UKERC
Public Engagement Observatory

Mapping Public Engagement with Energy, Climate Change and Net Zero

Jason Chilvers, Phedeas Stephanides, Helen Pallett & Tom Hargreaves

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Summary

This UK Energy Research Centre (UKERC) Public Engagement Observatory briefing presents the key findings of a mapping of public engagement with energy, climate change, and net zero occurring in the UK between 2015–2022.

- The study used the comparative case analysis method developed in an earlier mapping of public engagement with energy between 2010-2015. Systematic searches of academic and grey literature identified 284 diverse cases of public engagement occurring between 2015-2022 which were analysed in terms of *how* people are engaging, *who* is involved, and *what* they are engaging in.

- While mainstream approaches often assume 'the public' lack knowledge or are disengaged, our analysis shows that publics are already engaged in many different ways around energy, climate change and net zero.

- Institution-led engagements to elicit public views through surveys, social research and deliberative processes remain prevalent, with the recent rise of citizens' assemblies associated with a mainstreaming of interest in the latter. A significant development in the current period of analysis has been the increasing visibility of citizen-led engagements relating to social movements, activism, protest, and citizen action. Some emerging forms of participation are apparent including domestication of technologies in the home, narrative-based engagement, and uninvited forms of consumer action.

- Our current mapping demonstrates that there is no single public in relation to energy, climate change and net zero. It instead shows that those engaging with these issues are plural 'publics', ranging from lay publics, aggregate populations, consulted publics, consumers, and users, through to special interest groups, affected publics, active citizens, active communities, and activists.

- The different publics and forms of engagement identified also bring forward a diverse range of public issues, views and actions on energy, climate change, or net zero. What people are engaging with spans 27 different aspects or objects of engagement, ranging from broader climate change, sustainability, and social dimensions through to more technical aspects of energy systems.

- Given these findings, it is necessary to: better recognise and respond to diverse public engagements with energy, climate change and net zero; attend to public engagements as continually emerging and interrelating in wider systems; and develop systemic approaches that encompass different forms of public engagement across issues, organisations, sectors, and systems.

- Observatories are one example of new entities and organisational forms that can advance and support these moves to more systemic approaches to public engagement. There is a need to further develop and experiment with these entities and approaches to mapping participation in practice to help make decisions, innovations, and participation more just, responsible, and responsive to society.

- The Public Engagement Observatory's website[1] includes an interactive online dataset where the cases of public engagement reported on in this briefing can be further explored, and a contribute function where additional cases can be suggested.

A new approach to public engagement

Public engagement is crucial to realising low carbon policies and technologies, shifting to more sustainable behaviours and practices, and ensuring just, democratic, and publicly accountable transitions.

Mainstream approaches to public engagement tend to focus on either an information-deficient public whose understanding needs to be corrected with improved communication, or on an insufficiently engaged public that needs to be invited to participate in discrete, often one-off, engagement processes. These approaches have been shown to be limited in empowering societal transformations and struggle to account for wider systems and debates. While energy transitions and climate change are systemic in nature, most existing approaches to public engagement are not.

Partly in response to the deficiencies of mainstream approaches, a new approach to participation is emerging across the social sciences and in practice.[2] The UKERC Public Engagement Observatory is advancing this alternative understanding of participation and publics through viewing them as being:

- ***Diverse*** – recognising the many different ways through which publics are already engaging with energy and climate change.
- ***Constructed*** – understanding that forms of participation and what publics say and do about energy and climate change are shaped by the settings and practices of engagement, how they are organised and by whom.
- ***Systemic*** – in that different public engagements do not occur in isolation but are interconnected and continually interrelate in wider systems, debates, and ecologies of participation.

Our work in the Science, Society and Sustainability (3S) Research Group at the University of East Anglia and in UKERC has developed this alternative understanding of public engagement over several years, including pioneering a new systemic approach to mapping diverse forms of public participation and engagement.[3] In an earlier mapping of 258 cases of UK-based public participation and engagement with energy and low carbon transitions occurring between 2010-2015 we revealed the diversity of ways that publics are engaging[4,5], as well as interrelations between different forms of engagement in wider systems[6], that would otherwise be excluded by traditional approaches. The mapping offered more plural and comprehensive insights into public engagement, citizens views and actions, and alternative future pathways for addressing problems of energy and climate change.

The Public Engagement Observatory has built on and further developed this approach to map diverse forms of public participation and engagement on an ongoing basis.[7] In this briefing we present the results of an updated mapping of public engagement with energy, climate change and net zero occurring in the UK between 2015-2022.

Mapping public engagement: The comparative case method

The Observatory is taking forward the comparative case analysis method developed in our previous UKERC research[3,4,5,6], alongside two additional methods for mapping participation – crowdsourcing and digital methods. This briefing reports on the comparative case analysis findings.

Comparative case analysis involves documentary analysis of diverse cases of public engagement to map *how* people are engaging, *who* is involved, *what* they are engaging in, and *where*. A key principle of the method is to attend to diversity in mapping the many different forms of public engagement that exist, rather than claiming to represent all engagements. As shown in Figure 1, the comparative case analysis process involves five steps.

First, in an ***initial scoping*** stage we undertook an analysis of key framings of low carbon transitions in significant contemporary statements and documents from policy and civil society organisations. We used this to update the framing, search terms, and synonyms for the '*what*' (issues of energy, climate change and net zero), '*who*' (public participants), and '*how*' (forms of participation) of public engagement from our prior 2010-2015 mapping. A key development during the current period of analysis was the UK's commitment to a net zero target in 2019[8], which broadened framings of low-carbon energy transitions in our mapping to also encompass aspects of climate change.

In a second step, we sought ***feedback*** on these mapping framings from representatives of UKERC and the Observatory's advisory group.

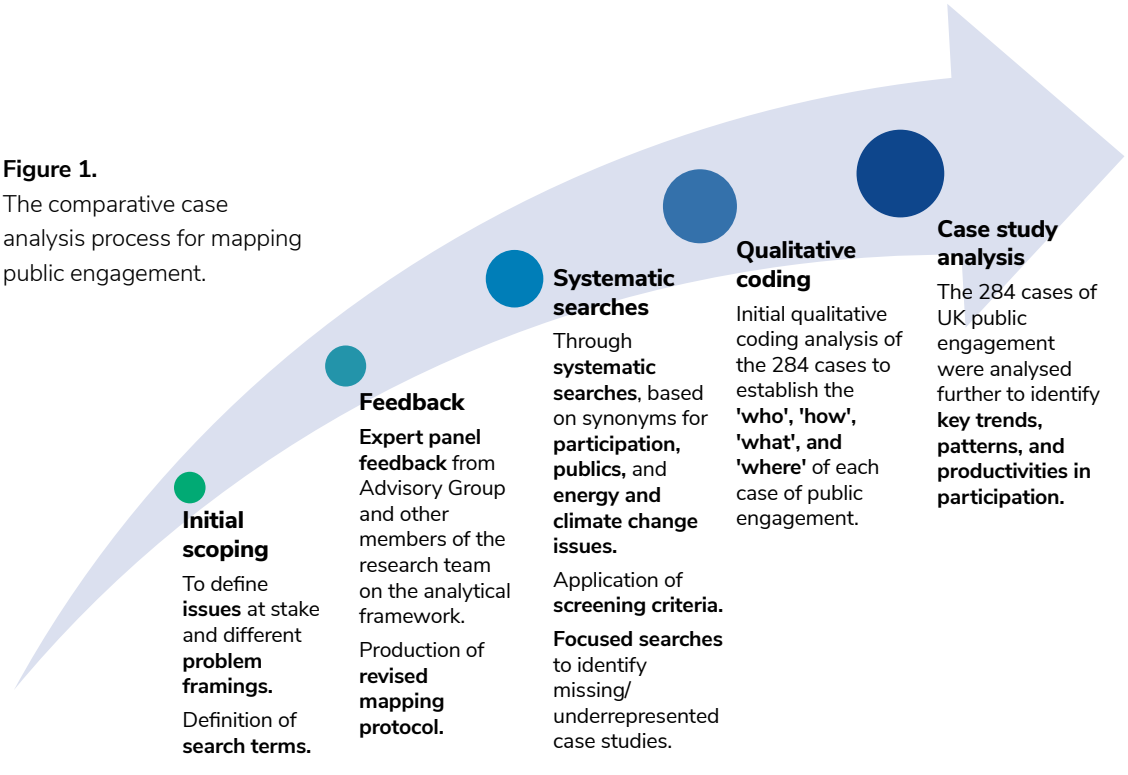

Figure 1.
The comparative case analysis process for mapping public engagement.

Third, ***systematic searches*** of the search terms and synonyms were undertaken on academic and non-academic search engines (Web of Knowledge, Scopus, Google Scholar, Google, and Ecosia) to identify cases of public engagement from the academic literature, grey literature, and media. The comparative case mapping method attends to diversity through an open definition of public engagement as *'collective practices through which publics engage in addressing collective public problems' (in this case energy and climate change-related issues)*.[3] We screened in cases that met this definition, that reflected the diversity and patterns of public engagements identified in the searches, that took place in the UK between 2015 and 2022, and that had enough documentary evidence to allow case study analysis, resulting in a corpus of 284 cases in total.

In a fourth step, we conducted an initial ***qualitative coding*** analysis of the 284 cases to establish the '*who*', '*how*', '*what*,' and '*where*' of each case of public engagement, amongst other categories. The coding structure was jointly created and tested on a sample of cases by the research team to ensure inter-coder reliability.

The fifth and final step involved a more fine-grained ***case study analysis*** to gain a deeper understanding of the diverse cases of public engagement, their productivities in terms of public views and actions, and the interrelations between them.

As shown in Figure 2, cases of public engagement in the corpus achieved national coverage across different regions of the UK, with 103 of the cases being UK-wide across all the devolved administrations, and a further 29 case studies occurring across multiple UK regions.

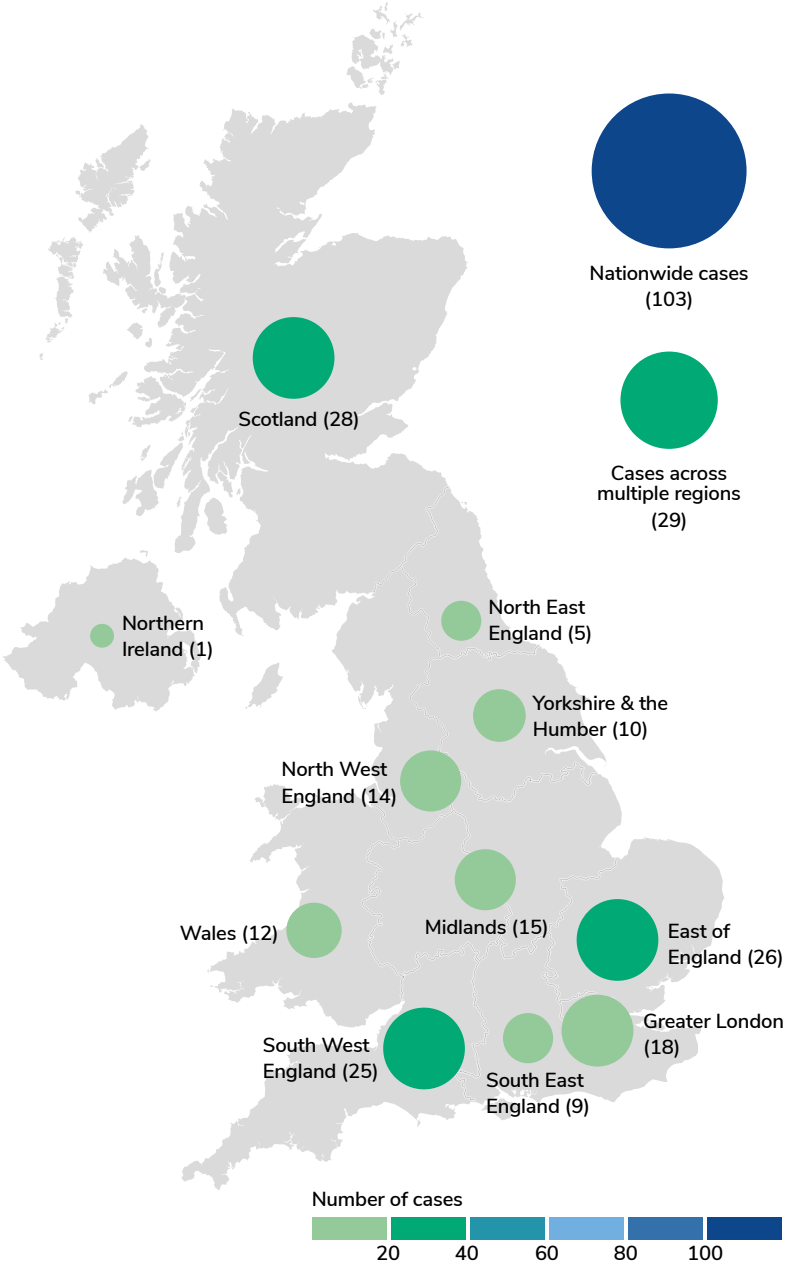

Figure 2. The geographical distribution of UK public engagements with energy, climate change and net zero identified in the 2015-2022 mapping. The size and colour of the bubbles relates to the number of cases associated with each geographical region. Cases achieving coverage across the UK (nationwide) or across more than one UK region (multiple regions) are included in the top right corner of the map.

How are publics engaging?

Against a common view that public engagement with energy and climate change is lacking, an overarching finding of our previous mapping was that publics are already engaged with these issues in multiple and diverse ways.[3] The findings of our most recent comparative case mapping further illustrate this.

As shown in Figure 3, the period 2015-2022 saw highly varied forms of public engagement spanning those that are more institution-led to citizen-led, and ranging from engagements that are about expressing public views to those that are more action oriented.

Instances where institutions invite publics to engage, on the left-hand side of the mapping space in Figure 3, are predominant. Here forms of elicitation, including public opinion surveys (48 cases) and focus groups / interviews (15 cases), are the most dominant way that government, business, academics and civil society organisations seek public views on energy, climate change and net zero-related issues. A range of existing and emerging forms of invited engagements have also sought to represent public views – including, amongst others, a large number of deliberative and public dialogue processes such as the rise of national and local citizens' assemblies (29 cases) (see Box 1), through to formal political processes including consultations

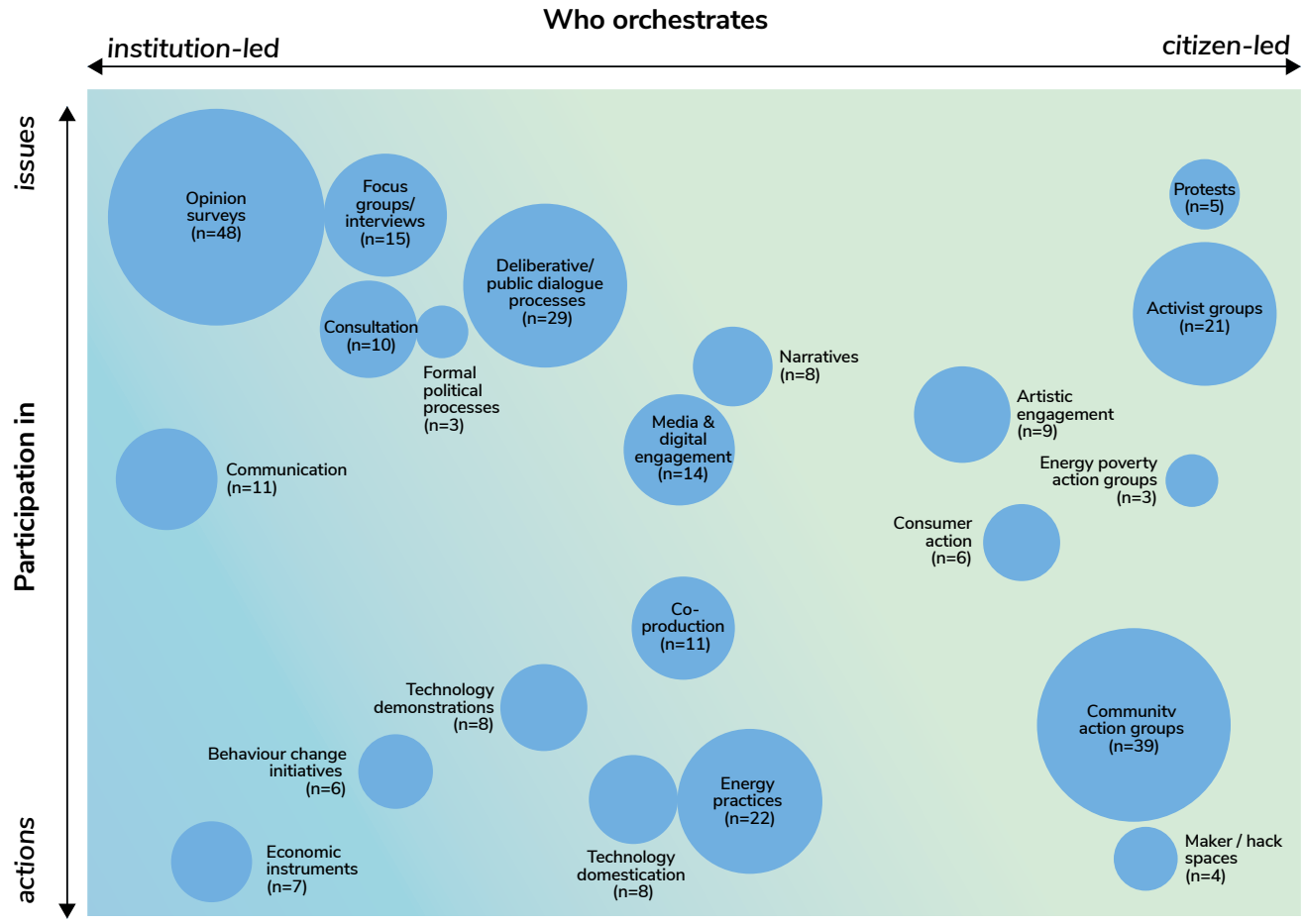

Figure 3. A mapping of cases of public engagement with energy and climate change occurring between 2015 – 2022 (n= 284 cases). The size of the bubbles relates to the number of cases associated with each form of public engagement identified.

(10 cases). Institution-led engagements that are more action-oriented included communication campaigns (11 cases), behaviour-change initiatives (6 cases), and economic instruments (7 cases).

A crucial finding of the current mapping in Figure 3 is the prevalence of engagements that are citizen-led and uninvited, which account for around a third of cases in the overall corpus (to the right side of Figure 3). A number of citizen-led cases see publics debating energy and climate change issues, developing alternative visions of sustainable futures, and challenging existing policies. This includes forms of activism (21 cases) (see Box 2), protest (5 cases) such as local mobilisations against coal mining in Wales and Cumbria, artistic engagements (9 cases) such as dramaturgical and creative writing engagements with climate change, and the use of digital spaces and social media (14 cases) such as online discussions on controversial issues including home decarbonisation and the UK gas and oil boiler ban. As shown in the bottom right corner of the mapping space in Figure 3, the mapping also included instances of 'bottom-up' citizen action in the form of community action groups such as multiple community energy initiatives (39 cases), maker/ hack-spaces (4 cases), and energy poverty action groups (3 cases).

Comparing the current mapping with the results of our previous 2010-2015 analysis[3,5] (see Figure 4) highlights that public engagement with energy and climate change is never static, being continually ongoing, emerging and in flux.

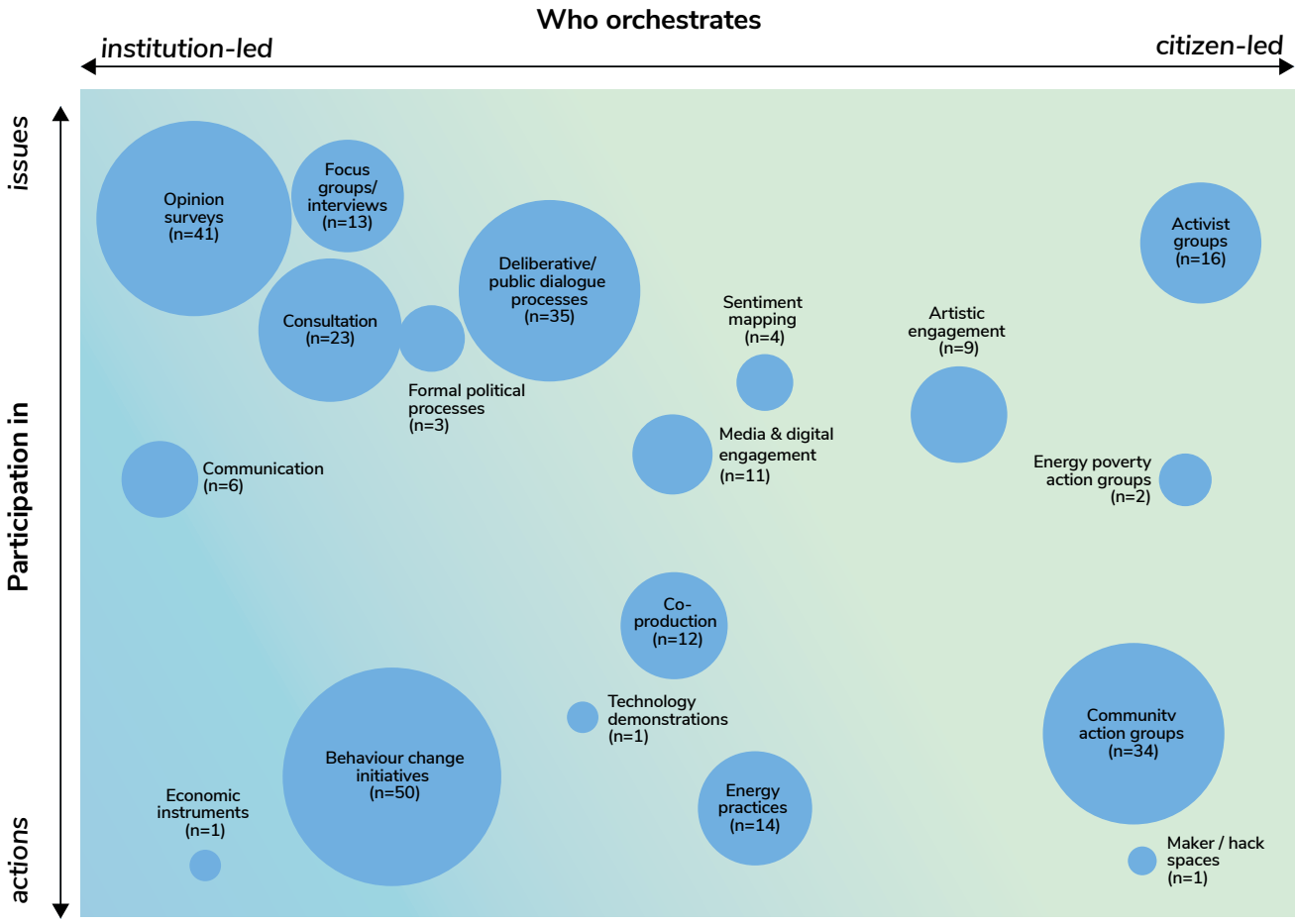

Figure 4. A previous mapping of cases of public engagement with energy occurring between 2010 – 2015 (n= 258 cases).[3] The size of the bubbles relates to the number of cases associated with each form of public engagement identified.

Our analysis traces some important changes in this regard between the two phases of mapping:

- The forms of public engagement revealed in our mappings have become further diversified in the recent period, with some emerging forms of participation becoming evident, including: narrative-based engagement, technology demonstrations, technology domestication, and uninvited forms of consumer action.

- The period 2015-2022 (Figure 3) shows a rise in visible instances of citizen-led activism and protest compared to the previous period (Figure 4). This includes more localised protests challenging energy infrastructure developments like fracking and renewables, through to the rise of activism, in the case of Extinction Rebellion (XR) protests and Fridays for Future (FFF) school strikes for example, that emphasises direct action and campaigning to bring about broader political and social change (see Box 2).

- Another significant development in the recent period is the continuation of the deliberative turn (29 cases in total), which gained increased relevance in relation to climate change, particularly through the mainstreaming of citizens' assemblies by governments and groups in civil society at local and national levels and throughout the world (see Box 1). This rise of citizens' assemblies has been closely tied to the demands of activist groups like XR, which highlights how many forms of engagement in Figures 3 and 4 interrelate.

- Cases relating to everyday practices and to the integration of new technologies into everyday life are more prominent in the current mapping (30 cases in total) compared to the earlier phase (14 cases), which partly reflects increasing interest in social practice theory approaches, as well behaviour change initiatives being less prominent in the current analysis (from 50 cases in the previous analysis to 6 cases in the current mapping).

- Despite these changes, some forms of engagement remain dominant in the wider ecology of participation, especially public opinion surveys (48 cases in the current analysis compared to 41 cases previously), which includes a number of companies undertaking extensive consumer research to explore levels of public support for green energy technologies and net zero, alongside opinion surveys orchestrated by government, academics, and civil society organisations.

Box 1. The rise of citizens' assemblies.

After decades of experimentation with public deliberation across issues and following calls from activists (see Box 2) the rise of citizens' assemblies is a significant development in the current mapping period. Alongside the nationwide Climate Assembly UK commissioned by UK Parliament and the Citizens' Assembly of Scotland, a range of local and regional citizens' assemblies have emerged including the Oxford Citizens' Assembly, Devon Climate Assembly, and the Brighton and Hove City Council Climate Assembly.

These citizens' assemblies have enhanced the involvement of members of the public in learning about, debating, and making recommendations on how we should act on climate change. These recommendations span what we buy and eat, how we should generate and use electricity and travel sustainably, along with options for greenhouse gas removal and carbon capture and storage. They identified cross-cutting principles that should guide responses to climate change relating to: mitigation leadership, technological innovation and uptake, education, fairness, choice, co-benefits, and preserving existing forms of living.

While citizens' assemblies and other deliberative processes are playing an important role, our mapping suggests it is crucial to understand how they relate within wider systems of public engagement with energy and climate change. Citizens' assemblies, however well-designed, do not equate to "the views of the UK Public" (as stated in the main report of Climate Assembly UK[9]). They offer a specific public representation, formed in a particular way, for particular purposes. A key challenge is to not only represent individual citizens through a citizens' assembly (or other singular means), but to also ensure that the many other assemblies of citizens – such as those identified in our mapping – are represented, listened to, and allowed to act on climate change.

Box 2. A new wave of climate activism and social movements.

Since 2018, a global wave of mobilisation under the banners of groups such as Extinction Rebellion (XR) and Fridays for Future (FFF) has injected new energy into climate activism.

FFF is a youth-led global climate strike movement that started in August 2018, when Greta Thunberg began a strike outside the Swedish Parliament, demanding urgent action on the climate crisis. The initiative quickly gained worldwide support, with the first Global Climate Strike organized in March 2019 and involving more than 1.5million people in over 2000 locations.

XR emerged slightly after FFF, when in October 2018 a Declaration of Rebellion against the UK government was announced, demanding for: the immediate proclamation of a climate and ecological emergency; rapid decarbonisation by 2025; and the creation of Citizens' Assembly to ensure the transition is delivered in an ethical and socially just manner.

Both groups provide insights on how models of public engagement circulate, are replicated, and translated across different regions. For instance, the Observatory database includes: a) multiple different occasions of mobilisation linked to XR and FFF (e.g. October Rebellion, XR London Occupations, Global Week for Future), b) different local action and affinity groups (e.g. XR Scotland, XR Tower Hamlets, FFF Scotland), c) XR groups focusing on delivering change in specific industries (e.g. XR Scientists, Doctors for XR), and d) a number of loosely affiliated groups (including Burning Pink, Youth Strike 4 Climate, and the Students Climate Action Network).

Who is engaging?

Our current mapping again demonstrates that there is no single public in relation to energy, climate change and net zero as some engagement approaches often assume.

It instead shows that those engaging with these issues are plural 'publics', ranging from lay publics, aggregate populations, consulted publics, consumers, and users, through to special interest groups, affected publics, active citizens, active communities, and activists (see Figure 5). These different kinds of publics engage in and are produced through the different forms of engagement outlined above.

Attempts to represent an aggregate population (39 cases) by selecting a statistically representative sample of the public according to key demographic characteristics continues to be a dominant framing of the public, especially in public opinion survey cases. The tendency is for individual surveys to claim a definitive representation of 'the public' in the UK or a particular segment of the population. This is also the case in many deliberative processes, where participants are typically framed in terms of lay publics or innocent citizens (17 cases), including Climate Assembly UK which claimed to represent 'the UK public' view on how the UK should get to net zero by 2050 (see Box 1).

No matter how inclusive or representative an individual engagement process seeks to be, there will always be other publics and already existing forms of participation that it doesn't include. Other framings of publics produced through the cases identified in our current mapping also offer reduced roles for citizens. For example, visions of publics as consumers (21 cases) or users (35 cases) remain prevalent and durable, both of which potentially limit the range of ways people can legitimately participate, giving primacy to direct engagements with the market or as users of services and technologies such as energy-related technologies in the home. In other cases, publics are framed in terms of an audience (13 cases) that is communicated to and consulted publics (13 cases) who respond to fixed pre-defined proposals.

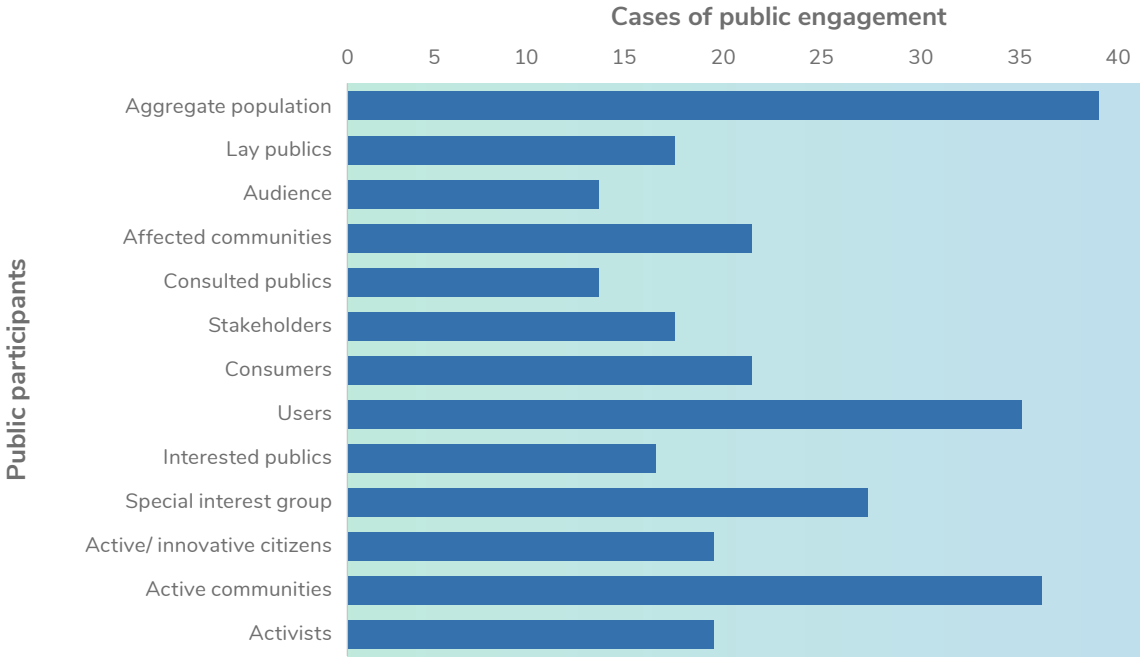

Figure 5. Who is engaging with energy and climate change in the UK, 2015-2022.

The current mapping saw a rise in engagements involving special interest groups (27 cases). Such publics are distinguished from the general population because of a special shared interest, characteristic or experience. For example, we identified cases focusing on the engagement of young people, older people, homeowners and the fuel poor. A related construction of participants is that of affected communities (21 cases), often in the case of more locally situated developments of new technologies and infrastructures.

In around a quarter of cases in the current mapping, much more active constructions of publics as activists, active communities, and active citizens are evident. This emphasises the political activism of publics, marked by the emergence of multiple activist mobilisations at the national and local level in the UK (see Box 2). This also demonstrates the ability of citizens to take action on their own and in their communities to address problems of energy, climate change and net zero – for example through community energy projects, with active communities (36 cases) being associated with the second highest number of cases in the current corpus.

This mapping analysis warns that the challenge of representing and engaging the public is more difficult than assumed in popular approaches to public opinion and behaviour change. It is crucial that existing approaches to public engagement and decision-making on energy, climate change and net zero better attend to these diverse publics, their views, and actions. This is crucial to achieving just transitions that can better account for different public views and concerns, while recognising opportunities to accelerate change through various already-existing forms of citizen action.

What are people engaging with?

Research that underpins the Public Engagement Observatory approach shows that what publics say and do is shaped by the ways in which they engage[2]. It is not surprising, then, that the plural publics and different forms of engagement identified above in our current mapping bring forward a diverse range of public issues, views and actions on energy, climate change or net zero.

As shown in Figure 6, what people are engaging with spans 27 different aspects or objects of engagement which relate to four broader themes of: climate change and decarbonisation, energy systems, energy and society, and wider sustainability issues.

A key development in the current mapping phase has been a significant increase in energy-related public engagement on wider aspects of climate change and decarbonisation. Climate change was the focus of engagement in the most cases across the whole corpus (44 cases). The rise of the net zero agenda and the UK's commitment to a net zero target meant that several public engagements were framed more specifically in terms of net zero (15 cases), decarbonisation (3 cases) or carbon capture and removal (10 cases).

Public engagement with diverse aspects of energy systems continues to be prevalent in the current mapping compared to 2010-2015. Here we see a similar pattern where energy-related objects and issues that are more immediate, close to home, and visible feature more predominantly – such as public engagement around renewables (25 cases), transport and mobility (20 cases), energy demand and efficiency (19 cases), domestic heating and cooling practices (19 cases), and smart technologies (11 cases). Other aspects of energy systems that are often more distant from people's everyday lives – like fracking, energy infrastructures, energy markets and nuclear power – were an important focus for some cases of public engagement but were fewer in number across the whole data set.

In our 2015-2022 mapping we see an increasing visibility of public engagements which focus more explicitly on social aspects of energy and climate change. This includes engagements focused on matters of concern in relation to energy justice (21 cases) in addition to energy poverty and affordability (17 cases). Other public engagements focus on the ways in which low carbon transitions are socially organised, in terms of community energy (24 cases) and energy democracy (2 cases). One further dimension is engagements with energy and technologies in everyday life, for example as captured by framings around low carbon homes, domestic energy practices, and comfort and wellbeing. These trends towards public engagements focused on social aspects demonstrates how low carbon transitions are increasingly seen as socio-technical and not purely as technological challenges.

Our mapping results show the relevance of non-energy energy participation in instances where public engagements focus on objects that are seemingly outside of, but act on, energy and climate systems, including sustainability and biodiversity (14 cases), sustainable living (6 cases) and environmental protection (2 cases). This shows how energy and low carbon transitions are inexorably linked with a broader nexus of concerns, beliefs, and actions. This includes more radical objects of engagement in some cases. Specifically, a growing focus on radical sustainability visions is suggestive of how civil society actors have been reframing the low carbon transitions challenge as one of moving significantly beyond a mainstream technofix approach within a growth-based economy. For example, framings including sustainable living (6 cases) and social and economic change (9 cases) direct our attention to growing interest in alternative forms of living and of governing low carbon transitions that

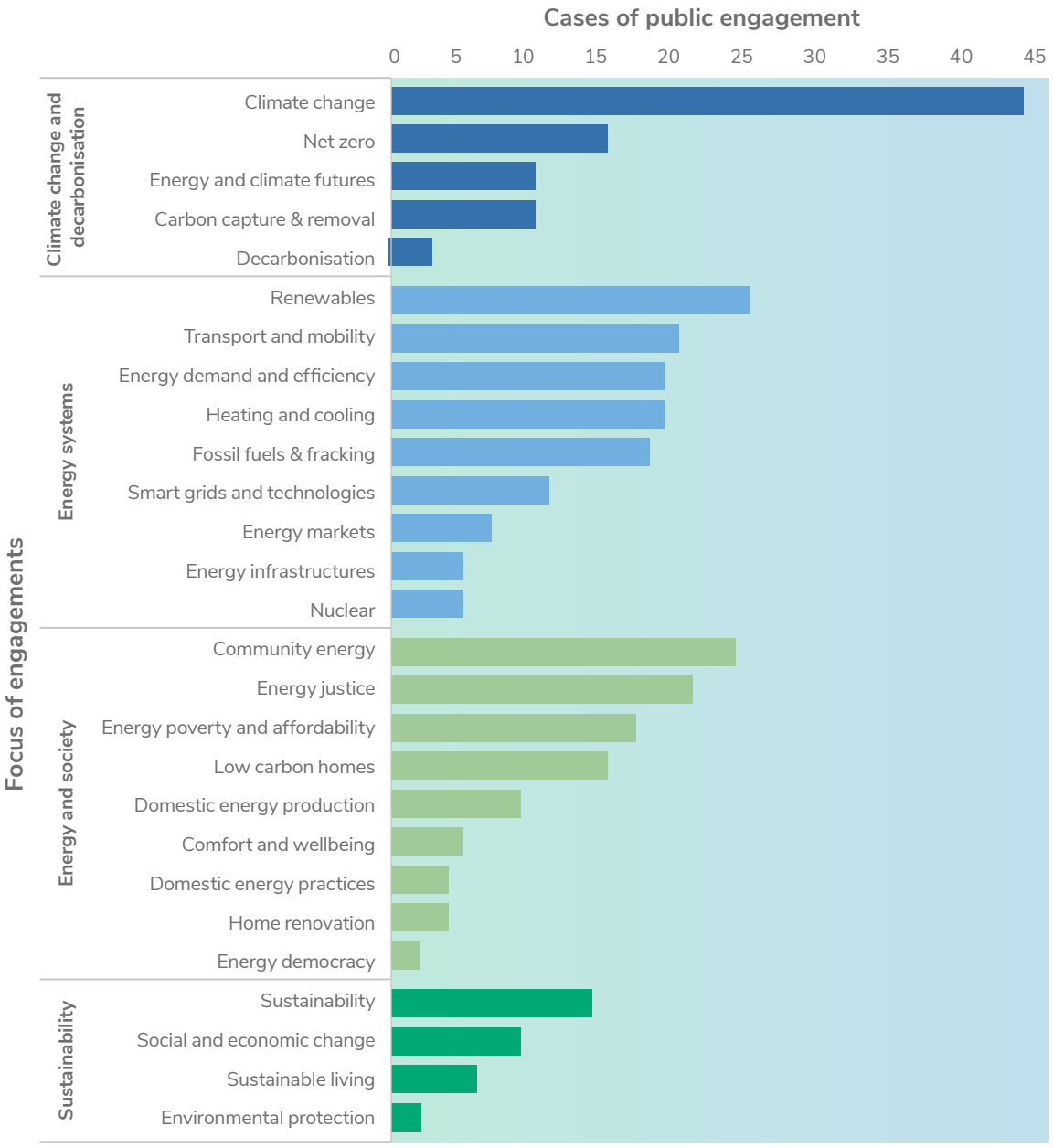

Figure 6. What publics are engaging with in relation to energy and climate change in the UK (NB – Framings are not mutually exclusive).

are respectful of critical carrying capacities of our life-supporting ecosystems – embracing, amongst others, a degrowth-informed vision of sustainability and of the good life.

What our mapping illustrates is that no single form or process of public engagement can therefore capture the multiple public views and actions on energy, climate change or net zero once and for all. Every instance of participation is partial and framed in particular ways. We find that more institution-led cases to the left side of the mapping space (Figures 3 and 4) are often more narrowly framed in instrumental, technical, and economic terms, whereas more citizen-led engagements to the right of the mapping space raise concerns and bring about actions focused on issues of equity, justice, more radical social change, alternative models of growth, and so on (see Boxes 3 and 4).

Box 3. From accelerating net zero to radical system change.

Many institution-led cases, such as opinion surveys and deliberative processes (see top left of Figure 3), often narrowed down the framing of the problem to one of accellerating the transition to net zero through technological and economic solutions that work within existing structures and forms of social organisation. The focus tends to be on increasing levels of public acceptance of net zero and associated infrastructures and, accordingly, solutions put forth mainly emphasise removing social barriers to sustainable growth through better regulation, incentivisation, and consumer education.

We find that citizen-led cases in the mapping (see right-hand side of Figure 3) often move beyond seeking public acceptance and instrumental framings of the problem to emphasise more radical visions of the transition and of the need for societal change. Many of these cases captured crucial public concerns over the direction of energy and net zero transitions, the extent to which the current economic system is part of the problem, and whether a more radical whole system shift is needed. Such engagements tend to place more emphasis on questions of fairness and justice, in terms of who stands to benefit and who will bear this risks of accellerating the transition to net zero. Some of the case studies emphasise the need to challenge consumerism by adopting a degrowth-based vision of progress by advocating for 'system change, not climate change'[10].

Box 4. Home energy decarbonisation as a technical or social challenge?

With respect to different domestic sustainable energy technologies (e.g. heat pumps, smart automation technologies, energy efficiency retrofits and domestic renewables), some institution-led cases (see top left-hand side of Figure 3) used survey-based approaches grounded in behavioural economics and social psychology to engage citizens. Collectively, these cases focused on providing evidence on how such technologies are both technically feasible, but also socially acceptable and desirable, with the majority of survey-based research, for instance, pointing to high levels of public acceptability of different smart and green energy solutions.

However, multiple cases involving more active citizen engagement challenged oversimplified accounts of behaviour change or technology uptake and provided additional evidence on the social complexities of home energy decarbonisation (see bottom half of Figure 3). In these cases, the focus was on how the performance and impacts of such domestic technologies depend on their interaction with competing practices, routine behaviours, and household-specific circumstances in everyday life. Moreover, these case studies raise concerns over the extent to which green and smart home technologies can be fully domesticated without undermining comfort and wellbeing and without posing additional challenges with regards to aesthetic concerns, heritage protection, control, freedom of choice, justice, and equity whilst being implemented.

Insights and recommendations

Recognise diverse public engagements with energy, climate change and net zero

- While mainstream approaches often assume the public lack knowledge or are disengaged, our analysis shows that **publics are already engaged in many different ways around energy and climate change. This should be the starting point**, not an after-thought or something to be denied, when approaching public engagement on these issues.

- Many existing forms of engagement in our mapping are discrete one-off processes that claim to definitively represent 'the public' in national deliberative processes or representative surveys for example, or seek to shift public behaviours in line with a pre-given transition. Our analysis demonstrates how it is not possible to definitively represent publics or solve problems of energy and climate change in discrete public engagement processes. Whatever energy, climate change or net zero-related issue one engages the public on, there are always other engagements - involving different kinds of publics, raising different public concerns, acting in different ways - occurring at the same time on these very same issues. **Attempts to engage and represent the public should do more to acknowledge plural publics and diverse forms of engagement on energy and climate change.**

- Our analysis shows that different forms of public engagement shape what people say and do about energy and climate change in different ways. In addition, institution-led engagements tend to be more narrowly framed in instrumental, technical, and economic terms, whereas citizen-led engagements raise concerns and bring about actions focused on issues of equity, justice, more radical social change, and so on. Relying on individual or a limited range of engagement processes will always exclude or miss important public concerns that need to be recognised and taken into account. It is therefore crucial that **policy, innovations and participation for energy and climate change become much more responsive to the views and actions of diverse publics and their engagements.**

- The **UKERC Public Engagement Observatory's** interactive online dataset[11] of diverse cases of public engagement between 2010 and the present day provides a **resource that can be used to explore, better appreciate, and account for these diverse forms of public engagement**.

Attend to public engagements as continually emerging, interrelating and excluded

- The discrete one-off basis of many existing processes creates a snapshot of public engagement at specific moments in time. **Our mappings challenge this relatively static view, by showing how public engagements with energy and climate change are always ongoing, emergent and in flux.** They trace the changing ways that citizens are engaging, including recent rises in activism, citizens' assemblies, technology demonstrations, and digital engagement, how certain kinds of publics like special interest groups and active citizens are becoming more prominent, and reveal changes in how publics are engaging around broader climate change, sustainability and social dimensions in addition to the more technical aspects of energy systems.

- **What our mappings also reveal is how public engagements never occur in isolation but interrelate with each other in a wider ecology of participation[6].** We see this in our most recent analysis, for example where forms of activism in the case of XR prompted renewed interest and investment in deliberative processes in the form of citizens' assemblies. A number of citizens' assemblies also included elements of digital engagement through the Covid-19 pandemic, while some citizen participants in these assemblies have gone on to engage in behaviour change activities after they have ended. We also see instances of activism and protest giving rise to the establishment of community action groups.

- **Attending to public engagement in this more interrelated and systemic way creates new opportunities.** These synergies between public engagements, along with emerging forms of engagement revealed by our mappings, could be better harnessed to enhance citizen responses to energy and net zero transitions. Having a more comprehensive and dynamic understanding of what publics are saying and doing about energy and climate change can also improve evidence bases for decision-making.

- Dominant approaches to public participation and engagement rightfully place an emphasis on inclusion. However, **all forms of public engagement are exclusionary in different ways.[2] This does not only occur**

at the level of individual engagement processes. Our mappings show that inequalities and exclusions in public engagement are also systemic. Some forms of public engagement are deemed to be more legitimate, recognised and resourced then others. For example, public opinion surveys and other forms of elicitation that claim public representativeness continue to be dominant forms of engagement. Other forms of citizen-led engagement like activism and protest are more marginalised or not deemed to offer valid forms of evidence for decision-making. This raises wider questions over who holds the power and resources in the wider system of public engagement and whether or how this might be redistributed.

Towards systems of public engagement

- **The current public engagement landscape is geared towards discrete forms of participation working in isolation.** The diverse engagements revealed in our mapping – whether that be deliberative processes, behaviour change, activism, community action, and so on – are most often treated separately in terms of their institutional arrangements, resourcing, skills, methods, how they are studied, and how their quality is evaluated. While it is important that specific types of public engagement perform well in their own terms, a more systemic approach is urgently needed.

- Rather than only silo specific types of engagement in particular departments, disciplines, theories, or communities of practice, **more systemic approaches are required that encompass different forms of public engagement across issues, organisations, sectors and wider systems**. Our analysis shows that a system – or ecology – of participation already exists, so this perspective is needed to understand and practice public engagement well. Furthermore, energy, climate change and net zero are systemic problems and therefore require systemic approaches to public engagement.

- **This demands new organisational and institutional architectures, more strategic approaches to systemic engagement across organisations, countries or internationally**, directing research funding and the resourcing of engagement to more cross-cutting, distributed or citizen-led initiatives, developing new ways of evaluating the quality of public engagement in systemic terms, building capacities in systemic approaches to engagement, and seeing public engagement not only as supporting specific centralised decisions but as inherent to the distributed governance of energy and net zero transitions.

Observatories and mapping participation for policy, innovation, and society

- **Observatories are one example of new entities and organisational forms that can advance and support these moves to more systemic approaches to public engagement.** Such entities can map, connect and initiate diverse forms of public engagement across systems, and link them to policy and practice in new ways.

- **Observatories and methods for mapping participation should be set up and experimented with in practice to support policy, innovations, and new forms of participation.** This can occur at the level of specific organisations, at the level of national or regional government, and across whole systems. The potential for observatories and mapping participation to support international developments that goes beyond existing discrete engagement processes like global assemblies[12], should also be explored.

- To advance this, the UKERC Public Engagement Observatory is undertaking a series of **collaborative experiments to explore what difference mapping participation can make to policy, innovations, and in shaping new forms of participation.**[1,7] This includes working with the UK and Dutch governments to inform policies and engagement strategies for climate change and net zero, working with a water company to shape the responsible innovation of low carbon technologies, and contributing to a citizens' panel on home energy decarbonisation with the Climate Change Committee and the Climate Citizens project at Lancaster University.

- The comparative case mapping method reported on in this briefing attends to diverse public engagements but is limited to sources that have already been published or publicised in the academic literature, grey literature, or the media. **There is a need to develop other complementary methods for mapping public engagement** that expand the data sources included and trace engagements as they happen. To this end, the UKERC Public Engagement Observatory is developing such methods in the form of crowdsourcing and digital methods.[1,7]

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11. The Observatory's interactive open access dataset of diverse cases of public engagement can be explored, analysed and visualised here: https://ukerc-observatory.ac.uk

12. See for example: https://globalassembly.org

Authors

Jason Chilvers, UKERC Co-Director, University of East Anglia
Phedeas Stephanides, UKERC, University of East Anglia
Helen Pallett, UKERC, University of East Anglia
Tom Hargreaves, UKERC, University of East Anglia

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About the UKERC Public Engagement Observatory

The UKERC Public Engagement Observatory maps the many different ways that people are engaging with energy, climate change and net zero on an ongoing basis. It openly shares, experiments with, and undertakes these mappings with others to help make energy and climate-related decisions, innovations and participation more just, responsible and responsive to society. Through its network, the Observatory makes connections and encourages learning across wider systems of public engagement in the UK and internationally.

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Contact

T: +44 (0)1603 59 3130
Email: jason.chilvers@uea.ac.uk
Website: www.ukerc-observatory.ac.uk
: @UKERC_Engage
: www.linkedin.com/company/ukerc-observatory

UK Energy Research Centre,
Central House, BSEER,
14 Upper Woburn Place,
London, WC1H 0NN
T: +44 (0)20 3108 7564
@UKERCHQ