



Perspective

The making of energy evidence: How exclusions of Social Sciences and Humanities are reproduced (and what researchers can do about it)

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ABSTRACT

Overland and Sovacool (2020) and Baum and Bartkowski (2020), in this journal, have provided important insights on the neglect of Social Sciences and Humanities (SSH) in energy and sustainability research. In this response, we develop this conversation further, arguing that the commissioning and funding of energy research can be understood as part of a *process of making evidence*, which is co-constructive with policy-making. This helps us analyse how exclusions of SSH within the energy research-policy landscape are reproduced, and, crucially, to identify opportunities for change. We draw on concepts from Science and Technology Studies regarding the co-construction of knowledges and policies; epistemic communities; and the active role of expectations and imaginaries around energy evidence, and we apply these to empirical material from workshops with EU policy-makers, and analysis of key documents relating to European energy research and policy. We explore ways that SSH are excluded through expectations around: i) the research enterprise and purpose of evidence; ii) the contributions of different SSH communities, iii) how different epistemic communities should work together; and iv) validity and rigour. Finally, we offer some reflections for research professionals and research funding organisations who wish to integrate SSH more meaningfully into energy research and policy, including suggestions around actors; documents; and the processes of reviewing and monitoring that are involved in the making of energy evidence.

1. Introduction

A recent debate in this journal [1,2] has provided important insights on the neglect of Social Sciences and Humanities (SSH) in energy and sustainability research. In this response, we build on these contributions, and move the debate forward by arguing that the commissioning and funding of energy research can be understood as part of a *process of knowledge-making*, which necessarily involves negotiations of meaning between different communities of academic and non-academic actors, and is inherently co-constructive with processes of policy-making [3,4]. In this, we draw on Science and Technology Studies (STS) and sociological literatures that speak directly to these issues, as well as our own recent empirical work on European Union (EU) energy research and policy. We refer here to ‘energy evidence’, by which we mean forms of knowledge that are produced by research and that relate to the broad field of energy. We are interested in the processes through which this evidence is commissioned (especially the framing and development of funding calls, and the evaluation of research proposals) and through which funding is allocated; understanding these processes as

interconnected with the framing, development and evaluation of policies.

STS and related sociological fields (e.g. Sociologies of Knowledge and of Expectations) are the branches of SSH that most directly address questions about the creation, use and valuing of knowledges. Crucially, these literatures offer insights into the processes that create and maintain the patterns of SSH exclusion that have been well-documented by Overland and Sovacool [1], Baum and Bartkowski [2] and others [5]. If we are to challenge these patterns of exclusion, we need to draw on a systematic and detailed understanding of how they operate. While the field of STS is diverse, Law [6] suggests that enquiry informed by STS tends towards sociotechnical thinking, paying attention to heterogeneity and how differences are constructed and sustained. Hess and Sovacool [7] (p14) argue that STS has much to offer energy-related research, highlighting the interface of STS and energy social science as “*an interdisciplinary nexus where both fields can advance via new conceptual hybrids and new research agendas*”. Recent years have seen growing attention to this nexus (e.g. [8–10]), and we suggest that STS can offer useful insights to the present debate on the role and valuing of energy-

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SSH.

Here, we apply STS concepts to the case of energy evidence at the European Union (EU) level, focusing on this site as an illustration of our argument for attention to the processes through which energy evidence is made. The European Commission (EC) has attempted to improve the ‘mainstreaming’ of SSH within its research funding (across energy and other areas) during its Horizon 2020 (H2020) funding programme (2014–2020). For example, certain topics are ‘flagged’ as SSH topics, and applicant guidance states that within these topics: “A proposal without a sufficient contribution/integration of SSH research and competences will receive a low evaluation score” [11] (no page number). However, this is not always reflected in funding outcomes: in 2018, 14% of projects under SSH-flagged topics had no SSH participation, according to the EC’s own monitoring [12]. Specifically for the H2020 energy research programme, in 2018, only 10% of the total budget was allocated to SSH partners [12]. We focus in this piece on energy, because this is the focus of our research, though the patterns identified here are likely to be echoed across the wider sustainability landscape and beyond, as hinted by [1,2,13].

Section 2 reviews some key STS ideas that help in understanding the making of evidence: co-construction of knowledges and policies; epistemic communities; and the active role of expectations. We apply these ideas to our empirical study in Section 3, exploring how exclusions of SSH are reproduced through four scopes of expectations, which we consider in turn. In Section 4, we reflect briefly on some issues around reconfiguration, agency and change, before suggesting some ways in which researchers and research funding organisations can work towards more inclusive processes of evidence-making, which utilise the full range of contributions offered by energy-SSH.

2. How STS helps in understanding the making of evidence

2.1. Co-construction of knowledges and policies

Recent decades have seen increasing recognition of messiness, bounded rationality and knowledge politics within the process of making so-called ‘evidence-based policy’ [14,15]. However, STS understandings suggest that even a psychologically-informed model of evidence-based policy is inadequate. These perspectives, in contrast, see evidence as co-constructive with policy, drawing on a fundamentally social understanding of knowledge:

“Scientific knowledge... both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions – in short, in all the building blocks of what we term the social” [4] (p.3).

This means that in order to understand how and why different types of evidence are valued and used, it is important to attend to the processes by which knowledges are made, and come to be seen as valid – or not. Watson et al. [16] (p3) argue that:

“...established professional practices, institutional processes, available technologies and tools, and codification of evidence work, make it difficult for ideas and evidence coming from intellectual framings that are distinctive from those underpinning policy orthodoxies to take root...”

For example, there is an established ‘hierarchy of evidence’ within which the best evidence to inform policy is seen as that derived from large quantitative studies [16,17]. This co-constructive perspective does not imply that evidence should not be used in policy-making; rather, recognising the social nature of all evidence-making is the first step towards understanding how certain forms of knowledge become

influential, and identifying opportunities for change.¹ Our aim here is to explore how processes of evidence-making operate, and how they might serve to reproduce exclusions of SSH.

2.2. Epistemic communities

There are several interpretations of the useful concept of epistemic communities, and we draw mainly on Haas [18], for whom an epistemic community is “a network of professionals with recognised expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge” (p3). Within Haas’ framing, epistemic communities share:

*Normative beliefs, giving a value-based rationale for action;
Causal beliefs around problems and possible policy actions;
Notions of validity, and criteria for valuing knowledge; and
A policy enterprise, or goal to which their competence is directed.*

Meyer and Molyneux-Hodgson [19] emphasise the dynamic, non-linear processes through which epistemic communities produce and ‘act with’ knowledge, noting how their evidence-making is entangled with policy-making: “The knowledge they produce has to provide solutions (in response) to specific problems; they have to produce ‘usable knowledge’” (no page number).

Epistemic communities are also diverse, overlapping and internally differentiated; for example, Cooper et al. [20] argue that science and engineering represent different epistemic communities. We are not concerned here with drawing boundaries, following Meyer and Molyneux-Hodgson’s [19] view that epistemic communities are not rigidly bound by an ‘essence of community’, but are dynamic collaborative constructions. However, we suggest that SSH are not necessarily a single homogenous epistemic community and different communities within SSH may play different roles in making evidence. For example, König [21] examined expert advisory groups guiding the writing of EU funding calls (across all topics) and found that “...economics is much better represented in the advisory groups than the other social sciences, while humanities are barely in place at all” (p15). Such differences probably contribute to observed funding differences, with the Humanities receiving much less EU funding than Economics, both in energy research and more widely [12].

Importantly for our purposes, work on epistemic communities opens up a range of specific elements that may be excluded from evidence-making processes, including: actors; normative agendas and purposes; questions and problem-framings; understandings of causes and effects; potential solutions; criteria for validity of methodological tools and approaches; and consequently the data, publications and arguments derived from these tools, among other things. We apply this idea to energy evidence in Section 3.

2.3. Performative expectations and energy imaginaries

Another useful subfield of STS-sociological work focuses on the Sociology of Expectations (e.g. [22]): how processes of predicting, promising, future-visioning, assessing risks and creating goals and requirements shape which possibilities for future action are included or excluded [23–25]. For example, in the energy sector, the expectations of energy modelers influence policy options and outcomes [26]. Furthermore, research itself is shaped by various kinds of visions, goals and promises, as well as playing a part in creating and re-creating these expectations, producing a kind of lock-in:

¹ As a result of this co-construction perspective, we deliberately do not address the question of: ‘to what extent is the problem about funding as opposed to culture/structure?’, as we see these as inseparably entangled.

“...expectations may be seen to exhibit certain material and social path dependencies (lock-in or irreversibility) becoming the basis for future envisioning, a predisciplining of the imagination through the legacy of former expectations” [27] (p293).

Policyworkers’ expectations regarding evidence may ‘prediscipline’ the commissioning of research, thus containing and constraining the evidence that is produced, serving then to reproduce pre-existing policy assumptions.

These expectations are not formed in isolation, but are expressions of pervasive sociotechnical imaginaries. Sociotechnical imaginaries are defined by Jasanoff [28] (p28) as:

*“collectively held and performed visions of desirable futures... animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology... these imaginaries are at once products of and instruments of the co-production of science, technology, and society in modernity”.*²

Genus et al. [31] apply this concept to the sphere of EU energy research and innovation policy, and identify a dominant “energy imaginary” that focuses on technical or behaviour change approaches to energy issues. Within this, risks are framed as technical challenges and needs for social acceptance, and measures’ impacts are defined in terms of economic development, competitiveness and consumer choice. This dominant energy imaginary informs policies, for example, around imagined smart grid futures [32,33], as well as producing a set of expectations that limit the role of qualitative SSH evidence [31]. Strengers et al. [34] similarly suggest that a limited range of sociotechnical visions of energy means that policyworkers focus on providing solutions for a narrow set of pre-defined problems and imagined futures, and direct research funding accordingly. Dominant energy imaginaries structure expectations about the purpose and validity of knowledges about energy, ‘predisciplining’ the making of energy evidence, with the effect of reproducing and reinforcing the same imaginaries. We use these ideas about expectations of energy evidence in framing our discussion in Section 3.

2.4. Applying STS concepts to study the making of energy evidence

As indicated above, these STS ideas shape our analytical approach to the making of energy evidence. They inform our understanding of *what* is being excluded when we speak of the ‘exclusion of SSH’; for example, actors, perspectives, questions, problem- and solution-framings, forms of knowledge, methodological tools and approaches, data and publications, among other aspects. They also inform our attention to how *expectations* are implicated in these exclusions. What are the expectations of (SSH) evidence that reproduce patterns of exclusion? How are these expectations embedded and enacted through the governance of energy evidence-making? Focusing on these expectations helps to open them up to challenge, and potentially, to change.

² Related to socio-technical imaginaries, the literatures on public reason [29] and bioconstitutionalism [30] also offer valuable insights into the making of energy evidence, which we do not have scope to consider here.

We adopt a method of tracing expectations and exclusions by analysing key documents, an approach inspired by, among others, Borup et al. [27]. We refer to these as ‘evidence-making documents’ because of their active roles in the making of energy evidence.³ In this category, we include documents that outline EU research funding priorities and specify opportunities for researchers to bid for energy funding (official funding calls⁴) – as similarly utilised by Foulds and Christensen [37] and Genus et al. [31] – as well as documents that outline the research projects that will be funded (i.e. abstracts of projects awarded grants). Because research and policy are co-constructive, we also include some key policy documents (EU energy strategies and plans) that are generated amongst research and policy communities. Importantly, these documents contextualise the goals that frame energy research, and simultaneously enact and embed – albeit through complex, political and negotiated processes – the knowledges produced by research.

We draw on two strands of data-collection carried out within the Energy-SHIFTS⁵ project (Table 1): two workshops at which expert participants reviewed, annotated and discussed six documents; and a Quantitative Content Analysis (QCA) of two larger document sets. This mixed-methods interrogation of documents is one way to begin exploring the complex processes that govern the production and use of energy evidence. While there are obvious caveats regarding the small size of this study, we have endeavoured to adopt a rigorous and in-depth approach, through careful integration of qualitative and quantitative tools and emphasis on participation from expert practitioners within the field.

Inductive analysis of workshop data was conducted first, and forms the main substance of Section 3, with the Quantitative Content Analysis then complementing qualitative results where relevant. Some parts of Section 3 draw more on one or other of the workshops, due to the different emphases of the two events. To safeguard participants’ anonymity, when we use quotes spoken in the workshop plenary sessions, these are labelled only with the workshop code (e.g. ‘Workshop 1 plenary’). Participants’ written annotations are labelled with the workshop number followed by a participant code (e.g. ‘Workshop 1, A1’).

3. Observing expectations and exclusions in the making of energy evidence

3.1. Introducing our analytical framework

This Section 3 uses empirical data to explore patterns of exclusion of SSH, and how these are created and maintained through expectations embedded in, and reproduced by, EU evidence-making documents. Our discussion is structured around an inductively-developed framework based on four expectation scopes (Table 2; see first column). Each scope corresponds to a set of specific expectations observed within the documents (second column). The third column highlights how these observed expectations play out through exclusions of particular SSH elements.

This four-part expectation scope framework could be applied to other contexts (for example, energy evidence in other geographic sites

³ See how, for example, Silvest et al. [35] (p7) justify their research vision because of how its alignment with EC SSH commitments will “*produce competitive bids*”.

⁴ We focus on EU Horizon 2020, as the main route for EU research and innovation funding. Specifically, we focus on its ‘societal challenges’ pillar, which “*supports the development of breakthrough solutions*” [36] (no page number) for society’s most-pressing problems. This pillar does therefore require a particular kind of normative engagement, given that the calls are written with the aim of delivering on the EU’s existing (e.g. energy) policy ambitions. Note the two other pillars of Horizon 2020 – Excellent Science (e.g. European Research Council) and Industrial Leadership (e.g. SME innovation) – may not show the same extent and kind of exclusions of SSH.

⁵ Energy SSH Innovation Forum Targeting the SET-Plan: <https://energy-shifts.eu>.

Table 1
Overview of data collection and analysis methods.

| Data | Data collection context | Documents used during data collection | Analysis |
|---|---|---|---|
| Workshop audio recordings and participants' annotations on EC-published research-policy documents | <p>Workshop 1*:</p> <ul style="list-style-type: none"> Brussels, 18 June 2019. Co-organised by Energy-SHIFTS and the European University Association. 22 participants: policyworkers from the EC and associated bodies, non-governmental policyworkers, and energy-SSH researchers. <p>Workshop 2:</p> <ul style="list-style-type: none"> Brussels, 20 November 2019. Co-organised by Energy-SHIFTS with EC Directorate-Generals for Energy and for Research & Innovation. 20 participants: policyworkers from the EC and associated bodies and energy-SSH researchers. | <p>Extracts from:</p> <ul style="list-style-type: none"> Strategic Energy Technology (SET) Plan. Towards an integrated roadmap: research and innovation challenges and needs of the EU energy system [39] (p40–43) [1059 words]. Communication from the Commission: Towards an Integrated Strategic Energy Technology (SET) Plan: Accelerating the European Energy System Transformation [40] (p3 & p10–12) [881 words]. H2020 energy work programme for 2018–20: LC-SC3-CC-1–2018–2019–2020 Social Sciences and Humanities (SSH) aspects of the Clean-Energy Transition (themes for 2018 and 2019) (see [41] p199–202) [773 words] LC-SC3-EE-14–2018–2019–2020 Socio-economic research conceptualising and modelling energy efficiency and energy demand (see [41] p43–45) [892 words]. <p>Extracts from:</p> <ul style="list-style-type: none"> Clean energy for all Europeans [42] (p5–7 & p12–13) [1990 words]. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy [43] (p15–22) [1194 words]. | Inductive thematic analysis |
| EC-published research-policy documents | <ul style="list-style-type: none"> Conducted in November 2020. Analysis on terms relating to: fields | <ul style="list-style-type: none"> All calls within the H2020 energy work programmes for 2014–15, | Deductive Quantitative Content Analysis |

Table 1 (continued)

| Data | Data collection context | Documents used during data collection | Analysis |
|------|---|---|---|
| | <ul style="list-style-type: none"> of study; human actors; qualitative/quantitative methods. See Appendix 1 for full details. | <p>2016–17, 2018–20 [41,44,45] [567 calls; 250,991 words].</p> <ul style="list-style-type: none"> Subset of these energy calls that the EC had 'flagged' as SSH** [106 calls; 52,074 words]. Abstracts of projects funded by these SSH-flagged energy calls*** [108 calls; 29,139 words]. | (QCA), in response to issues posed by thematic analysis |

*Further details can be found in [38].

**These calls were identified using the SSH filter option within the EC's database of funding calls, accessed at: <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-search> [Accessed 11 October 2020].

***These abstracts were derived from the EC's internal CORDA database, and supplied via personal communication from an EC representative (14 February 2020).

Table 2

Expectation scopes, observed expectations and exclusions embedded in research-policy documents.

| Expectation scope | Observed expectations in EU energy research-policy documents | Associated exclusions in EU energy research-policy processes | See sub-section |
|---|--|--|-----------------|
| Normative expectations around the research enterprise and purpose of evidence | Evidence in general is instrumental; it delivers innovation for economic growth. SSH evidence in particular is instrumental; e.g. it delivers engagement and acceptance. | Non-instrumental applications of SSH are largely excluded, including alternative problem-framings and evidence that speaks to less dominant agendas. | 3.2 |
| Expectations of the contributions of different epistemic communities within SSH | SSH equal Economics; Economics perspectives are the only relevant ones. | Critical SSH knowledges, perspectives and actors are largely excluded. Humanities knowledges, perspectives and actors are almost entirely excluded. | 3.3 |
| Expectations of how epistemic communities (should) work together | Interdisciplinarity is hierarchical; SSH are subordinate. Tokenistic 'integration' is adequate. | SSH actors, knowledges and perspectives achieve only weak or partial inclusion within 'mainstream' research. | 3.4 |
| Expectations of validity and rigour | There is a hierarchy of methods; qualitative and participatory methods are inferior. | Qualitative and participatory methods, tools and techniques are largely excluded, as is evidence based on these methods. | 3.5 |

and governance levels), in which case different observed expectations and exclusions would probably be identified. Equally, the particular expectations and exclusions we observed are not fixed, and will evolve over time, as indeed wider energy imaginaries may evolve. In Section 4



Fig. 1. Frequency of terms relating to fields of study (total for 'All Funding Calls' and 'SSH Project Abstracts'). Created using WordItOut.

we return to this idea in considering how EU energy evidence-making could and should change in the future.

The following subsections 3.2–3.5 address each of Table 2's four Expectation Scopes in turn.

3.2. Normative expectations around the research enterprise and purpose of evidence

A common theme of workshop discussions was that evidence in general is seen as a tool to serve pre-existing policy aims, not as shaping or challenging such aims. Specifically, evidence is expected to support EU policy goals of innovation and economic growth.⁶ Indeed, within the documents, research is inseparable from innovation, which, as Guy and Shove [47] note, is understood predominantly as technological development, testing, roll-out and dissemination. Within this innovation-for-growth agenda, SSH evidence seems to be expected to play a narrow role in communication, engagement and behaviour change. Participants (Workshop 1 plenary) suggested SSH are expected to promote “acceptance”, or a “legitimising social reality-check”. One policyworker said they wanted SSH to deliver “leveraging” effects:

“...so that we have more people talking about this than just the ones that we can spend research budgets on... We know that we need to talk to them and get them to embrace change, for example. Or change behaviours... What are effective strategies to do that? That is what I would think would come from SSH evidence and projects” (Workshop 2 plenary).

Another policyworker identified “two places where SSH can help policy-makers: ...crystallizing what [citizens'] expectations are, and also building on [citizens'] willingness to do this sort of burden-sharing” (Workshop 2 plenary).

The dominant narrowly-instrumental expectations⁷ mean that SSH are placed late in activity timelines, rather than in the project/policy design stage. Several participants (Workshop 1 plenary) noted that SSH tend to be treated as an “add-on” or have a role at “the end of the project, but can't intervene/change the course of (technology) development along the way, because deliverables and impacts were already set before the project started.”

This expectation of the purpose of SSH also seems to be linked with a neglect of alternative goals, agendas and problem framings, as well as certain experts and forms of expertise. For example, energy efficiency is

a key concept in EU policy and research, and fits neatly into agendas of technological innovation and economic growth. Meanwhile, energy sufficiency (which does not necessarily complement these agendas) gets far less attention. Building on the idea of expectations around *what energy evidence should do*, we considered expectations of *what topics energy evidence should be concerned with*, drawing on our Quantitative Content Analysis. Fig. 1 gives a visual overview of terms around ‘fields of study’ used in energy funding calls and project abstracts (see Appendix 1 for details of methods and numerical data).

The apparent dominance of terms related to economics and technology, and relative backgrounding of terms related to social, and especially cultural, issues leads us to the next Expectation Scope, regarding contributions of different SSH communities.

3.3. Expectations of the contributions of different epistemic communities within SSH

As discussed in Section 2, SSH are not a single homogenous community. Linked to the above observations on fields of study and the framing of research as innovation for economic growth, an almost universally-identified theme in both workshops related to the dominance of Economics within energy research, especially that which informs policy. This dominance was identified through specific terminology; for example, impacts of a policy principle were framed as affecting “sectors and markets” and “categories of economic agents” in one EC SSH funding call [41] (p.43). Workshop 2 plenary participants also identified economic language, e.g. “investing” and “costs and benefits” throughout an EC policy document [43], with one saying: “I myself as an economist and engineer, it reads like exactly a document written by those two disciplines”.

Both workshops emphasised the narrow framing of individuals as consumers, not citizens. This was supported by the QCA which found the term ‘citizens(s)’ was used 12 times in the SSH funding calls, while ‘consumer(s)’ was used 112 times.⁸ Within this, the consumer is also defined narrowly, with assumptions about their wants; e.g. to optimise energy use through ICT (as in [40]) or buy a house (as in [43]) their cost-based decisions; and how they require “teaching” and “informing” (Workshop 2: A6, annotation on [42]). Some participants noted a tendency to treat people as a homogenous category with “no differentiation between different groups of the society in all those documents” (Workshop 2 plenary), while “consumers’ is reduced to household consumers” (Workshop 2: A1, annotation on [43]), ignoring actors such as industry. Furthermore, H2020 documents/systems sometimes use the term ‘SSH’ interchangeably with ‘socio-economics’ (which then proves to signify, to a large extent, ‘Economics’).

Discussions highlighted how question-framing determines not only the answers, but also *who* gets to answer. For example, a call text written by those with Economics training, in economic language, ‘scripts’ (c.f. [48]) the bids that are written in response, defining the concepts and models that can be employed. Only bids written to this script can demonstrably meet the criteria for success. One outcome of this locked-in cycle is exclusion of other aspects of SSH, especially critical or interpretive perspectives. Workshop 1 participants noted that the Humanities are largely absent from the documents, except for a few passing mentions, e.g. of “sociocultural ...issues” [41] (p199). As noted above, Humanities receive extremely little funding, even compared to other SSH fields. No History experts were funded by H2020 energy-SSH programmes in 2018 (compared to 21 Economics experts and 16 in Business and Marketing) [12], despite work highlighting the value of History in the energy field (e.g. [49]). The documents (Workshop 1) were criticised as largely ahistorical, emphasising innovation rather than issues such as

⁶ Economic growth is obviously a core EU policy goal, directly affecting energy policy; the new European Green Deal policy, as an example, explicitly positions itself as a “growth strategy” [46] (p2).

⁷ Not all policyworkers share these views; we also note that there are improvements ongoing, with the development of Horizon Europe.

⁸ The difference was even starker when all energy calls were included (i.e. both SSH and non SSH flagged calls), with consumer(s) being used 275 times and citizen(s) 26 times.

inertia; decommissioning; or the agency of existing infrastructure – thereby echoing findings by Borup et al. [27] on historical amnesia and future-centrism. Participants (Workshop 1) noted that the documents also lack recognition or critique of issues of power; vested interests; justice; rights; access; equity; controversy; and resistance, and that “*society [is] seen always as passive*” (Workshop 2: A3, annotation on [43]).

Participants (Workshop 1) suggested that an economic worldview dictated the documents’ stated aims, questions and instructions, which conceptualise energy systems in terms of barriers, factors, inputs/outputs, optimization, win-wins and simple linear causality, leaving little room for alternative SSH perspectives. They suggested a circular relationship between an absence of SSH and an oversimplification of energy systems, with documents ignoring the possibility of overlapping barriers, co-explanation and recursive relationships, and focusing on a single aspect of a problem while ignoring closely-related aspects, e.g. looking at renewables policy and ignoring fossil fuel policy. While some simplification is inevitable, it is important to consider what is systematically excluded; for example, when people are ‘simplified’ to economic agents.

3.4. Expectations of how epistemic communities (should) work together

Building directly from these discussions of disciplinary dominance/exclusion, participants raised issues of unequal interdisciplinarity and partial or weak ‘integration’ of SSH with other disciplines. SSH are widely presented as a supplement or support to core economic and technical forms of knowledge; “*collateral*” in one participant’s phrasing (Workshop 1 plenary), rather than contributing in their own right. Another participant (Workshop 2 plenary) pointed out that “*in some cases disciplines are not really mixed but simply put together*”, echoing Baum and Bartkowski [2] on the challenges of interdisciplinarity in practice. There may be a tendency to ‘retrofit’ technological or Economics work with SSH elements (Workshop 1), or give SSH issues tokenistic mentions. For example, the funding call ‘Socio-economic research conceptualising and modelling energy efficiency and energy demand’ listed SSH as one of the “*cross-cutting priorities*” for this call, at the end, but without clearly stating their role in the main call text⁹ (Workshop 1: A2, annotation on [41]). In another EC funding call [41], gender-related impacts were listed as expected impacts at the end (p201), but gender was not mentioned in the research questions (p199–201). Many documents included lists of factors or impacts, such as technological, political, economic and social (e.g. [39]), but Workshop 1 participants questioned whether each of these were taken seriously as a (valid) different approach.

Another common finding related to the use of SSH-related terms without explanation or reflection; for example: *community*, *inclusive* and *empowerment* (Workshop 1) (c.f. [50]). One participant observed (Workshop 2 plenary): “*I say this as somebody who’s also been involved in some drafting of policy documents: we produce documents that aren’t always very clear on what we mean by those terms*”. While full discussion of every term may be impossible, a systematically unreflexive use of terms relating to SSH issues suggests a pattern of exclusion. One participant (Workshop 1) highlighted how a document may start with an apparently open wording, followed by concrete questions that are very specific, revealing the embedded (often contradictory) problem-framing. Another participant (Workshop 1) raised the point that including SSH-related topics or issues within an evaluation is *not* the same as including SSH methods or evidence: an SSH-related topic such as behaviour or practice can be operationalised in a reductionist way by,

for instance, reducing it to a factor in a model, or a value in a cost-benefit analysis. This imprecision and tokenism are possibly also linked with the instrumental expectations of SSH discussed above, i.e. it is not worth engaging with SSH ideas because the role of SSH is to deliver services such as engagement and behaviour change.

3.5. Expectations of validity and rigour

A final scope of expectations relates to notions of validity and rigour, which can differ between epistemic communities, as highlighted in Section 2. While SSH can use diverse quantitative and qualitative methods, participants noted assumptions about research approaches and methods embedded in the documents, which seemed to overlap and intersect with expectations around the role of SSH (see also [51] on varying methodological conventions across disciplines in energy-SSH). Workshop 1 participants noted the dominance of economic empirical approaches, cost-benefit analysis, foresight, modelling and statistical methods; with a corresponding neglect of qualitative, longitudinal and participatory approaches. One EC call [41] (p.45) asks for “*quantified indicators and targets wherever possible*”. Indeed, our QCA found that ‘quantified’ and closely-related terms appeared 119 times in the energy funding calls, while equivalent terms around ‘qualitative’ methods appeared only twice. Terms such as ‘robust’ are often used without definition, but carrying connotations of statistical measures.

This reflects wider experiences; Watson et al. [16] argue that, across the sustainability field, institutionalised understandings of evidence prioritise generalisability and reproducibility, presenting challenges for evidence produced through qualitative and interpretive approaches. Overland and Sovacool [1], in their call for more rigorous energy-SSH, warn against methods involving small numbers of participants. Conventional hierarchies of evidence leave little room for depth-focused, interpretive, critical or theoretical work; the latter in particular risking being labeled “*wishy washy*” [1] (p4). We might ask, then, where this leaves SSH contributions such as critiques of energy efficiency [52]; debates on energy democracies and participation [53]; conceptual insights on energy justice [54]; normative perspectives on climate change [55]; or historical explorations of energy systems [49] – and whether we as energy researchers and research funding organisations could expand our thinking about what constitutes valid, rigorous and useful research.

3.6. Reflections on expectations and exclusions

In summary, this unpacking of evidence-making documents highlights a range of expectations that can contribute to the exclusion of SSH actors, disciplines, ideas, tools and approaches. Supporting the arguments of Genus et al. [31], we suggest that such exclusions are expressions of a dominant energy imaginary centred on technological innovation and behaviour change, within which SSH (especially qualitative SSH) are relegated to subordinate and instrumental roles.

We stress that these expectations are not solely the preserve of policyworkers. Participants in Workshop 1 discussed the idea of self-censorship, suggesting that researchers themselves are to some extent engaged in maintaining the patterns of exclusion outlined above. For example, they may feel they have to use certain language in order to be ‘heard’ by policy-makers. Part of this process is the ‘conditioning’ of researchers to anticipate the wishes of imagined users of evidence, such as funders, or policy audiences. This censorship can be tacit or explicit, as in the case of a participant (Workshop 1 plenary) who was told by a colleague, “Don’t criticise the Circular Economy!”. This reflects recent academic debates, where self-censorship by researchers has been blamed for shallowness, lack of originality, an intellectual monoculture, and a focus on technological innovations rather than deeper insights [56]. It has also (in the South African context) been linked with conceptual complacency, and the risk of academic social science becoming a “policy think tank or self-referential echo chamber” [57] (p374). The role of self-censorship in exclusions of energy SSH is a topic where

⁹ This text on cross-cutting priorities is not included in the published EC (2020) document, but is included in the online version of the call document [<https://ec.europa.eu/info/funding-tenders/opportunities/portal/scree n/opportunities/topic-details/lc-sc3-ee-14-2018-2019-2020>] (accessed 24 September 2019)

further research would be valuable. Equally, proposal reviewers' or evaluators' interpretations and expectations will also be significant, though our study has not had scope to explore these.

While this is a study of one particular site of governance, it is perhaps telling that Overland and Sovacool [1] and Baum and Bartkowski [2] noted similar challenges at other sites, while König [21] suggests these issues of SSH exclusion extend far beyond the energy sphere. If the observed patterns of expectation and exclusion are not addressed at the EU level, the new Horizon Europe funding programme is likely to repeat the same systemic problems in integrating SSH that have been apparent in H2020, and indeed other past programmes [58]. However, observed expectations and exclusions may change; issues of what sort of change we might want to see, and how we might work towards it, are the subject of Section 4.

4. Routes to change

Our direct experience at the interface of research and funding policy interests has shown us the value of scholars becoming active agents of change. This involves researchers finding a balance between, on one hand, offering novel critiques and problem framings; and on the other, seeking alignment (or at least a shared middle ground) with current funding structures and policy frameworks. This resonates with the idea that research(ers) should focus on 'reconfiguring' socio-technical systems and practices, rather than minor 'reforms' or radical 'revolutions' [59]. It also resonates with Adler and Haas' [60] arguments (written in the context of International Relations, but relevant here) for:

"an evolutionary process in which epistemic communities play meaningful roles as sources of policy innovation, channels by which these innovations diffuse internationally, and catalysts in the political and institutional processes leading to the selection of their shared goals" (abstract: no page number).

Given that we regard research and policy as co-constructive, we do not naively suggest that researchers can simply or quickly transform the expectations and exclusions identified herein. However, as actors within the systems they seek to influence, researchers do play a part in the dynamics of change [61]. While the impacts of researchers' interventions in (research) funding/policy are not easy to predict or control, we do believe it is nonetheless valuable to sustain some degree of 'illusion of agency' [25,61]; to identify the kinds of change we would like to see, and possible routes in those directions.

Specifically, we propose that shifts in the expectations of researchers, research funding organisations, and wider policy communities (within all four Expectation Scopes discussed here) could open up new ways for SSH to contribute to research and policy on energy. We cannot encompass all possible or desirable changes here, but to highlight a few:

- *Normative expectations of the purpose of (SSH) evidence* could be broadened to encompass a role in providing new problem-framings, agendas and critiques, as well as serving techno-economic agendas.
- *Expectations of different SSH communities' contributions* could be shifted to recognise the value of all SSH disciplines and perspectives, including critical Social Sciences, and the Humanities.
- *Expectations of how communities should work together* could go far beyond the present tokenistic and partial integration to embed SSH contributions at every stage of the research-policy process.
- *Expectations of validity and rigour* (amongst policyworkers and research communities) could be updated to reflect the rich body of work on quality in qualitative research (e.g. [51]), and draw on more diverse and participatory tools and approaches.

We emphasise that it is not only the expectations of funders and policymakers that matter: as SSH researchers we can also reflect on our own expectations, and the ways in which we may be self-censoring in

order to conform with (and thus reproduce) dominant energy imaginaries. To support SSH researchers, and research funding organisations, to work towards more inclusive approaches to energy evidence, we suggest paying attention to four aspects of the evidence-making process as starting points:

- *Actors*: Who are the individuals and organisations involved in co-developing funding calls? It is useful to identify these actors (who are not just within the funding body itself) and understand their different backgrounds, in order to engage effectively with them and advocate for the full range and value of SSH contributions.
- *Documents*: what are evidence-making funding calls, templates, evaluation criteria, applications and forms scripting for, and how could they be more inclusive in language and structure? Of course, there is no such thing as a 'neutral' term (e.g. consumer/citizen), but documents could be written with attention to, and recognition of, different theoretical perspectives, and avoid tokenistic usages. Whilst funding call texts themselves are commonly peer reviewed by an invitation-only group, other 'scripting' documents are not, and would undoubtedly benefit from this engagement.
- *Review processes*: who is involved, and how are the interactions organised? Ultimately, how are proposals with well-integrated SSH rewarded, or not? Our experience suggests that it often only matters that integration (or worse, 'inclusion') of SSH has happened, with adequate credit rarely given for the type, form and quality of that integration. As SSH researchers, we can volunteer to be on those panels, but the funders too need to commit to having at least one SSH researcher (ideally more) on every panel, appreciating that one cannot represent the full breadth of SSH. Similarly, funder databases of possible reviewers need to better showcase the expertise on offer from SSH experts.
- *Monitoring processes*: what is (not) being seen in monitoring processes; for example, in what ways is Economics included (or not) in SSH? And in what ways are the Humanities and/or the Arts disaggregated, versus being lumped together (as in current EC monitoring)? How could better qualitative, longitudinal monitoring be integrated within the commissioning of research, and crucially, are there formal procedures in place to take action based on such monitoring?

Further suggestions on practically embedding these, and other improvements, can be found in [62–64].

In closing, we support the arguments of Overland and Sovacool [1] and Baum and Bartkowski [2] for greater attention to the meaningful integration of SSH into energy and sustainability research. We propose that SSH can offer much more to energy policy than they do at present; including reframing questions and suggesting new answers. Excluding these contributions means putting blinkers on the knowledges available to policy, and risks reproducing flawed policy assumptions within the dominant energy imaginary (e.g. people as rational consumers; the value-action gap; narratives of smart utopian futures). Despite policies aiming to promote 'innovation' agendas, such lock-ins serve to stifle innovation in a deeper sense; innovation in ideas. Opening up the processes of evidence making and policy-making to contributions from across the full breadth of energy-SSH is crucial in fostering this kind of innovation.

5. Role of the funding source

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix 1:. Quantitative Content Analysis Methods and Results

Method

Step 1: Creating the three documents

- We downloaded all funding calls within the H2020 energy work programmes for 2014–15, 2016–17, 2018–20 [41,44,45]. We combined the calls into one document and removed non-call text. This produced the document set: All calls [including 567 calls; 250,991 words].
- We created a similar document that contained a subset of these calls, namely those flagged by the European Commission as Social Sciences and Humanities calls¹⁰. This created the document: SSH Calls [including 106 calls; 52,074 words].
- We identified all projects funded by the EC under these energy calls that were flagged as SSH projects, and extracted their abstracts.¹¹ This created the document: SSH Abstracts [including 108 abstracts; 29,139 words].

Step 2: Creating the Count Lists

- For each of the three documents we generated a list of the most frequently used 1000 words, using WordCounter online.
- We read each list and highlighted all terms that relate to our two main topics: fields of study, and human actors. This was essentially a coding process that generated a list of terms to be used for quantitative content analysis (Count List) for each topic.
- A term was included on the Count List if it appeared in any one of the document 'Top 1000' lists (it did not have to appear in all). Once a word was included on the list, we also added its immediate grammatical variants, for example, singular and plural versions.
- For the Human Actors terms, we did not cluster words into groups, other than grouping singular and plural versions together.
- For the Fields of Study terms, which are more numerous and relate to slightly more diffuse concepts, we grouped closely-related words together to form clusters, for example, *city* and *urban*.
- A third topic, Methodological Terms, used a simplified method for generating a Count List, since we chose to only count explicit references to quantitative and qualitative approaches, so we created a very simple protocol for finding words directly related to these two terms.

Step 3: Counting occurrences

- Having created the Count List for each of the three topics, we used the frequency tables generated by WordCounter to count the occurrences of each term in each of the three document sets.
- We found that terms around qualitative methods were not frequent enough to appear in the WordCounter list. We therefore chose, for

Table 3

Fields of study: Count of words appearing in the top 1000 words for each document set.

| Short name for word cluster | All Calls | SSH Calls | SSH Abstracts |
|------------------------------|-----------|-----------|---------------|
| Technology | 1633 | 316 | 163 |
| Industry | 660 | 145 | 52 |
| Markets | 655 | 128 | 87 |
| Buildings | 529 | 133 | 61 |
| Finance | 479 | 93 | 35 |
| Environment | 438 | 113 | 53 |
| Business | 386 | 92 | 100 |
| Cities and local authorities | 334 | 63 | 84 |
| Society | 281 | 148 | 104 |
| Economy | 247 | 78 | 30 |
| Domestic | 100 | 34 | 37 |
| Institutions | 82 | 37 | 19 |
| Behaviour | 81 | 52 | 51 |
| Politics | 76 | 26 | 14 |
| Socioeconomic | 63 | 37 | 17 |
| Anthropology | 0 | 0 | 0 |
| Culture | 0 | 0 | 6 |
| Demography | 0 | 0 | 0 |
| Geography | 0 | 11 | 0 |
| History | 0 | 11 | 0 |
| Humanities | 0 | 21 | 5 |
| Justice | 0 | 0 | 0 |
| Philosophy | 0 | 0 | 0 |
| Poverty | 0 | 9 | 32 |
| Psychology | 0 | 0 | 0 |
| Sociology | 0 | 0 | 0 |
| Theology | 0 | 0 | 0 |

completeness, to count the occurrences of Methodological Terms in the full text of the documents using the Search function in Microsoft Word.

- The data on terms' occurrences are presented in the tables below. Please see the notes on the tables for details about how terms were included/excluded, and important caveats to interpretation.

Terms relating to Fields of Study

By field of study we mean a theme within research on energy, which often corresponds to the focus area of a particular discipline or disciplines, or to a particular angle or approach within energy research. For example: *economy*, *society*, *technology*, *politics*. We did not include terms such as supply and demand, which cut across diverse disciplines. Rather, we aimed to identify terms that provide an indication of which broad research themes or disciplinary angles on 'Clean, secure and affordable energy' are most prevalent within funding calls. Table 3 presents the counts generated.

Words were clustered with closely-related words; see Table 4 for the full list of words within each cluster (and exclusions).

Notes on Table 3

- The table is ordered by frequency in 'All Calls' (and alphabetically where the value is 0)
- 0 means the word does not appear in the top 1000 words for that document set. The word may still appear in the document set, at low frequency.
- Names of organisations were excluded where they were found, as being not likely to refer to the topic of the research (e.g. being consortium partners or target audiences for impact). The same applies to publication titles.
- Terms around legislation were not included due to occurring predominantly in the administrative small print of calls.
- We excluded words that are commonly used to denote a wide range of meanings within the calls (other than relating to the field of study). For example, the word policy is often used in general text about the policy context or policy implications of research, rather

¹⁰ These calls were identified using the SSH filter option within the EC's database of funding calls, accessed at: <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-search> [Accessed 11 October 2020].

¹¹ These abstracts were derived from the EC's internal CORDA database, and supplied via personal communication from an EC representative (14 February 2020).

Table 4
Count inclusion protocol for Fields of Study.

| Short name for word cluster | List of words included (and excluded, where relevant) |
|----------------------------------|--|
| Technology | technology technologies technical technological TRL (except where used adjacent to 'Technology Readiness Level', to avoid double counting) |
| Economy | economy economic microeconomic economically economies |
| Socioeconomic | socio-economic socioeconomic |
| society | social society societal |
| Political | political politics governance |
| Institutional/ organisational | institutional institution institutions organisation organisations organisational |
| Business | businesses business SME(s) enterprise company companies |
| Industry | industrial industry industries manufacturing manufacturers |
| Behaviour | Behavioural Behaviour Behavior |
| Buildings | Buildings NB building excluded due to its wide use as a general verb |
| Markets | market markets |
| Domestic | Domestic Residential Home Homes |
| City and LA | city Cities urban Local authority Local authorities LA LAs We also ran a count on 'rural' for completeness, given we counted 'urban'. This produced a 0 count for all sets. |
| Financial | Finance Finances Financial Financing NB co-financing excluded as it is only used in administrative small-print to calls |
| Environment | Environmental environmentally Environment NB environments excluded as likely to refer to more specific surroundings, rather than to environmental issues |
| Poverty | Climate climatic Poor NB all uses of poor were checked. One was removed due to meaning generically weak, rather than referring to poverty issues |

Table 4 (continued)

| Short name for word cluster | List of words included (and excluded, where relevant) |
|-----------------------------|--|
| | Poverty Vulnerable vulnerability |
| Justice | Fair Just Ethics Ethical Equity Equality |
| Humanities | Humanities |
| Culture | Cultural, culture |
| History | History, histories, historical, historic |
| Philosophy | Philosophy, philosophies, philosophical |
| Geography | Geography, geographies, geographical |
| Anthropology | Anthropology, anthropological |
| Theology | Theology, theologies, theological |
| Psychology | Psychology, psychologies, psychological |
| Demography | Demography, demographics, demographic, socio-demographic |
| Sociology | Sociology, sociologies, sociological |

Table 5

Human actors: Count of words appearing in the top 1000 words for each document set.

| Words | All Calls | SSH Calls | Abstracts |
|------------------------------------|-----------|-----------|-----------|
| Public, publics | 514 | 146 | 54 |
| Stakeholder, stakeholders | 342 | 58 | 87 |
| Consumer, consumers | 275 | 112 | 48 |
| Community, communities | 191 | 50 | 34 |
| Actor, actors | 100 | 50 | 34 |
| User, users | 77 | 26 | 48 |
| Expert, experts | 43 | 7 | 10 |
| Investor, investors | 32 | 7 | 5 |
| Citizen, citizens | 26 | 12 | 32 |
| Manager, managers | 25 | 0 | 5 |
| Worker, workers | 24 | 7 | 0 |
| Architect, Architects | 0 | 0 | 4 |
| Craftsmen, Craftspeople, Craftsman | 0 | 0 | 4 |
| Developer, Developers | 0 | 7 | 0 |
| Engineer, Engineers | 0 | 0 | 5 |
| Household, households | 0 | 20 | 9 |
| Individuals | 0 | 6 | 0 |
| Installer, Installers | 0 | 0 | 6 |
| Owner, Owners | 0 | 12 | 0 |
| People, person, peoples | 0 | 20 | 11 |
| Professional, Professionals | 0 | 9 | 8 |
| Prosumer, Prosumers | 0 | 0 | 14 |

than implying that the research call itself is concerned with the issue of policy. However, we emphasise the subjective interpretation that is inevitable here.

- Results should be interpreted with caution, since almost every word can have multiple meanings.

Terms relating to Human actors

This analysis is concerned with terms that relate directly to the framing of human actors. Table 5 shows the counts for each word (with singular and plural forms grouped together, but no other clustering).

Notes on Table 5

- The table is ordered by frequency in 'All Calls' (and alphabetically where the value is 0)
- 0 means the word does not appear in the top 1000 words for that document set. The word may still appear in the document set, at low frequency.

Table 6

Count of terms relating to research methods.

| Terms | All Calls | SSH Calls | SSH Abstracts |
|----------------------------|-----------|-----------|---------------|
| Quantif., Quantitative(ly) | 119 | 24 | 18 |
| Qualitative(ly) | 2 | 1 | 0 |

- Individual (singular) was not counted, as its use is too generic (not relating to human actors)
- Some terms were excluded due to probably referring to the research project itself rather than the field of study: researchers, participants, partners, consortia. Experts is a grey area, but included, alongside engineers and some other borderline professions.
- We did not include those terms that specifically denote formally-structured organisations such as businesses. However, terms referring to an informal grouping (i.e. community) were included. We did not include very generic terms such as group or very wide terms such as society.
- We do note, however, that many of these terms can, in some circumstances, be used to refer to things other than humans. For example, *actors* itself can refer to a range of entities. For this reason, results should be interpreted with caution.

Methodological terms

For this exercise we used a very simple method, with the count list consisting of terms directly relating to the words *qualitative* or *quantitative*. As explained above, for this count we used the full text of the documents, because some of the counts were too small to register on the lists created by WordCounter. Qualify/Qualification were excluded as not usually referring to methodologies (see Table 6).

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