

- *Invited macro/informal participation*: open, unstructured public engagement that occurs in wider public and private arenas beyond formal institutions but that

[4] This is at least partly due to the analysis itself being shaped by the TM approach that formed the object of study.

[5] This has been adapted from Chilvers' (2010a) mapping of the diverse meanings of public engagement evident across the UK science and technology domain.

[6] See Chilvers (2010b) for further discussion and examples of these modes of participation in sustainable energy transitions (additional resources are available at: http://www.uea.ac.uk/env/esrcsems/sems/part).

can often be initiated by them in shaping socio-technical relationships and change – for example household energy demand reduction programmes, roll out of smart energy technologies (including smart meters), community or group-based pro-environmental behaviour change schemes, institutionally mediated open innovation processes, public debate about renewable energy and nuclear power in the wider public sphere, and so on.

- *Uninvited participation*: organic, spontaneous public engagement initiated and organised by citizens and civil society actors themselves rather than decision institutions, which may be directed towards their own actions and/or challenging formal institutions – for example forms of public protest and direct action (e.g. Climate Camp), instances of citizen science including lay epidemiology or community-based assessments (e.g. community energy audits), Pro-Am science, grassroots innovations in community energy, other sites of distributed innovation such as open source movements, and so on.

In opening up to this more diverse and distributed sense of participation in transitions it is useful to reflect on the way that different strands, or conceptual traditions, within the transitions literature can be seen to uphold particular imaginations of publics and participation in the system. For example, as we have seen in Section 2.2 (above), TM tends to emphasise invited micro-level forms of participation mediated by incumbent institutions. Whereas the literature on SNM, particularly that exploring the role of civil society actors, places the emphasis on uninvited spaces of engagement in sustainability transitions where the processes of enrolling social actors are more distributed and rhizomatic. Importantly, the above typology allows the critical empirical questions - about inclusions/exclusions, who orchestrates the process, and whose visions count - to be symmetrically applied across a range of modes and sites of participation. It is this sort of comparative analysis across the low carbon energy system that has been missing from both the transitions and participation literatures hitherto.

The transitions literature has introduced some further concepts that can be useful in distinguishing between different modes of participation. Smith and Stirling (2007) make the distinction between *appraisal* and *commitment* in relation to participation in socio-technical systems. Material commitments reflect the way in which different actors participate in and reproduce the socio-technical system through their patterns of interaction and the deployment of resources. In addition the material forms of commitment, there are discursive commitments that play a role in co-ordinating action between actors. Appraisal reflects different ways of *knowing* the system, a fundamentally epistemic process (Smith and Stirling, 2007: 354). Appraisal therefore reflects a *deliberative* form of participation and one that may involve a range of different actors. There are overlaps between commitment and appraisal, and in particular between discursive commitments and appraisal.

Understood in this way, many forms of appraisal, discursive commitment and material commitment could be understood as interventions in the system, as attempts to modulate or express agency. Smith (2012) provides a useful example of

the various sites of civil society intervention in sustainable electricity transitions (Figure 2 below). However, not all are necessarily interventions, for example, there are many forms of *passive* commitment which simply reproduce the system on a day to day basis without seeking to disrupt it. Indeed, as Shove and Walker (2010) have argued, it is the complex interplay and aggregation of thousands of practices that construct and uphold socio-technical regimes (see also Hargreaves et al, 2013a).

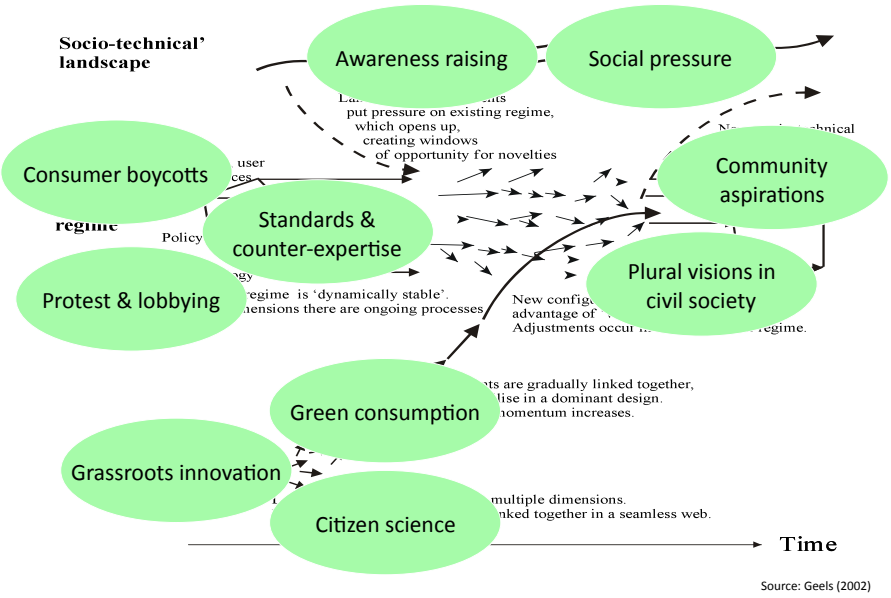

Figure 2. Civil society intervention in sustainable electricity transitions (Smith 2012).

Figure 2 illustrates that distinct forms (or configurations) of participation exist and occur at specific *sites* across the socio-technical system. Here the notion of a site is left deliberately flexible. It could reflect: an actual, specific physical site (e.g. Kingsnorth power station); a more generalised site (e.g. the household); or a more abstract phenomenon (e.g. the public sphere). The multiplicity of sites stresses the fact that there are multiple possibilities for the *where* of interventions. Indeed it seems likely that forms of participation that make up particular interventions connect and disturb multiple sites. Furthermore, it is at these sites that the interactions between different actors take place and thus where the politics of the system unfold. Thus the governance of the system takes place in coupled and overlapping arenas of interaction, which reflect the way in which the ability to influence the system is distributed amongst a range of sites, forms of participation and participating actors (Rip 2006). A more thorough understanding of the political dynamics and context in which purposive interventions might take place is therefore a necessary precursor for the development of more equitable and just forms of

reflexive governance, as is recognising the multiple forms and scales of power relations (Voß and Bournemann 2011; Lawhon and Murphy 2011).

2.4 Summary

This section has set out the background and rationale for the *Participation, politics and actor dynamics in low carbon transitions* workshop. It has made the case for developing a broader notion of socio-technical participation to address two key concerns within the literature. The first relates to the sites and modes of intervention in socio-technical systems. The dominant framing of the multi-level perspective has directed attention towards technological niches as the key sites of intervention in systems. However, a broader sense of participation points to multiple sites of distributed innovation and governance. Secondly, a set of questions has been raised about the politics of transition, in particular about the democratic implications of system interventions. Markard et al (2012) suggest that questions of agency are a growing area of inquiry within the transitions literature. This work is increasingly inspired by 'flatter', relational ontologies as a means of theorising and exploring the roles of different actors (Geels 2011; Garud and Gehman 2012; Shove and Walker 2010) In a similar vein, we have proposed some frameworks that provide a starting point for exploring these issues more deeply. This provides a basis for moving beyond existing assumptions and conceptions in the literature to develop a more comprehensive and systemic understanding of socio-technical participation in transitions processes, and the implications of this broader conception, through the following questions:

1. What are the diverse modes and sites of participation in low carbon energy transitions?
2. Which actors are involved, who/what enrolls them, and what gets excluded in these particular forms of participation (whose transition or vision counts)?
3. How do these forms of participation express agency and interact to shape the trajectories of low carbon energy transition pathways?
4. What are the implications of this broader conception of socio-technical participation:
    a. For theory?
    b. For research (and researchers)?
    c. For governance of socio-technical systems?

We now turn to the analysis of how these questions were tackled and addressed in workshop discussions in the following two sections.

3. UNDERSTANDING PARTICIPATION IN LOW CARBON ENERGY TRANSITIONS

In this section we present the findings and analysis of workshop discussions in the first two sessions on Day 1, which explored the diversity and dynamics of participation in low carbon energy transitions. First, participant mappings of the diverse forms of participation that exist in low carbon energy systems are presented and reflected upon. Second, in-depth explorations of specific instances of participation in low carbon energy transitions are then presented, offering a comparative analysis of the forms of mediation, enrolment, exclusions and visions produced across different cases. The final part of this section then draws across the first two workshop sessions to draw out emergent themes highlighting systemic perspectives on social actor involvement in transitions, both in terms of the inherent interconnectedness between different forms of participation and the importance of time and temporalities.

3.1 Mapping diverse forms of participation

The first workshop session focused on the question 'What are the diverse modes and sites of participation in low carbon energy transitions?' In order to address this participants worked in four groups to map out different forms of participation in socio-technical transitions, each according to different 'system frames' as detailed in Table 1.

Table 1. Different system framings of participation in energy systems

Framing	Details of task
What are the various forms of **invited and uninvited participation** in the energy system?	Map the different forms of invited and uninvited participation across the system? E.g. energy reviews, consultations, the planning system, pilot projects, protests etc. Who is involved? How influential? How useful is this binary?
What forms of engagement / participation act to contribute to the dynamic **stability** of the system?	What are the forms of engagement that contribute to the stability of the energy system? E.g. the material commitments of infrastructure, actors, etc.
What are the forms of engagement that represent **social appraisal** of the system?	What are the various forms of deliberation that produce knowledge about the energy system? Which are the most significant? Who is involved? What influence do the different forms of appraisal have on the system?
What are the forms of engagement that reflect **deliberate intentions to intervene** in changing the system?	Map the different forms of participation where actors are attempting to intervene in the dynamics of the system. Interventions could be forms of protest, innovation, lobbying. What is the relation between different forms of intervention?

Each group engaged in a creative process to draw a visual 'map' of diverse forms of participation according to their specific framing and then presented this back to the

whole workshop which opened up wider plenary discussion. Thumbnail images of these maps are provided below, with full size images given in Appendix 3.

Group 1: Uninvited / Uninvited

Group one used the invited/uninvited distinction that is made in the participation literature (introduced in section 2.3 above) to map out different forms of participation. The group produced the map shown in Figure 3, which identified 14 different types of participation, with multiple examples of each type. The types ranged from formal invited consultations, deliberative events, open innovation and expert advisory processes through to more informal and uninvited instances of participation in the form of activism, counter expertise, campaigning and lobbying. The mapping produced by this group essentially questioned and problematised the usefulness of the invited/uninvited distinction, producing a map that used a spectrum rather than a strict binary. Furthermore, certain forms of participation upset the distinction – for example, it was questioned whether business related interventions are 'invited' even when they run counter to the governmental thinking. One participant made a similar point about the role of academics and their ambiguity in relation to this distinction. Furthermore, the group guarded against drawing simplistic assumptions that only uninvited forms of participation can be critical of the incumbent system, citing the example of Germany's recent "Ethics Commission" into the future of nuclear energy which was invited but also critical.

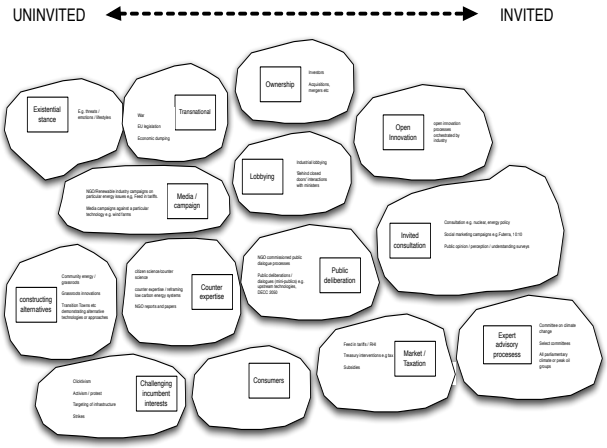

Figure 3. A map of invited/uninvited forms of participation in low carbon energy transitions (see Appendix 3 for the full-size image).

Group 2: Mapping Stability

Group two sought to map out the forms of participation that contribute to the stability of energy systems (see Figure 4). Central to their mapping was the way in which certain forms of participation lead to the 'lock in' of prevailing socio-technical systems, a concept that is already well established in the literature (see Unruh 2002). The group highlighted three dimensions of this lock in – cognitive, infrastructural, and commercial. Beyond this they identified four other factors that were felt to be significant in the stability of systems.

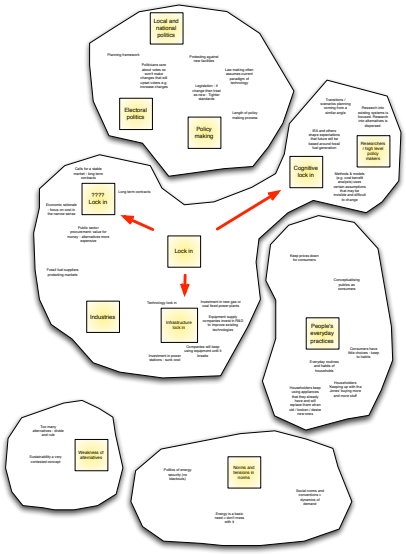

Figure 4. A map of the forms of participation and intervention that contribute to the stability of energy systems (see Appendix 3 for the full-size image).

The first was the influence of political and policy processes, particular the way in which they can prevent long-term planning. Secondly, there was the role of established social norms. Thirdly, there was the way in which systems are reproduced by everyday practices and routines. Finally, the weakness of alternatives was seen also as a significant factor in underpinning the stability of incumbent systems.

Group 3: Social Appraisal

Group three mapped out forms of participation and engagement that could be considered forms of social appraisal within energy systems. As shown in Appendix 3, the group took a very broad framing of appraisal and much of the discussion was around different understandings of what appraisal might mean, ending up with a definition that social appraisal reflected 'processes by which knowledges of the energy system are constructed.' At the centre of their mapping was the 'social construction of energy issues' reflecting the agora of energy issues and the ways of knowing the future. Beyond these more formal processes of knowledge production (including academic research) was a range of more informal processes such as tacit, experiential knowledges of the system (e.g. through power cuts).

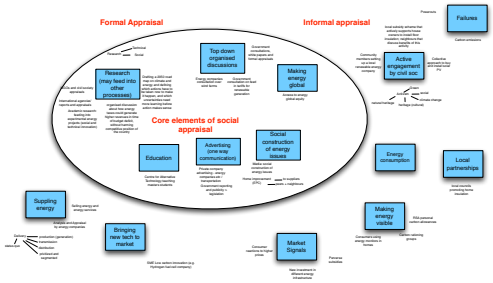

Figure 5. A map of forms of engagement that represent social appraisal of the system (see Appendix 3 for the full-size image).

Group 4: System change

The fourth group sought to explore the different forms of participation that were responsible for system change. They ended up with a range of overlapping forms of engaging in the system such as forms of innovation, political engagement and value led change (see Appendix 3). In the middle three processes were seen to be central to all of the surrounding forms: i) the production of knowledge; ii) the use of the media; iii) enrollment of actors. At the middle of these three processes was a 'time-space window' reflecting the fact that all opportunities to influence system dynamics are contextualised in time and space.

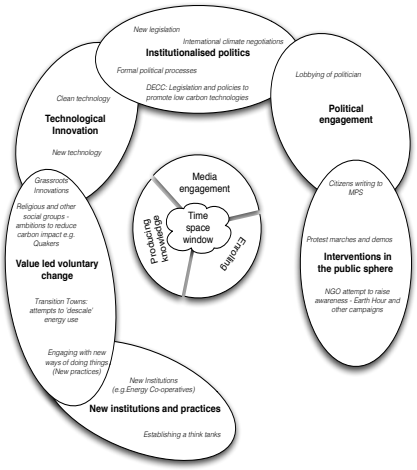

Figure 6. A map of engagement as deliberate interventions in system change (see Appendix 3 for the full-size image).

A number of insights were drawn from the four mappings in plenary discussions and can be further reflected on. Perhaps most obvious is the way in which the mappings collectively illustrate the shear diversity and multiplicity of the different forms of participation and social actor engagement in low carbon energy transitions. The maps illustrate a range of sites of intervention across the energy system and a range of possible roles for different actors in ways that are not fully captured in existing literatures. For example, the mappings go beyond perceiving the public solely as consumers, which has been a tendency within the sustainability transitions literature (Lawhon and Murphy 2011). The maps also expose the highly partial considerations, assumptions and imaginations of participation in existing strands of the literature considered in Section 2 – such as the emphasis on small-scale invited deliberative events in transition management, or more bottom-up and grassroots processes increasingly emphasized in literature on niche development. But the extent to which meanings of participation in sustainability transitions have been opened up by the more thoroughgoing systemic perspective prompted by the mapping approach taken in the workshop goes even further. As the stability mapping demonstrates, everyday life – or simply being or existing in the world – also became implicated as an important site of participation in energy systems. Everyday practices, norms and values were all seen as significant in shaping commitments and appraisals of the system. Participants commented on how while both the participation and transitions literatures tend to focus on sites of change the mapping exercise had brought the dynamics of participation in stability *and* change into conversation in new ways.

In moving beyond a focus on particular sites or instances of participation at different points in the energy system, then, mapping out the diversity of social actor engagements across the system highlights the inherent complexity and interconnectedness of wider ecologies of participation (a theme to which we return

later in Section 3.3.1). The way in which this highlights the partial and contingent nature of any one instance of participation in low carbon energy transitions helps draw attention to the inherent uncertainty and indeterminacy of the forms of representation and visions of energy transitions produced in particular settings. Attending to the plurality of visions and expressions of the public issues at stake being mobilized in diverse and co-existing forms of participation across 'the system', as shown in the above maps, opens up possibilities for reflexive ways of understanding and intervening in future processes. On top of this, however, rather than only suggesting ways of enhancing *reflectiveness* through offering more complete representations of participation across the system and its emergence, the way in which the four maps shown above were subject to different framing conditions draws attention to the mutual construction of subject/object and the pre-commitments shaping one's view of the system - consideration which amounts to *reflexivity* proper when analysing and enacting participation in transitions (cf. Stirling, 2006).

Despite their different framing conditions, it is interesting to note the other parallels that can be observed between the maps. First, one interesting aspect is the degree to which the maps suggest that interventions occur in social and cultural spheres, rather than directly in the technical system. They emphasize the *socio*- dimension of socio-technical systems and the multiple forms of appraisal and commitment that are constantly being undertaken. Thus, technological innovation only appears on two mappings (groups 3 and 4). Of course, the transitions literature is premised on the argument that radical technological development can stimulate system transitions, explaining the attention given to technological niches. Contrastingly, the workshop mappings suggest that technological innovation is only one form of system intervention amongst many, and that interactions between technological niches and many other sites of participation are likely to influence the trajectory of novel technologies. Second, knowledge production about the system is perceived to be a significant factor but this occurs in multiple ways and in multiple sites. This reinforces the argument that the politics of knowledge production is of critical importance when understanding transition processes. Third, as some writers have argued (e.g. Meadowcroft 2007) you cannot exclude political spaces from an understanding of transitions. Not only are these are significant sites of participation involving multiple actors in themselves, but there is a need to understand how they link to purposive interventions. Finally, there is an economic dimension to participation that should not be overlooked. At one level, economic power reflects a way of intervening in a system (e.g. lobbying), at another the economic rationale and logics of the system can be a factor in maintaining stability. Some of these themes, and the connections between different forms of participation, will be returned to later in this report.

Whilst the maps illustrated the distributed nature of power and innovation across the system, they themselves should be treated with a note of caution. Following Smith and Stirling (2007) each of the mappings can be considered only a partial framing of they system. Each has emerged from a negotiated aggregation of situated perspectives, and is to some extent 'myopic' (Shove and Walker 2007). Thus the

workshop maps focus more closely on the functional / user side of the system than the production side (see Geels 2005), reflecting the expertise of the participants. Thus, whilst they are useful in exploring the distributed nature of participation in transition processes, we also need to be reflexive about the power that they carry as forms of representation themselves. By representing energy systems in this way, these maps open up different possibilities for intervention that would be invisible on different mappings of the system. However, whilst the maps often suggest visually different interventions are of equal significance, further detailed work is needed to understand their relative significance, interrelations and blindspots.

3.2. The dynamics of participation in low carbon energy transitions

The second session of the workshop focused in on specific forms of participation in more detail in addressing workshop question 2: 'Which actors are involved, who/what enrolls them, and what gets excluded in these particular forms of participation (whose transition or vision counts)?' The purpose of this session was to explore in more depth the dynamics and features of distinct cases of participation in low carbon energy transitions through a process of comparative analysis.

The research team selected nine cases before the workshop and participants with experience of each case were asked to come prepared to offer some introduction and background to the case within the workshop session. Summaries of these cases are given in Table 2. Cases were selected to offer a diversity of forms of participation across low carbon energy systems. For example, as illustrated in Figure 7, initial *a priori* understandings showed the cases to be varying across the axes of invited/uninvited participation and appraisal/commitment (introduced above in section 2.3). Furthermore, there was some variety in the different forms of invited commitment such as researcher led interventions, government programmes and different forms of innovation. Each of the cases reflected some kind of attempt at purposive intervention in the system.

During the session participants again broke out into four groups, each group working with a pair (or in one case, a trio) of cases studies. After a short verbal introduction to the case by one participant, each group considered a number of questions on the participation dynamics in relation to the case study. Each group then fed back their findings to the whole workshop in a plenary session where further comparative analysis was conducted across all nine cases. A summary of the main findings from this analysis across the cases is given in Table 3.

Table 2. A summary of the nine case studies of participation in low carbon energy transitions.

Case study	Description
Amsterdam Port	A participatory sustainability initiative designed to generate creative ideas for the regeneration and 'greening' of Amsterdam Port (see Lissandrello and Grin 2011).
Low Carbon Communities	A UK government programme designed to provide communities with resources to develop low carbon projects (see http://bit.ly/p8ZsCU).
E.ON Open Innovation	An open innovation platform developed by E.ON to generate ideas for energy saving.
GEO Smart Meter Trials	A pilot exploring how early adopters interact with smart meter technology (see Hargreaves et al 2010 and Hargreaves et al 2013b).
Carbon Conversations	A grassroots, UK civil society initiative that is intended to stimulate voluntary reductions in energy consumption (see http://bit.ly/WvyO7y).
Climate Camp	A direct action protest movement that took place at a number of different sites between 2005 and 2009 (see for example Schlembach 2011).
Energy 2050 Pathways – DECC Public Dialogue	A public dialogue process to engage the public in the debate about transforming the energy system, based around DECC's 2050 Pathways Calculator (see http://www.sciencewise-erc.org.uk/cms/energy-2050-pathways-a-public-dialogue/).
Zero Carbon Britain	An NGO-led appraisal process which proposes a pathway to a 'Zero Carbon' Britain by 2030 (see http://www.zerocarbonbritain.com).
Transition Pathways	An academic consortium project which developed and appraised three low carbon energy transition pathways combining qualitative and quantitative data (see Foxon et al 2012).

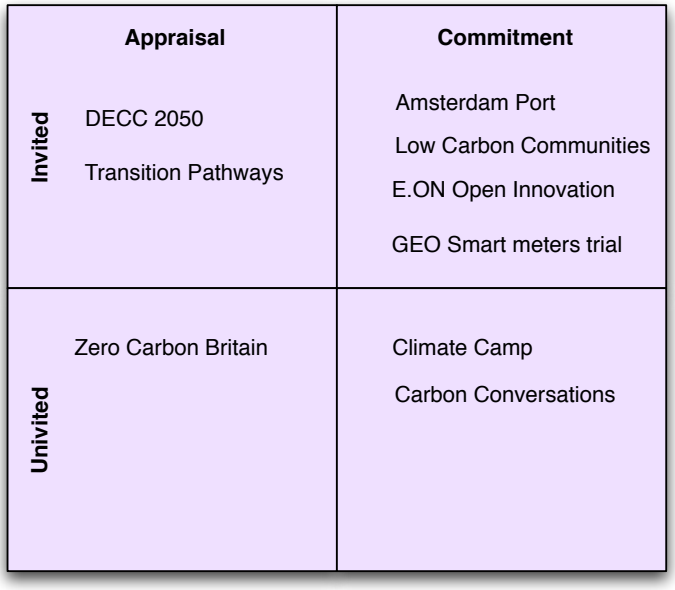

Figure 7. An illustration of how the nine case studies of system intervention potentially vary in relation to invited/uninvited participation and appraisal/commitment.

Table 3. A summary of the comparative analysis of nine cases of participation in low carbon energy transitions.

	E.ON Open innovation	Carbon Conversations	Low Carbon Communities	GEO Smart Meter Pilot	Amsterdam Port	Climate Camp	Transition Pathways	Zero carbon Britain	DECC 2050
Who is involved?	E.ON, the public who access the site and people realising the innovations.	'Greens', certain localities linked to Transitions Towns, an instigator, various funders	Energy consumers, Passive householders, DECC, Local authority, Muswell Hill Sustainability Group, 3rd party contractors, academics	Early adopting energy consumers, DECC, commercial smart meter manufacturers	A citizen panel supported by experts, an Expert panel, Director of the Port, Alderman of Amsterdam, Researchers	Self selecting Campers, Invited speakers (NUM, academics, journalists), local communities, media, police	Academics. Energy industry, some NGOs, policy makers. Imagined actors: government, market, civil society (in pathways)	Academics, industry, NGOs, think-tanks.	Young people, community leaders, general public (through online game)
Who is excluded?	Govt regulators, social innovators, people outside the reach of the marketing	Government, business, academics	The big six energy companies		Radical groups on both sides who had previously been conflictive	'Big business', the 'object' of the protests.	Wider civil society, some NGOs; financial institutions.	Government representatives, non-experts / wider publics, financial institutions.	NGOs, interest groups
How is participation orchestrated?	By E.ON using a TV programme and website to get the idea out and then managing the responses.	Participation is encouraged by word of mouth through local networks, through the local press, websites and NGO networks.	Orchestration at multiple levels starting with DECC, Haringey Council, the Steering Group and volunteers.	At multiple levels in an inverted pyramid. DECC at the widest point, then GEO, then UEA, then householders.	Orchestrated by researchers in order to promote variety and innovation.	Orchestrated by core group in order to engender inclusivity. Also significant practical orchestration e.g. constructing the physical infrastructure	Orchestrated by researchers, EPSRC and E.ON.	Funded by charitable trust and donations from trustees.	Orchestrated by civil servants in DECC and BIS, Sciencewise and a few facilitators.
What are the visions produced?	E.ON's vision of improved service and energy saving along with raised awareness of energy issues. Possibility of commercially viable innovation emerging.	A more radical vision of lower consumption living that is voluntarily diffused.	A techno-rationalist, optimistic vision. Vision of experimentation as a learning process. Tension within DECC between (i) community is a delivery mechanism and (ii) community as non-core business and cuddly.	Techno-rationalist optimism – confidence in new technologies and information deficit models of behaviour change.	Multiple visions of sustainability were specifically encouraged by the orchestrators.	Tension in vision between being an open and democratic forum and the influence of specific political groupings. A shift in vision was perceived between 2007 and 2009 away from plurality and towards a focus on the problems of capitalism.	Vision of pathways based on an interpretation of the visions of other (industry civil society, etc).	Vision of an expert panel: scientific and technological visions,	Technical, top down vision of experts, civil servants and facilitators.
Are any visions excluded?			The visions of householders are not prominent.	The visions of householders are not prominent.			More radical visions with a societal focus. The international dimension was neglected.	The social and political constraints were under-emphasised	Alternative / radical visions of society and different forms of social organisation.
How is system change envisaged?	Incremental vision of system change: Improving relationship between company and customers might lead to better communication. More profit might lead to more investment in low carbon energy systems. Influential products and services might emerge from the innovation process	A cascading model of behaviour change leading to a widespread shift to low carbon lifestyles. This model has not actually materialised in the way that it was hoped. Also, by reducing consumption within the constraints of current infrastructure.		Through an increase in technological optimisation / efficiency (i.e. the roll out of a 'Smart Grid')	By creating positive visions and a 'window into the future'. By legitimizing some activities and delegitimizing others. By a specific focus on 'system defects' and how to manage them using expert advice. By acting as a demonstration project that might influence other experiments.	By creating positive visions and a 'window into the future'. . By legitimizing some activities and delegitimizing others. By leaving no footprint. By influencing public discourse, building a social movement and shifting practices.	By opening up and reframing debate. By brining together novel combinations of actors.	By opening up space in public for debate. By allowing for future political moves. By framing a low carbon future as an opportunity.	By assisting government decision and ensuring lock in (e.g. support for nuclear). By influencing the attitudes of civil servants.

3.2.1 Orchestration, mediation, enrolment

All of the different forms of participation described in Tables 2 and 3 can be understood as collectives or hybrid assemblages of (human and non-human) actors[7] configured in particular ways and cohering around particular definitions of low carbon energy-related issues. In this regard one important consideration for workshop participants in Session 2 was the ways in which actors become enrolled into these collectives. In particular discussion of this point focused on how these forms of participation are orchestrated and mediated. It was clear that all instances involved the active enrollment of participants but the processes by which this enrolment took place varied across the nine cases in Table 3. In some cases – such as DECC 2050, Amsterdam Port, and Transitions Pathways – mediation was a highly centralized and a formalised process where professional facilitators or researchers invited participants to become enrolled into small-group deliberative events or interdisciplinary research processes. For example in the Amsterdam Port case members of the public were invited to apply for membership of a citizen panel via the local media and mailshots. Applicants were then profiled according to seven different socio-cultural 'types' in order to come up with a panel that was 'representative' of local socio-demographic characteristics. In other cases the forms of orchestration and mediation involved were much more distributed and rhizomic where the identification of who was doing the enrolling was much less clear. This appeared to be the case in the Climate Camp example as well as Carbon Conversations where a series of linked collectives were brought into being by cascading through networks in a more 'bottom up' fashion. In some circumstances, such as the E.ON open innovation project, it was a more open process in that any participant could become involved, whilst still being orchestrated by one central actor (i.e. E.ON).

So, despite taking different forms it was thus recognized that all nine case of participation were explicitly orchestrated, with enrolment being mediated by certain actors for particular purposes or around particular definitions of the problem at stake.[8] One important insight that this provides is that forms of participation that are seemingly very different are all subject to mediation and exclusions. Often romanticized forms of participation from the 'grassroots' or civil society can be highly exclusive and are not necessarily as organic or spontaneous as they might be portrayed within some quarters. Instead they too are carefully managed and orchestrated. Similarly, more deliberately inclusive Habermasian inspired deliberative processes are partial and subject to exclusions and 'overflows' (Callon, 1998). Indeed, one group in session 2 was struck by the parallels between the

[7] One objective of the workshop was to explore the extent that a focus on participation could form the basis of a 'flatter' ontology on which to explore transition dynamics, as opposed to the more hierarchical MLP (although see Geels 2011). Some of the terminology used therefore drew inspiration from Actor Network Theory (a similarly flat ontology). While having a symmetrical concern for both, participants often placed a relative emphasis on discussing the dynamics of social actors over non-human actors in the workshop.

[8] This point was further emphasized by the way Group 4 in session 1 put enrolment at the middle of their system map (Figure 6), reflecting the way in which these were common elements of the various forms of intervention that had been identified.

Amsterdam Port case study and the UK based Climate Camps. Whilst on face value these appear to be very different forms of intervention in the system, they were both carefully orchestrated to be inclusive and participatory processes. Furthermore, as one participant observed, structured and hierarchical processes are not necessarily antithetical to stimulating interesting things at the grassroots level and in fact can be highly transformative in particular instances.

The Climate Camp case also drew attention to the fact that orchestration is not necessarily just an administrative process that it can also involve the organisation of infrastructure, non-human actors and certain technologies. Indeed, to some extent all the cases required such broader assemblages to be configured, involving the co-ordination of knowledge, material systems and actors (cf. Lezaun, 2007; Marres, 2012). One participant noted that we could pay more attention to the interaction between these, the way in which the participation of non-human artifacts and technologies shapes participation. One relevant example from session 2 was the way in which websites were, for several cases, crucial technologies in the enrolment processes (for example Carbon Conversations; DECC 2050; E.ON Open Innovation). There are also implications for the way in which civil society is theorised within transition theory: often it is conceptualised as a *space* or site from which innovation and activism emerges. However, the insights on orchestration and enrolment suggest that a perspective that views civil society as being something that is actively constructed and shaped might be something that is worth exploring (e.g. Szreter 2002).

A further insight that emerged from one group in session 2 highlighted the way in which, within some cases, there appeared to be a hierarchy of orchestration taking place. The group represented this as an inverted pyramid, as illustrated by Figure 8.

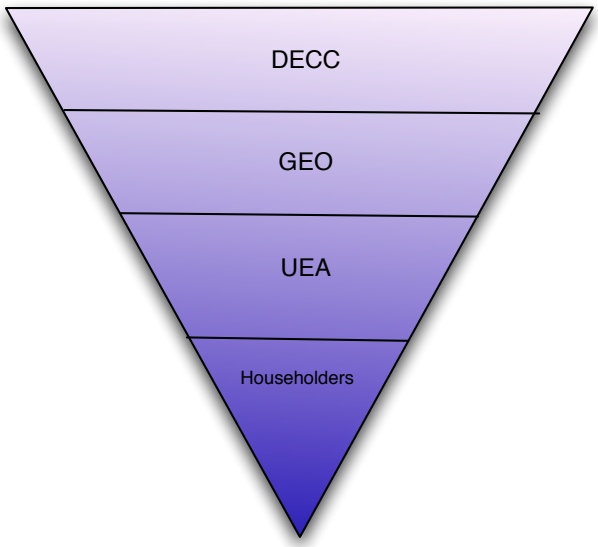

Figure 8. The inverted pyramid of orchestration in the Smart Meter pilot.

In this particular example it was the Department for Energy and Climate Change (DECC) who were responsible for the top level of orchestration by setting a strong policy agenda around the roll-out of smart meter technology in the UK. Responding to this GEO (the technology developer) recruited a UEA research team to undertake longitudinal qualitative research on the pilot households. In the example of the case the UEA were then responsible for orchestrating the participation of households in the research process. Similar hierarchies could be observed in other cases, suggesting that orchestration is not a simple mono-level process. Furthermore, there are also indications that it is not always a linear process. For example, in the case above, if the wider smart meter pilot is considered then GEO themselves were also orchestrating householders directly. Thus multiple and nested forms of enrolment and orchestration are likely to be a feature of many different kinds of intervention, including transition arenas and purposively created technological niches.

3.2.2 Visions, purposes, exclusions

As already noted, the orchestration and mediation of the collectives that make up the nine cases of participation inevitably leads to particular exclusions and the production of particular definitions or visions of low carbon energy-related issues. In each case the forms of participation would not have occurred in the absence of mediation and without actors being enrolled around *something*. To take exclusions first, various inclusions and exclusion were identified across the nine cases considered (Table 3). Firstly, there was the exclusion of (social) actors. In some cases actor exclusions were *collateral:* an inevitable by-product of the nature of the participation process. It is simply not practically possible (or perhaps desirable) to be completely inclusive. In other cases exclusions were *strategic,* more explicit and conscious. Indeed it was argued that exclusions could even be productive, such as the case of Amsterdam Port where a number of previously antagonistic actors, on various sides, were deliberately excluded from the process. What this suggests is that whilst deliberative sites of intervention can be critiqued for the types or nature of exclusions that occur (e.g. Lawhon and Murphy 2011) it is more problematic to criticize them for exclusivity *per se*. Instead it demands that the orchestrators of such interventions are explicit and reflexive about the nature of such exclusions, and the motivations behind them. This may be particularly relevant in the case of forms of systemic appraisal, which are often invited-macro processes that are portrayed as open and inclusive but which the workshop suggests are themselves always partially closed. Indeed, as one participant noted, in many cases there appeared to be a tension between attempting to form a consensus and deciding at what point you draw a boundary and say 'no – these are the people we are against.'

With regard to visions, comparative analysis of the cases in session 2 offered perspectives on the sorts of visions and knowledges that are produced through the performance of these forms of participation as well as those that are excluded (see Table 3). For the cases that placed more emphasis on appraisal, both the DECC 2050 process and Transition Pathways were deemed to have worked largely within the existing energy regime to the exclusion of more radical visions that imagine alternative forms of social organization and innovation for example. The Zero Carbon

Britain appraisal was very much seen to be the opposite of this, painting a more radical vision of system change while consciously underplaying the political and social constraints that might cause problems along the way. Whilst these three cases were similar in form – appraisals that generate visions of possible future system dynamics – the consequent visions themselves vary widely highlighting that these are not neutral processes and depend on their modes of orchestration and underpinning purposes. In both the LCCC and GEO Smart Meter Pilot a techno-rationalist optimistic vision predominated – both in terms of technologies of community and new information technologies – with the visions of householders being notable exclusions. Carbon Conversations cohered around a narrative of lower consumption living, but did not go as far as challenging the constraints of existing infrastructures in more radical ways. The Climate Camp engagements on the other hand were more radical in challenging incumbent regimes, reflected through an increasing focus over time on the underlying problems of capitalism and the exclusion of business interests from the collective. The attempt here was to also influence landscape level dynamics by shifting public discourse and building a social movement. Within a sub-set of cases there was a specific intention to provide a space for competing visions to interact and potentially be integrated through deliberative and participatory processes. For example, this was a strong feature of the Amsterdam Port case where the process was specifically structured to generate multiple visions of possible futures. The effective functioning of such sites would seem to require mechanisms to reconcile competing or conflictive visions. Rather than opening up to multiple visions, however, most of the cases already noted and described in Table 3 sought to close down around a specific vision of the future.

Yet, while it was possible for workshop participants to identify these particular visions they also emphasised that in all instances of participation exists a complex patterning of competing visions, purposes and rationales – both in terms of desired future states and underlying motivations for participating. It was noted that while the nine cases of participation considered ostensibly occur in the domain of low carbon energy transitions, actors may become involved for other reasons and for other causes – such as meeting expressed social needs, transforming socio-political structures, social justice, anti-capitalism, the survival of a business, and so on. As one participant suggested, in some contexts 'low carbon' is just a playing field on which other political visions are played out. Any one instance of participation has a multiplicity of often-implicit issues and framings attached to it. The ambivalence of actors involved in any one instance of participation is partly a product of their multiple-identities and simultaneous multivalent attachments with other networks and collectives (cf. Wynne, 1993). This also plays into the different rationales for participating in the process itself – whether they be instrumental, substantive or normative or some combination of these (Fiorino, 1990). A clear finding of the workshop was that these reasons are multiple, complex and interwoven. What this suggests is that forms of participation and interventions in low carbon energy transitions are motivated by a range of different rationales, operating at different levels, with potential differences between different actors. In other words, politics plays out at multiple levels, and it would be misplaced to assume a single and overarching 'logic' to any given form of participation. Thus whilst the 'logic' of the

system itself is the outcome of contestation and the nexus of multiple logics, so too can each specific intervention be understood as being constituted by multiple and possibly conflictive rationales, logics and visions.

3.3 Systemic perspectives on participation in energy transitions

In the final part of this section we draw across the first two workshop sessions discussed above to consider cross-cutting themes which point towards more systemic perspectives on social actor involvement in sustainability transitions, both in terms of the inherent interconnectedness between different forms of participation and the importance of time and temporalities.

3.3.1. Interactions and interconnections

An important theme that emerged in plenary discussions reflecting across the first two sessions of the workshop, which was also a key inspiration in framing the workshop at its inception, recognised the inherent interconnectedness of the diverse forms of participation identified in both the mappings produced and the case studies. Under this more holistic and systemic perspective these collectives were viewed as part of diverse, interrelated and co-evolving 'ecologies of participation' (see also Chilvers, 2010b; Chilvers, 2012). One aspect of this was a number of connections evident between the cases explored in the second session. For example, one group highlighted the interrelation between the government orchestrated DECC 2050 public dialogue and the CAT's Zero Carbon Britain process. In addition to responding to the framings of the DECC dialogue it emerged that the CAT team had got hold of the carbon calculator (which formed a key aspect of the DECC online dialogue component), hacked into it, changed some of the framing assumptions on which it was based, and sent it back to DECC as a direct challenge to their vision of UK energy futures. In the case of the GEO trial and the LCCC cases, smart meter technologies trialed in the former were also present in some community context in the latter. Workshop participants also offered evidence of connections with forms of participation beyond the immediate cases discussed. For example, the Carbon Conversations process was in some respects quite closely linked to Transitions Towns initiatives, with similar actors being involved in both and the use of networks formed by the latter assisting with processes of enrollment in the former.

The workshop also drew attention to the mobility of some forms of participation, further emphasizing their interconnectedness. For example, some case studies highlighted forms of intervention that were explicitly attempting to diffuse, such as in the case of Carbon Conversations. Indeed, this case was based around a specific model that, it was hoped by the instigators, would enable the process to spread virally. What this indicates is that some forms of participation can become codified and replicated. Group 1 also drew attention to the way in which different groups might move from being invited to uninvited (or vice versa). These processes themselves are worthy of further investigation. In addition, another insight that emerged was the way in which the public sphere becomes a site of interaction between various different forms of intervention. Many forms of participation are concerned with the production and dissemination of knowledge. In some cases this

knowledge is intended to inform (e.g. expert advice, some research) in others it is explicitly intended to influence the behaviour of other actors (e.g. lobbying, advertising). The broader public sphere therefore becomes a key site of interaction between different knowledges and where contestation over the framing of issues takes place. One implication of this is that the media actors become more significant participants in transitions than is otherwise recognised in current theory. More narrowly, a site where many different forms of intervention intersect is in the formal political sphere. Various different forms of intervention (lobbying, invited consultation, expert processes, protest) were intended to influence formal political processes.

All of the mappings produced in Session 1 also highlighted this sense of wider interconnected ecologies of participation in low carbon energy transitions (see Appendix 3). For example, as mentioned above, Group 2 identified the way in which different forms of participation combine and reinforce each other to create 'lock-in' and stability of the overall socio-technical configuration. One implication of this is that single forms of intervention are unlikely to have major effects unless of course, they happen to be particularly 'disruptive' in some sense. This raised questions as to whether the focus on innovation within the transitions literature has led to a theoretical neglect of the processes and sites of stability. One workshop participant noted a similar bias towards novelty within the participation literature, such as that on constructive / participatory technology assessment. Whereas the forms of participation that change things are often explicit, visible and orchestrated, those which contribute to stability are often unconscious, habitual and ignored, invoking Law's (2009) concept of 'collateral realities'.

Another interesting question raised was the relationship between those assemblages of participation which support system stability and those which attempt to stimulate change. Are they directly related or substantively different? What happens to the processes of stability to create the time-space window in Group 4's map (Figure 6, above)? What other connections exist? What theoretical questions does this raise? One interesting insight was the way in which some forms of participation – such as those relating to formal politics – appeared both on the mappings of system stability and system change. Electoral cycles and policy-making processes can build in conservatism and act as barriers to more radical transformations, yet the group exploring 'system change' felt that formal political engagement was one possible form of participation where actors can potentially shift system dynamics. In further reflecting on relationships between stability and change, if explaining these states cannot be reduced to isolated forms of participation then maybe it is the wider alignment of configurations across multiple forms of participation that creates 'windows of opportunity'. Building on this point, one participant suggested that rather than system change being driven by niches it might be about how different activities link up with those of the regime. Perhaps different forms of participation reflect different 'anchoring' processes that allow transformation processes to take place.[9] The proposition that certain alignments are

[9] The concept of 'anchorage' has been proposed as a means of linking niche activity with regimes. See Elzen et al (2008)

necessary for transitions to take place is a key argument of recent work on Transition Pathways (Geels and Schot 2010). However, the alignments beings discussed here were not simply between the three levels of the MLP but amongst various forms of participation across the system.

One final pattern of connection between different forms of participation was that which occurred over time. At one level this related to the way in which these forms travel and are re-translated in different contexts. For example, whilst it remained ostensibly the same form of participation, Climate Camp underwent subtle changes over the duration of its several iterations. Again this suggests that what appear from the outside to be similar forms of participation may actually be very different in their actually unfolding and functioning at particular points in time. There were also a number of discussions about the significance of cultural-historical antecedents and how these both shape and can provide greater insights into contemporary cases (and ecologies) of participation (cf. Jasanoff, 2011). Thus it was felt that Climate Camp should be understood in the context of a longer tradition of environmental direct action in the UK and which itself may well have evolved into the Occupy movement. This raised the difficult questions of how you bound cases, a problem that has already been raised within the transitions literature (Genus and Coles 2008). It was suggested that investigating the antecedents might be one possible strategy, in order to get a good idea of where a case has come from and also to gain a fuller sense of the openings and closings of different forms of democratic engagement over longer cycles of political change. Another suggestion was to follow the actors, tracing the way in which they move between different sites and forms of participation. Finally, as a historian pointed out, historical antecedents and previous interventions, such as energy reduction campaigns in the immediate post-war era, can be learned from and provide pertinent insights into contemporary interventions.

3.3.2. Temporalities and windows of opportunities

The issue of antecedents discussed above illustrates another theme that emerged regularly during the workshop; that of the temporality of transition processes. One thread of this related to *windows of opportunity*. The idea of a time-space window featured at the centre of the mapping of interventions undertaken by Group 4. This was intended to represent the fact that all possible interventions are contextualised in both time and space. Therefore the extent to which any given intervention has any purchase will depend, to some extent on exogenous factors. Again, to some extent this echoes the existing work on transition pathways and the way in which system change may arise out of specific temporal configurations of landscape, regime and niche (Geels and Schot 2010). However, from the perspective of participation, such configurations can be considered in new ways. Firstly, they relate not only to the opportunity for new technologies to shape system dynamics. Furthermore, a participation perspective sheds light on the way in which different forms of participation within regimes have the potential to influence system dynamics. For example, in the case above, the German Nuclear Ethics Commission (a formal appraisal) has played a decisive role in the trajectory of the energy system in Germany. Thus, as one participant noted, it might be useful to think about the

importance of other forms of alignment outside those framed by the multi-level perspective. However, an important point was made that you need people who misjudge the time, such as the early wind turbine pioneers in Denmark. If they had not believed the time was right in the early 1970s then the wind industry would have developed very differently. This led to the suggestion that the idea that the timing must be 'right' is itself a social construction.

There is a strong temporal dimension to the sustainability transitions literature, both in terms of the historical case studies and the future orientated scenario and forecasting work. However in both cases time is conceptualised as fundamentally linear, a uniform backdrop to the unfolding of transition processes. The workshop drew attention to the way to the fact that transitions are perhaps not just multi-phase (Grin et al 2010) but also involve multiple temporalities. For example, the group mapping stability drew attention to a number of different rhythms that were implicated in upholding the stability including those of electoral cycles, the duration of contractual agreements and of infrastructure lifespan. Understood in this way then, windows of opportunity might arise through the alignment of a number of different temporalities. Related to this was the fact that the forms of participation had their own rhythms and durations. The workshop drew attention to the way in which such temporalities can be manipulated or constructed. One way in which this occurs is through the orchestration of specific interventions. Forms of political temporality are socially constructed, such as the timescale set for the Low Carbon Community Challenge. In such cases certain actors have the ability to set the pace and duration of specific interventions. A second way of manipulating time is through the specific temporal imaginary that is used. This is particularly relevant in forms of appraisal where different future timespans are adopted. The workshop suggested that the longer these are, the broader the possibilities (but also the uncertainties). Indeed within the Amsterdam Port case the technique of extending the timescale over which change was envisioned was deliberately used to minimize conflict and open up possibilities of imagining more radically different futures. In other words, time is not just a backdrop it can, in certain cases and sites, be something that is manipulated and actively constructed.

4. TOWARDS SYSTEMIC PERSPECTIVES ON PARTICIPATION IN ENERGY TRANSITIONS: RESEARCH QUESTIONS AND CHALLENGES

In this section we conclude the report by reflecting on the implications for future research that come from adopting a broader system-wide understanding of participation in low carbon energy transitions. The section draws on workshop discussions from Day 2 where all participants collectively reflected on research implications and broke into four groups each of which considered one of the following aspects in more depth:

1. What are the research questions that we should be addressing?
2. What sorts of empirical research should be done?
3. What other theories might be useful in taking this work further? What are the implications for transition theories?
4. What are the implications for the governing system change and development of *purposive* interventions?

Taking account of overlaps between the outputs from each group we first consider suggested questions that should form the focus of a future research agenda in this area before outlining the main research challenges identified by participants in terms of developing empirical studies, theoretical implications and intervening in system change.

4.1 Research questions

All participants had the opportunity to write down what they viewed to be the key research questions emerging from the workshop on post-it notes. These research questions were then collated by a subgroup of participants, organised into key themes, and then further refined during post-workshop analysis. The key research themes and questions relating to the broader conception of socio-technical participation developed in the workshop are shown in Box 2.

These questions broadly reflect and build on the Day 1 sessions and discussions (reported in Section 3, above). This is especially the case for the questions focusing on *mapping systemic participation* and the utility of typologising between different features and axes of difference, as well as the set of questions on *participation dynamics* about how assemblages of participation get made, orchestrated and the forms of mediation involved. Workshop participants also focused on the *mobility* and processes of diffusion associated with forms of socio-technical participation, with some participants having more analytical ('how do particular configurations of engagement move from place to place') and some more interventionist ('how can we scale up desirable forms of engagement in transitions') interests in this regard.

The theme of *ecologies of participation* took forward questions considered in framing the workshop at its inception and focused on the interactions and interconnectedness of diverse forms of participation and the consequences of this to

participants, society and system change. A number of participants also questioned the actual *influence* that specific instances of participation have in shaping sustainability transitions. Again there was a distinction here between participants seeking to empirically explore these dynamics and more normatively framed questions where the main interest was in designing and bringing about 'better' or more 'effective' forms of participation in transitions (as if what we mean by better is somehow pre-given).

Questions of *power* and *political economy* were writ large throughout the workshop discussions in terms of how forms of participation are governed, whether incumbent interests can be influenced and open up to alternative perspectives and visions, the resourcing of participation, and the role of ownership/property rights. Focusing on questions of participation and democracy also brought about more general questions of *transition dynamics*, meanings of transition(s), and the relationship between stability and change in the system (as discussed in Section 3.3). Finally, participants considered that taking forward a broader conception socio-technical participation considered in the workshop depends on constructive *interdisciplinary connections* for example with historical transitions studies and translating the results of these studies for input into energy system modeling.

Box 2. Research questions

- *Participation dynamics.* How are instances of participation in energy transitions constructed and produced? How do processes of enrollment and orchestration vary across different forms of participation? How do these interventions gain legitimacy?

- *Mobility of participation.* How/why do some forms of participation in energy transitions become mobile, standardised or 'scaled up' while others remain as localized practices? How can particular forms of socio-technical participation scale up and diffuse? How can we better understand how innovations in social practices and regime changes occur (and catch on)?

- *Mapping systemic participation.* How can we best map diverse forms of participation in energy transitions? What are the key axes/categories that differentiate between different forms? Is it possible to develop typologies or are these distinctions (e.g. the invited/uninvited distinction) untenable given the complexities involved?

- *'Ecologies of participation'.* How do diverse forms of participation across the wider energy system interact, interconnect, and with what consequences?

- *Influence, agency and 'effectiveness'.* How can the actual influence of different forms of participation on emergent sustainability transitions and system change be evaluated? Which interventions have most influence? What constitutes 'effective' participation in energy transitions?

- *Political economy and power.* Who or what governs spaces of participation in energy transitions? How can we better understand the political economy of participation in this context? Who funds participation? What is the role of ownership in socio-technical participation? Who's listening to what forms of participation and why? How can formal institutions acknowledge/open up to outsider or grassroots perspectives?

- *Transitions dynamics.* How do processes ensuring stability (including 'normal', routine and mundane practices) interact with those enabling system change? What is a transition, what different kinds are there, and how do they come about?

- *Interdisciplinary connections.* What does a more holistic perspective on socio-technical participation mean for transition theories? How can historical analyses contribute to understanding contemporary spaces of participation in transitions (and visa versa)? How can we translate the results of these studies into a form that bridges the gap to energy systems modeling?

4.2 Research challenges

In addition to future research questions workshop participants reflected on the implications and challenges of taking a more holistic perspective on participation across socio-technical systems in terms of developing empirical studies, theoretical considerations and intervening in system change. A brief summary of each of these points is given below by way of concluding the report.

Empirical research challenges

There was a strong sense from workshop participants that better understanding actor dynamics and participation in energy transitions demands both embedded 'real time' studies that provide detailed insights into emergent processes and more longitudinal and historical work to trace longer term transformations and effects on ideas, institutions, practices and low carbon energy technologies. The two go hand in hand. Embedded studies can usefully draw on ethnographic and action research approaches. There are considerable challenges for established methods in adequately capturing the dispersed, distributed nature of participation however. In-depth ethnographic approaches would need to respond to this, drawing more fully on multi-site ethnographies for example. The longitudinal studies of interventions – ranging from consultations on large infrastructure projects to household social practices – were deemed to be of value in exposing the conditions under which important transitions are successful (such work would include comparative examples

outside of the energy domain). Longitudinal studies can also help examine practices and regimes and the critical points of intersection between them. Linking with questions over the orchestration and meditation of forms of participation in energy transitions workshop participants highlighted the need for both embedded and longitudinal studies to explore how boundaries are drawn around particular instances of participation – or in other words the framing effects – in producing particular visions or imaginaries of energy futures, innovation, publics, democratic engagement and so on.

A strong theme in discussions of empirical research directions centred on the need for comparative analyses across distinct cases, instances and systems of participation in energy transitions in space and time. No only does such comparative work allow interrelationships between moments of participation to be explored, workshop participants also saw a need for cross-national comparisons which attend to the importance of national and political cultures in mediating the forms of intervention being enacted. In more fully considering the 'where' and 'when' of participation in transitions participants also highlighted instances that have gone understudied in existing sustainability transitions research. For example, one participant noted that such research tends to focus on downstream technological development whereas upstream developments in emerging areas of science and technology will also have considerable influence in shaping future energy transition pathways. Processes of participatory technology assessment should also form an important site of study in transitions research. Connecting back to earlier discussions of stability and change (see Section 3.3) a number of participants emphasized the importance of studying the normal, mundane, and routine practices and interventions in the system. It was acknowledged that there are significant challenges in seeing and empirically representing these familiar instances of 'stability' and that this is one of the most important aspects of gaining a deeper understanding of energy transitions. Finally, with particular reference to the ecologies of participation theme (Box 2, above), some workshop participants asked whether the collectives or assemblages of participation should form the unit of analysis or whether it is more appropriate to follow the actors as they move through different sites and forms of participation in space and time. It was felt that both of these entry points would be necessary and important in studies that seek to understand the complexities, interactions and interrelationships involved.

Theoretical implications

Discussions on theoretical implications of taking a broader systemic perspective of participation in low carbon energy transitions were rich and wide ranging but ultimately less clear in terms of final recommendations. On this point, workshop participants focused more on how a systemic perspective on participation and the tasks undertaken in Day 1 of the workshop (as reported in Section 3, above) problematize and pose challenges for existing transitions theory, including the multi-level perspective and transition management frameworks. For example, the systemic perspective on participation was felt to have exposed the transition management model (based on front runners from civil society, policy, business, research) to be one

that excludes a wide range of social actors and existing engagements in the system. The workshop tasks served to highlight the deeper complexities of actor dynamics in energy transitions which, for some participants, rendered perspectives from existing transition theory to be 'somewhat clunky'. One general suggestion was that theory itself (and researchers as theoreticians) needs to become more reflexive and adaptive in relation to this complexity. This should also include better awareness of the (participatory) democratic assumptions and imaginations that are inherent within different strands of transition theory (as discussed in Section 2.3, above). Participants also emphasised that the approach taken in the workshop highlighted the need to further address power dynamics in transitions theory in addition to ways of better understanding the more human side of transitions that often gets missed from more systemic theoretical perspectives – about the motivations, values, norms, identities and emotions that drive and are transformed in energy transition processes.

In terms of how to address these challenges through future theoretical development, workshop discussions were less clear, partly due to time constraints on the process. Taking a broader perspective on socio-technical participation led the group discussing theoretical perspectives to map out a range of theories that could enrich or work alongside established transitions theories. These included theories and concepts of justice, deliberative and participatory democracy, social movements, discourses, social practices, governmentality, neo-Gramscian political economy, phronensis, pragmatism, assemblages, actor network theory, and other concepts and methods from science and technology studies and the history of science. This implies the need to move towards a more integrated theoretical framework of socio-technical participation and efforts to spark a more vibrant and interdisciplinary theoretical dialectic in the field of sustainability transitions.

(Reflexive) governance interventions

A central theme of the discussions around governance interventions was the challenge of integrating 'top down' and 'bottom up' processes and how they might be linked. For example, how to combine the 'dis-organised' bottom up work on novelties with that which is more directed, such as combining the organisational skills and investment funds of large companies with the creativity of individuals and small companies. Three different ways of addressing this challenge were discussed; through technological innovation, through policy and regulation and, thirdly, through social change processes. This led to some consideration of the differing degrees of engagement of different actors. For example, at one end, what approaches might be successful in involving passive actors, whilst also identifying those actors who do have the ability to influence system dynamics.

Throughout the workshop there were ongoing discussions about the way in which research activity could link to governance processes. One obvious way was to focus on research topics that could inform governance decisions. For example, it was suggested that cross-national comparative studies could lead to generalizable insights about governance. These could explore the differences between transition trajectories in different countries, in particular the effects of culture, history and landscape influences. A second governance specific research theme was for more

work on the processes of exclusion and inclusion: how are energy decisions being made and on what grounds. Whilst there was widespread support for reflexive research on such topics, there were still difficult questions about the nature of the relationship between reflexive research and (reflexive) governance. Questions about what kind of research is most *useful* for the governance transitions are subject to the same kind of critique relating to implicit and often unexpressed normativities of researchers (Shove and Walker 2007). This underlines the point that within transition processes as a whole, academic research is a significant form of participation, and one that deserves interrogation in its own right.

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APPENDIX 1: WORKSHOP PARTICIPANTS

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APPENDIX 2: WORKSHOP PROGRAMME

Participation, politics and actor dynamics in low carbon energy transitions: Workshop programme

EPSRC/E.ON Transition Pathways Project workshop, University of East Anglia, Norwich, 21-22nd March 2012

WEDNESDAY 21ST MARCH

12:30 Lunch

13:30 Introductions

13:45 **SESSION 1: Mapping engagement in the low carbon energy system**

Purpose: To develop more comprehensive representations of the diverse forms of engagement across the low carbon energy system, the actors involved and how they interact.

15:15 Coffee break

15:45 **SESSION 2: Exploring sites of participation**

Purpose: To explore different forms of participation in more detail with respect to actor dynamics, how they are organized, what gets excluded and how they influence the system.

17:25 Five minute wrap up of day

1730 Session close

1930 Evening meal

THURSDAY 22ND MARCH

0900: **SESSION 3: Implications and research agenda (part 1)**

Purpose: What are the implications of yesterday's discussions, and of adopting a broader system-wide understanding of participation in low carbon energy transitions.

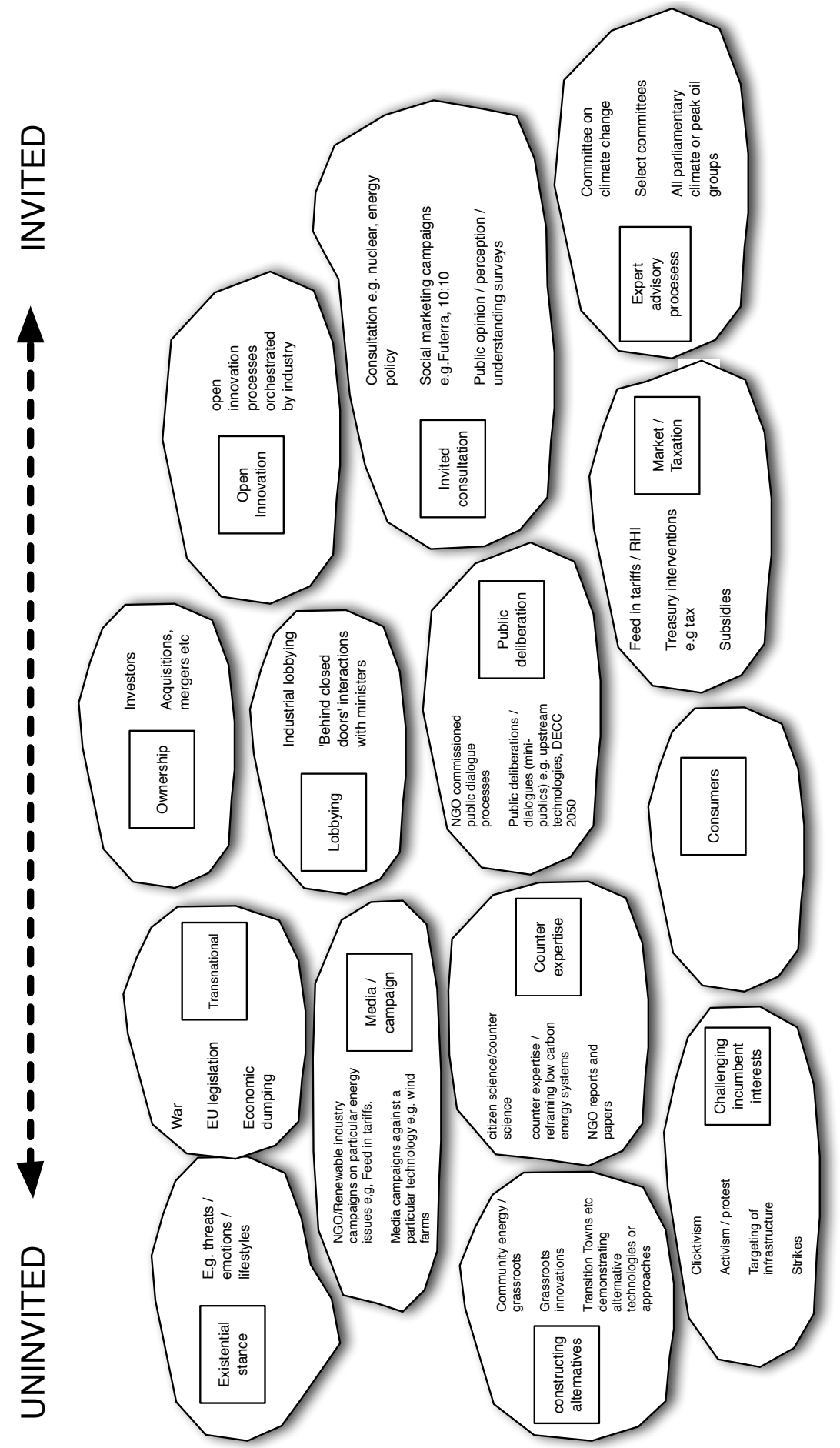
10:30 Coffee break

11:00 **SESSION 4: Implications and research agenda (part 2)**

Purpose: To draw out conclusions on the implications and research agendas associated with taking a broader conception of participation in socio-technical (energy) transitions through reflecting on the previous session(s) and panel discussion.

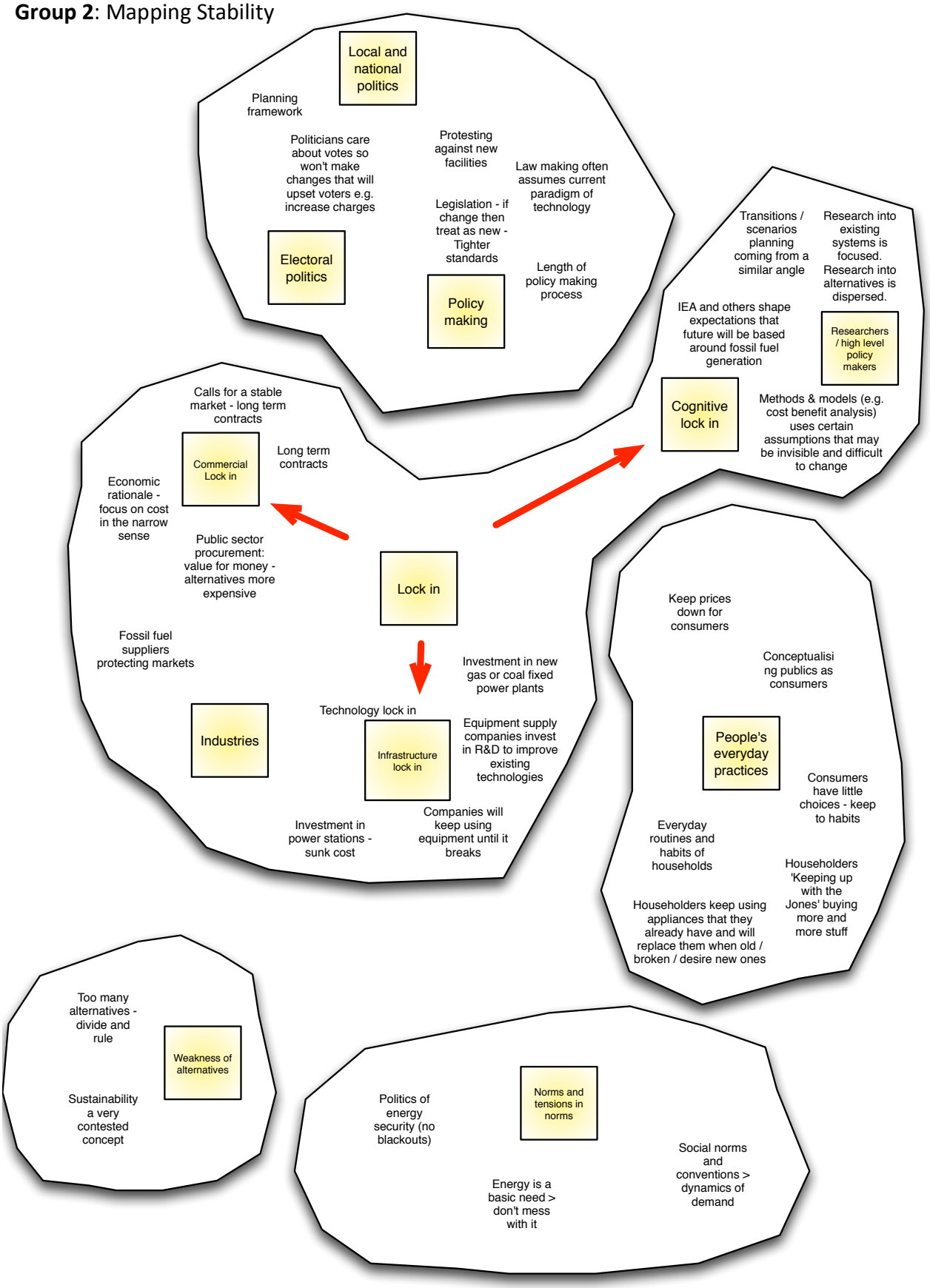
1230 Lunch and close

APPENDIX 3: MAPPING ENGAGEMENT IN LOW CARBON ENERGY SYSTEMS

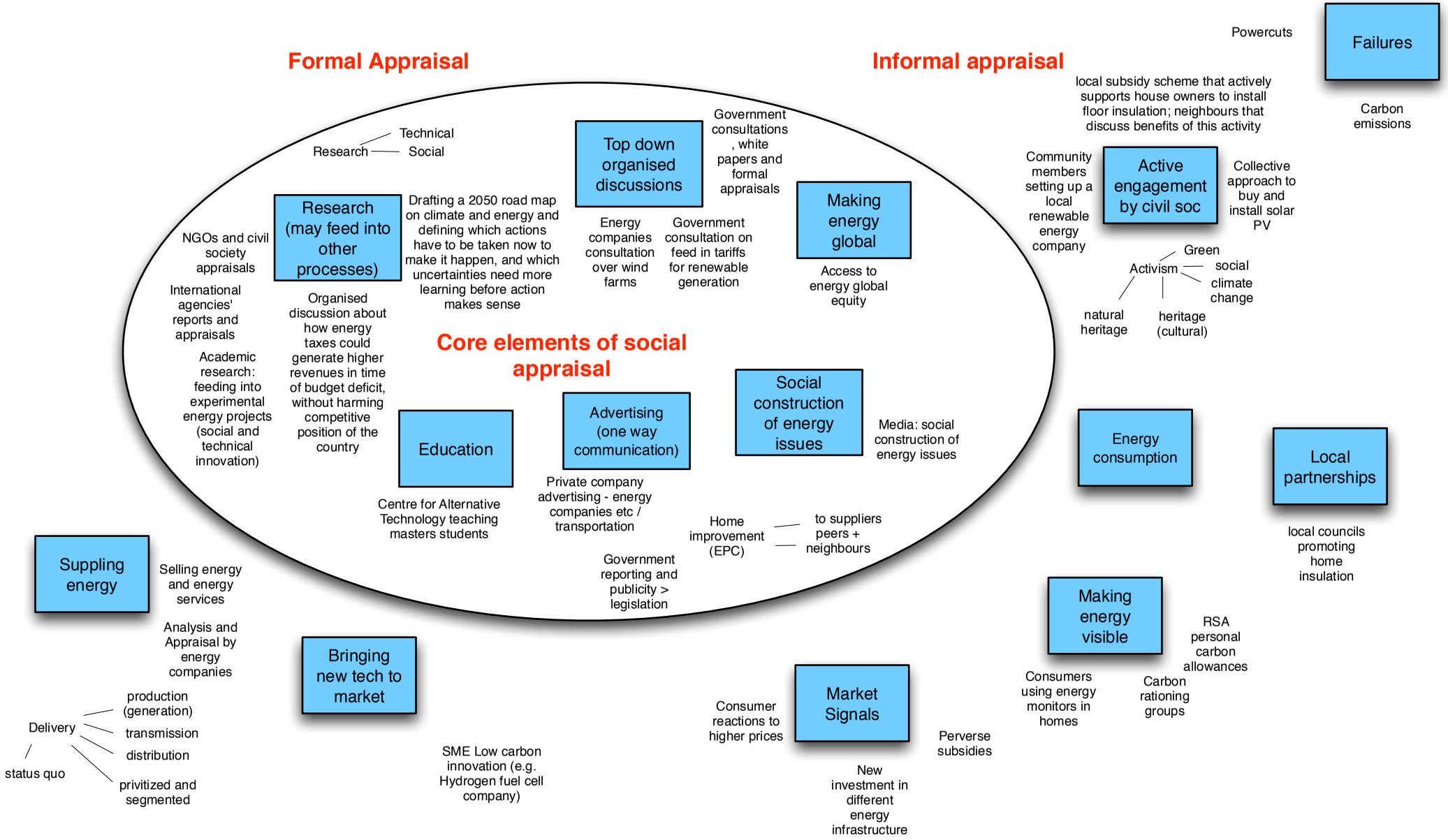


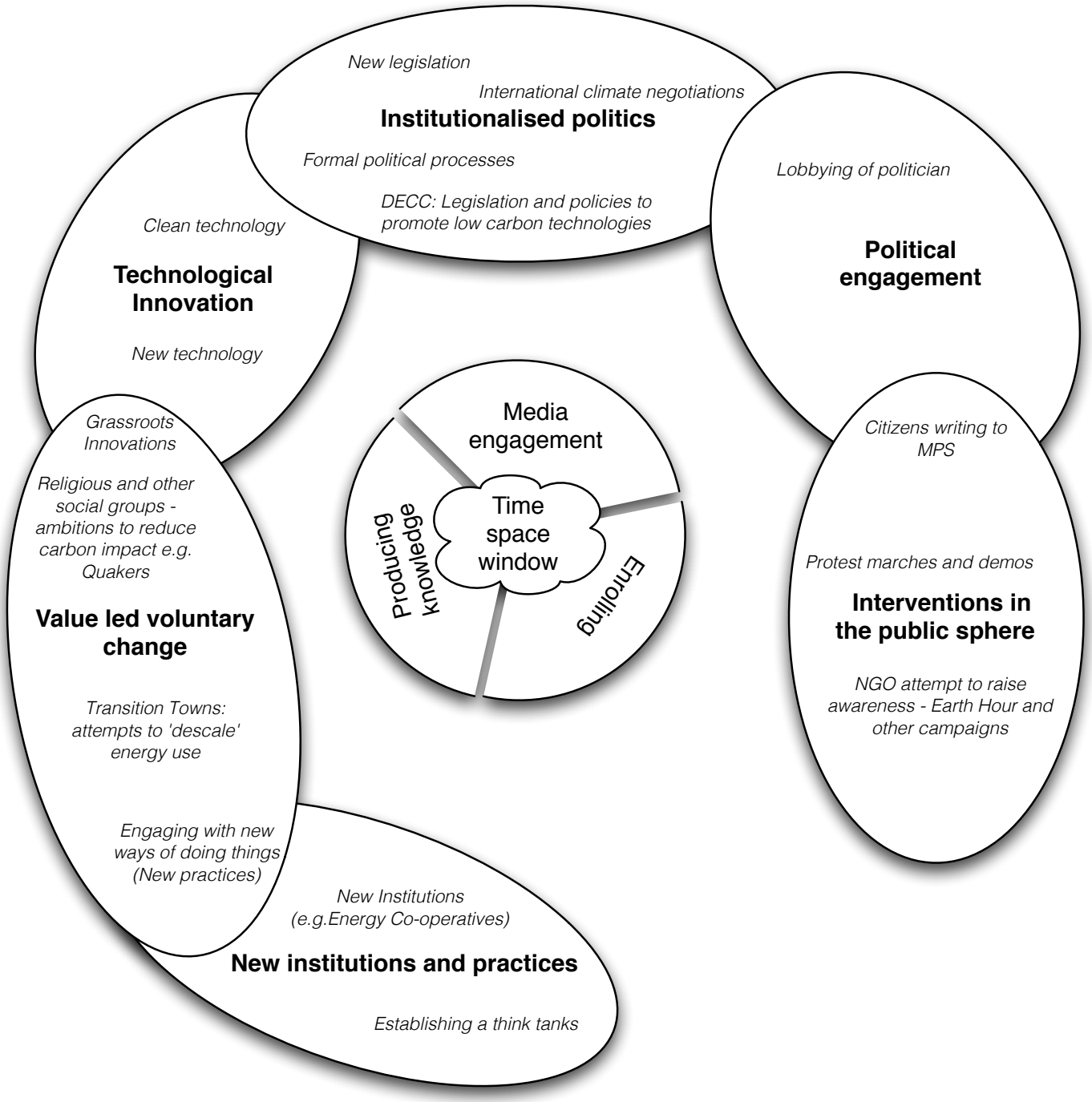
Group 1: Uninvited / Invited

Group 2: Mapping Stability



Group 3: Social Appraisal




New legislation
International climate negotiations
Institutionalised politics
Formal political processes
DECC: Legislation and policies to promote low carbon technologies
Clean technology
Technological Innovation
New technology
Lobbying of politician
Political engagement
Grassroots Innovations
Religious and other social groups - ambitions to reduce carbon impact e.g. Quakers
Value led voluntary change
Transition Towns: attempts to 'descale' energy use
Engaging with new ways of doing things (New practices)
Media engagement
Time space window
Producing knowledge
Enrolling
Citizens writing to MPS
Protest marches and demos
Interventions in the public sphere
NGO attempt to raise awareness - Earth Hour and other campaigns
New Institutions (e.g.Energy Co-operatives)
New institutions and practices
Establishing a think tanks