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An approach to identifying future Social Sciences & Humanities energy research priorities for Horizon Europe:

Working Group guidelines for systematic Horizon Scanning

Energy -SHIFTS

ENERGY SOCIAL SCIENCES & HUMANITIES INNOVATION FORUM TARGETING THE SET-PLAN

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Executive summary

The purpose of this report is to present our systematic approach to producing four policy-relevant Horizon Scans. Horizon Scanning is a type of Foresight method used to bring together new disciplines and expertise in new ways, to undertake systematic and usually fairly comprehensive evaluations of emerging trends, issues, priorities, etc. Our four policy-focussed Horizon Scans will each detail the top 100 energy-related Social Sciences and Humanities (energy-SSH) research questions that the energy-SSH communities themselves believe need more funding in the EU's forthcoming Horizon Europe programme (2021-2027). Our recommendations will be submitted to the European Commission's (EC) Directorate-General for Research and Innovation (DG RTD), specifically to both the Ecological and Social Transitions (C5) and the Clean Energy Transition (D1) units.

The topics of the four Horizon Scanning exercises are: Renewables (Working Group 1); Smart Consumption (Working Group 2); Energy Efficiency (Working Group 3); and Transport and Mobility (Working Group 4). These have been selected because they are core topic areas within the EU's Energy Union priorities, which subsequently drive the contents and foci of the Strategic Energy Technology Plan's (SET-Plan) actions – and it is the SET-Plan that predominantly sets the agenda for Framework Programme investment (e.g. Horizon Europe) in energy and thus energy-SSH too. Our four Working Groups (WGs) will each be made up of 25-30 European energy-SSH experts, from a range of SSH disciplines, geographies, research interests, career experiences/trajectories, genders, etc.

Our Horizon Scanning approach draws heavily on the Delphi method developed and used to identify key research questions within the (multidisciplinary) Environmental Sciences, most prominently by the ecologist Bill Sutherland. We argue that it has considerable potential and applicability for identifying EU energy-SSH research funding priorities.

We have broken down our Horizon Scanning approach into the following steps, which this guidelines report details in-depth:

- Preparatory groundwork
- Step 1 – Produce Terms of Reference
- Step 2 – Select WG members
- Step 3 – Solicit answers from the community
- Step 4 – Edit and categorise
- Step 5 – WG voting on questions
- Step 6 – Group meeting(s) to arrive at the final list of Top 100 Questions and categories for these
- Step 7 – Framing the Horizon Scan
- Step 8 – Write the final policy recommendations report

Alongside the core Horizon Scanning exercises – which will produce the 100 priority research questions for each of the four WG topics – we will also be producing a set of companion resources and insights. These are intended to either: contextualise the Horizon Scans by looking at the past development of related energy-SSH fields (via interviews with 10 WG members, and four annotated bibliographies showcasing useful research); or, evaluate the experiences of co-ordinating (via fieldnotes) and participating in (via two surveys) the Horizon Scanning process.

This report also contains a number of detailed appendices, which transparently present the resources that we will utilise in our research, including the consent forms, participant information sheets, surveys, fieldnotes template, bibliography editorial guidelines, and interview protocol.

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List of Acronyms

ARU	Anglia Ruskin University
EERA	European Energy Research Alliance
DRIFT	Dutch Research Institute for Transitions
DG	Directorate-General
DG RTD	Directorate-General for Research and Innovation
E3G	Third Generation Environmentalism
EC	European Commission
Energy-SHIFTS	Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan Horizon 2020 project
Energy-SSH	Energy-related Social Sciences and Humanities
ESR	Early-Stage Researcher
EU	European Union
JU	Jagiellonian University
NTNU	Norwegian University of Science and Technology
SET-Plan	Strategic Energy Technology Plan
SHAPE ENERGY	Social Sciences and Humanities for Advancing Policy in European ENERGY Horizon 2020 project
SSH	Social Sciences and Humanities
STEM	Science, Technology, Engineering and Mathematics
ToR	Terms of Reference
WG	Working Group
WP	Work Package

1. Introduction

The European Commission's (EC) Directorate-General for Research and Innovation (DG RTD) is currently convening a cross-DG planning exercise for the implementation of the European Union's (EU) Framework Programme 9, Horizon Europe (European Commission, 2019a). Horizon Europe will run over 2021-2027, and is set to total over €100m of investment in research and innovation in EU Member States and Associate countries (ibid.). As part of its Strategic Planning exercise, the EC has committed to two important decisions concerning investment in the Social Sciences and Humanities (SSH). First, it will continue with its Framework Programme 8's (Horizon 2020, 2014-2020) commitment of 'mainstreaming' SSH across all of its work programmes. This specifically means that SSH should be regarded as a cross-cutting priority that should really be tangibly featuring in every project, regardless of its original SSH grounding (Kania et al., 2019). Second, the EC has committed to continuing to fund dedicated energy-SSH research and innovation projects. It is this second decision that this report primarily speaks to, in the context of Horizon Europe's new 'Climate, energy, mobility' cluster number 5 that has already been noted as having e.g. "*socio-economic and behavioural research and innovation*" (European Commission, 2019a, p.87) cutting through its five priority areas.

Indeed, a key purpose of the Energy-SHIFTS (Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan) project is to provide DG RTD with the energy-related Social Sciences and Humanities (energy-SSH) research priorities from energy-SSH research communities themselves. Too often have the wide range of energy-SSH experts been overlooked in the setting of the research and innovation priorities that policymakers task them to address. Indeed, energy-SSH research funding opportunities have usually been framed and/or centred around ideas of techno-economics (Foulds and Christensen, 2016). Such framings are ultimately constraining which energy-SSH perspectives create the evidence base that the EC looks to in supporting its EU Energy Union policy ambitions (Foulds and Robison, 2018). It matters how funding opportunities are designed (c.f. Rip's work in this area, e.g. Rip (1986; 2000), Shove and Rip (2000)). As such, significantly more needs to be done to funnel the wide range of energy-SSH voices and perspectives to the policy officers responsible for shaping Horizon Europe's energy-SSH funding, as part of demonstrating and showcasing how SSH can contribute to (and sometimes constructively challenge) their policy objectives in new and powerful ways.

This report is part of a series of Energy-SHIFTS reports that directly address this policy gap in knowledge. Specifically, Energy-SHIFTS is running four Working Groups (WGs) based on four of the EU Energy Union priorities: (WG1) Renewables; (WG2) Smart Consumption; (WG3) Energy Efficiency; and (WG4) Transport and Mobility. These four areas are embedded within the EU energy policy landscape and, as such, the EC has been tasked with finding ways to meaningfully fund research and innovation in these four core priorities (European Commission, 2015). Thus, Horizon Europe will invest in these regardless, and it is important that cutting-edge energy-SSH research questions are considered. This is exactly what these four WGs will do through the undertaking of Horizon Scanning exercises, which will work with European experts to identify the top 100 energy-SSH research questions for each of these four areas.

This report aims to present in detail our systematic Horizon Scanning approach, alongside supporting rationales, preparatory materials, and background contexts. In doing so, we hope to also demonstrate the potential usefulness and applicability of Horizon Scanning methods for deriving expert-based recommendations for future (energy-SSH) research funding recommendations.

The target readership for this report is three-fold. First, we hope that all Energy-SHIFTS partners and WG members (i.e. those co-ordinating and participating in the Horizon Scanning) find this useful in managing their own expectations of the process involved, including any difficulties and plans for navigating them. Second, this report will be of use to the EC and indeed any other party interested in our Horizon Scan outputs. We are keen to build a transparent approach that clearly shows the processes that underlie the funding recommendations that we will produce. Third, we will contribute to the literature on Horizon Scanning and thus trust that the materials and step-by-step instructions detailed herein may be useful for others wishing to undertake similar exercises.

We structure this report as follows: we begin by introducing Horizon Scanning, including past attempts from literatures beyond energy-SSH that we have drawn upon in the development of our approach (Section 2). The core of this report, Section 3, is primarily centred on detailed discussions of our step-by-step approach, with clear resources signposted where appropriate, such as Participant Information Sheets, Consent Forms, etc. in the appendices. Section 4 covers the companion resources and insights that we will be producing alongside the final Horizon Scan's recommended research questions. These include interviews with a selection of WG members to contextualise our Horizon Scans, through looking back at the evolution of the field and its associated contestations more generally; as well as evaluation exercises, namely fieldnotes for WG co-ordinators and a feedback survey for WG participants. We also discuss ethics and data management issues (Section 5); inclusivity and diversity issues (Section 6); and risk management and contingency planning (Section 7). We finish by emphasising the contributions of this report to relevant literature, in particular regarding Horizon Scanning methodologies (Section 8).

2. Background context: Introducing Horizon Scanning

We live in a time of transition, with further hopes and plans for even deeper transformations to how societies interact with the energy system. Horizon Scanning is a systematic approach to gather knowledge so as to manage or direct such changes. In particular, Horizon Scanning is a way to bring together different disciplines and expertise in new ways.

In this section, we discuss: the history of Foresight exercises (section 2.1.); what Horizon Scanning offers as a set of methods (section 2.2.); involving mixed audiences through Horizon Scanning (section 2.3.); gaps in previous energy-related Horizon Scanning exercises (section 2.4.); and lessons for the Energy-SHIFTS Horizon Scanning work (section 2.5.).

2.1. History of Foresight exercises

Horizon Scanning is a type of 'Foresight' method used to undertake "*comprehensive, systematic and sustainable*" evaluations of emerging issues, challenges, trends and innovations (Hines et al., 2019, p.1). While applications vary widely across various fields, the overarching aim of Foresight exercises is to inform decision-making, risk management, strategy development, and/or policymaking. This is useful in domains where "*issues appear unexpectedly, when with hindsight, many of them were foreseeable*" (Sutherland and Woodroof, 2009, p.523).

Foresight exercises were pioneered in Japan in the 1970s, where experts were surveyed every five years on their views of future developments and technologies (Martin, 1996). Through the 1990s, European Science and Technology policy was also informed by Foresight exercises, particularly the Delphi-style[1] survey we will use in our WGs (Brandes, 2009). In the UK, various Foresight initiatives have been established since the founding of the Foresight Programme in 1994, and interest in Horizon Scanning is still widespread across UK government (Schultz, 2006), driven in part by perceived failures in science and policy (Sutherland and Woodroof, 2009).

Foresight may involve a combination of approaches, all designed to gain as comprehensive and accurate a 'glimpse' into the future of dynamic fields as possible. Specific methods may include Delphi surveys, expert interviews, expert panels, expert workshops, literature reviews, scenario building and analyses, and trend/driver analyses (Doos et al., 2016). Depending on the aim of the exercise, forecasters may either glimpse into the immediate future, or attempt to evaluate developments over a range of decades. Early Japanese forecasts attempted to assess technology developments over a 30-year time period, for instance. Related to the temporal range of the forecast, forecasters may either be tasked with exploring broad trends or the general influence of particular drivers, or (e.g. over shorter timeframes), may attempt to evaluate specific emerging technologies. Finally, not all methods rely solely on experts. Tsekleves et al. (2017), for example, outline the use of a 'Design Fictions' tool where experts and citizens collaborate in imagining the future implications of government policy. Used in this way, Foresight exercises do not simply 'predict' the future. Instead, they may help to inform a wide-ranging intelligence-gathering exercise about multiple, rich, and largely qualitative aspects of various possible futures, and thus help to *create* or 'actively design' particular futures. Or, as Tsekleves et al. (2017, p.8) put it, these methods "*do not claim to predict the future; they act as aids to enable their audiences to act as interlocutors*" (see also, Martin, 1996).

1 The Delphi Method has a long history of use, dating back to the 1960s (e.g. Dalkey and Helmer, 1963). Its primary focus is to establish consensus views through a series of surveys, which are accompanied at strategic points with controlled and purposeful feedback from those coordinating the surveys.

2.2. Development of Horizon Scanning

Horizon Scanning is a group of methods that is used to gain foresight about emerging opportunities and risks, identify knowledge gaps at the frontiers of fast-evolving phenomena, and set strategic priorities for decision-makers or researchers. The approach is well-established within Europe, where policymakers have recognised the need for taking heed of 'early warning signs' and taking a more proactive (rather than reactive) approach to the risks, challenges and threats posed by complex problems.

From the mid-2000s onwards, a distinct stream of Horizon Scanning work has systematically sought to identify emerging research priorities, set scholarly agendas and – crucially – identify research priorities that (could) interface closely with policymaking. The broad approach is to identify important research questions from a community of scientists and others who use scientific evidence, and then identify the most important priority questions through a systematic process of deliberation. Facilitators aim to develop a coherent research agenda for scholarly communities, but also, crucially, aim to influence strategic policymaking, for example:

> *"by better aligning research questions with policy needs it is thought that conservation science may become more relevant to policy makers and thus increase its real-world salience for conservation of biological diversity".*
>
> (Rudd, 2010, p.861).

This 'question selection' approach has been used to identify emerging issues (and research foci) in, among others, research on: ecology and conservation (Sutherland et al., 2019), global agriculture (Pretty et al., 2010), UK food system (Ingram et al., 2013), influence of pharmaceuticals and personal care products in the environment (Boxall et al., 2012; Rudd et al., 2014), and water (Brown et al., 2010). Policymakers have also realised the importance of Horizon Scanning exercises that focus attention on knowledge gaps and emerging priorities. An early example was the European Environment Agency which reflected, in 2001, that (alongside monitoring) searching out and addressing blind spots and gaps in scientific knowledge was important for avoiding undesirable outcomes (Sutherland et al., 2011).

Sutherland et al. (2011) identified three key audiences for these exercises:

1. policymakers and practitioners within public, private and third sector organisations responsible for crafting policy, who may benefit from the crafting of a scholarly agenda that meets their policy needs.
2. research funders and research-policymakers who may wish to focus on themes and priorities that both scholarly communities and *users* of knowledge have jointly identified as important.
3. researchers, who can prioritise questions that have been identified as important knowledge gaps and who can focus attention on questions identified as important by policymakers and other users.

2.3. Involving mixed audiences

The method we use in Energy-SHIFTS is a slightly adapted version of the Delphi technique previously used to identify novel emerging threats for biodiversity conservation and the top 100 questions for biodiversity, conservation and global agriculture (Pretty et al., 2010; Sutherland et al., 2019). This involves canvassing subject experts and their networks for their opinions on key knowledge priorities, categorising the answers, and reaching a joint consensus on the most important questions. The decision on the final number of questions to include relates to the breadth of the topic, as well as practical constraints such as the time available to participants. Sutherland et al. (2011, p.244) suggest that: "*The number of priority questions or issues is partly related to the breadth of the topic… A larger number of priorities may minimise the tendency to contribute questions that are extremely broad or inclusive.*"

Key to these exercises is the bringing together of a wide range of multidisciplinary perspectives in a facilitated process that ensures adequate representation of different disciplines and epistemic communities. Carney (2018) advocates for the selection of a broad cadre of 'generalists', and mixing participants from the arts and sciences.

'Question selection' exercises have not, however, necessarily restricted themselves to academic scholars. Sutherland et al. (2006) have, for example, facilitated exercises wherein policymakers selected questions that they would most like answers for, with academics "*facilitating and injecting information; for example, advising that a proposed question could already be answered*" (Sutherland et al., 2008, p.823). In a subsequent exercise, policymakers and researchers have

played an equal role in deliberations, which brought together the views of experts from a range of sectors:

> *"Twenty-three governmental organizations, charities or businesses selected representatives to send to the meeting. They were joined by 12 academics. A science and technology journalist provided insights into future technological developments and a member of the UK Government Horizon Scanning Centre was invited to provide other perspectives".*
>
> (Sutherland et al., 2008, p.823)

Bringing together multidisciplinary teams and including a range of perspectives is essential to broadening the scope of questions beyond existing emphases and addressing existing skews and biases towards particular epistemic communities – as has been noted by e.g. Fear et al. (2006), Granjoy and Arpin (2015), and Hazard et al. (2018).

Tsekleves et al. (2017, p.10) highlight the role of "*democratic relationships*" within the research process as an important ethical consideration in Foresight exercises. By this, they refer to the conventional reliance on (relatively removed) 'experts', thus excluding publics whose views, experiences and perspectives are generally not accounted for in technology forecasting exercises. We consider that similar ethical considerations apply even within Foresight exercises that rely solely on experts. These are not conventionally domains in which unequal power relations and relative vulnerabilities may obviously present themselves. Yet, we consider that any group exercise is liable to present these issues to some extent, as a result of differences in, for example: age; professional status; language competence (relevant in a context where an international scanning exercise is being conducted primarily in English, even if participants are highly skilled); gender; and even as a result of ontological and epistemological differences arising from different disciplinary backgrounds. Ethical concerns arise when these differences constrain participants' engagement with the process, to the detriment of the overall exercise. To mitigate these ethical concerns, we emphasise openness, transparency, reflexivity and diversity as key guiding principles to inform Horizon Scanning processes.

A key point to bear in mind is that while policymakers and other decision-makers are a key audience, Horizon Scanning itself is not a policymaking exercise. Horizon Scanning does not aim to develop specific policies; instead, it may help to support evidence-based policymaking by improving the knowledge-base on which decision-makers may rely. To support this goal, past exercises have explicitly involved policymakers in a variety of ways. Sutherland et al. (2011, p.244) suggest that "*interaction among policy makers and academics helps to identify which questions are important, answerable by research, and for which substantial knowledge does not already exist*". The levels and types of policymaker engagement depends on the aims of the Horizon Scanning. In Sutherland et al. (2006) for example, policymakers were the main participants, selecting the questions that they themselves wished to have answered. In that example, the role of scholars was simply to assist by providing policymakers with information about which questions represented true research gaps, and also to oversee the re-wording and editing of questions posed by the policymakers. In other exercises, policymakers have actively participated as collaborators, working with groups of academics to identify priority questions. However, regardless of the level of engagement of policymakers, it is recognised that Horizon Scanning exercises need to be 'translated' for policy audiences. A key recommendation from the European Commission's assessment of the use of Horizon Scanning to inform policy thus focuses on how information gathered in Horizon Scans is converted into a form of value to policy audiences:

> *"There must be a clear way how information (about risks and opportunities) is transferred and how it can be used as knowledge. A brokering function needs to be organised to ensure that the key observations and conclusions can be exploited and reacted to"*
>
> (Cuhls et al., 2015, p.5)

2.4. Energy-related Horizon Scanning

Moving now to Horizon Scanning exercises specifically with regard to energy transitions, we point to a number of gaps. Most significantly, the use of Horizon Scanning methods has tended to be limited to technological and infrastructural problem framings (e.g. Delphi Energy Future, 2016; Pereira et al., 2017; Czaplicka-Kolarz et al., 2009). To date, SSH components of Horizon Scans have been extremely limited, and, where they have featured, the societal components have been constrained to techno-economic thinking (e.g. Wehnert et al., 2007). This has meant that the contributions of SSH have been limited to notions of managing economic order and competitiveness, as the core factor(s) of driving energy transitions.

Compared to the aims and scope of our Energy-SHIFTS Horizon Scanning – whereby we will inclusively

seek perspectives from a wide range of SSH disciplines – it is therefore especially notable that to date energy transitions related Horizon Scans have been conducted using, to borrow words from a different context, "*just a narrow 'forward look' within a single domain or area of interest*" (Sutherland and Woodroof, 2009, p.525). The European Environmental Agency (2001, p.4) warns exactly against this sort of "*compartmentalised science*", and indeed this is exactly a rationale for why our Horizon Scanning will look (in a somewhat deviant way) to include a wide range of SSH voices, rather than limiting the policy contributions to non-SSH or to only certain (e.g. Economics-led) forms of SSH.

In fact, previous Energy-SHIFTS scoping work has argued that our Horizon Scanning should seriously consider a de-prioritisation of the techno-economic and 'Individualised' forms of research that have traditionally dominated policy (funding) priorities (Royston and Foulds, 2019). The point being that if we are to use the Horizon Scans as a prompt for policymaker reflections on their research funding decisions, then perhaps we should shine the light on parts of SSH that have previously remained in the shadow of these much more mainstream ideas of what SSH is meant to be and offer.

2.5. Implications and lessons for Energy-SHIFTS Horizon Scanning

We now conclude section 2 with some brief further reflections on the process of doing Horizon Scanning. Firstly, Horizon Scanners agree that the method is constantly evolving, and that there is no single, universally accepted 'best practice'. Indeed, the European Commission guidance on Horizon Scanning recommends that analysts "*just do it!*" (Cuhls et al., 2015, p.6) – learning as they go. Invariably, even the same team of Scanners may find the method evolving based on learning and the varying needs of different Horizon Scans. In fact, John Carney cautions Scanners against methodological over-confidence:

> "*there is no magic (or agreed) recipe for how to do Horizon Scanning but watch out for thinking that the way that you do it is the best and only way*"
> (Carney, 2018, unpaginated)

It is in this vein that we note a common reflexive thread throughout this report: we recognise that, as with all other collaborative and deliberative processes, the outcomes (i.e. the Horizon Scans) are shaped by the individual participants, their relationships, and the means of group facilitation shaping these. Similarly, it is vital that we be reflexive and pro-actively consider how the selection of Horizon Scan participants (i.e. our WG members) shapes the Horizon Scans themselves – after all, it is inevitable that the participants' expertise will "*bias*" the prioritisation of topics and research questions, it is just a matter of how much and to what degree it is accounted for (c.f. Sutherland et al., 2019, p.13).

In setting out our proposed methods in this report, we respond to calls to present methodologies as explicitly and as transparently as possible (Kark et al., 2016). We argue that methodological clarity is not commonplace across Horizon Scanning to date. This may be simply due to the fact that the journals Horizon Scans are being published in have short word counts for Methodology sections, but, regardless, we are keen to transparently present our methodological rationales and assumptions, as an early accompaniment to the final Horizon Scans that will be submitted next year to the EC.

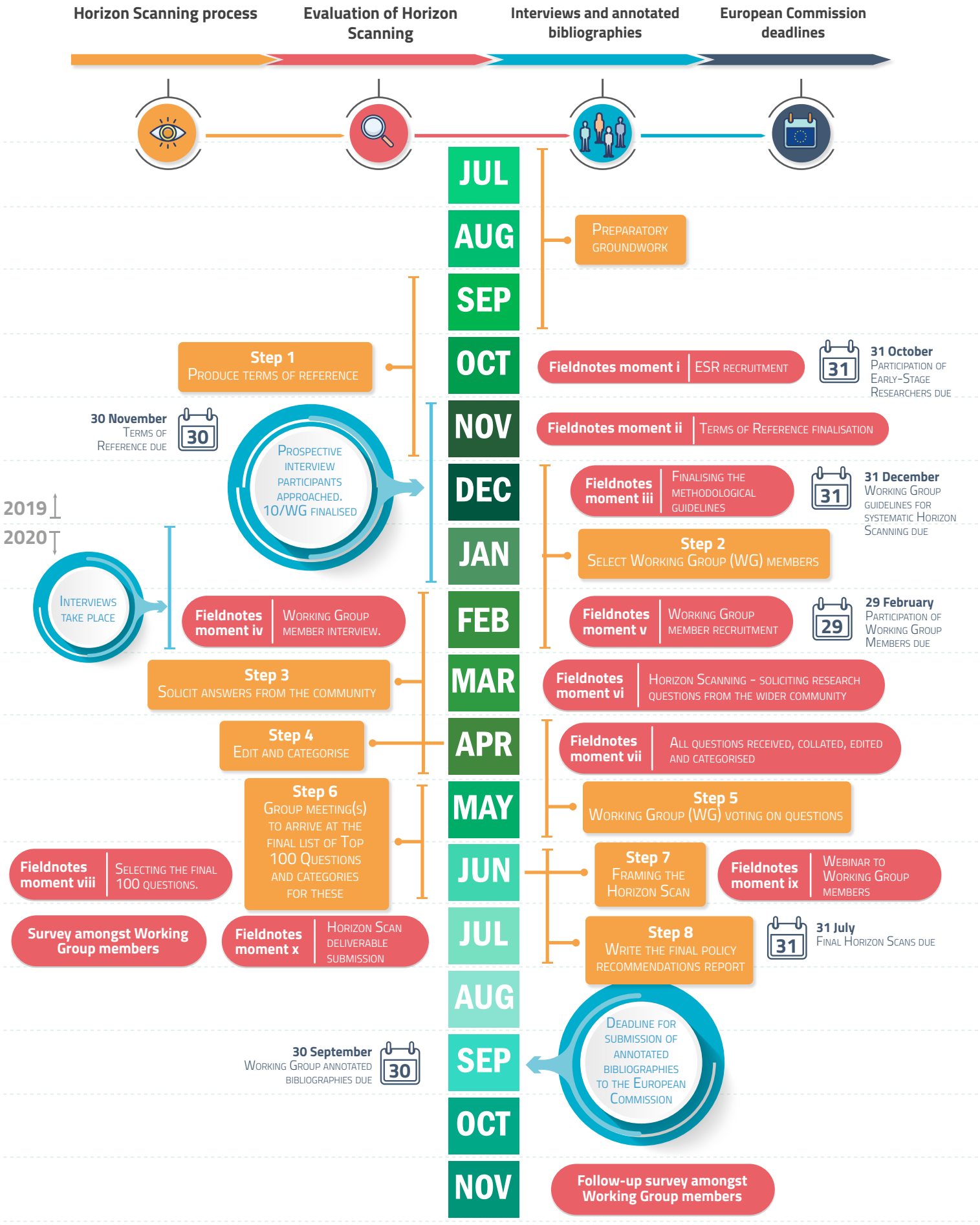
3. Energy-SHIFTS Horizon Scanning method and procedures

Our overall aim is to produce four lists of priority energy-SSH research questions, focussed on each WG topic, which constitute key future priorities for research funding. We will draw on the Delphi method developed and used to identify key research questions within the (multidisciplinary) Environmental Sciences, most prominently by the ecologist Bill Sutherland (Sutherland et al., 2011). We argue that it has considerable potential and applicability for identifying EU energy-SSH research funding priorities.

This section 3 details in-depth the exact approach taken in delivering the Horizon Scan outputs, i.e. the research questions recommendations for the EC. We begin by presenting the provisional timeline in graphical form (Figure 1, section 3.1.) and the roles and responsibilities of those involved in co-ordinating the Horizon Scanning, i.e. the 'Steering Committees' (section 3.2.). The bulk of section 3 is then dedicated to detailing our eight Horizon Scanning steps.

3.1. Provisional timeline

Figure 1: Timeline of Horizon Scanning and associated activities.



3.2. Who does what in the Horizon Scanning?

To lead and monitor the process of each WG's Horizon Scanning, it is crucial to discern roles and responsibilities. The WG's activities will be organised and led by a Steering Committee, consisting of the following roles (see Table 1 for a breakdown of names):

- *Chair*: the Chair is the final person responsible for delivering the Horizon Scan.
- *Co-chair*: the Co-chair, together with the Chair, is responsible for delivering the Horizon Scan.
- *Critical Policy Friend*: the Critical Policy Friends strategically link the work of the individual WGs to ongoing policy debates, developments and events. A key role for them is to help ensure that the WGs ongoing discussions are not stuck inside a research vacuum, and thus that policy contexts are appreciated and actively reflected on along the way. They will also reflect themselves on the value (or not) of specific energy-SSH research debates, in the context of normative energy policy progression.
- *Early-Stage Researchers* (ESRs): the ESRs support the work of the Chair and Co-chair, for instance by identifying potential WG members, and reflecting on the process through keeping fieldnotes. The extent to which the ESRs are involved is to be agreed with the Chair and Co-chair of each WG.

Each individual WG Steering Committee will manage the organisation of roles and responsibilities within their own Steering Committee, and as such, the exact roles and responsibilities will change from WG to WG. Important issues that Steering Committees are advised to discuss include the balance of work between the different roles (e.g. in conducting interviews and assessing responses). Should any problems arise, then the Steering Committee can escalate the matter to the Work Package lead for the Energy-SHIFTS WGs (Chris Foulds, ARU).

Table 1: Plan for who will be in each of the Working Group Steering Committees (n=19).

Working Group (WG)	Names (institutions) of those in the Steering Committees			
	Chair	*Co-chair*	*ESR(s)*	*Critical Policy Friend*
WG1 – Renewables	Derk Loorbach (DRIFT)	Aleksandra Wagner (JU)	Robert Wade (Queen's University Belfast) Olga Coretcaia (Utrecht University)	Ronan Palmer (E3G)
WG2 – Smart Consumption	Rosie Robison (ARU)	Tomas Moe Skjølsvold (NTNU)	Emily Judson (University of Exeter) Viera Pechancova (Tomas Bata University)	Johanna Lehne (E3G)
WG3 – Energy Efficiency	Chris Foulds (ARU)	Thomas Berker (NTNU)	Efthymia Nakopoulou (National and Kapodistrian University of Athens)	Quentin Genard (E3G)
WG4 – Transport and Mobility	Marianne Ryghaug (NTNU)	Timo von Wirth (DRIFT)	Emilia Smeds (University College London) Aline Scherer (Fraunhofer Institute for Systems and Innovation Research)	Quentin Genard (E3G)

3.3. Horizon Scanning step-by-step approach

The purpose of this section is to move through each of the eight steps one-by-one to discuss in detail our objectives, expectations and practicalities associated with our approach – with context additionally provided by the preparatory groundwork that was done beforehand.

3.3.1. *Preparatory groundwork*

The steps that we go onto describe and explain (sub-sections 3.3.2. to 3.3.9.) have been arrived at through an iterative process of consultation across the project consortium, some of which we detail briefly in this sub-section 3.3.1.

A loose, suggested overview of the Horizon Scanning process was first prepared by the project's Horizon Scanning Methods lead (Zareen Pervez Bharucha, ARU). This overview drew much inspiration from previous Horizon Scanning exercises by Pretty et al. (2010) and annual exercises by Sutherland et al. (see 2019), with light adaptations in line with our goals of mapping divergence (including e.g. the spread of perspectives and approaches) across different epistemic communities within each WG topic area. It was vital that methodological tweaks were made to ensure that consensus was not unreflexively sought, considering the contrasting ontologies and problem definitions in play. Thus, for example, key adaptations were made to the survey, including: a question about the respondents' 'home' discipline; as well as the instruction to provide a short rationale for each research question proposed, with references included wherever appropriate. This suggested overview was produced early and acted as the foundations for anchoring much of our subsequent planning discussions.

These preparations also included a final decision being made on the issue of languages. Specifically, we agreed that our Horizon Scanning will be conducted in English, given the dominance of English as a key common language for scholarly dialogue across the EU and given that English is the most widely used second-language in the EU. It is anticipated that WG members will be conversant in English, but that WG Chairs and Co-chairs will still need to remain mindful of potential variations in language competence across the question sorting, voting and deliberation stages of the exercise. As such, we have included notes on mitigating for language-related difficulties in the following sub-sections.

Furthermore, the suggested overview and its related discussions were concretely built upon through a session at the consortium meeting in Brussels (September 2019) that used a provisional Horizon Scanning survey template as a prompt to discuss the contents, framing, phrasing, etc. of the specific survey design. All participants annotated the working version of survey with critiques and suggested changes, as well as engaged in a round of deliberations on the whole Horizon Scanning process.

All these inputs from the wider consortium shaped the final provisional form of the Horizon Scanning survey, in addition to our overall thinking about the process. Specific inputs that we took into account included the following recommendations:

1. Clearer position on how to treat 'sub-questions', if e.g. survey respondents proposed a question with many parts or composed of a group of related questions. We have provided instructions to WG Chairs and Co-chairs that their editorial overview of questions may involve splitting entries with sub-questions, using their discretion.
2. Greater clarity on the overall aim of the project – creating better links between (i) research and (ii) policy, specifically Horizon Europe planning. This led to us to including a brief 'rationale' section for survey respondents in the final survey text.
3. Provide a rough word limit for the rationale accompanying each question was a suggestion taken on board in the survey text.
4. Specify what 'good' questions are, both for the benefit of the Chairs and Co-chairs, as well as Horizon Scanning survey respondents too.

The final survey text, as well as the step-by-step process for the whole Horizon Scanning, were subsequently discussed in a series of meetings between the co-authors of this guidelines report over October and November 2019. These discussions were instrumental in shaping the contents of the following sub-sections.

3.3.2. *Step 1 – Produce Terms of Reference*

[September – November 2019]

Each Steering Committee started by producing a Terms of Reference (ToR) document, for which ARU provided a template for consistency purposes. These ToRs set out the tasks, roles, and thematic boundaries for the individual WGs. The aim of each ToR was to

provide a tangible starting point for each WG's forthcoming Horizon Scanning activities, which could e.g. be distributed to prospective WG members when appropriate. The ToRs in many ways were the precursor for this guidelines report that builds upon the foundations laid in the ToRs regarding purposes, objectives, and likely timelines.

The four topics of the WGs – Renewables; Smart Consumption; Energy Efficiency; and Transport and Mobility – were also described and committed to. These four topics are in line with the EU's Energy Union priorities, which in turn shape the SET-Plan's action areas that Energy-SHIFTS is aiming to influence (European Commission, 2015). This decision was made strategically, as by directly linking the Horizon Scans to the SET-Plan priorities, the results can more easily feed into Horizon Europe.

One key issue that the Steering Committees were mindful in cautiously navigating was not to 'close down' the Horizon Scanning's directions of travel. Indeed, whilst preliminary descriptions of the four WG topic areas were included in the ToRs from a broad SSH perspective, there was a collective agreement not to be overly prescriptive on how SSH expertise will engage with the SET-Plan-led topics areas (Royston and Foulds, 2019). It is ultimately the role of the WG members to shape the Horizon Scans' outcomes and hence it would be foolhardy of us (inadvertently) to constrain proceedings from the very outset of the process.

To read the individual WG ToRs, please refer: to Loorbach et al. (2019) for Renewables; Robison et al. (2019) for Smart Consumption; Foulds et al. (2019) for Energy Efficiency; and Ryghaug et al. (2019) for Transport and Mobility.

3.3.3. *Step 2 – Select Working Group (WG) members*

[December – February 2020]

We acknowledge that certain perspectives will be locked-in through the selection of WG members. We thus, herein, explicitly state our expectations for how the Steering Committees will select their members.

We aim to confirm 30 energy-SSH researchers as WG members for each WG by the end of February. There is a minimum participation rate of 25 persons per WG for each final Horizon Scan, and thus this target of 30 accounts for possible drop-outs during the Horizon Scanning. A set of selection criteria has been formulated to ensure a consistent approach to WG member invitations and associated progress reporting (Table 2).

Table 2: Selection criteria and associated Key Performance Indicators for use in shortlisting and inviting prospective Working Group members.

Selection criteria	Key Performance Indicators (KPI)[2]
Researcher identity. It is not a requirement that prospective members must be based in a university. Instead, all members must self-identify as a researcher, regardless of whether they are in e.g. academia, industry, NGOs/charities, or policy. As has been noted by de Geus and Wittmayer (2019, p.18): *"If we want a research agenda with relevant outcomes for policy and practice, the agenda cannot be formulated by academic researchers alone."*	All (100%) self-identify as a researcher.
Eligible for EU Framework Programme funding, ensuring that those providing recommendations for the future of energy-SSH in Horizon Europe are part of the very community that would be delivering it. Eligibility includes e.g. being based in a country that either is an EU member state or is a Horizon 2020 'Associated Country'[3].	All (100%) based in organisations/ countries eligible for Horizon 2020 funding.
Relevance of research interests, ensuring that the full breadth of the WG topic's preliminary description (in the ToR) is not ignored.	All (100%) have relevant SSH research interests.
Balance of genders, taking into account non-binary gender associations as well as the EC's guidance on gender sampling targets (European Commission DG RTD and Helsinki Group on Gender in Research and Innovation, 2018).	Minimum of 12 (40%) female or non-binary gender participants.

2 Numbers based on expectation of 30 Working Group members successfully recruited.
3 As per the current version of the EC's Horizon 2020 grant manual: https://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cpart/h2020-hi-list-ac_en.pdf

Selection criteria	Key Performance Indicators (KPI)[2]
Balance of regional representation, covering Northern, Southern, Eastern and Western regions of Europe[4]. Country location to be based on the organisation's location that the member works for, not on e.g. an individual's nationality. For members from non-European countries (e.g. Turkey, Cyprus), sensible judgement should be applied regarding their compass point attribution.	Target of 7-8 (25%) from each of Northern, Southern, Eastern and Western Europe. Minimum of 6 (20%) per region.
Range of countries, ensuring that geographical balance is also achieved through country heterogeneity, so that the balance of regions cannot be attained through only involving researchers from the same select few countries.	Target of 18 (60%) from different countries. Minimum requirement of 12 (40%).
Diversity of Social Sciences and Humanities (SSH) disciplines, including, but not limited to[5]: Business; Communication Studies; Development; Economics; Education; Environmental Social Science; Gender; History; Human Geography; Law; Philosophy; Planning; Politics; Psychology; Science and Technology Studies; Social Anthropology; Social Policy; Sociology; and Theology. Disciplines are to be self-assigned/-identified by the participants. Every member must be assigned to at least one SSH discipline; multiple disciplines can be assigned to one member.	Minimum of 10 SSH different disciplines over whole of WG.
Experience of Science, Technology, Engineering and Mathematics (STEM) disciplines. Whilst the Horizon Scanning is intended to solely represent the views of energy-SSH researchers, rather than e.g. of all energy research communities, we do see the value of including SSH researchers who have cross-disciplinary experience of working beyond SSH.	Minimum of 3 (10%) SSH researchers who previously trained in STEM.
Representation of 'field leaders', who are those with have proven track records within their research communities (e.g. journal editors, authored seminal publications, research group directors). Their focus tends to be on theoretical expertise, rather than through practical application.	Minimum of 8 (27%) field leaders.
Representation of 'frontrunners', who are those pushing at the fringes of conventional academic boundaries by e.g. crossing conceptual boundaries, dealing with explorative research agendas, engaging with practical questions and practical applications of SSH, etc. Their ideal type may be, for example, an action researcher whose work closely relates to policy development. Further, they may be open-minded, entrepreneurial, interdisciplinary, able to cross boundaries between science and practice, and have significant empirical expertise.	Minimum of 8 (27%) frontrunners.

These WG members will be the core analytical 'force' behind the Horizon Scanning and, as such, will each be listed as a co-author on the final Horizon Scan and any associated publications. They will agree to participate across all phases of the Horizon Scanning, and, whilst we recognise that some participants may be forced to drop out due to unforeseeable circumstances, we do ask that invitees think carefully about the engagement involved. Indeed, members will also be asked to involve other colleagues from their wider research community in their network; this wider network will be referred to as the wider 'field' or 'community' (see next sub-section). Ultimately, individuals who can input into all stages of the exercise are most useful (Sutherland et al., 2011).

4 As per the UN's Geographic Regions classifications for Europe's regions: https://unstats.un.org/unsd/methodology/m49/

5 The SSH disciplines listed here are taken from SHAPE ENERGY's energy-SSH researcher database (SHAPE ENERGY, 2020). We acknowledge that other disciplinary categorisations of SSH exist (e.g. European Commission, 2019b), and we have opted for SHAPE ENERGY as it is relatively streamlined, which is important given that SSH cannot never be perfectly broken down and, as such, we will not be overly focusing on disciplinary battle lines. Instead, disciplines will be used as indications of contrasting perspectives, points of departure, ontologies, problem definitions, etc., and thus Working Group members will have the freedom to self-assign themselves to whatever disciplinary category that they feel most comfortable with.

3.3.4. *Step 3 – Solicit answers from the community*

[February – April 2020]

Once constituted, each WG will begin to solicit a wide range of candidate research questions from their wider networks of scholars and practitioners. This will mainly be done via a short online survey (Appendix 1) that each WG member will complete themselves and also send out to their wider networks, with a short introductory email (using the suggested template; Appendix 2). Whilst the survey text in Appendix 1 is, at this stage, provisional, it is important to reiterate that it is not a template – once finalised, the survey must be reproduced exactly as is for consistency purposes.

Beyond such a survey, previous Horizon Scanning exercises have also allowed for the collection of candidate questions opportunistically and through relatively informal means, such as conversations during meetings and conferences or by publicising the call for questions through social media (Pretty et al., 2010). We will avoid this, in order to streamline the capture and storage of candidate questions in a central, electronic database. WG members are, nevertheless, welcome to spread word of the survey to key networks and at key events. However, in order to avoid duplication and cross-posting, it may be most efficient for the WG Chair and Co-chair to manage an agreed-upon list of key events and networks to target during the time the survey is open, rather than individual WG members spreading the word at different meetings.

Our aim is to get a broad and comprehensive list of candidate research questions for each WG. Note that we are not seeking input on (relatively broad) knowledge gaps or needs, but rather, on (relatively specific) answerable research questions that are amenable to concrete projects or programmes. In defining what constitutes a good 'research question', we will adhere to the following principles (adapted from Sutherland et al., 2011; Pretty et al., 2010):

1. questions should be phrased to avoid simple 'yes' or 'no' answers, unless they are interrogating a precise statement. Ideally, they will be phrased in a 'why, where, when, how or what' format, while recognising that not all energy-SSH perspectives may necessarily be amenable to such a phrasing.
2. questions should fall within the remit of SSH disciplines, and represent key future priorities for scholarship and research funding.
3. questions should be capable of being answered by a research team through a realistic research design, with a tractable[6] spatial and temporal scope.
4. impact- and intervention-related questions need to have a subject, an intervention, and a likely outcome that could be evaluated either qualitatively or quantitatively.
5. questions should address a substantial gap[7] in knowledge (i.e. a well-established knowledge base should not already exist).
6. questions relevant to our target policy audience (e.g. useful for drafting Horizon Europe work programme texts).

In order to better account for key disciplinary differences between the Natural Sciences and SSH, we made minor modifications to the list of criteria as presented by Sutherland et al. (2001) and Pretty et al. (2010). Specifically, we removed a criterion for questions being amenable to 'factual' answers that are not dependent on value judgements, in order to account for SSH approaches that may involve – and may actually fundamentally embrace – varying amounts of subjectivity. Indeed, this is an implicit part of the process that we are undertaking: through reflexivity, we will demonstrate to EC policymakers how the provision of evidence/recommendations (e.g. through Horizon Scanning) is bound up in subjectivities (c.f. Guba and Lincoln, 1994). Thus, conflicts and divergence (rather than neat consensus) is inevitable and that is fine – much can still be learned for the good of policymaking (Hulme, 2009). We also removed a criterion alluding to the questions having to be amenable to being answered through testable hypotheses, given differences in research design within SSH disciplines, which are often much less reliant on positivist-leaning ontologies and epistemologies. Finally, in order to ensure a focus on the core aims of the scanning exercises, we added specific reference within the criteria to the need for questions falling within SSH disciplines, and those

6 The issue of tractability will likely involve some discussion within WGs. Previous exercises have asked respondents to consider specific temporal and funding limits (e.g. Boxall et al., 2012). We will probably not be quite so specific, but do agree that it may be useful for WG facilitators to challenge participants to think about what sort of size/scope of project implied by the proposed questions.

7 Using the terms put forward by Sandberg and Alvesson (2011), we acknowledge that these 'substantial gaps' can be spotted in relation to: "*confusion spotting*" (p.29), where there may be competing definitions; "*neglect spotting*" (p.30), where there may be overlooked areas, under-researched areas, or areas lacking empirical support; "*application spotting*" (p.30), where there is a possibility of extending/complementing literature; and "*problemisation*" (p.32), where the fundamental conceptualisation of the problem at hand could be overturned.

relevant to target policy audiences, namely with regard to Horizon Europe.

It is anticipated that WG members will send emails to up to 20-25 colleagues[8], inviting those colleagues to then each provide 2-5 questions themselves. Each email will also invite those e.g. 20-25 colleagues (per WG member) to send recommendations for further candidates whose views could be solicited. This is to minimise cross-posting and multiple emails being received by subject experts. We have also ensured that individuals can only respond to our survey (and thus contribute questions) *once*. This will be ensured through a 'screening filter' in the online survey; individuals will be asked if they have already provided answers to that particular WG and if so, they will be barred from proceeding with the survey. We note that some individuals could respond to multiple WG exercises, if they e.g. have expertise in more than one WG topic; this is considered acceptable and we will not take any measures to prevent engagement across multiple WGs, as long as responses are only provided once per individual to each WG.

Any question selection exercise necessarily relies on the composition of WGs and the size/reach of its members' networks. Members of multidisciplinary groups composed of scholars with varying levels of experience and seniority will necessarily have different personal networks of different sizes, reach and responsiveness. This raises the potential for skews in the responses received, towards certain disciplinary, epistemological, and/or ontological leanings in the sets of questions received. We have sought to mitigate the potential for this through the following measures:

- *WG member selection* – WG members will have a particular standing in networks. They will be given clear instructions on how to engage with their experts, including a rough target for the number of solicitations to send out to the community (up to 20-25 per WG member) and a collective exercise of identifying key networks and events of *relevance to the entire topic* that the WG should target.
- *Deliberation* (amongst organisers – those doing the first iteration) – on the spread of categories and the constituent questions, including reflections on the reasons why certain questions have been discarded.
- *Flexibility* – throughout the process, with WG members free to propose new questions.
- *Reflexivity* – Chair and Co-chair to reflexively challenge one another and have frank conversations about how their own positionality and the WG's own contexts are shaping the categorisation (during analysis stage). Reflexivity will also be essential for the recommendations that each WG produces.

3.3.5. *Step 4 – Edit and categorise*

[April 2020]

Once the survey closes, a full list of all the questions received will be compiled. The total number of submissions received (N) should be recorded. This 'raw data' is then prepared for further analysis in the following steps.

The Chair and Co-chair should go through the list of all questions received, and:

- *remove* all identifying data such as names and affiliations, arriving at a list of research questions only.
- *filter out* questions that are irrelevant, e.g. those that have nothing to do with energy, SSH, and/or the WG topic.
- *delete* questions that do not qualify according to the criteria for good research questions (sub-section 3.3.4.). In addition, some submissions may appear to be statements, rather than questions, and these can be deleted unless there is a straightforward way of converting the statement into a question.
- *split* multi-part questions into two, if appropriate. It is up to the discretion of WG Chairs and Co-chairs to determine if entries with sub-questions should be split or if they are more reasonably presented as one entry.
- *collate and merge* substantially similar questions into one, if appropriate.
- *sense-check* the final list to make sure that questions are worded clearly, and check for any issues with language, grammar and formatting.

It is up to the WG Chair and Co-chair if they would prefer to do this initial cleaning task sequentially or in parallel. We have not suggested one approach over the other, as in part, this may depend on the number of questions received and practicalities (e.g. time available to the Chair and Co-chair, possibilities for joint working). The number of questions in this 'cleaned' list (n) should be recorded. This is the number that is then

8 As a minimum, the WG members must respond to the Horizon Scanning survey as an individual. This further action of disseminating the survey to colleagues is not mandatory for their participation in the WG, but is certainly encouraged. The selection of these additional colleagues is not subject to rigid selection criteria, e.g. as per Table 2.

analysed by the WG to achieve the final list of Top 100 questions.

At this stage in Step 4, the WG Chair and Co-chair may also wish to come up with a draft list of categories into which the final list of questions could be split. These categories mainly serve the purpose of organising the final list of questions into a clearly justifiable order, and representing – to the final reader – the spread of topics, themes and issues covered by the questions. Different groups may choose to categorise the questions differently (e.g. following either an inductive or a deductive process), and categorising questions based on topics, disciplinary orientations, or some other theme that is considered relevant. The choice of how to categorise should rest with the Steering Committee, but should be: agreed by all Working Group members; clearly justified in the final Horizon Scan report; and useful as an aid to presentation and narrative in the final report.

3.3.6. *Step 5 – Working Group (WG) voting on questions*

[April – May 2020]

This Step involves WG members examining the cleaned list of questions individually (i.e. there are no collective deliberations), over a period of around a week. Whilst different software options are currently being considered, it is likely that simple MS Word or Excel documents will be used during this Step. The tasks for WG members at this stage is to:

- familiarise themselves with the full dataset.
- raise questions to the WG Chair and Co-chair on the wording of questions that are unclear.
- suggest new questions to 'fill in gaps' (along with supporting rationale) or propose merging between two questions (these will be recorded as a qualitative list; WG members will not vote on new questions they have themselves proposed at this stage).
- express their first, strong preferences by assigning a vote to each question on a scale of 1 (definitely exclude) to 5 (definitely include).

To facilitate this, questions should be presented as a clear list (e.g. each one should be numbered), with the accompanying rationale placed alongside. Also alongside each question should be a column in which each WG member assigns a vote from 1 to 5 where:

- 1 = Definitely exclude from the list.
- 2 = Somewhat unfavourable for the final list.
- 3 = Unsure or neutral about the question.
- 4 = Somewhat favourable for the final list.
- 5 = Definitely include in the final list.

A scale of 1-5 has been chosen as it allows for a relatively tractable spread compared to an e.g. 1-10 scale, particularly given that WG members may be voting on lists of hundreds of questions long.

Finally, each WG member should have the opportunity to propose that individual questions be reworded for clarity, merged with others, or propose entirely new ones. Space should be provided for this in a second column.

After the voting process is complete, the WG Chair will:

- sum up the votes received for each question, calculating the mean, median and standard deviation for each.
- produce qualitative recommendations for rewording, synthesis and new questions.

The WG Chair and Co-chair will then work together to:

- *retain* questions on which at least one quarter of respondents have given a score of either '4' or '5', indicating that they strongly feel the question is important.
- *remove* the remaining questions to a separate list for later viewing by the WG.
- *collate* a list of suggestions made for question rewording, synthesis, and new questions.

The list of questions retained, along with their (1) ratio of respondents who have given a score of either '4' or '5', (2) mean votes, (3) median votes, and (4) standard deviation, should then be sent to the WG members, to familiarise themselves with 'what remains' prior to discussion. The WG Chair may also wish to send WG members 'draft thoughts' on the categories they propose to divide the questions into and a brief justification.

3.3.7. *Step 6 – Group meeting(s) to arrive at the final list of Top 100 Questions and categories for these*

[May 2020]

WG members then need to convene (most likely virtually) and have two separate conversations, focusing on: (1) Agreement on the categories used to divide up the questions and the rationale for the same; and (2) Agreement on the final list of Top 100 Questions by deliberating on the list of questions that remain after the automatic deletion process undertaken above.

This Step represents the core 'analytical' element of the Horizon Scanning, where WG members collectively use their combined expertise, experience and perspectives to sift through the candidate questions, and use dialogue and deliberation to make reasoned choices about which ones to retain in the final list. The two main outcomes of this Step are:

- *Categories of questions*: Organising the final list into categories is helpful in order to demonstrate a spread of questions across the whole range of topics and perspectives relevant to each WG topic. It is anticipated that the WG Chair and Co-chair will, in their initial editing, identify a possible list of categories for organising the questions. These can either reflect existing themes in the questions submitted, or reflect some general thematic- or issue-based spreads that makes sense for the particular topic.
- *Final list of questions*: The WG considers the list of questions along with the median votes received and the variance in the votes received (standard deviation; a high standard deviation indicating variability in opinions within the group, and thus potentially, the need for greater deliberation) and deliberates to reduce the list down to the top 100 questions.

There are a number of ways in which this deliberation could be done. We anticipate that WGs will differ slightly on the precise steps and methods used, depending on the number of questions they have received, the availability of WG members and preferred mode of contact (e.g. some WGs may not be able to convene a virtual meeting – although this is strongly encouraged). Whatever final mode of deliberation is decided should be clearly recorded and justified, so that it can be presented as part of the methods accompanying all subsequent deliverables and publications.

Whatever the final method used, we suggest that some form of deliberation is used. In other words, while it may be tempting to simply undertake multiple rounds of binary voting (yes / no) until a final list is reached, this method will not yield the best results or be particularly productive for WG members. This is because it will preclude the *joint*, *interdisciplinary* synthesis and dialogue upon which decisions should be made, as well as precluding the chance for people's ideas to develop in dialogue with others, potentially leading to new questions or creative syntheses of existing questions.

Options for a more deliberative method could include, for example:

- Questions that have received the highest number of votes (e.g. the top 50) can be automatically included.
- Questions that have received less than a median of 4 can be automatically discarded, unless any WG members make a very strong case for their retention.
- For the remainder, the group can deliberate on the questions remaining, reflecting particularly on questions that have received the most *variable* votes (calculated using variance, comparing mean with median, or applying a trimmed average) and taking into account the supporting rationale that was submitted by the question's original proposer.
- Deliberations may either involve the entire WG, or at this point (depending on the number of questions) the WG could be split into groups based on the themes / categories for the remaining questions. If sub-groups are formed, a chair should be appointed for each sub-group who will take overall responsibility for the deliberations, facilitate them, and report to the WG Chair with a final list of questions by an agreed date. The WG Chair, in consultation with other members, may then decide to convene a plenary session to do a final round of deliberation and decision making, or simply view the exercise as provisionally concluded (subject to the final presentation of the list of questions in the Step 7).

It should also be acknowledged that the process inevitably involves subjectivity and there can never be a single perfect, 'objective' final list of questions. The outcomes are inherently contingent on the experiences and perspectives of WG members, and also on the quality of facilitation, e.g. the extent to which different members are able to express their opinions and manage disagreement or conflict constructively. The voting and deliberation methods we have suggested are not designed to mask or mitigate this inevitable

subjectivity, only merely to allow WG members to express their views in a fairly tractable manner while working with a large list of questions. Indeed, as has been noted by others (e.g. Sutherland et al., 2011), an effective and inclusive Horizon Scanning process should emphasise transparency, appropriate levels of flexibility, and openness.

We suggest that deliberations on the final set of 100 questions, and decisions about the number and type of categories, be kept separate. In other words, question selection should not depend only on the number of questions already in a particular category, but on the overall merit and relevance of an individual question and its importance to the overall field. Only once the list of 100 questions is finalised and agreed should they be organised within the relevant categories, and a final check made across the WG as to the relevance of the categories and the distribution of the questions across them.

At this final point, the WG Chair will also invite individual WG members to write a short narrative (e.g. two paragraphs) of introduction to each category, which can be used as a prompt for discussion (Step 7) on route to writing the final Horizon Scan for the EC (Step 8).

3.3.8. *Step 7 – Framing the Horizon Scan*

[June 2020]

The aim of Step 7 is to gather feedback on initial plans for framing the final list of questions as part of the final Horizon Scan output, as indeed Sutherland et al. (see 2019) do with their annual Horizon Scans. The discussions with WG members at this stage of the process is not about (re)opening the question selection, voting, categorisation process once again; herein, we only discuss the final output in the context of the outcomes generated thus far.

The core task herein is the running of a webinar for all WG members, within which the WG's Steering Committee will present the final list of questions and their associated thematic categorisations. In presenting these questions, the provisional framing and accompanying narrative of these categories of questions will be detailed and feedback sought. For this to work effectively, we expect the Steering Committee to have developed further any short narratives that may have been developed by WG members or indeed themselves previously (via Step 6). It is important for the Chairs and Co-chairs to take an especially leading role, as opposed to leaving it open and discussing it as a group in the webinar, because they will have the working knowledge of what the EC are expecting.

The format of the webinar is flexible and open to what is deemed appropriate by the Chair and Co-chair nearer the time, as per e.g. the level of interest from WG members, availabilities, etc. However, should there be sufficient interest and availability, then particularly collaborative options could be explored, such as presenting the proposed framings and narratives in a shared Google Document, within which all webinar participants can comment and annotate on pre-drafted text. In this sense, the webinar ceases to be a conventional webinar, in truth, given that it is much more about two-way knowledge exchange, rather than one-way knowledge transfer. Alternatively, a more conventional format is also acceptable, whereby suggestions are presented with Q&A and comments sought as part of a more conventional teleconference structure. Regardless though, it is important that the webinar is recorded and distributed amongst the whole WG for their records and in case some WG members cannot make it.

Ultimately, this Step is an important bridging point between the final questions (Step 6) and the final write-up for the policy audience (Step 8), and hence those with the privileged understanding of energy-SSH in Horizon Europe (i.e. the Chairs and Co-chairs, via ARU if needed) must take on the role of mediator.

3.3.9. *Step 8 – Write the final policy recommendations report*

[June – July 2020]

This final Step involves writing the final recommendations report concerning which energy-SSH questions, we believe, that the EC should seriously consider funding as part of its Horizon Europe programme of investment. The report itself will be publicly available (at www.energy-shifts.eu) and will be written with the European Commission's Directorate-General for Research and Innovation (DG RTD) in mind. Specifically, within DG RTD, the recommendations will be submitted to both the Ecological and Social Transitions (C5) and the Clean Energy Transition (D1) units, as well as discussed in ARU's monthly teleconference calls with DG RTD. We will be producing four separate reports (one per WG), which will be submitted and discussed with the EC altogether. The deadline for submission is 31 July 2020.

A recommendations report will not merely be, for example, the list of the top 100 questions. Indeed, as Cuhls et al. (2015) note, it is vital that information identified through Horizon Scanning is transformed into utilisable knowledge through a broker that is

aware of and is sufficiently able to meet the needs of policymakers.

Bearing all this in mind, we suggest that the following is included in the final recommendations reports, as a minimum:

- One-page Executive Summary.
- Brief overview of the boundaries[9], foci and purpose of the Horizon Scanning activity, e.g. linking back to the foundations of the WGs, as set out in the ToRs.
- Brief background policy context, e.g. how has energy-SSH in that specific WG topic area been funded previously?
- Brief summary of methods used to generate the recommendations, linking back to this guidelines document for further details where appropriate.
- Commentary on the 100 research questions at a theme/category-specific level.
- Brief closing reflections on the questions as one large set, e.g. why are they important as a collective? What do they allow researchers/policymakers to challenge or even maintain? How do these bottom-up Horizon Scans fit with the top-down plans from the EU/EC? etc. Essentially, a small amount of text that moves beyond the theme/category-specific level would help to draw out the implications of the Horizon Scan even further.

We expect the Critical Policy Friend's advice and reviews to be especially helpful at this stage, given their expertise in writing for policy audiences. In particular, we note that the provision of 100 priority research questions (400 in total across our energy-SSH topic areas) will represent a significant amount of information that runs the risk of being ignored. We expect to leverage the categories that cluster these questions together (within each WG topic area) as part of initiating conversations and writing possible briefs for policymakers, and thus the Critical Policy Friends will be useful in making such judgements – especially in light of understanding the policy/political landscape at that time.

We anticipate that all four WG Horizon Scans will be developed into journal articles, for those who are interested in the processes and the underlying evidence of the Horizon Scan(ning). We strongly recommend that text for the recommendation reports not be written with the ambition of evolving that text into said journal articles; these two publications have very different purposes and thus there should be a distinct boundary between their writing efforts. Indeed, such is the opportunity for more expansive discussion in the journal article, that we suggest Chairs and Co-chairs seriously consider drawing upon the complementary interview data (see sub-section 4.1.1.) for contextualising the novelty of the Scan's contents in terms of how it relates to past research directions. This is something that there would never be space for in the more targeted, focussed EC report.

9 On the issue of boundaries, de Geus and Wittmayer (2019) reiterated the importance of considering how the dynamic work of each WG may have moved beyond – or at least been pushing at the boundaries of – its stated topic area, and thus we encourage Chairs and Co-chairs to reflect on this as part of presenting the final Horizon Scan product.

4. Producing companion resources and insights

Section 4 now moves away from the Horizon Scanning steps and final Horizon Scan output, which were looking at the future development of energy-SSH EU funded research. Specifically, in section 4.1., we discuss ways in which we will contextualise our Horizon Scans by considering and showcasing how those same energy-SSH fields have evolved in the past. Indeed, the importance of 'looking back' (as well as 'forward') has been reiterated by part of the Energy-SHIFTS scoping work that noted the role of e.g. existing literature on past/ongoing transitions (Amon and Wagner, 2019). We also discuss our plans for evaluation, both in terms of our own internal project experiences of coordinating the Horizon Scanning (via fieldnotes), as well as the experiences of the WG members (via surveys) (section 4.2.). Taken altogether, we call these our 'companion resources and insights' as they exist only to complement and accompany each WG's core output: the Horizon Scan.

4.1. Situating the Horizon Scans in past and ongoing research debates

This section is split into two sub-sections. The first (4.1.1.) details the planned interviews with 10 members from each WG, and the second (4.1.2.) details the planned annotated bibliography publications that will draw on these interview data.

4.1.1. *Interviews with 10 selected Working Group (WG) members*

The purpose of conducting 10 interviews with a selection of the WG members is to collect data on how the respective energy-SSH fields have evolved in recent decades and what 'state-of-the-art' currently means. This is an important companion task to the Horizon Scanning, as it will ensure that past and current trajectories are not overlooked. These interview data will not be fed into the Horizon Scan itself. Instead, the interview data will primarily feed into the annotated bibliographies (sub-section 4.1.2.), as well as provide a secondary source of contextual data for the data analysis of Horizon Scanning fieldnotes (sub-section 4.2.2.) in the context of conflicts and divergence within/across research communities.

The Chair and Co-chair of each WG are responsible for conducting the 10 qualitative interviews. The division of labour is for them to decide amongst themselves, although a suggested division is 6-7 interviews by the Chair and 3-4 interviews by the Co-chair. We anticipate the interviews will be on average 45 minutes in duration and that all interviews will be done in English. They will most likely be done remotely, being audio recorded and then with verbatim transcription following.

In selecting the 10 WG members, we encourage Chairs and Co-chairs to adopt a deviant sampling approach, whereby difference and range are explicitly prioritised and sought. It is important that each interview participant is able to offer a relatively distinct viewpoint on the field, in the context of their research experience and disciplinary stance for instance. We also ask that the WG member selection criteria (sub-section 3.3.3., in particular Table 2) are considered. Indeed, whilst we do not expect the same selection targets to be followed in earnest – not least because the interviews also represent an opportunity to do snowball sampling with established gatekeepers, as part of 'plugging gaps' in the WG membership – we do nevertheless expect that a cross-section of all the criteria is adhered to. For example, it is important that not all of the interviews come from one region of Europe, from a small set of (similarly thinking) disciplines, are all male field leaders, etc. A cross-section of sampling priorities needs to be evidenced.

We will also be inviting each WG's Critical Policy Friends to sit in on 2-3 interviews per WG. This is to expose those Friends to (likely new) research-specific

debates that may not have made their way into policy circles yet, potentially because of the disconnect that exists between policy audiences and non-mainstream SSH perspectives. These interview experiences will be a particular point of reflection, as decisions are made regarding how best the Critical Policy Friends can advise the Steering Committee throughout the Horizon Scanning exercises.

4.1.2. *Annotated Bibliographies*

The aim of the Annotated Bibliographies is to showcase the breadth of SSH insights on offer to policymakers, as part of concretely signposting to existing knowledges and approaches that are already available to learn from. These four publications (one per WG) will capture some of the main SSH debates, milestones, and advances in the field in question through a summary of key scholarly contributions. They will be submitted to the EC DG RTD as companion resources to the Horizon Scans, by 30 September 2020 at the latest.

Each WG will publish one bibliography, within which approximately 25 key pieces of literature will be accessibly summarised in relation to the given WG topic area. Our logic for limiting each bibliography to around only 25 publications is that, primarily, it is intended to be a resource that policymakers can draw upon, and thus it needs to be focussed for it to be accessible and ultimately read. We also recognise that these bibliographies are not intended to be comprehensive by any means, and instead will offer a flavour of what policy-relevant literature already exists – we believe that ~25 publications is sufficient to achieve this objective, even with the ambition to demonstrate range and difference.

The publications will be primarily selected based on the suggestions provided by the energy-SSH frontrunners and field leaders (see Table 2 for definitions, sub-section 3.3.3.), as part of our WG member interviews (sub-section 4.1.1.). Consequently, as a first step in the assembly of a bibliography, interview participants will be asked to suggest a minimum of five peer-reviewed research publications prior to the interview, to be sent via email (see Appendix 3 for interview protocol). These publications can be original academic articles, review articles, monographies, or anthologies, and there are no time constraints in terms of when it needed to have been published by.

We also note that, depending on scheduling and the insights attained from the interview data, we may also utilise the Horizon Scanning survey responses in the selection of the bibliographies' publications. Specifically, the survey states that evidence and rationale (ideally in the context of the literature) must be given to justify the research question(s) they are proposing.

Full editorial guidelines for the bibliographies are in Appendix 6, including advice on how to select the ~25 publications for inclusion.

Additional inspiration can also be sought through, for example, reviewing the wide range of annotated bibliographies available and indeed the Guide for Authors published by Oxford Bibliographies[10].

4.2. Evaluation of Horizon Scanning

One of the objectives of conducting Horizon Scanning in Energy-SHIFTS is to demonstrate the usefulness and applicability of the approach to help research inform policy. In order to do this, it is right that we evaluate the inherent (experiential) worth of our Horizon Scanning approach. Moreover, evaluation is needed to gather ideas about possible adjustments of the approach for future implementation.

Evaluations of whether Horizon Scans have met their stated objectives have rarely been undertaken (Sutherland et al., 2019). Even if conducted, because of its technological context, they have often focussed on the issue of 'accuracy' of forecasts (see references in Doos et al., 2016). Because of our different focus, our evaluation of the Energy-SHIFTS Horizon Scanning exercises takes a different approach. It is:

- *Formative* – aimed at securing the success of the project.
- *Summative* – aimed at verifying its actual effects.
- *Reflexive* (van Mierlo et al., 2010) – reflections of project participants (as expressed in fieldnotes and during consortium meetings) will be one of the most important data sources.
- *Theory-based* (Weiss, 1997) – before evaluation, the assumed causal chain of activities and effects was articulated; the goal of summative evaluation will be to verify the most important causal links with the use of both qualitative (fieldnotes) and quantitative (surveys) data.

Building on these principles, the following sub-sections detail in-depth three aspects of evaluation activities. First, the core evaluation questions that guide all our evaluation work are presented (4.2.1.). Second,

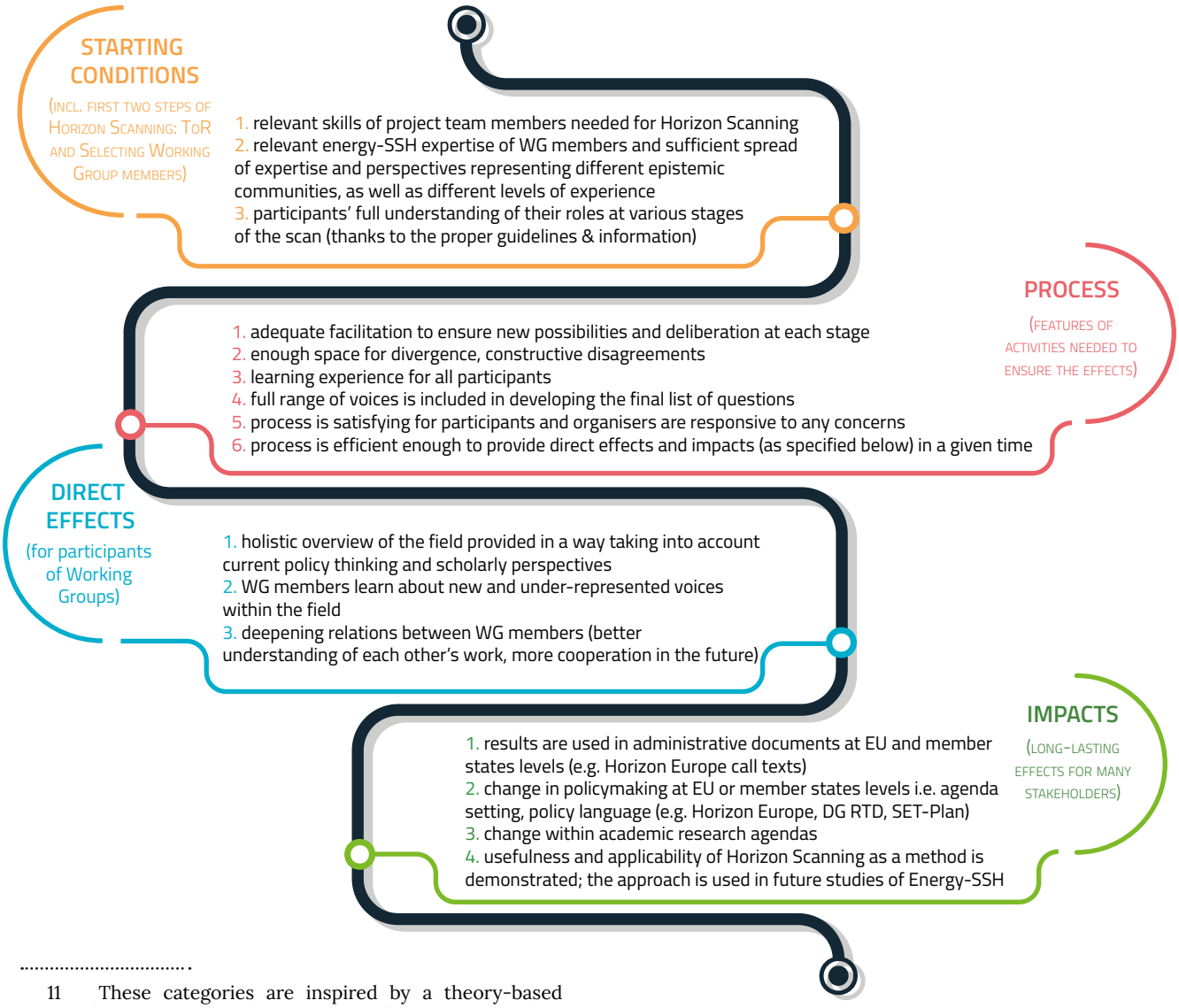
10 https://www.oxfordbibliographies.com/fileasset/Oxford%20Bibliographies%20Contributor%20Guidelines.pdf

we discuss our plan for collecting and analysing field-notes from the WG Steering Committees (4.2.2.). Third, we present our plans for surveying WG members on their experiences of participation (4.2.3.).

4.2.1. *Guiding evaluation questions*

This sub-section describes the Horizon Scanning as a causal chain leading from starting conditions, through process, to direct effects and also impacts[11]. Subsequently, it discusses the evaluation questions and how they will be answered. This imagined causal chain of Horizon Scanning is presented in Figure 2; it presents the assumed key elements for the success of the exercise.

Figure 2: The key elements of success in the imagined causal chain of Horizon Scanning



11 These categories are inspired by a theory-based approach (e.g. Funnell and Rogers, 2011), but were tailored to the Horizon Scanning.

There are three general questions related to formative and summative functions of evaluation:

1. What else can we do to make the success of the Horizon Scanning even more likely?
2. What effects of the core activities were achieved and how?
   a. Were the starting conditions ensured?
   b. Was the process conducted according to the expectations?
   c. Were the direct effects achieved?
   d. What unexpected effects were caused by the activities?
   e. What other (than included in theory) factors influenced the success of the activities?
   f. How likely it is to attain planned impacts?
3. What can we done in a future applications of the tool to make it even more successful at selecting priority research questions?

We will answer the first question (1) on a continuous basis, with adequate improvements applied as soon as possible. Moreover, there should be time dedicated to the subject during Steering Committee calls, as well as with the wider Energy-SHIFTS consortium. We will answer the next two questions – (2) and (3) – with the use of fieldnotes (as presented in sub-section 4.2.2.), survey and monitoring data. Table 3 presents provisional plans for sourcing data for these second and third evaluation questions, and relates them to the elements of success that are imagined as part of assumed causal chain of Horizon Scanning (Figure 2). We have endeavoured to source a diversity of data sources, as part of delivering a well-rounded and evidence-based set of conclusions and recommendations.

Table 3: Evaluation questions and data sources

Evaluation questions	Elements of the imagined causal chain of Horizon Scanning	Data sources		
		Fieldnotes (moments)	*Surveys among WG members*	*Monitoring data*
2a. Were the starting conditions ensured?	1. relevant skills of project team members needed for Horizon Scanning	ToR finalisation; ESR recruitment; Finalising the methodological guidelines; Interviews	✓	
	2. relevant energy-SSH expertise of WG members and sufficient spread of expertise and perspectives representing different epistemic communities, as well as different levels of experience	WG member recruitment; Interviews	✓	✓ (meeting participation targets as described in 4.3.2)
	3. participants' full understanding of their roles (thanks to the proper guidelines & information)	ToR finalisation; Finalising the methodological guidelines; Interviews	✓	
2b. Was the process conducted according to expectations?	1. adequate facilitation to ensure new possibilities and deliberation at each stage	Horizon Scan and Webinar (vi-ix)	✓	
	2. enough space for divergence, constructive disagreements		✓	
	3. learning experience for all participants		✓	
	4. full range of voices is included in developing the final list of questions		✓	
	5. process is satisfying for participants and organisers are responsive to any concerns		✓	
	6. process is efficient enough to provide direct effects and impacts in a given time		✓	✓ (timing and quality of deliverables)
2c. Were the direct effects achieved?	1. holistic overview of the field provided in a way taking into account current policy thinking	Horizon Scan deliverable submission	✓	
	2. WG members learn about new and under-represented voices within the field		✓	
	3. deepening relations between WG members (better understanding of each other's work, more cooperation in the future)		✓	
2d. What unexpected effects were caused by the activities?		Horizon Scan deliverable submission	✓	
2e. What other factors influenced the success of the activities?		All	✓	
2f. How likely it is to attain planned impacts?	1. results are used in administrative documents at EU and member states levels (e.g. Horizon Europe call texts)			✓ (number of citations)
	2. change in policymaking at EU or member states levels i.e. agenda setting, policy language (e.g. Horizon Europe, DG RTD, SET-Plan)		✓	
	3. change within academic research agendas		✓	✓ (number of citations)
	4. usefulness and applicability of Horizon Scanning is demonstrated; the approach is used in future studies of Energy-SSH		✓	✓ (number of citations)
3. What can we done in a future applications of the tool to make it even more successful?		All	✓	

In addition to more generally contextualising (and thus potentially lightly featuring in publications relating to) the Horizon Scan's recommendations, the findings and conclusions from this analysis will primarily feed into three publications. First, we will be publishing an open access deliverable that evaluates the core activities of the Energy-SHIFTS project, of which these WG Horizon Scanning activities constitute a key component. This deliverable will be submitted to EC DG RTD by January 2021. Second, we plan to write a paper that digs deeply into the experience of doing Horizon Scanning, which we anticipate will be submitted to a journal by March 2021 at the latest. Third, we will be working on an article summarising the evaluation of the core activities of the Energy-SHIFTS project, which we plan to submit by April 2021.

4.2.2. *Fieldnotes: reflections on Horizon Scanning experiences and processes*

This sub-section details the approach taken for gathering fieldnotes across the Horizon Scanning tasks, including matters of who will do the fieldnotes, when they will be produced, as well as how they should be written. We finish the section by explaining how we plan to analyse these fieldnotes data and how those related findings will feed into planned publications. All of the Steering Committee members are expected to contribute fieldnotes individually; for an overview of their roles in coordinating the WGs, please see Table 1 (section 3.2.).

It is vitally important that SSH methods and perspectives are embraced in the broader delivery of Horizon Scans. Indeed, and more specifically, SSH methods are well-placed to focus on reflexivity:

> "*reflexivity is self-critical sympathetic introspection and the self-conscious analytical scrutiny of the self as researcher. Indeed reflexivity is critical to the conduct of fieldwork; it induces self-discovery and can lead to insights and new hypotheses about the research questions. A more reflexive and flexible approach to fieldwork allows the researcher to be more open to any challenges to their theoretical position that fieldwork almost inevitably raises.*"
>
> (England, 1994, p.244)

However, what in-situ matters of experience are we asking the WG Steering Committees to focus their attention on? First, we must bear in mind that a key principle of our Horizon Scanning plans is that we will embrace and highlight points of divergence, e.g. where SSH disciplinary perspectives can not converge on points of consensus. Indeed, we acknowledge from the very start that total agreement on all of the final research questions will not be possible, ranging from the more micro- issues concerned with e.g. exact words and phrases used to frame the research problem at hand, to the more macro- issues concerned with e.g. thematic categorisations of questions. We anticipate that these potential conflicts will be much more commonplace than in other Horizon Scanning processes that are more self-constrained to objective, topic-focussed dialogue, which may be more directed by e.g. which technology areas have the most potential to achieve normative policy ambitions and/or have been the most under-researched to date. Therefore, we intentionally deviate from this typical approach, as part of bringing together many diverse SSH research perspectives and this is exactly why we feel that fieldnotes are essential to understand the dynamics in play.

Further, it is because of this approach and these contexts that we believe it vital to take fieldnotes that focus on "*significant moments*" (Styaert and Bouwen, 1994, p.137). Fieldnotes are defined as:

> "*... a form of representation, that is, a way of reducing just-observed events, persons and places to written accounts. And in reducing the welter and confusion of the social world to written words, fieldnotes (re)constitute that world in preserved forms that can be reviewed, studied and thought about time and time again.*"
>
> (Emerson et al., 2001, p.353)

Fieldnotes have long been considered an essential component of rigorous qualitative research, allowing researchers (or participants) to construct "*thick, rich descriptions of the study context*", as well as providing insight into meaning and meaning-making, facilitating reflection, and allowing for the identification of bias (Phillippi and Lauderdale 2018, p.381). Where fieldnotes are being solicited from study participants, they provide an excellent means by which people can depict their own experiences in their own language (Milligan et al., 2005, in Kerr et al., 2011, p.83). Over time, they may also help to show how participants' views and perspectives are evolving as they progress through a study.

Our use of focussed participant observation, which looks particularly a key moments, utilises fieldnotes only from those engaged in the coordination of Horizon Scanning. The strategically important moments that we chose to focus our resources on, were chosen to represent when: (1) decisions were made that significantly shape the future direction of the scan, such as the

stage at which WG composition is set (Sutherland et al., 2019); and (2) WG members are making key decisions and deliberating using their disciplinary expertise and individual perspectives (e.g. the final question selection phases). Narrowing the focus of these fieldnotes in this way also ensures that we can collect a wider range of perspectives from different fieldnotes contributors, while keeping a tractable size of dataset. From a pragmatic perspective, it would have been asking too much for the WG members to give detailed fieldnotes, as part of their already generous in-kind contributions to the project.

Specifically, the 10 moments that we will be focusing our fieldnotes on are as follows[12]:

i. *ESR recruitment*: is when the ESR applications have been reviewed, as well as offers been made to and accepted by the ESRs. Thus, one will be able to reflect on the roles, responsibilities, and aspirations for involving ESRs in the Horizon Scanning.

ii. *ToR finalisation:* is when the first stage of planning for the Horizon Scanning is done, which in particular involves the first attempts to draw the boundaries of the WG topics and how SSH may be involved with those policy-driven topic areas.

iii. *Finalising the methodological guidelines*: is a pivotal moment for the WGs, not least because many of the coordinators have not participated in Horizon Scanning before. It is therefore vital that colleagues pause to reflect on the guidelines provided, before entering the next (implementation) phase.

iv. *WG member interviews*: is the only moment where one can step back to reflect on the bigger picture issues associated with the research fields' past development and current dynamics. These contextual insights will say much about contestations across SSH and will thus help to contextualise much of the rest of the fieldnotes, in particular moments vi.-ix. that involve bringing together the WG members. The fieldnotes are likely to be especially interesting for the Critical Policy Friends herein, who will be sitting in on 1-3 of these interviews and will likely be exposed to certain SSH debates for the first time.

v. *WG member recruitment*: given that the WG members represent the primary source of perspectives and views feeding into the Horizon Scanning process, this is a vital moment to reflect on who was recruited, how, and with what possible implications. To what extent, for instance, were the selection criteria on gender, geography, SSH disciplines, etc. followed, and where/how were compromises made if not?

vi. *Horizon Scanning – soliciting research questions from the wider community*: is the stage at which WG members provide candidate questions themselves using the online survey form, and also send the Horizon Scanning survey out to other members of the scholarly community within their networks. This is a pivotal moment because it represents the first 'contact point' with the wider community, and the first instance in which people will have a chance to set down their own thoughts about candidate research questions.

vii. *Horizon Scanning – all questions received, collated, edited and categorised:* is the set of actions that together represent the substantive analytical work involved with receiving contributions from the wider community, coming to an understanding of what community perspectives are (and how they are spread across different disciplinary divides), and deliberating with a diverse group of colleagues.

viii. *Horizon Scan – selecting the final 100 questions:* is the final stage of deliberations in which a certain element of 'forced choice' will make itself known, when questions are finally either included or discarded from the list. At this stage, deliberations are likely to be quite intensive, with different viewpoints having to be justified and the case made for questions to either be included or excluded from the final list.

ix. *Webinar to WG members:* is the first step after the 100 recommended questions being finalised, and thus this is the first moment where feedback is sought. In addition to feedback on the questions, WG members will also be invited to discuss the accompanying narrative(s) that sit alongside these recommendations in the relevant publications.

x. *Horizon Scan deliverable submission:* is the moment at the very end of the process. The recommendations report will have been written, agreed upon by the WG members (as much as possible), and submitted to EC DG RTD for consideration. Whilst the recommendations, and their accompanying narrative(s) and framing(s), are still fresh in the mind of fieldnotes contributors, it is important to capture their thoughts on reflections on the entire process, experiences of pulling together this final output, and hopes for EC policy impact.

12 We acknowledge that the first two moments (i. and ii.) will, by the time this guidance is published, actually be in the past. As such, fieldnotes contributors will have to retrospectively reflect on those moments, and this will be considered when analysing said fieldnotes.

In addition to these fieldnotes, a set of reflections on the method and key learning points will be kept on a weekly basis by the Energy-SHIFTS' Horizon Scanning Methods Lead, in order to capture reflections on the ongoing process of the Horizon Scanning across the four WGs. These reflections will cover:

- The contexts of our research.
- Broad reflections on the approach and tool, and its application in SSH contexts.
- Emerging or unanticipated problems over the duration of the exercise and their resolution.
- When and how WG Chairs or Co-chairs make contact, and e.g. with what questions.
- Suggestions, based on these, for future exercises.

A full breakdown of the fieldnotes template/prompts for every one of the aforementioned 10 moments (from i., to x.) is available in Appendix 7, alongside some introductory guidance for what is expected from those doing the fieldnotes. Whilst the prompts span a number of different themes, we have endeavoured to pay particular attention to e.g. expectations; collaboration arrangements; WG member cross-fertilisation; collective decision-making; notions of progression; power; and learning(s).

The first two steps of fieldnotes –relating to moments i. and ii. – will act as a pilot, whereby ARU will solicit feedback on the process of reflecting and drafting these fieldnotes from all those involved, including asking for recommendations and suggestions for changes. This feedback, combined with what ARU observes from the fieldnotes themselves, will feed into a posible second iteration of the fieldnotes template (Appendix 7). ARU will also check-in periodically to see how the fieldnotes are being completed, and ensure that any changes are made as and when is appropriate. This approach is consistent with recommendations to formulate a well-formed framework guiding the collection of fieldnotes prior to the study, and revising this purposively as the study proceeds (Phillppi and Lauderdale, 2018).

In completing the fieldnotes, we ask that around 1-3 pages are written in response to the prompts provided for every 'moment', by each Steering Committee member doing the fieldnotes. This instruction on the size of individual entries was decided upon in order to balance adequate space for reflection and discursive development, while maintaining a relatively tractable size of overall dataset at the end of the project. A unique Google Documents weblink will be provided to each individual fieldnotes contributor, meaning that they will be able to have ownership of a full set of fieldnotes. It was important that a dynamic, working document was the basis for these fieldnotes, so that colleagues are able to revisit their earlier notes and revise/annotate them or even cross-reference across moments (e.g. 'as I felt in stage 4...') to highlight continuity or contrasts (Phillippi and Lauderdale, 2018). Whilst other alternatives were discussed that more pragmatically made the process of completing the fieldnotes easier – for instance, through using online survey software – it was deemed that the process of data collection would feel too much like a survey, whereby data are 'submitted' at the key moments, rather than 'developed' across the key moments. Essentially, there would be less room to evolve the fieldnotes iteratively if using survey software, which we regarded as critical in ensuring that data included the reflexive dimensions required.

Analysis will not begin (led by ARU) on these fieldnotes data until each contributor has explicitly signed-off on their submission to ARU. It is important to give all an opportunity to do a final read-through of their own fieldnotes, in case they would like to annotate any previous comments and ultimately provide any supporting context or reflections that they think would be of interest. At the final stage, we will certainly emphasise that we would like annotations and additional text (if necessary), and not edits of the text. Indeed, that final opportunity is not a means for them to create this perfectly joined-up story that 'accurately' reflects reality. After all, these fieldnotes are very much intended to be somewhat messy "*behind the scenes*" documents (Lofland and Lofland, 1995, p.96), as opposed to them being ready-to-publish in its raw form for external audiences. We will also reiterate that no one set of fieldnotes will be more 'correct' than another, not least because they will be authored by different people, each of whom will have their own stylistic preferences regarding e.g. "*diction, point of view, and organization*" (Emerson et al., 2001, p.358), meaning that all of their fieldnotes will differ in numerous dimensions. Indeed this is wholly expected given that, as Emerson et al. (1995, p.106) point out, fieldnotes are simply descriptions and thus are "*selective, purposed, angled, voiced, because they are authored*".

The aim of the analysis will be to identify patterns within the data (thematic analysis; Braun and Clarke, 2008) through a systematic process of 'sense making', rather than simply summarising qualitative text. The analysis will begin with the fieldnotes data being 'cleaned' for analysis, via the following steps (drawing from Thomas, 2006; Braun and Clarke, 2008):

1. The lead analyst will read through the whole dataset, ensuring clarity in language used throughout. This is because not all fieldnotes contributors may necessarily use English as a first language. Where the meaning of a particular part of the text is unclear, the analyst will contact the fieldnotes contributor to

query the meaning of the unclear text; this will be recorded as a distinct entry 'in-line' with the main fieldnotes text.

2. Fieldnotes will be anonymised by removing:
   a. all identifying information such as names within the text. Where names are used, they will be replaced with monikers that broadly reflect the identity of the person being named (e.g. 'Dr Bloggs' replaced with 'A Political Scientist'); and by,
   b. the names of the fieldnotes contributors, and replacing them with a code to reflect their designation (e.g. 'WG Chair 1' / WG Co-chair 1…). Dates for each entry will be retained.

Once the data have been 'cleaned', they will be prepared for analysis by transferring to NVivo, a software that facilitates qualitative data analysis. After which, the following steps will be taken to code code the fieldnotes data inductively:

3. Gaining a descriptive overview and preliminary set of important themes:
   a. Reading across the dataset, a preliminary set of codes and themes applicable across the entire dataset will be generated. These will touch on a number of dimensions that are of interest, including, for example: conflict, debate, inclusiveness, clarity of the Horizon Scanning process, group functioning. At this stage, entries will also be parsed for useful recommendations on the process, a list of emerging or unexpected challenges that authors noted, and their perspectives considered on how these were resolved (including evaluating the quality of the support received).
   b. Reading across each designation (e.g. 'all fieldnotes by Chairs'), to reflect on the influence of the fieldnotes contributors' positionalities and associated perspectives.
   c. Reading across each moment (e.g. 'all fieldnotes during the finalisation of the ToR'), to reflect on the specifics of how each Horizon Scanning Step worked, what the specific challenges were, and how different steps compared in terms of type and quality of deliberation and analytical effort. At this stage, the lead analyst will also refer back to and reflect on their own fieldnotes, recorded throughout the process, to inform the process of understanding how the process evolved and informing their thinking on the development of codes and themes.
4. Collating themes and towards 'sense making':
   a. A consistency and 'sense check' will be performed at this stage. The lead analyst will prepare a list of codes and a brief description of what the code is intended to address. They will then share this, along with the coded dataset with a colleague to ensure that the codes are being appropriately and consistently applied.
   b. A list of important cross-cutting themes will then be generated through an iterative (inductive) process of re-analysing the dataset. A coding tree will be developed (codes and themes and their placement in relation to each other and according to an appropriate hierarchy). The list of important themes will be accompanied by a brief summary of what the theme broadly covers (what aspect) and what the data under the theme shows (without quotes).
   c. Key illustrative descriptions will be marked off (e.g. powerfully articulated narratives of moments of conflict or divergence), and analysed in greater depth (what drove conflict and its resolution, who was involved and why?).
   d. Depending on the quality and consistency of the data received, an effort may be made to quantify certain themes (e.g. to note frequencies of conflict, or to explore discursive differences between authors with different positionalities).
   e. A stakeholder check will be performed, wherein a sub-sample of fieldnotes contributors will be invited to comment on the codes (with their brief description and illustrative quotes). At this stage, the lead analyst will invite both written comments on the existing codes as well as to engage (subject to consent and ensuring anonymity) with a few fieldnotes contributors to hear feedback about overall 'sense' and 'quality' of reading of the fieldnotes entries.
5. Finalising analysis:
   a. The codes and coding structure will be 'reduced down' to its most important elements, and 3-5 illustrative quotes will be identified for each.
   b. The supporting narrative for each theme will be revised upon a final re-reading across the entire dataset.

At the end of this process, a draft 'Findings' section will be ready for internal feedback from those fieldnotes contributors who have assisted with the analysis (e.g. through participating in the checks listed above; these will be designated as co-authors due to their additional analytical contribution to the process). This will be inserted into a fuller paper manuscript ready for journal submission, subject to further input and sign-off from co-authors.

4.2.3. *Surveys: investigating Horizon Scanning processes and effects*

The aim of the surveys will be to collect data needed to answer the evaluation questions presented in sub-section 4.2.1. While plenty of insightful data will be collected through the fieldnotes, there are three main reasons why additional survey data are still needed. First, surveys will make it possible to investigate all evaluation questions. Second, collected data will enable comparisons among WGs and with other project activities. Third, and finally, using surveys such as this do not (crucially) demand too much of the respondents' time, which is important if we are to gather WG member insights – indeed, we will be asking for WG members to participate in two surveys, after a relatively intensive period of collaboration on the Horizon Scanning.

Provisional versions of the surveys are available in Appendices 9 and 10; these will be further developed and piloted. The surveys will be prepared in appropriate software, most likely Microsoft Forms or LimeQuery depending on the final version of the tool. The survey forms will be sent to WG members in July (just after submitting the Horizon Scans to the EC) and November 2020. The first survey will focus more on the process of Horizon Scanning, and the second survey on its effects. We assert that it will be best for WG members to answer questions about the process immediately after the Horizon Scanning has been completed, with then a second survey necessary to return to the direct effects and impacts after the dust has settled somewhat.

While there will be around 100 people who could fill in the survey, we set the ambitious target of 80% response rate (i.e. 80 responses to be collected). The survey data will be anonymised and, as such, there will be no possibility to match the survey responses with specific WG members.

The following types of data analysis will be conducted:

- *univariate* – the frequency of responses for each question will be investigated.
- *bivariate* – the frequency of responses will be compared for diverse groups of respondents.
- *multivariate* – if needed, the impact of many characteristics of respondents on their answers will be analysed.

JU will be responsible for the analysis, under the supervision of the Energy-SHIFTS Evaluation Work Package lead (Seweryn Krupnik). Analysis will be conducted using IBM SPSS Statistics software.

5. Ethics and data management

This section briefly summarises ethical and data management procedures for the following activities: Horizon Scanning survey; WG interviews; Fieldnotes; and evaluation surveys. Ethics guidelines for the whole Energy-SHIFTS project are provided in Deliverable 7.1 Ethics Guidelines, which is available (internally only) on the project website for partner reference. These ethics and data procedures have been developed in accordance with all relevant legislation (most notably GDPR) and the UK Research and Innovation (formerly Research Councils UK) guidelines[13], and are based on procedures and templates approved by Anglia Ruskin University's ethics committees.

Horizon Scanning survey: Before participating in the Horizon Scanning survey, all participants will be provided with information about the project and how their data will be used, stored and deleted, as well as contact details for further queries, and how to modify/delete information. Participants will be required to confirm their consent before participating in the survey, and to confirm that they are at least 18 years old. This information and consent confirmation checklist are included within the front matter of the provisional Horizon Scanning survey documentation (Appendix 1). Survey responses will be anonymised.

In addition though – bearing in mind that this is the first stage that the WG members will be tangibly participating in the Horizon Scanning itself – those survey respondents who are also WG members will be additionally asked to confirm that: they understand their name will be listed on the Energy-SHIFTS website and as a co-author of Working Group outputs; and they consent to audio/video recordings of webinars (see section 3.3.8) and the sharing of those recordings with other WG members.

Interviews: The 10 WG members who will also be interview participants will be sent a Participant Information Sheet and Consent Form at least one week before the interview (see Appendices 4 and 5). As with the Horizon Scanning survey, these documents cover information about the project and how their data will be used, stored and deleted, as well as contact details for further queries, and how to modify/delete information. Participants will be required to confirm their consent before participating in the interview, including that they understand that all data will be anonymised and used in relevant outputs, that they are at least 18 years old, and that they are happy for the interview to be audio recorded.

Fieldnotes: All fieldnotes contributors will receive information about the fieldnotes process, and use of their data, as part of the Supporting Notes they will read before completing fieldnotes (Appendix 7). They will be required to complete an accompanying Consent Form (Appendix 8), before beginning the drafting of fieldnotes. The Supporting Notes will remain at the top of the fieldnotes Google Documents file throughout the process, for reference purposes whenever necessary.

Evaluation surveys: Both the first evaluation survey and follow-up evaluation survey (section 4.2.3) require participant consent: this will be gained through the provision of all relevant information in the front matter of each survey, and completion of a consent checklist within the same document (provisional versions available in Appendices 9 and 10). These surveys clearly explain that there is a minor risk of quotations being attributable to individuals despite the anonymisation process (because WG members will be acknowledged by name elsewhere), but this risk is very small due to the expected sample size and the way in which findings will be reported. Any participant can choose not to complete the evaluation survey, if this is not acceptable to them and/or to back out up to two weeks after completion (as indeed is standard across all of the above data collection methods).

Data management: Data management guidelines are provided in the Energy-SHIFTS confidential Deliverable 6.2 (available to partners only on project website). Headlines include that all (electronically stored) data with 'identifying information' must be password protected, and that all files with 'personal data' must be encrypted. Consortium partners should also be mindful about safeguarding passwords of encrypted files, as they often cannot be retrieved if lost. Furthermore, and as is standard across all Energy-SHIFTS activities, personal data will be held for a maximum of 2 years after the end of the project (i.e. up to 31 March 2023), after which time it will be destroyed.

13 https://www.ukri.org/files/legacy/reviews/grc/rcuk-grp-policy-and-guidelines-updated-apr-17-2-pdf/

6. Inclusivity and diversity issues

Inclusivity and diversity issues are central to the Energy-SHIFTS project, not least because it is (in part) an extension of work within SHAPE ENERGY[14], where nurturing an inclusive SSH field was a central objective of the project. SHAPE ENERGY also provided important reflections on how inclusive engagement was catered for within the project itself, and the SSH field at large (Søraa et al., 2020). In Energy-SHIFTS, one of the first project activities was therefore to organise a Scoping Workshop on the topic of inclusive engagement in energy (Suboticki et al., 2019). The outcomes of this workshop included important recommendations for how Energy-SHIFTS should work towards inclusive engagement through its own project activities – not the least, to make inclusive engagement part of the projects DNA, as opposed to ad-hoc or post-hoc activity.

Although the outcome of the Horizon Scanning should be a completely open and ground-up exploration of research need – thus not explicitly encouraging inclusion- or gender-specific recommendations – project participants and researchers should address a few key considerations when setting-up and conducting the Horizon Scanning. It is therefore the purpose of this section to briefly detail these.

First, each WG needs to discuss what inclusive engagement means for their respective energy-SSH research topics. One of the findings of the scoping activities is that inclusive engagement is not a set number of criteria. Although representative categories in relation to gender, geography and discipline may be important, their respective importance may vary in relation to topics or goals of research. For instance, in relation to transport-related SSH research, it may be especially important to gain insights from colleagues who have researched (but not necessarily been located in) different places in Europe because they have profoundly different transport needs. In addition to these more overt criteria, WG members may need to discuss what perspectives could be marginalised. This might go beyond disciplinary background or geographical location, and include discussions on possible theoretical positions that have been structurally/deliberately excluded from mainstream publication channels.

Once WG Chairs and Co-chairs have established what they think is important to establish an inclusive picture of research needs in their topic area, the second step is to select their WG members, and then sub-set of members for interviews. There are no formal criteria for how inclusivity should be established in any given topic, but the discussions within the WG should provide ample opportunity to reflexively engage with this selection, beforehand and in retrospect. If in doubt, WG Chairs and Co-chairs can also contact ARU (as the WGs Work Package lead) and/or NTNU (as Inclusivity and Diversity lead for the project) with queries. Moreover, should pro-active measures to addressing inclusivity and gender equality ever lead to the under-performance with regard to WG member selection criteria (see sub-section 3.3.3., and in particular Table 2), then colleagues should contact ARU to see if partial exemptions can be attained. The possibility of partial exemptions exists because those same selection criteria are to aid the project's pursuit of inclusivity and diversity, and thus we should not feel overly-wedded if they are shown to be detrimental to those same ends.

Third, the semi-structured protocol for the WG interviews (Appendix 3) specifically prompts some reflections on marginalised issues within the field. Specifically, the provisional protocol includes prompts for questions around marginalisation associated with the current state and past trajectories of disciplines/theories/ontologies, geographies, and research-policy relationships.

Fourth, all Steering Committee members should reflect on issues of inclusion in their fieldnotes diaries. In addition to very concrete observations of some forms of exclusion, the format of the diaries also provides ample room to reflect on questions of inclusion more freely. These fieldnotes may be especially useful later on in the project when the impacts of the projects are synthesised and evaluated. This may also be essential input for further work in strengthening energy-related SSH research in Europe.

14 www.shapeenergy.eu

7. Risk assessment and contingency planning

It is essential that all research exercises undergo a frank risk assessment procedure, as part of planning for possible pitfalls that could emerge during the research's lifetime. This is especially important for the Energy-SHIFTS Horizon Scanning and associated activities, given the ambitious timescales and the number of parties involved. Table 4 describes a selection of identified risks as well as contingencies that are in place as a result.

Table 4: Description of possible risks and project plans for mitigation.

Risk ref. no.	Description of risk	Mitigating actions
1	Unable to recruit WG members.	Letters of support attained at the proposal stage (from a wide variety of stakeholders) to ensure buy-in at the earliest stage possible. Contact then maintained with those contacts throughout the process. The Terms of Reference publications also set out priorities for WG member recruitment, meaning that time to recruit will be maximised (and in a consistent way too) as that was a relatively early project deliverable.
2	Lack of diversity of voices: WG members are limited only to the consortium's network of contacts.	We utilise a snowballing approach to recruiting members, whereby new WG members (in particular interview participants) are asked for recommendations on new WG members where necessary, with a real attempt to involve new voices. When gaps still remain, WG leads will need to do independent research (e.g. using the SHAPE ENERGY researcher database, journal review papers, conference proceedings, etc.) to target WG members and to create a diverse group of participants, according to the diversity criteria. The fieldnotes will support reflections on the opportunities and limitations of fostering a diverse group of WG members.
3	WG responses are so divergent as to make it difficult to provide clear, concise recommendations.	This very guidelines document will provide a means by which we will hopefully be able to find agreement on a number of key elements of the final Horizon Scan; from question selection, to question categorisations and narratives. This said, it is still important that we create the safe space for the WG members to disagree, and indeed for us as researchers to transparently report such points of divergence back to the EC policy officers.
4	WG members stop responding to emails or resign from participating.	To make sure that we stay above the threshold of a minimum of 25 participants per final WG Horizon Scan, each WG will recruit 30 members in the first instance. This way, we anticipate up to a 17% drop-out rate. We will also realistically set out our expectations (in terms of the extent and type of engagement required) at the invitation stage and/or soon afterwards, and ask that WG members consider carefully their capacity to remain involved throughout the process.

5	Horizon Scan results are not acknowledged by the target group.	The progress of the Horizon Scanning activities will be a recurring agenda point at ARU's monthly meetings with EC DG RTD. Our project partner, EERA, will also leverage its connections with the EC and SET-Plan policy communities, in anticipation of the launch of our recommendations reports.
6	The project team will fail to collect data needed for evaluation because of: low response rates; responses not being insightful enough; or other challenges with data. As a result, the usefulness and applicability of Horizon Scanning will not be demonstrated.	The process of data collection will be thoroughly monitored and good practices of data collection (e.g. pre-testing of instructions and surveys) will be applied. All stakeholders will be informed at the beginning of the process about the data collection, so as to manage their expectations.
7	By asking WG members to reach out to their own contacts for further research question proposals, there is a risk of skew (e.g. certain SSH perspectives featuring more prominently in the final Horizon Scan because of certain WG members having more capacity/success with garnering additional questions).	Monitoring procedures will pro-actively examine Horizon Scanning survey responses, in terms of disciplinary backgrounds, with other WG members sought out (and buffer time potentially utilised) if major skews arise. We also note that WG members are selected on the basis of disciplinary difference, and thus the contact networks that they will be utilising will differ, which would significantly reduce the chances of especially significant skews.
8	WGs do not receive sufficient questions to be able to reduce down to a list of 100 questions.	This is unlikely to occur, because of the process we have designed, as we have around 25 participants (minimum) each submitting a minimum of 3 questions taking us to a minimum of 75 questions in the first round, even if no one else from the wider community responds.
9	WGs receive a large number of unclearly worded questions requiring Chairs and Co-chairs to spend a long time rewording and editing for clarity, adding a further element of subjective judgement at this early stage, or delaying the process.	Clear guidance on our expectations for the content of the questions, to be given in in the Horizon Scanning survey. In addition, the early responses to the survey will be monitored, with changes to the survey wording made if poorly worded questions are consistently submitted. Further, if the Chairs and Co-chairs feel unsure regarding the editing of the submitted questions, then tracked changes edits can be emailed to the respective WG member for their approval.
10	WG members are unable to convene at a set date to do the final round of deliberations, post-voting.	WG Chairs will fix this meeting well in advance and pre-warn WG members about the need for a plan B contingency, just in case.
11	Deliberations overrun, leading to drop-outs or to a small 'core' group forming and taking over the process; or WG members fail to deliberate as the clock runs down, leading to them simply choosing questions 'randomly'.	WG Chairs and Co-chairs should assign enough time for these deliberations, e.g. at least a half-day workshop style meeting, with the potential for parallel sessions to save overall time, if group discussion would help speed up matters. All Chairs and Co-chairs should also seek to complete their 10 WG interviews as soon as possible in January-February 2020, so as to allow as much time as possible for the Horizon Scanning.
12	WGs experience conflict during the scan deliberations, leading to negative experiences and possible resentment afterwards and thus contestation of the final recommended questions.	The process will necessarily involve some disagreements, but WG Chairs and Co-chairs will facilitate these sensitively. If time management is efficient and effective, then there should be time to ensure that such sensitivities are adequately catered for.

8. Contributions

We conclude by emphasising the contributions made by this publication. Primarily, we offer methodological contributions to the literature on Horizon Scanning, which we also believe best supports our core aim of meaningfully identifying energy-SSH research funding priorities for Horizon Europe.

First and foremost, we note that the methodological details that underlie final Horizon Scan output are very rarely presented. For this reason alone, we hope that this document is useful for those new to Horizon Scanning and/or for experts eager to share approaches. However, beyond this, we also note the following methodological contributions: First, we made changes to the application of the Delphi technique used in similar Horizon Scanning question selection exercises. In particular, we ask for accompanying evidence and justification, including a suggestion for the respondent to situate their question(s) in the context of the literature. Such an approach is used in some Delphis, but not by all e.g. by Sutherland et al. (see 2019). Second, we have an intense focus on divergence, dissent, conflict, contestation, etc., to understand better how these multidisciplinary efforts really unfold in practice. This is a clear point of contrast with dominant Horizon Scanning methods (especially those that take the Delphi method) as they would normally search for consensus come what may. We feel this is essential given the different ontologies, epistemologies, problem definitions, etc. that exist across SSH, which we hope to broadly cover as much as is realistically possible. Third, and finally, the operationalisation and application of these Horizon Scanning ideas and tools to the SSH landscape has been a missed opportunity, given that these exercises have been much more commonly used in the Natural Sciences.

We also assert that our evaluation plans for our Horizon Scanning is novel, in that (as far as we are aware) we will be the first to undertake both reflexive and theory-based evaluations, which investigate anticipated versus actual experiences and effects. First, we are especially interested to use the reflexive fieldnotes entries as a platform for digging deeply into the experiences of key Horizon Scanning personnel at pivotal moments in the process, particularly in relation to the aforementioned issues regarding divergence, conflict, etc. Second, we also believe that the imagined causal chain of Horizon Scanning provides a framework for tracing the steps leading to the successes and, at the same time, factors that may hinder it. Therefore, the use of the tool and evaluation activities will provide detailed insights on the process and its effects, in addition to being a useful prompt for discussion with others experienced in using and applying Horizon Scanning methods. Third, and finally, we therefore believe that at the end of the Horizon Scanning we will not only have four lists of questions for policymakers, but also a verified evaluation tool with detailed recommendations related to its implementation across four (energy-SSH) contexts.

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11. Appendices

11.1. Appendix 1 – Horizon Scanning survey - provisional version

This Appendix is the provisional version of the Horizon Scanning survey that all Working Group members (as well as a selection of their contacts) will be asked to respond to. There are no separate Participant Information Sheets and Consent Forms, as all relevant information is instead included in the front matter of the survey.

Energy-SHIFTS Horizon Scanning survey *[page 1]*

The *Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan* (Energy-HIFTS) project is a €1m investment through the EU Horizon 2020 programme running over 2019-2021. Specifically, it represents the European Forum for energy-related Social Sciences and Humanities (energy-SSH). Energy-SSH has played less of a role to date in shaping (European) energy policy than Science, Technology, Engineering and Mathematics (STEM) disciplines and, as such, Energy-SHIFTS is working to develop Europe's interdisciplinary expertise in using and applying energy-SSH, particularly at the strategic European level.

An indicative list of disciplines we consider to be SSH include, but are not limited to: Business; Communication Studies; Development; Economics; Education; Environmental Social Science; Gender; History; Human Geography; Law; Philosophy; Planning; Politics; Psychology; Science and Technology Studies; Social Anthropology; Social Policy; Sociology; and Theology.

The two-year Energy-SHIFTS project began in April 2019 and is coordinated by Anglia Ruskin University (UK). As a core part of its work, the four Energy-SHIFTS Working Groups aim to identify future priorities for energy-SSH research, with particular reference to the Horizon Europe programme of funding.

Thank you for agreeing to contribute to our Working Group survey on *[insert topic]*. We very much appreciate your time and expertise.

This survey has only one core question related to future energy-SSH research priorities, but also asks you to provide justification for each of your priorities (in the form of relevant literature where possible). Responses will be anonymised and circulated to all members of the Working Group.

The Working Group members will be working together over March-June 2020 to edit, categorise and rank the research priorities that you suggest in this survey, before then reporting these to the European Commission's Directorate-General for Research and Innovation (DG RTD).

Should you have any queries about this survey (or the Energy-SHIFTS project more widely), please contact *[Working Group Chair's email address]* for specific Working Group queries, or chris.foulds@anglia.ac.uk for more general queries about the project and its Horizon Scanning plans. You are free to withdraw within two weeks of completion of this first survey by emailing these addresses.

☐ If you are a member of the *[insert topic]* Energy-SHIFTS Working Group, please tick to confirm you understand that: your name will be listed on our website and that you will be given the option to be named as a co-author of Working Group outputs.

☐ If you are a member of the *[insert topic]* Energy-SHIFTS Working Group, please tick to confirm that you understand that discussions within the Working Group may be audio and/or video recorded and recordings shared within the Working Group.

☐ Please tick to confirm you are at least 18 years old.

☐ Please tick to confirm you understand information submitted to this survey will be anonymised and circulated (confidentially) to Energy-SHIFTS Working Group members, and that the final outputs will be made publicly available online.

☐ Please tick to confirm you have not previously completed a Horizon Scanning survey for this *[insert topic]* Working Group. We are only able to accept one survey response per person, per Working Group.

☐ Data Protection: Please tick to confirm you understand that data may be shared with Energy-SHIFTS partners, some of whom are based outside the EU, but all of whom are contractually bound to abide by EU data protection law. Personal data will be held for a maximum of 2 years after the end of the project (i.e. up to 31 March 2023), after which time it will be destroyed. For more information about how we process your personal data for this project, please see our project Privacy Policy (https://energy-shifts.eu/privacy-policy/) and ARU's general Privacy Notice (https://aru.ac.uk/privacy-and-cookies/research-participants) for research activity.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 826025.

Professional details *[page 2]*

Name:

Email address:

Gender (please tick):

☐ Male

☐ Female

☐ Other

Job title:

Organisation name:

Country (where your organisation is based)*: *[ensure that only EU Member State and Horizon 2020 Associated countries are included within this dropdown list]*
*** if your organisation is not based in an EU Member State or an Horizon 2020 Associated country, then you are unfortunately not eligible to participate.**

Nationality: *[dropdown list of all nationalities in the world]*

Which disciplines would you say you represent? If more than one, please rank in order of 'most fit' to 'least fit':
[open, free text box]

If you are not a member of the *[insert topic]* Working Group, please state who invited you to participate in this Horizon Scanning survey.
[open, free text box]

Prioritising future energy-SSH research questions *[page 3]*

Horizon Europe is charged with delivering the research and innovation to drive the European low-carbon energy transition, as set out in the EU's 'Clean Energy for All Europeans package' and the 'Long-term Strategy – A clean planet for all'.

What do you see as the 3-5 most important energy-SSH research questions in the field of *[insert topic]* **that should be prioritised in future European research funding?**

Please note that we are looking for open-ended questions (not 'yes' or 'no', and not statements) that address substantial gaps in energy-SSH knowledge. Questions should also be 'answerable' by a research team through a realistic research design. Finally, should your question be about a specific intervention, please make sure the question includes the (i) subject that the intervention is focusing on, (ii) the intervention itself, and (iii) a possible outcome(s), however broad, that you would expect to investigate.

[5 free text boxes for each of their possible research questions. These are to be entitled e.g. energy-SSH research question 1, energy-SSH research question 2, etc.]
[Every time text is entered into one of the above text boxes (with a proposed research question) another follow-on question will open up:]

Please provide your rationale and supporting evidence (up to 200 words) for each of your questions, ideally with references to the literature (if applicable).

[open, free text boxes]

Keeping in touch *[page 4]*

We hope you may be interested in staying in touch with the project. For example, over the next two years Energy-SHIFTS will be publishing a number of accessible guides relating to SSH in energy policy, as well as running masterclass events, conferences and citizen debates. We would like to invite you to sign up to the Energy-SHIFTS mailing list (one email every 1-2 months).

Thank you!

[option to have the survey response – and thus participant information and consent-related text from the start of the survey too – emailed to the respondent upon completion of the survey]

11.2. Appendix 2 – Email template: invitation for Working Group members to use when/if inviting others

This Appendix is a suggested invitation for Working Group members to use when contacting others in their research communitites to solicit further research questions. We acknowledge that colleagues are very much welcome to modify this template based on their best judgement, taking into account the recipient and their relationship with them.

Dear *[invitee name]*,

Invitation to contribute to a Horizon Scanning project on *[insert WG topic]*

I am writing to invite you to contribute your views to a new Horizon Scanning exercise to identify the Top 100 Research Questions important for future research and funding in *[insert topic]*.

This exercise is being conducted as part of Energy-SHIFTS, a new H2020 programme on Social Sciences and Humanities contributions to the energy transition in Europe. Energy-SHIFTS has been designed to feed into the EU SET-Plan and Horizon Europe priorities around energy, and to aid this, we are collating expert's views on the top research questions that require focussed attention and funding. An overview of the Energy-SHIFTS is available here: https://energy-shifts.eu/

As a recognised expert in *[invitee's research field]*, I'd like to ask you to submit 3-5 questions using the short survey form: *[Insert survey weblink here]*.

Please note that while this form asks for your name and affiliation, all responses will be anonymised when we analyse and write-up our findings.

The closing date for the survey is *[date given by WG Chair and Co-chair]*.

If you have recommendations for others whose views we should solicit, please let me have your recommendations by return email. Please include a full name and working email address.

Finally, if you have any questions or would like further information before participating, please do not hesitate to contact me or to email the Chair of the Working Group (*WG Chair's email address*).

Many thanks and best wishes,
[WG member name]

11.3. Appendix 3 – Interview protocol template

This Appendix presents the interview protocol that will be used when interviewing 10 members of each Working Group. The expectation is that this represents a minimum requirement, and thus whilst interviewers must follow the below lines of questioning, they are also welcome to ask additional questions as they see appropriate. Given that all interviewers are experienced in interviewing, we ask that they apply their judgement and contact ARU (as WP2 lead) if e.g. they consider that the introduction of any new lines of questioning will significantly impact on the data collection being prioritised in the below protocol's existing questions. We also emphasise that we are adopting a semi-structured approach, hence this interview protocol should be interpreted accordingly.

Interview protocol: Working group members

Pre-interview

- Send Consent Form and Participant Information Sheet at least one week beforehand.
- **IMPORTANT: the interview cannot proceed unless consent has been given by the interview participant beforehand.** This should be done by either: the interview participant signing/scanning the Consent Form and emailing it back to the interviewer; or them explicitly providing consent over email. Opting-in is essential; it is not enough to provide the option to opt-out. The email exchange must be kept by the interview (and emailed to emma.milroy@anglia.ac.uk) for record-keeping purposes.
- Ask participants to send a list of 5 pieces of literature, prior to the interview. These must be past seminal or recent cutting-edge peer-reviewed scholarly contributions (see sub-section 4.1.2, on Annotated Bibliographies, for more detail).

Opening the interview

- Introduce yourself, as appropriate.
- Note the inclusion of others on the call, e.g. Critical Policy Friend(s) who may be listening in to hear more about energy-SSH research debates.
- Briefly restate aims and scope of the project, working group, and interviews. [do not discuss any detail of the Horizon Scanning here – instead, do that at the end as part of discussing next steps for their involvement with Energy-SHIFTS]
- Confirm verbally that they are happy with the Consent Form and Participant Information Sheet. Explain that their transcript will be anonymised and made freely available on an open data platform (as per EU funding requirements).
- **Remember to audio record the interview.**

Background context

- Tell me about your research to date in the context of *[WG topic]*.

- Follow-up points, if not covered in above main "tell me about…" question:
  - Your current research position(s)
  - Your disciplinary orientations
  - Your current/recent research projects
  - Other researchers who you have collaborated with on this topic

Development of SSH literatures

- Tell me about how you feel SSH research in the *[WG topic]* area has evolved (or not) over the last 20-30 years.
- Follow-up points, if not covered in above main "tell me about…" question:
  - Origins: do you feel SSH research on *[WG topic]* began in a certain timeframe? When?
  - Degree and form of research fragmentation – examples of contestation, debate, conflict, etc. across SSH literatures on this topic.
  - Clear moments where the research directions have changed, e.g. seminal publications, changes in policy priorities, changes in funding landscape, etc. The influence of these pivotal moments?
  - Dominant or marginalised SSH disciplines/theories/ontologies/etc., and why?
  - Dominant or marginalised geographies; e.g. more insights coming from certain parts of Europe? how European/Westernised/globalised is this research? and why?
  - Relationship between policy and research communities – how has this changed over time? Any stories of particular success or failure/marginalisation?

Specific players

- Briefly explain our plan for producing annotated bibliographies that will accompany the final Horizon Scans. Ask: why they chose the suggested pieces of key literature in the field; why they found them important; if they had any difficulties in choosing this literature; if they would like to add other titles, based on e.g. today's discussion.
- Confirm that they are happy to be named in the general acknowledgements section of the annotated bibliographies, given that we will be using their suggestions. [noted in the consent form, in bold]
- Recommend Working Group members:
  - …for inclusion more generally (especially if they see them as representing groups that are usually marginalised).
  - …to meet specific gaps in that Working Group's membership (e.g. gender, geography, disciplines, frontrunner / field leaders).

Closing the interview

- Anything else that you wanted to say, which you have not been able to say thus far?
- Briefly explain next steps for their involvement in the Working Group's Horizon Scanning, including likely timelines.
- Any queries about the Working Group and general Horizon Scanning activities?
- *(if helpful, point them towards the Energy-SHIFTS methodological guidelines deliverable – available online by the time of the interview).*
- We would like to mention that as part of Energy-SHIFTS, we are matching 20 prominent policyworkers with SSH researchers (Policy Associates), to discuss a specific energy policy dilemma they have raised. Would you, or perhaps someone in your team, be interested in being considered for this collaboration? If yes, then we would like to send you more information about the Fellowship scheme. [N.B. there are no guarantees of their participation. Please pass their answer to this question onto Tessa.]
- Remind them that a transcript will be emailed to them for approval.

Post-interview

- Send audio recordings and Consent Forms/emails to emma.milroy@anglia.ac.uk for project records.

11.4. Appendix 4 – Interview Participant Information Sheet

This Appendix is the information sheet that all Working Group Group interview participants must must read, alongside the accompanying Consent Form, prior to participating in the interview.

Energy-SHIFTS Working Group interviews: Participant Information Sheet

Energy-SHIFTS
Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan

Thank you for initially agreeing to participate in a **Working Group interview** for the Energy-SHIFTS Forum.

What is Energy-SHIFTS?

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan (Energy-SHIFTS) is a €1m investment through the EU Horizon 2020 programme running over 2019-2021. Specifically, it represents the European Forum for energy-related Social Sciences and Humanities (energy-SSH). Energy-SSH has played less of a role to date in shaping (European) energy policy than Science, Technology, Engineering and Mathematics (STEM) disciplines. Energy-SHIFTS' work is feeding directly into the DG for Research and Innovation of the European Commission and is working to inform future Horizon Europe and SET-Plan priorities.

The Working Group interviews

Energy-SHIFTS is undertaking around 40 informal interviews between December 2019 and March 2020 with representatives of key energy-SSH academic communities who have agreed to participate in the four Energy-SHIFTS Working Groups. The interview will last up to 60 minutes (via phone/online/in person) and be audio-recorded. As well as the interviewer, there may also be a note-taker present. Discussion will cover a number of themes related to your work and the aims and scope of the *[insert topic]* Working Group.

Outputs

The interview will feed into written outputs, including a publicly available report on energy-SSH research needs for Horizon Europe, as well as help shape the next stage of the Working Group consultation processes. All data in such outputs will be anonymised, but may include direct quotes. The anonymised transcripts will also be made publicly available via a relevant EU open data portal.

You are free to decide before or during the interview not to take part, or to withdraw your data within 2 weeks of taking part; in both cases please contact your interviewer. The Energy-SHIFTS project is led out of the Global Sustainability Institute, Anglia Ruskin University, UK, and activities have received ethical approval [GSIDREP/1617/001/R].

Key contacts for any questions

[interviewer's name, role, and email]
Dr Chris Foulds, Energy-SHIFTS Horizon Scanning working groups Work Package lead (chris.foulds@anglia.ac.uk)
Dr Rosie Robison, Energy-SHIFTS Ethics Work Package lead (rosie.robison@anglia.ac.uk)

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 826025.

11.5. Appendix 5 – Interview Consent Form

This Appendix provides the Consent Form that all interview participants must read and respond to before beginning the Working Group interviews.

Energy-SHIFTS Working Group interviews: Consent Form

Energy -SHIFTS

ENERGY SOCIAL SCIENCES & HUMANITIES INNOVATION FORUM TARGETING THE SET-PLAN

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan (Energy-SHIFTS) represents the European forum for energy-related Social Sciences and Humanities (energy-SSH). As part of its scoping work, Energy-SHIFTS is conducting a number of informal interviews in 2020.

At the start of the interview: the information sheet will be discussed, and you will be asked to confirm verbally and by email that you agree to the following statements:

- I am at least 18 years old.
- I agree to take part in the interview.
- I have been provided with a copy of the Participant Information Sheet and Consent Form.
- I have read the information sheet. I understand what my role will be, and all my questions have been answered to my satisfaction. I understand I am free to ask further questions at any time.
- I understand that I am free to withdraw my data within two weeks of the interview, without giving a reason, by contacting the interviewer.
- I understand what will happen to the data collected from me for the research.
- I understand the interview will be recorded, that anonymised quotes from me may be used in Energy-SHIFTS materials, and that anonymised transcripts will be made available on an EU open data portal.
- Data Protection: I agree to the Energy-SHIFTS consortium processing personal data that I have supplied. I agree to the processing of such data for any purposes connected with the Energy-SHIFTS Project as outlined to me. I understand my data may be shared with Energy-SHIFTS partners, some of whom are based outside the EU, but all of whom are contractually bound to abide by EU data protection law. I understand personal data will be held for a maximum of 2 years after the end of the project (i.e. up to 31 March 2023), after which time it will be destroyed. For more information about how we process your personal data for this project, please see our project Privacy Policy (https://energy-shifts.eu/privacy-policy/) and ARU's general Privacy Notice (https://aru.ac.uk/privacy-and-cookies/research-participants) for research activity.

Please also confirm with your interviewer whether you are happy to be named in the general acknowledgements of Energy-SHIFTS outputs (not associated with individual responses).

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 826025.

11.6. Appendix 6 – Annotated bibliography editorial guidelines

This Appendix provides the provisional editorial guidelines for the annotated bibliographies, which ultimately details the project's expectations for how the task should be implemented.

Annotated bibliographies: Editorial guidelines

Task description

Each WG will provide an annotated bibliography (with around 25 key pieces of literature) to accompany their research priority reports (D2.3), with the aim of summarising and signposting to supporting SSH literature. The target audience will be policyworkers and/or those new to the related energy-SSH debates. The basis for the bibliographies will be interview data. The bibliographies will have policy-focussed Executive Summaries.

Each WG should prepare one annotated bibliography. As with other WG tasks, the thematic and task divisions for writing and delivering these bibliographies are in accordance with the roles of the WG Chairs and Co-chairs, as set out elsewhere in the main body of this Guidelines document.

Annotated bibliographies are essentially expanded reference lists that have short, accessible explanations on why each reference is useful (and in what ways) in line with the specific aim of the respective bibliography. These short explanations are not merely a repeat/edit of the article's abstract, and instead must be written with a particular audience in mind. Examples include those published by SHAPE ENERGY, e.g. Buchmann et al. (2017), Heidenreich et al. (2017), Mourik et al. (2017), and Sumpf et al. (2017).

Provisional timeline

- End of April 2020: First draft sent for review to partners. NTNU (as Bibliographies lead) to coordinate this.
- Mid-May 2020: Drafts returned to authors with review.
- Mid-June 2020: Revised drafts sent for final review by NTNU.
- End of July 2020: Final versions to accompany the final Horizon Scan policy recommendations.
- End of September 2020: Official deadline for submitting to the EC.

Authorship attribution

To avoid misunderstandings, we encourage partners to clarify who will precisely co-author each bibliography and thus decide what the division of responsibilities will be from the start (e.g. within the respective partners leading on each WGs). Of course, authors may change during the writing, but we recommend that such changes are discussed as early as possible and certainly in advance. The lead partner is expected to identify the lead author within their institutions (likely the Chair themselves), unless another arrangement is agreed upon with Co-chair. Final authorship should be decided in line with the Vancouver Guidelines for Authorship[15].

Publication

All four annotated bibliographies will be published on the Energy-SHIFTS website and will be targeted towards a policy audience. We would, however, encourage the authors to consider revising the bibliography for peer reviewed

15 http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html

publication, either as an individual paper or as background context for an academic publication of the Horizon Scan results.

Topics

Each annotated bibliography should focus on the topic of the WG, but further clarity and detail on said topics should also be included in each bibliography. The exact boundaries and scope of the WG topic in the bibliographies will inevitably depend on the:

- Description of the WGs in the Terms of Reference.
- Selected group of interview participants e.g. their discipline, areas of focus, research interests.
- Suggested corpus of literature provided by interview participants.
- Additional literature included by the authors.

Authors should be reflexive regarding how their methodological choices influence the definition of the topic.

Aim

The aim of the annotated bibliography is to summarise and signpost key SSH literature within each given topic. In line with the purpose of the 10 qualitative interviews, the bibliography has three main objectives:

- To capture some of the main SSH debates, milestones, and advances in the field in question, through a summary of key scholarly contributions.
- To serve as a companion to the final Horizon Scans (i.e. the top 100 research questions submitted to the EC) by providing a contextual anchoring to the suggested questions.

Audience

Policyworkers are the main target audience for the Energy-SHIFTS annotated bibliographies. Since the goal of Energy-SHIFTS is to promote and improve the impact of SSH research on (EU) energy policy(workers), it is important for the annotated bibliographies to clearly target a policy-oriented audience. As such, the following should be remembered:

- Policyworkers may range from either being highly experienced or new to the WG topic.
- We can assume that they are familiar with reading descriptive (scholarly) literature, but possibly not energy-related SSH scholarship.
- Authors should therefore avoid highly specialised terminology, and should give clear explanations and be reflexive about their attention to details that may not be relevant to a non-academic audience.

Of course, also scholars new to the energy-SSH field may be interested in reading the annotated bibliographies. We think that a focus on clarity will also serve as a good introductory step for academic readers.

Methodology for selecting 25 key pieces of literature

There are four steps in the selection procedure for the 25 key pieces of literature to be included in an annotated bibliography:

1. A list of papers will be collected through the 10 in-depth interviews. Each interview participant will be asked to provide a list of at least five ground-breaking or central pieces of literature for the topic in question.
2. Once all the suggestions are collected, the second step is to review possible overlaps between the suggested literature and compose a full list of suggestions.
3. Then, the authors (most likely the WG Chair and Co-chair, with any collaborators that they deem necessary) need to review the suggestions. If the authors are not familiar with the literature, they should first read the necessary contributions.
4. Selection criteria:
    - Although this is not a narrative review, the selection criteria should focus on capturing key debates and advances in the field, rather than a complete overview of the field.
    - Attention should be paid to deviance, as per the bibliographies' aim of exposing key, novel and wide-ranging contributions of energy-SSH papers.

- No 'objective' criteria will be used, but we encourage bibliography authors to consider the arguments put forward by the interview participants, especially in the context of the other papers already selected for the bibliography. It is not acceptable to only base selection on the number of times a paper was e.g. referred to in the interviews or has been cited in the literature to date. We thereby encourage the authors to use their own qualitative assessment in judging which papers to select; a record should be kept of their justification.
- Depending on the number of suggested pieces of literature, the authors may need to either cut down the number of pieces included, or possibly, add additional suggestions.

Content/template for annotated bibliography

The annotated bibliographies should be between 20-25 pages, excluding front and back matter. For now, we ask that all bibliographies follow the same structure:

- Front page
  Including: title; co-authors (name, organisation, country); email of corresponding author.
- Executive summary
  One page maximum.
- 1. Introduction
  Including: Purpose of the bibliography; presentation of the topic (including a justification for its boundaries and scope); a note to the reader about how the bibliography can be used, and by whom.
- 2. Methods
  Including: A description of the methodological choices – how the included 25 papers were chosen; a note on both the strengths and limitations of the approach; a brief summary of the Working Group interviews that took place, as quotations from the interviews may be drawn upon in the following section.
- 3. Presentation of key pieces of literature
  The presentation of the papers should be grouped in sub-sections. These sections can be devised according to debates, perspectives, topics, or similar. Each selected paper should be summarised in one paragraph, in maximum of around 250-300 words. If it is useful to quote directly from the Working Group interviews, then please do so. Harvard referencing should be employed.
- 4. Conclusions
  Conclusions should give an overarching summary of the papers. Authors should also provide some reflections on the outcome of the selection. They may see that a majority of the literature originated in specific countries or disciplines. These are important insights for further developments of the field.
- 5. Acknowledgements
  Including: EU funding acknowledgment; thanks to all interview participants and reviewers.

We do not anticipate that Appendices will be required for these bibliographies.

Contact

Please contact ivana.suboticki@ntnu.no with any queries regarding the Energy-SHIFTS annotated bibliographies.

11.7. Appendix 7 – Fieldnotes template and guidance sheet

We envisage that fieldnotes will be collected across 10 moments of the Horizon Scanning (and associated activities). This Appendix includes the prompts that will be posed at each of those moments, as well as some opening notes on what we expect from those doing the fieldnotes, and information regarding the use of their data. A dedicated working document will be setup for each fieldnotes contributor to use.

Energy-SHIFTS fieldnotes

[WG no.] | *[individual name]* | *[role]*

ENERGY SOCIAL SCIENCES & HUMANITIES INNOVATION FORUM TARGETING THE SET-PLAN

Participant information: Supporting notes for fieldnotes contributors

- These fieldnotes will be collected by:
  - Working Group Chairs
  - Working Group Co-chairs
  - ESRs
  - Critical Policy Friends
- The purpose of these fieldnotes is to record and gather the experiences of those involved in the Horizon Scanning, as part of reflecting upon how those very experiences may shape outcomes and outputs, as well as evaluating what worked well and what could have been improved.
- We have included a template to guide the process of reflecting and recording notes at 10 key moments. This should be treated as an indicative guide; the fieldnotes can cover additional moments that may be deemed important or noteworthy. This is at your discretion, and will vary across individuals and Working Groups. At various stages of the Horizon Scanning, the fieldnotes contributors will inevitably have different roles and be more/less involved in different ways at different times, and thus the prompts provided are just that: prompts for fieldnotes contributors to react to. We very much appreciate that some prompts will be more/less relevant depending on who is responding, and when.
- For each of the 10 moments: please draft around 1 page of A4 in your designated Google Document (excluding the prompts' text), reflecting on your thoughts and experiences during this stage of the Horizon Scanning process. You may draft a longer set of reflections if you wish, but please limit yourself to no more than 3 pages single spaced (excluding the prompts' text).
- Please do remember:
  - To date your individual fieldnotes by the date on which you start fieldnotes for a particular 'moment'. If you return to the fieldnotes and add text at a later date, you may insert the date of this later text 'in-line'. If you return to the fieldnotes to edit your text, you may add an in-line annotation to state that the original text was edited on x date. There is no need to retain the old text; the fieldnotes are there to craft as you see fit.
  - The 'moments' we have selected broadly overlap with the step-by-step process of the Energy-SHIFTS Horizon Scanning, as outlined in our Methodological Guidelines (see main text of this document). However, depending on how different Working Groups conduct their analytical deliberations, it is possible that some steps may merge or take place in a different order. We ask that you use your own discretion and

best judgement in making your reflections at each moment, if you note an evolving mismatch between the Horizon Scanning steps and the 'moments' we have selected below.

- There are no wrong answers; any and all views, experiences and observations are useful to know.
- Everyone's fieldnotes will be very different. Subjectivity is inevitable and actually something that we embrace in interpreting and analysing the fieldnotes.
- We are looking for reflection rather than description; i.e. we are interested in your observations, thoughts, reactions and perspectives, rather than a summary of what 'went on' at each stage.
- You may have a lot to say in response to some of the prompts, and much less on others, and that is fine.
- Please provide your opinion freely; criticism of the process is welcome, as is reflection on conflicts, difficult conversations, failures in deliberation or facilitation within the group, etc. Indeed, these will provide a very rich and valuable source of data, and reflecting on these adds to (rather than retracts from) the rigour of the process.
- Everything you say will be anonymised when it is reported on beyond the bounds of the project (e.g. for EC reports, academic papers, etc.). The small number of Energy-SHIFTS researchers (likely summing 2-4) who will read/analyse these fieldnotes will treat all that they read confidentially.
- We have used prompts intentionally to focus one's efforts in writing these fieldnotes. Essentially, if you have something outside of these prompts that you believe we need to know, then please do include this, but otherwise please do prioritise responding to the prompts provided.
- You are welcome to edit your own writing. If you have 'further thoughts' about a stage that has passed, you are welcome to simply add this to the relevant portion of your Google Document. We will only collect fieldnotes once the entire process is complete, so please feel free to record your ideas and impressions as they occur to you.

- We are planning to write a journal article on the basis of these fieldnotes. Whilst we are extremely grateful for you contributing these fieldnotes, that alone will not be enough to make you a co-author of that article. Nevertheless, all fieldnotes contributors will be given the opportunity to do additional tasks (associated with the article's development) that will justify co-authorship status. Should fieldnotes contributors not be able to deliver on those additional tasks (and there is no formal pressure to do so), then they will still be explicitly thanked in the Acknowledgements.
- ARU must receive a signed Consent Form before one can begin doing the fieldnotes. These will be collated by emma.milroy@anglia.ac.uk.
- You are free to decide not to take part, or to withdraw your data (until two weeks after the final submission of your fieldnotes contribution); in both cases, please contact Chris Foulds or Zareen Bharucha (details below). The Energy-SHIFTS project is led out of the Global Sustainability Institute, Anglia Ruskin University, UK, and activities have received ethical approval from the Institute's ethics review committee [GSIDREP/1617/001/R].
- For questions about these fieldnotes, your participation and/or your data, please contact chris.foulds@anglia.ac.uk and zareen.bharucha@anglia.ac.uk.

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i. ESR recruitment *[ESR representatives should skip moment i., and thus begin their fieldnotes at moment ii.]*:

1. What are your overall reflections on how the ESRs were recruited?
2. What are your expectations on how the ESRs will contribute to this process? Why are they valuable? How good a fit are the recruited ESRs for these expectations?
3. How did the group work together to make decisions to finalise the recruitment? If there were any disagreements, tensions, clashes or conflicts, can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group - such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else - play out in the discussions?
4. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact recruitment decisions?
5. Were there any observations or comments that you feel are important to note, related to this stage of finalising the terms of reference process?
6. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

ii. Terms of Reference (ToR) finalisation:

1. What are the expectations - from yourself and the wider group - about the whole of the forthcoming Horizon Scanning process? What are your thoughts, hopes and ambitions, or any concerns you have about how the process will work and what it will achieve?
2. What was your experience with 'defining' the Horizon Scan boundaries for your Working Group?
3. How did the group work together to make decisions to finalise the ToR? If there were any disagreements, tensions, clashes or conflicts, can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group - such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else - play out in the discussions?
4. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact on the direction of the discussion?
5. Were there any observations or comments that you feel are important to note, related to this stage of finalising the terms of reference process?
6. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?
7. Can you give us some feedback on your experience of doing these reflections? Were they easy or difficult? Too time-consuming? Have we missed out on something that you feel people should reflect on? Was it easy to do these fieldnotes as a relative observer of the process (e.g. if you are a Critical Policy Friend)?

iii. Finalising the methodological guidelines:

1. What are your overall reflections on how the methodological guidelines were crafted and finalised? What are your expectations of how they will be received once they are rolled out?
2. Which parts of the mandatory requirements feel more / less comfortable, and why? Are any parts of the guidelines confusing?
3. How did the group work together to make decisions to finalise the methodological guidelines? If there were any disagreements, tensions, clashes or conflicts, can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group – such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else – play out in the discussions?
4. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact on finalising and rolling out the methodological guidelines?
5. Were there any observations or comments that you feel are important to note, related to this stage of finalising and rolling out the guidelines?
6. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

iv. Working Group (WG) member interviews:

1. What do you think about how the interviews were conducted?
2. How do you think the interviews were useful (or not) in revealing how the field has evolved?
3. Were there any group discussions about the process or content of the interviews (either the questions or the data)? How did these discussions go? Were there any disagreements, tensions, clashes or conflicts? Can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group – such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else – play out in the discussions?
4. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact at this stage?
5. Were there any observations or comments that you feel are important to note, related to this stage?
6. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

v. Working Group (WG) member recruitment:

1. WG Chairs and Co-chairs only: What are your expectations and feelings about facilitating the process with the recruited group?
2. What are your overall reflections on how the WG members were recruited? Were there any challenges with meeting the selection criteria? How representative do you think the final set of WG members are in terms of the variety of perspectives, topics and viewpoints within this particular WG topic?
3. What are your expectations on how the WG members will contribute? What do you think will influence different members' contributions?
4. How did the group work together to make decisions to finalise the recruitment? If there were any disagreements, tensions, clashes or conflicts, can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group – such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else – play out in the discussions?
5. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact on recruitment decisions?
6. Were there any observations or comments that you feel are important to note, related to this stage of finalising the terms of reference process?
7. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

vi. Horizon Scanning: soliciting research questions from the wider community:

1. What are your expectations for the amount and kind of research questions which we will receive in response to our 'call for questions'?
2. If you helped to spread the survey, what were your experiences of contacting the wider community?
3. Was there any discussion within the group at this stage regarding how questions should be solicited, or which networks to target (or something else)? If so, how did these discussions go? Were there any disagreements, tensions, clashes or conflicts? Can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group – such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else – play out in the discussions?
4. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact on how questions will be solicited from the wider community?
5. Were there any observations or comments that you feel are important to note, related to this stage?
6. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

vii. Horizon Scanning: All questions received, collated, edited and categorised:

1. Now that a list of questions has been received: looking back, what do you think of the process so far? Has it yielded a good list of questions, in terms of number, breadth, and quality? Do you think there has been a skew towards certain topics or perspectives?
2. What were your initial thoughts on the list of questions that was received?
3. WG Chairs and Co-chairs only: What did you think of the initial list of questions received (the 'raw data')? What was the process of editing these like?
4. WG Chairs and Co-chairs only: How did you decide on the initial list of categories? Can you reflect on your thinking and the discussions you had about this between yourselves? Was the process easy / difficult and why?
5. Can you comment on your reactions to the 'cleaned' list of questions and doing the first round of voting? Was this voting process easy / difficult and why?
6. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact on the creation of the various categories and the classification of the questions?
7. Were there any observations or comments that you feel are important to note, related to this stage?
8. At the end of the first round of voting, can you reflect on your reactions on the votes?
9. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

viii. Horizon Scan: Selecting the final 100 questions:

1. Now that there is a list of questions that are 'definitely in': what are your thoughts on these? How do you feel about the questions that are 'up for discussion'? What do you think has influenced the group's voting behaviour during the first round?
2. Can you elaborate a bit on the overall process by which the final questions are being decided on? How is this being coordinated? Are group members coming together, or discussing only remotely (or some combination of the above)? Is the process being done 'iteratively' – with distinct phases or conversations or as one ongoing conversation between WG members? Do you think WG members are comfortable with how the selection is proceeding?
3. How were questions deleted, combined or refined to arrive at the final list? Were there any disagreements, tensions, clashes or conflicts? Can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group – such as in prior experience, sectoral affiliation, gender, seniority, or something else – play out in the discussions?
4. Can you comment on the process by which the final categories were decided on and questions classified? Were there any disagreements, tensions, clashes or conflicts? Can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to disagree'?) How did differences within the group – such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else – play out in the discussions?
5. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact on the selection of the questions?
6. Were there any observations or comments that you feel are important to note, related to this stage?
7. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

ix. Webinar to Working Group (WG) members:

1. How the webinar unfolded, and the overall discussion between WG members.
2. How did different WG members react to the final group of questions presented? Were there any disagreements, tensions, clashes or conflicts? Can you tell us about these, reflecting on why they may have occurred, how they played out, and what helped the group achieve resolution at the end? (If the group continued to disagree but matters moved forward anyway, what was the 'deciding factor' that made people 'agree to

disagree'?) How did differences within the group – such as in prior experience, sectoral or disciplinary affiliation, gender, seniority, or something else – play out in the discussions?
3. Were there any instances of 'major breakthroughs' in the discussion, such as where something you (or a colleague) had a significant impact during the WG discussions?
4. Were there any observations or comments that you feel are important to note, related to this stage?
5. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

x. Horizon Scan deliverable submission:

1. Your thoughts and reflections on the entire process, looking back. Do any particular events, conversations or stages stand out as particularly interesting to you or particularly significant? What were these and why are they significant?
2. How did the process as a whole match with your expectations?
3. If you helped to craft the final deliverable, what was this experience like?
4. Did any previously resolved conflicts or tensions re-emerge at this stage? Any new ones? How were these dealt with?
5. Overall, what was your experience of how the group held together and deliberated throughout the process? Were there any particularly 'persuasive' members or any that consistently 'held back'? How were these differences managed by the various WG members?
6. Were there any observations or comments that you feel are important to note, related to this stage?
7. What do you think the Horizon Scanning process will offer to EC policymakers?
8. What could be done at this stage to encourage (or not) the future use of Horizon Scanning methods?

11.8. Appendix 8 – Horizon Scanning fieldnotes Consent Form

Before any fieldnotes contributor can begin the fieldnotetaking, they must complete and return this Appendix's fieldnotes Consent Form.

Energy-SHIFTS fieldnotes Consent Form

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan (Energy-SHIFTS) represents the European forum for energy-related Social Sciences and Humanities (energy-SSH). As part of its Horizon Scanning work, Energy-SHIFTS is gathering fieldnotes from people involved in the Working Group process.

Please confirm by email that you agree to the following statements:

- I am at least 18 years old.
- I agree to provide written fieldnotes on my experiences.
- I have been provided with a copy of the Participant Information Sheet (specifically: the 'supporting notes' at the start of your Google Documents fieldnotes template) for the fieldnotes, and a copy of this Consent Form.
- I have read the supporting notes. I understand what my role will be, and all my questions have been answered to my satisfaction. I understand I am free to ask further questions at any time.
- I understand that I am free to withdraw my data without giving a reason, until two weeks after the final submission of my fieldnotes contribution, by contacting Energy-SHIFTS.
- I understand what will happen to the data collected from me for the research.
- I understand that anonymised quotes from me may be used in Energy-SHIFTS materials.
- Data Protection: I agree to the Energy-SHIFTS consortium processing personal data that I have supplied. I agree to the processing of such data for any purposes connected with the Energy-SHIFTS Project as outlined to me. I understand my data may be shared with Energy-SHIFTS partners, some of whom are based outside the EU, but all of whom are contractually bound to abide by EU data protection law. I understand personal data will be held for a maximum of 2 years after the end of the project (i.e. up to 31 March 2023), after which time it will be destroyed. For more information about how we process your personal data for this project, please see our project Privacy Policy (https://energy-shifts.eu/privacy-policy/) and ARU's general Privacy Notice (https://aru.ac.uk/privacy-and-cookies/research-participants) for research activity.

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11.9. Appendix 9 – End-of-process Working Group member feedback survey – provisional version

This Appendix contains the survey that will be used to evaluate the experience of the Working Group members just after the project submits the final list of Top 100 Questions to the EC..

Energy-SHIFTS Evaluation Survey

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan (Energy-SHIFTS) is a €1m investment through the EU Horizon 2020 programme running from 2019-2021. Specifically, it represents the European forum for energy-related Social Sciences and Humanities (energy-SSH). Energy-SSH has played less of a role to date in shaping (European) energy policy than Science, Technology, Engineering and Mathematics (STEM) disciplines and, as such, Energy-SHIFTS has been working to develop Europe's interdisciplinary expertise in using and applying energy-SSH, particularly at the strategic European level. The two-year Energy-SHIFTS project began in April 2019 and is coordinated by Anglia Ruskin University (UK).

This Evaluation Survey is being sent to all members of the Energy-SHIFTS Working Groups. As one of the goals of the project is to evaluate the processes and effects of Working Groups, it is really important for us that you reflect on the questions and answer them honestly. Your input will be used to summarise the Working Groups and – if possible – improve the experience for the future participants of similar exercises.

This survey is intentionally designed to be easy-to-do and should take only up to 10 minutes. Responses may be quoted (anonymously) in project outputs including a public, free-of-charge evaluation report at the end of 2020 (available via www.energy-shifts.eu). Since you are a named participant/contributor to the Energy-SHIFTS Working Groups, there is a small chance quotes may be identifiable, although we anticipate well over a hundred responses, making this unlikely.

Should you have any queries about this survey, please contact seweryn.krupnik@uj.edu.pl; or any queries about the Working Groups or Energy-SHIFTS project more widely, then please contact chris.foulds@anglia.ac.uk. You are free to withdraw within two weeks of completion by emailing these addresses.

☐ Please tick to confirm you understand information submitted to this survey may be anonymised and made publicly available online.

☐ Please tick to confirm you are at least 18 years old.

☐ Data Protection: Please tick to confirm you understand that data may be shared with Energy-SHIFTS partners, some of whom are based outside the EU, but all of whom are contractually bound to abide by EU data protection law. Personal data will be held for a maximum of 2 years after the end of the project (i.e. up to 31 March 2023), after which time it will be destroyed. For more information about how we process your personal data for this project, please see our project Privacy Policy (https://energy-shifts.eu/privacy-policy/) and ARU's general Privacy Notice (https://aru.ac.uk/privacy-and-cookies/research-participants) for research activity.

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[Indicative questions]

Professional details

Name:

Gender (please tick):

☐ Male
☐ Female
☐ Other

Organisation type (please tick):

☐ Academic
☐ Policy
☐ Industry
☐ Non-Governmental Organisation
☐ Citizen
☐ Other (please state: _____)

The experience of Working Group participation

Which Working Group were you a member of?:

☐ WG1: Renewables
☐ WG2: Smart Consumption
☐ WG3: Energy Efficiency
☐ WG4: Transport and Mobility

Now we would like to ask you about your experience as a member of your specific Working Group. Please indicate whether you agree or disagree with the following statements:

1. I have had a full understanding of my role at various stages of the work.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

2. All group members have had relevant energy-SSH expertise.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

3. There was sufficient spread of expertise and perspectives representing different epistemic communities, as well as different levels of experience.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

4. There was an adequate facilitation to ensure new possibilities and deliberation at each stage.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

5. There was enough space for divergence and constructive disagreements.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

6. Full range of voices was included in developing the final list of questions.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

7. Overall, I am satisfied with my participation in the group.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

8. My participation in the group was a learning experience.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

9. The process was efficient enough to provide high-quality effects in a given time.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

10. Overall, I am satisfied with the final list of research questions.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *Agree* ☐ *strongly agree*

11. The final list of research questions provides a meaningful overview of the field that the Working Group was dedicated to.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *Agree* ☐ *strongly agree*

12. Thanks to the participation in the Working Group, I learned about new and under-represented voices within the field that group was dedicated to.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *Agree* ☐ *strongly agree*

13. As a result of my participation in the Working Group, I better understand the work of other members of the Group.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *Agree* ☐ *strongly agree*

14. It is very likely that I will collaborate more with other members of the Group in the future.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

15. You indicated that you do not agree with the following statements. Please, for each of them, elaborate on how these elements of Horizon Scanning could be improved.

16. Were there some unexpected effects of your participation in the group?

17. Additional comments

Please use this space to tell us anything else that you think we should take note of.

11.10. Appendix 10 – Follow-up Working Group member feedback survey – provisional version

This Appendix contains the survey that will be used to evaluate the effects of the Working Groups. The data will be collected 5-6 months after Working Groups decide on (not submit) the final list of Top 100 Questions.

Energy-SHIFTS FOLLOW-UP Evaluation Survey

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan

Energy Social Sciences & Humanities Innovation Forum Targeting the SET-Plan (Energy-SHIFTS) is a €1m investment through the EU Horizon 2020 programme running from 2019-2021. Specifically, it represents the European forum for energy-related Social Sciences and Humanities (energy-SSH). Energy-SSH has played less of a role to date in shaping (European) energy policy than Science, Technology, Engineering and Mathematics (STEM) disciplines and, as such, Energy-SHIFTS has been working to develop Europe's interdisciplinary expertise in using and applying energy-SSH, particularly at the strategic European level. The two-year Energy-SHIFTS project began in April 2019 and is coordinated by Anglia Ruskin University (UK).

As you were a member of one of the Working Groups in the project, we kindly ask you to answer some questions about the effects of the activity. This follow-up evaluation survey is being sent to all members of the Working Groups. We appreciate that you have already filled in the original evaluation survey. This follow-up survey has different questions and is being sent to all Working Group members.

As one of the goals of the project is to evaluate the effects of Working Groups, it is really important for us that you reflect on the questions and answer them honestly. Your input will be used to summarise the Working Groups and – if possible – improve the experience for the future participants of similar exercises.

This survey is intentionally designed to be easy-to-do and should take only up to 5 minutes. Responses may be quoted (anonymously) in project outputs including a public, free-of-charge evaluation report at the end of 2020 (available via www.energy-shifts.eu). Since you are a named participant/contributor to the Energy-SHIFTS Working Groups, there is a small chance quotes may be identifiable, although we anticipate well over a hundred responses, making this unlikely.

Should you have any queries about this survey, please contact seweryn.krupnik@uj.edu.pl; or any queries about the Working Groups or Energy-SHIFTS project more widely, then please contact chris.foulds@anglia.ac.uk. You are free to withdraw within two weeks of completion by emailing these addresses.

☐ Please tick to confirm you understand information submitted to this survey may be anonymised and made publicly available online.

☐ Please tick to confirm you are at least 18 years old.

☐ Data Protection: Please tick to confirm you understand that data may be shared with Energy-SHIFTS partners, some of whom are based outside the EU, but all of whom are contractually bound to abide by EU data protection law. Personal data will be held for a maximum of 2 years after the end of the project (i.e. up to 31 March 2023), after which time it will be destroyed. For more information about how we process your personal data for this project, please see our project Privacy Policy (https://energy-shifts.eu/privacy-policy/) and ARU's general Privacy Notice (https://aru.ac.uk/privacy-and-cookies/research-participants) for research activity.

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[Indicative questions]

Professional details

Name:

Gender (please tick):

☐ Male
☐ Female
☐ Other

Organisation type (please tick):

☐ Academic
☐ Policy
☐ Industry
☐ Non-Governmental Organisation
☐ Citizen
☐ Other (please state: _____)

The effects of Working Group participation

Which Working Group were you a member of?

☐ WG1: Renewables
☐ WG2: Smart Consumption
☐ WG3: Energy Efficiency
☐ WG4: Transport and Mobility

Now we would like to ask you about your opinion about the effects of Working Group (further group). Please indicate whether you agree or disagree with the following statements:

1. Overall, I am satisfied with the final list of research questions.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

2. The final list of research questions provides a meaningful overview of the field that the group was dedicated to.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

3. Thanks to the participation in the group, I learned about new and under-represented voices within the field that the group was dedicated to.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

4. As a result of my participation in the group, I understand better work of other members of the group.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

5. As a result of my participation in the group, I collaborated more with other members of the group.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

6. I have observed that the results of the group work are used in administrative documents at EU or member states levels.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

7. I observed an influence of the final list of questions on academic research agendas.

☐ *strongly disagree* ☐ *disagree* ☐ *undecided* ☐ *agree* ☐ *strongly agree*

8. Were there some unexpected effects of your participation in the group?

9. Additional comments

Please use this space to tell us anything else that you think we should take note of.

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a.r.u. Global Sustainability Institute

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EERA European Energy Research Alliance

acento comunicación

Jagiellonian University in Kraków

NTNU Norwegian University of Science and Technology

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