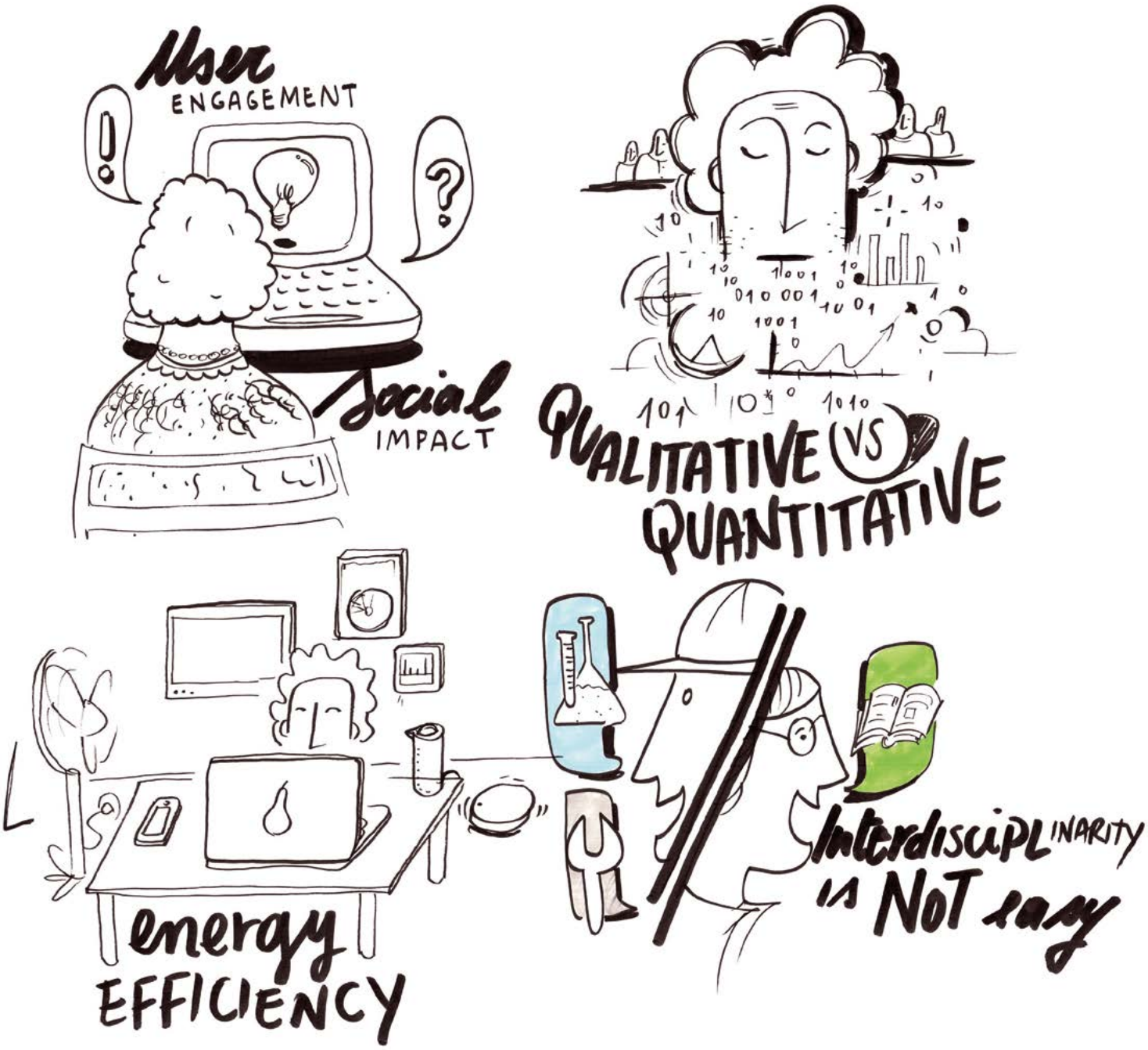
KEY FINDINGS- The SHAPE ENERGY Horizon 2020 Sandpits



KEY FINDINGS

The SHAPE ENERGY Horizon 2020 Sandpits

SHAPEENERGY

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Executive summary

The Horizon 2020 Sandpits, called 'From Horizon 2020 towards FP9 interdisciplinary projects: be amazed at what we can achieve together!', were dedicated to the issue of integrating Science, Technology, Engineering and Mathematics (STEM) with Social Sciences and Humanities (SSH) in EU-funded energy projects.

SHAPE ENERGY used sandpits to promote intensive discussion forums, where free thinking was encouraged to delve into the problems and explore innovative solutions concerning EU energy policy. Sandpits are residential interactive workshops involving 20-30 participants, a director, a team of expert mentors, and a number of independent stakeholders. Sandpits usually have a highly multidisciplinary mix of participants, some active researchers, and others potential users of research outcomes, who all come together in pursuit of lateral thinking and radical approaches to research challenges.

In this report, we detail: the selection process of the projects that were represented at the sandpits; the sandpit activities; and key findings that came out of the SSH-STEM integration exercises that were conducted. This report gathers understandings on what can bring together academics and practitioners involved in energy related EU-funded projects aiming at reaching a higher integration of SSH. Outcomes from sandpits have been useful for: comparing current directions and ongoing tasks in individual EU energy and transport projects; proposing concrete ideas for increasing the impacts of those projects on society; reflecting on innovative methods of interdisciplinary and cross-sector working within energy and transport projects; and presenting seeds for future project ideas for progressing energy-related topics.

The sandpits took place at two different times, each dedicated to two of the four SHAPE ENERGY topics:

- 8-9 February 2018: Topic 1 'Energy efficiency and using less' and Topic 2 'Competitive, secure, low carbon energy supply';
- 22-23 February 2018: Topic 3 'Energy system optimisation and smart technologies' and Topic 4 'Transport sector decarbonisation'.

In total, 75 practitioners and researchers in total attended the two sandpits, representing institutions from 17 different countries: Belgium; Croatia; Czech Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; the Netherlands; Norway; Portugal; Slovakia; Spain; and the United Kingdom. Their disciplinary background was distributed across STEM (approximately two-thirds) and SSH (approximately one-third).

Based on the results of these two 2-days' worth of ice-breaking and team-building activities – which were assisted by improvisational theatre actors and graphic illustrators visualising real-time content of the storytelling activities – we worked with the participants in considering a set of concrete SSH-STEM integration challenges and research proposal ideas. From such activities, our main findings emphasised how SSH is still predominantly regarded as a means to orient the market and encourage individuals to accept a top-down policy, technology or process, and this is further illustrated through the ways that the Horizon 2020 energy and transport calls are fundamentally framed and positioned.

It was evident how challenges exist in establishing meaningful STEM-SSH dialogue, as a basis for interdisciplinary collaboration for instance, with different (disciplinary) vocabularies being a particular reason for friction and incomprehension emerging. Relatedly, there was clear (unconscious) bias due to the lack of a real epistemological (i.e. regarding what we can ever possibly know about 'what exists') acknowledgement of different disciplines' expertise, which in turn fed into disagreements over what respective disciplines were regarded as being able to 'effectively' contribute to with 'authority'. The question of 'translation' between disciplines also arose during the other SHAPE ENERGY activities, and thus we would argue that there is a real need for projects (and their constituent partners) to work with better understandings of what the mutual value could be of establishing pluridisciplinary modes of thinking.

Our findings have implications for future Horizon 2020 projects, and indeed the European Commission's plans for Horizon Europe. Specifically, we advocate a different approach to energy funding calls that better

embraces systems-thinking and the various SSH perspectives on offer. We recognise that any funding calls that remain open to progressive and SSH-informed research questions may well lead to different approaches, different problem definitions and thus also different outcomes, compared to what was perhaps originally intended by those writing the calls. We, however, argue that being less oriented towards direct utilitarian thinking, which is often what dominates many existing calls, may facilitate a more integrated SSH contribution – both in terms of the problem conceptualisation and research design phase of the proposal-writing and in terms of the subsequent implementation of the projects themselves.

These insights can open up debates on what is needed to drive further interdisciplinary and society-relevant research and innovation, through enhanced multi-stakeholder cooperation and transdisciplinary communication on complex topics. Such progress is needed if we are to build coalitions, trust and connections, as well as establish the necessary shared values, goals and motivations, amongst our energy researcher and practitioner communities.

List of Abbreviations and Acronyms

CO2	Carbon dioxide
CORDIS	COmmunity Research and Development Information Service
DSO	Distribution System Operator
EC	European Commission
EE	Energy efficiency
EPSRC	Engineering and Physical Sciences Research Council (United Kingdom)
EU	European Union
FP7	The Seventh Framework Programme for Research and Technological Development
FP9	The Ninth Framework Programme for Research and Technological Development
H2020	Horizon 2020 – The European Union's Funding Programme for Research and Innovation
ICT	Information and Communication Technology
LCA	Life-Cycle Assessment
NGO	Non-Governmental Organisation
PA	Public Administration
POLITO	Politecnico di Torino (SHAPE ENERGY project partner)
RE	Renewable energy
RIA	Research and Innovation Action
SSH	Social Sciences and Humanities
STEM	Science, Technology, Engineering and Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization
WP	Work Package

Contents

1. Introduction

Politecnico di Torino (POLITO) organised two 2-day sandpits (on 8-9 February and 22-23 February 2018), at Valentino Castle, Turin, Italy. As per the UK's Engineering and Physical Sciences Research Council (EPSRC), a sandpit can be defined as a 'short, intensive event aimed at generating new ideas and new collaborations. It provides time and space away from the day-to-day running of a project to reflect upon and consider future directions. It can for example help facilitate 'blue sky' thinking, and consideration of radical new questions and methods' (EPSRC, 2018).

The SHAPE ENERGY Horizon 2020 Sandpits programme was designed as an opportunity for participants to reflect on how to frame questions that help SSH to become embedded into existing and future energy- and transport-related projects, encouraging interdisciplinary depth around problem-centred issues. In these sandpits, four core topics were covered: (1) 'Energy efficiency and using less' and (2) 'Competitive, secure, low-carbon energy supply', on 8-9 February 2018; and (3) 'Energy system optimisation and smart technologies' and (4) 'Transport sector decarbonisation', on 22-23 February 2018.

The main goal of the SHAPE ENERGY Sandpits was to bring people together who are interested in improving and innovating their own (and indeed others') perspectives, and who are currently or have recently been involved in EU-funded projects on issues relating the sandpit's four core topics. In line with one of the SHAPE ENERGY project objectives of reaching a deeper integration of SSH into energy- and transport-related projects for Horizon 2020 and beyond, the events aimed to deliver short-term benefits for participants, such as meeting Europeans colleagues in a stimulating environment and generating future energy project ideas with an emphasis (or at least a novel twist) on the role and/or impact of society. Additionally, attendees had the opportunity to reflect on current directions and tasks in their own individual projects, as well as also experience innovative facilitation methods targeting interdisciplinary and cross-sector working.

This report gathers information on the organisational aspects of the sandpits, the participants, the practice of interdisciplinarity, and the place of SSH in energy- and transport-related projects – as per SHAPE ENERGY's broader four topics which fed directly into the scope and boundaries of the sandpit topics (Figure 1).

Figure 1: The sandpits' four topics.

This report is divided into four sections. After this introduction (section 1), the sandpits' design and implementation phases are described, including the participant details and the sandpit activities carried out by the POLITO team (section 2). Section 3 presents the results in terms of lessons learned and observations made from the participant reports/feedback. We then finish with our conclusions (section 4), including discussion of possibilities for further research topics and aggregation of major concerns and opportunities to work together.

2. The SHAPE ENERGY Horizon 2020 Sandpits

In this section, the sandpits' design and implementation phases are described. These include the creation of the EU project database, the sandpit participant selection criteria, participants' facts and figures, and activities carried out by the POLITO team (storytelling, visual thinking, social dinner, and UNESCO world heritage site visit). All our sandpit planning was done with the aim of creating a stimulating environment to share new and/or novel ideas as part of fostering future collaborations.

2.1. Preparing for the sandpits

In the months from March to May 2017, POLITO created (and then updated) a database of more than 500 EU Horizon 2020 and Seventh Framework Programme (FP7) energy and transport projects. These projects were selected according to their relevance to the aforementioned four SHAPE ENERGY topics.

The projects were chosen according to following procedure:

- On the freely accessible CORDIS EU portal[1], keywords associated with the four topics were used to find potentially relevant EU projects. In order to limit the research in such a way as to be as relevant as possible to SHAPE ENERGY, we did a cross-search based on different keywords such as 'energy', 'inclusive', 'transport', 'energy supply', 'low carbon energy', 'secure energy', 'competitive energy', 'sociology', and 'humanities'.
- Afterwards, we did a project-by-project examination to identify all those potentially relevant projects, and thereby we eliminated off-topic projects (such as, for example, Marie Curie projects that were solely mobility-focused projects, or solely technical projects that dealt with research infrastructures that do not concern energy-SSH interplay).
- Finally, we reviewed all our shortlisted projects to eliminate those for which we did not have significant and/or critical details (e.g. co-ordinator contacts) to be useful for the SHAPE ENERGY projects database. This led us to a list of mostly Horizon 2020 projects, with some FP7 ones too. In creating a final list of EU projects, we opted to only include projects that had their final year from 2016 onwards; we were keen to ensure that there was maximum scope for us to potentially influence how they accounted for SSH in the final and/or follow-on stages of their projects.

Invitations to apply were sent to the coordinators of those ~500 projects during late October to early November 2017. Herein, project coordinators were asked to make their partners aware of the opportunity to apply for the sandpits. They were also told that the sandpits were intended for three or four members of each consortium (from at least two different partners) to attend, and that preference would be given to consortia for whom this was the case. However, applications were welcomed also for projects with just one partner/individual interested in attending. They were asked to indicate the opic(s), and thereby sandpit date, they would have liked to attend.

In the invitation to the project coordinators, the following opportunities for participants were emphasised:

- reflect on current project direction and tasks, and take inspiration from each other on ways to tackle or innovate regarding these;
- generate and discuss future project ideas with current and potential partners, in light of the latest Horizon 2020 funding calls;
- experience innovative methods of interdisciplinary and cross-sector working (such as storytelling), through workshop sessions;

1 Community Research and Development Information Service (CORDIS) can be accessed via: https://cordis.europa.eu/home_en.html

- consider the integration of different disciplines within energy and transport projects, including the challenges and successes in this area;
- generate concrete ideas for increasing the impact of their projects;
- meet cross-European collaborators in a stimulating environment, through dedicated networking sessions; and
- spend quality time with a few key partners in their current consortium.

Call for applications officially closed on 22 November 2017; many applications were nevertheless sent a long time after the deadline had passed. The number of applications received summed 147, meaning that we were oversubscribed and had to create a waiting list. The great majority of applications were related to Topic 1, followed by Topic 2, meaning that the participation in the first sandpit (that is, the one where Topic 1 and Topic 2 were covered) was by far the most desired.

Starting from 27 November 2017, emails were sent to the accepted projects with the indication of the places available for them. In the instances where the offered/available places were less than the requested ones, project coordinators were left free to decide within their consortium who was going to participate. Our only request was not to have more than two representatives from each partner. As written above, preference was given to consortia with the highest number of representatives interested in attending the sandpits. Secondarily, we prioritised the projects where the interest to participate was expressed by individuals coming from under-represented countries. In addition, and once we had received the confirmations of participation from the accepted projects, we also sent emails to the other applicants to thank them for their interest and confirm that all spots were unfortunately filled.

SHAPE ENERGY funds covered participants costs associated with lunches/refreshments, accommodation, and a gala-dinner. Due to the great number of requests and to the limited budget, POLITO decided (and timely informed participants about that decision) to set limits to the number of nights covered through the SHAPE ENERGY funds. For instance, no nights were covered for participants travelling from Piedmont; one night was covered for participants travelling from places situated at less/around four hours by train from Turin (those places were identified as being Aosta Valley, Liguria, Lombardy, Veneto, Trentino-Alto Adige, Emilia-Romagna, Florence and Rome); and two nights were covered for participants coming from all the places not included in the previous examples.

2.2. Participants at the sandpits

In the following subsections, a descriptive overview is provided of the sandpit participants': Horizon 2020projects; SHAPE ENERGY topic alignment; gender; and country location of their research organisation. As is detailed, STEM disciplines were more represented than SSH disciplines, men were more represented than women, and Eastern Europe organisations were the less represented than other regions of Europe. While the first two aspects may be, at least partially, explained by the current disparities related to funding processes and to female underrepresentation in the energy sector, the latter – for lack of better explanations – may in part be due to logistical aspects. Saying this, we do note that there are systemic issues associated with Eastern Europe's capacity to do SSH work, compared to other (mainly western and northern) parts of Europe. But despite all this, we found no evidence that the slightly uneven representation of Europe geographical areas impacted significantly on the work carried out during the sandpits.

2.2.1. Horizon 2020 project representation

The representatives of 36 projects (at the end, all of which were Horizon 2020 projects) were present at the sandpits:

- The Horizon 2020 projects represented at the first sandpit (8-9 February 2018) summed 21: Ambition; Bio-HyPP; BIOROBURplus; BRISK2; CEMCAP; EMPOWERING; ENERGISE; EnPC-INTRANS; ENTRUST; GEMex; IRON; MAGIC-NEXUS; MOBISTYLE; NATCONSUMERS; PVSITES; ShaleXenvironmenT; SHAPE ENERGY; START2ACT; SWInG; THOMSON; and UPGRADE.

- The Horizon 2020 projects represented at the second sandpit (22-23 February 2018) summed 17: Ambition; BestRES; CONSEED; E2District; enCOMPASS; ENLARGE; ESA 2.0; FLEXMETER; ISABEL; LIMPET; Mobility4EU; PEMs4Nano; RenGen; SHAPE ENERGY; SHAR-Q; STOREandGO; and ZERO-PLUS.

Among these, STEM representatives were consistently more represented than SSH representatives. A breakdown of this balance can be found in Among these, STEM representatives were consistently more represented than SSH representatives. A breakdown of this balance can be found in Table 1.

Table 1. Breakdown of Science, Technology, Engineering and Mathematics (STEM) and Social Science and Humanities (SSH) participants per sandpit topic

Topic no.	Topic	No. of STEM participants	No. of SSH participants
1	Energy efficiency and using less	14	9
2	Competitive, secure, low-carbon energy supply	14	6
3	Energy system optimisation and smart technologies	12	5
4	Transport sector decarbonisation	10	5

A similar breakdown concerning the number of participants per project is provided below in Table 2. Two projects (AMBITION and SHAPE ENERGY) were represented at both sandpits. For them the total number of participants to the sandpits was six and seven respectively, thus representing 8.0% and 9.3% of total participants respectively.

Table 2. Sandpit participants per Horizon 2020 energy and transport project, summed across all topics and both sandpit events

Participants per Horizon 2020 project	No. of projects	% of total projects	No. of participants	% of total participants
1	15	41.7	15	20.0
2	11	30.6	22	29.3
3	7	19.4	21	28.0
4	1	2.8	4	5.3
5	0	0.0	0	0.0
6*	1	2.8	6	8.0
7*	1	2.8	7	9.3
TOTAL	**36**	**100.0**	**75**	**100.0**
* Project with representatives at both sandpits.				

2.2.2. Strategic Energy Technology Plan (SET-Plan) topic coverage

The participants were much more numerous for topics 1 and 2 (23 and 30 respectively, vs. 17 and 15 for topics 3 and 4 respectively). A set of panellists (mixing STEM and SSH professors from both Engineering and Social Sciences) discussed the results of the research-project exercise at the end of the second day of the sandpits. Further details can be found in Table 3.

Table 3. Date, number of participants and panellist information per topic over the two sandpits.

Topic no.	Topic description/name	Sandpit date	No. of participants	No. of participants per sector	Panellists
1	Energy efficiency and using less	8-9 Feb. 2018	23	Academia: 21 Business: 17 Policy, research and NGO: 5	Enrico Macii, Marco Masoero, Politecnico di Torino; Dario Padovan, Università di Torino.
2	Competitive, secure, low-carbon energy supply	8-9 Feb. 2018	30		
3	Energy system optimisation and smart technologies	22-23 Feb. 2018	17	Academia: 14 Business: 11 Policy, research and NGO: 7	Piero Boccardo, Pierluigi Leone, Politecnico di Torino; Daniela Ciaffi, Università di Palermo.
4	Transport sector decarbonisation	22-23 Feb. 2018	15		

2.2.3. Gender representation

The sandpits had a higher male (50 participants out of 75; 66.7%) than female (25 participants out of 75; 33.3%) participation, with the most eccentric value with respect to this aspect being related to Topic 1 (female participation at 39.1%), as seen in Figure 2.

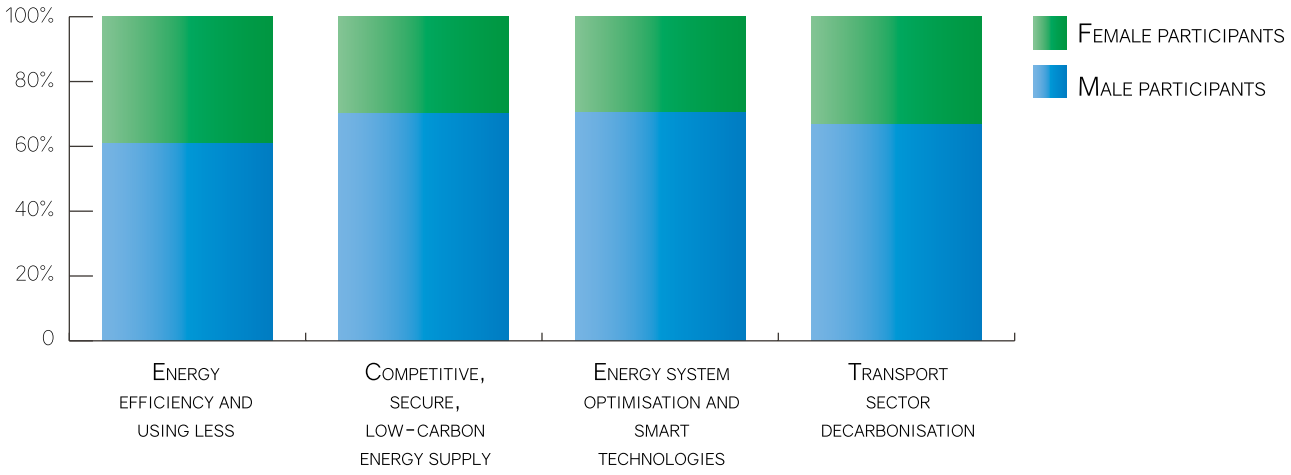

Figure 2. Percentage of males and females participants working across the four topics at the SHAPE ENERGY sandpits (n=75).

Whilst various studies have noted how women engage more in interdisciplinary research collaborations (Rhoten and Pfirman, 2007; Schiebinger and Schraudner, 2011; Van Rijnsoever and Hessels, 2011), we do not have enough evidence here to support/contradict this claim, perhaps in some way due to the overall success of the facilitation methodologies used in the sandpits (which saw no significant difference in engagement between males and females). However, we do recognise the persistent lag faced by the underrepresented minority of women in both STEM and SSH fields (Beede et al., 2011; Williams and Ceci, 2015; Anfinsen and Heidenreich, 2017).

2.2.4. Country representation

In terms of the countries where participants work – or, more precisely, where participants' research organisations have their main or secondary offices (Table 4) – Italy was the most represented with 25 participants out of 75, of which: seven from POLITO; five from other institutions based in Turin or in the

Metropolitan City of Turin; seven from the neighbouring regions of Lombardy and Liguria; and six from other regions.

Table 4. Participants per country at the Horizon 2020 SHAPE ENERGY Sandpits. The countries indicated refer to where the sandpit participants were employed.

Country	No. of participants	% of total participants
Belgium	2	2.7
Croatia	1	1.3
Czech Republic	2	2.7
Denmark	2	2.7
Finland	1	1.3
France	8	10.7
Germany	10	13.3
Greece	1	1.3
Hungary	3	4.0
Ireland	4	5.3
Italy	25	33.3
Norway	2	2.7
Portugal	1	1.3
Slovakia	1	1.3
Spain	2	2.7
The Netherlands	4	5.3
United Kingdom	6	8.0
TOTAL	**75**	**100.0**

All European geographical regions were thus represented. Due to the high presence of Italian institutions, the majority of participants came from Southern Europe, while Eastern Europe institutions were the least represented (Figure 3).

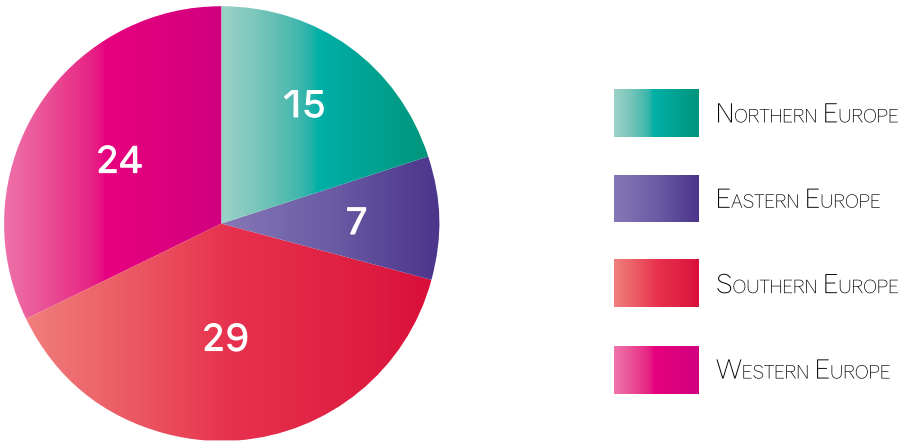

Figure 3: Number of sandpit participants from different European geographic regions (n=75).

2.3. Delivery of the sandpits

In this subsection, we detail the implementation of the sandpits, including ice-breaking and storytelling activities. The agendas of the two sandpits can be found in Appendices 1 and 2.

The participants at the first sandpit

2.3.1. Contextual presentations

An opening presentation introduced the participants to the SHAPE ENERGY project, its Platform activities, and how the SHAPE ENERGY Horizon 2020 Sandpits fitted into this wider set of activities. The need for interdisciplinarity and the barriers it poses (different ontologies, methodologies, concepts, etc.) were specifically highlighted, both during the opening presentation and during the keynote presentations by Gerd Schönwälder (European Commission, Policy Officer) and Andrea Bonaccorsi (Università di Pisa, Expert in qualitative evaluation of research products) who each delivered their speeches during the first and the second sandpit respectively. Defining and exploring such scope and boundaries issues was important and useful for stimulating the desired discussion during the rest of the sandpit. Indeed, our very first steps acknowledged that the sandpits were involving participants from a range of disciplines and backgrounds – from the Arts, Humanities and Social Sciences; to Engineering, Physical Sciences and Mathematics – and that there was a need to establish a shared understanding of the other participants' expertise.

Agreeing a common language and terminology amongst diverse backgrounds and disciplines had been very challenging, yet we argue that using creative and innovative thinking techniques in break-out sessions to focus on a problem (i.e. the integration of SSH in energy-related projects) made the audience more receptive to all the various new ideas and tasks coming from POLITO's team and themselves during the sandpits.

2.3.2. Storytelling activities

As in many other scoping activities delivered by the SHAPE ENERGY Platform – e.g. multi-stakeholder workshops in cities across Europe, an Early Stage Researcher programme, etc. – a storytelling technique was utilised (Mourik *et al*., 2018). Interdisciplinary and multi-stakeholder working is integral to these activities, and using innovative methods proven to enable collaboration and mutual understanding is a central pillar of the Platform. Storytelling involves communicating in a way that emphasises plot, characters, and narrative, and is an instinctive form of talking or writing which humans have used for centuries to transfer essential life lessons or for other learning purposes (Gottschall, 2012; Lambert, 2013; Moore, 2013). Storytelling as a research and collaboration tool is grounded in several SSH disciplines, including Anthropology and Sociology.

Specifically for these sandpits, the storytelling was especially useful to engage diverse project stakeholders, acting as a bridge between different expectations as well as between different degrees of

willingness to contribute to the sandpit activities. Storytelling helped to overcome perceived barriers to collaboration and, as a research and development tool, connected the EU energy policy (the ground for our storytelling exercise) and the knowledge-based academic community. It furthermore seemed to provide a pivotal connection between the stakeholders in a novel way that went beyond the customary concerns of policy and academic practice. Storytelling-derived scenarios enabled them to think beyond current issues in operational contexts, to think about the broader SSH-STEM collaboration issues, and to focus on the perspectives of the final users. In line with previous studies, participants generally recognised the need for greater collaboration, and the value of informal collaboration through engagement with various networks and associations (as was the basis for the sandpit themselves).

For each topic, there was a dedicated storytelling POLITO team consisting of: one director (who chaired proceedings), one mentor (topic expert); one facilitator (researcher with the qualitative methodological skills required to manage the debate, to stimulate different perspectives and to fruitfully engage all the participating individuals); and one expert in EU funding calls.

During the first day, the storytelling activity was aimed at smoothing the process of reporting on the STEM-SSH dynamics envisaged and experienced in the participants' projects. Those working on the same project were asked to deliver one single common description of project vision/experience, via following the story spine form (see Appendix 3). Some common issues were identified and, following that, the POLITO experts in EU funding calls identified one or two current Horizon 2020 calls which was then the basis for the second day's exercise.

During the second day, participants formed cross-disciplinary groups (five in the first sandpit; four in the second sandpit) that, by means of the second day story spine form, worked on responding to the identified Horizon 2020 calls. Their responses were then presented in the final plenary session and received feedback and comments from the invited panellists. Two versions of the story spine form were given to participants during the second day of the sandpit (Appendices 4 and 5): participants could choose between a proper story spine form and a more conventional abstract form. The forms were not always strictly followed by participants, i.e. the results of participants' work (as they were presented in written and oral forms) often contained a mixture of both narrative tools. In all cases, they served as a means to stimulate discussions, which thus went beyond the mere compilation of a form. Drawing from Foulds and Christensen (2016), it was not easy to match research interests with Horizon 2020 calls, given that SSH interests rarely aligned with techno-economic conceptualisations of the e.g. energy consumer.

Networking lunch

Session with real-time illustrators

Ice-breaking exercices

Even when willing to embrace SSH, no-one ended up going towards the same (e.g. SSH-explicit) Horizon 2020 funding calls, since the prevalence of STEM and the possible industry partnerships / business outputs were inevitably a far more tempting starting position to address the specific challenges posed by the (more STEM-based) funding calls.

All the sessions (which where the products of the storytelling activities) were presented back to all participants, and these overview commentaries were also accompanied by real-time graphic illustrations. These live illustrators (from RUBRA studio[2]) helped us a lot in distilling complex messages, concepts, and project journeys in engaging and meaningful ways. In real time, they captured and synthesised the ideas and the stories told by each of us and by each of the participants into a bold and beautiful, hand-drawn graphical record of our sessions. We chose this method of graphic recording because it allowed us to go beyond just documentation, unlike note-taking and video-recording. The final drawings were distributed openly to all participants, in the hope that it would thereby deepen engagement, provide a memory of the collaborative activities, drive shared understandings, and strengthen transdisciplinary communications.

2.3.3. Ice-breaking exercises and storytelling training session

This session was led by Giulia Sonetti (POLITO), Roberto Garelli and Lara Mottola (Quinta Tinta, Improvisational Theatre Academy), and provided the foundations – and gave participants the relevant competences – for participating in the wider sandpit (storytelling) sessions.

The exercises proposed to the group during the ice-breaking aimed to increase awareness of the importance of interpersonal connections (Parsell, 1998; Schulenkorf and Edwards, 2012; Steenbakkers *et al.*, 2015). Through the mechanisms and principles of theatrical improvisation, the participants were involved in a game in order to make contact with others in the group, to get to know each other, and to tell one another about oneself. The activities were both physical and verbal, to set in motion all of one's being, in relation to the space and to the other members of the group. All the exercises were followed by brief feedback, in which the participants were invited to express their considerations on what had been activated and put into play by the exercise itself, and also about the sensations that arose as a consequence.

Growing skilfulness in applying improvisational principles (deep listening; "yes, and..." responses; how to collaborate with new colleagues; etc.) also inevitably involves growing core character values like honesty, transparency, vulnerability, trust, collaboration, empathy, proactivity, accountability, and care. These characteristics are useful tools to avoid performance anxiety and allow a free flow of thoughts when different stakeholders gather for a short period of time to exchange ideas. The feedback from the sandpit's participants (some of them retraceable also in video interviews available on the SHAPE ENERGY website[3] referred to the importance of having created a relaxing environment through, for example, breaking attitudes in work, ensuring openness, clarifying the setting, staying in the present moment, and helping facilitate group cohesion - and of course much of this can be attributed to our the storytelling exercises, as well as how these ice-breaking exercises were organised and run.

2 The illustrators were Marco Grazioso and Gian Maria Mazzei, helped by Beatrice Meloni.

3 https://shapeenergy.eu/index.php/breaking-barriers-in-shape-energy-sandpits/

Our exercises included included the following:

A. *Presentation among the participants, greeting with handshake*: The emphasis was placed on greeting more carefully those in the group we have not yet met, or who we do not know very well yet. The emphasis was placed on maintaining eye contact.

   This exercise progressively increases the degree of closeness of people, deepening the relationship and (especially in the physical sense) trying to break or change the 'proxemic egg', without forcing, leaving in any case freedom for each participant to relate to the other in a more or less intimate way according to their own disposition. In doing this, the participants were guided by the following steps:

   1. Players begin exploring their own space (i.e. their own 'kinesphere');
   2. Move in to connection and move together;
   3. Move apart, but somehow staying in contact (e.g. could be a rhythm, eye contact, rushing past each other, etc.);
   4. Come back together; and
   5. Make group sculpture based on a theme related to the four SHAPE ENERGY topics.

   The purpose was to reconcile the individual with the greater whole and increase non-verbal communication. Comments by participants focused particularly around the awareness of their personal space and shared space.

B. *Triangles:* each participant was invited to choose two other participants in the sandpit group, without communicating it, and with the goal of together building an equilateral triangle. The conductor was able to stop at a certain point and signal to adjust his position, thereby forcing the other participants to also adjust their positions. This exercise aims to emphasise the personal tolerance of error and the consideration that everyone's movement influences everyone else's movement too.

C. *Scenographic construction:* each participant, one at a time, binds to the scenography declaring who or what it is (whether it be an object or a character) in a coherent way to the group. For example: "I am the tree", "I am the apple hanging from the tree", "I am the caterpillar that spells the apple", etc. This exercise, in addition to the purpose of making the participants move, asked them to position themselves and to represent the objects physically. It worked on the concept that everyone can be an essential piece of a bigger construction and that, via working in collaboration and with their own creativity, they may come to an unexpected realisation that unites everyone's ideas without preconceptions.

D. *Related words*: "I said 'xxx' because he said 'yyy'". The exercise took place in a circle, in which progressively each participant says a related word. For example, the first one: "I say PIZZA"; the second one: "because you said pizza, I say tomato"; the third: "because you said tomato, I say plant", etc. When everyone has expressed their word connected to the previous one, I proceed backwards, remembering what the previous word was that made me say mine, up until we return to the starting word. This exercise makes us aware of the value of attention and connection. The starting word of the circle, on this occasion, is chosen according to the themes of the sandpit: "energy - climate change". The connection request exclusively with the previous word brings out new connected words and opens up new possible unexpected ideas.

E. *Presentation in pairs*: In turn, each member told the other in two minutes what he/she wanted the other to know. Not only work, in fact, for example: "I like cats, I love ice cream, I wanted to be an astronaut, etc." After this first phase, couples were exchanged and each one presented himself/herself to the new person as if he/she were the other, remembering what he/she was told. One may tell the other what he/she wants to know about him/her, not only about his/her job. Tales, photos on the phone, a cloth were even used as prompts to start conversations about what was important to the participants. The purpose was for participants to pay more attention to what one is told than merely to what one says; a fundamental principle of theatrical improvisation is that colleagues must adequately listen and give one another sufficient attention if they are to be able to construct the scene in a coherent, logical and positive way.

Plenary session in Stanza della Caccia (The Hunt Room)

While in co-design there seems to be a widespread understanding that innovation is a planned, goal-oriented activity that can be propelled forward through well-facilitated events, in which company employees collaborate with external parties (users in particular) – the conversations therein aim for consensus on new product and service ideas (Buur and Larsen, 2010). Conflict belonged to the 'old days' when participatory design played a part in the struggle between workers and management (Bødker, 1996). In transdisciplinary work, however, the theory of complex responsive processes of interaction suggest a crucial moment for innovation, creativity and essentially (epistemological) mutual understandings, particularly when conflicts arise and when emotional intelligence is brought to place. Introducing impro-theatre in the sandpit activities was a novel approach that facilitated the real meeting of participants with different stakes, exploring and crossing intentions that created new insights as well as movement of thought and action (Binder, 1999; Giraud Voss, Voss and Moorman, 2005). We use improvised theatre to investigate what happens in events that embark on participatory activities, and the barriers that prevent them. Through experimenting with improvised scenes and audience reactions, we found a higher quality of conversation emerged that allowed new meanings to develop, which we would speculate could lay the foundational conditions for innovation more broadly. (Buur and Larsen, 2010). Of course, we need to develop new formats of collaboration for large, complex contingents of stakeholders, where conflicting intentions are encouraged and the efficacy of such novel approach can be evaluated.

2.3.4. Other details

A list of SSH disciplines was provided to participants to ease their understanding of what 'SSH' may actually comprise.[4] The working language of the Sandpits was English.

The gala dinners took place at the 'Circolo dei Lettori' restaurant, where participants could taste and enjoy either the best 'Piemonte Region' food and the particular atmosphere of the city.

4 The list comprised the following SSH disciplines: Anthropology, Business Studies, Communication Studies, Demography, Development, Economics, Education, Environmental Social Science, Gender Studies, History, Human Geography, Law, Philosophy, Planning, Political Science, Psychology, Science and Technology Studies, Social Policy, Sociology, Theology.

3. Findings

This section represents our immediate reflections and preliminary findings (which are predominantly thematic clusters and aggregations) that emerged from the empirical materials collected, namely: the story spines compiled during the first days; the final proposals produced during the second days; and the audio recordings of the final plenary sessions when the final proposals were presented and discussed (taking advantage of panellists' comments too). The story spine forms are available in Appendices 3, 4 and 5.

Participants were asked to sign a Non-Disclosure Agreement, to ensure confidentiality of current project outputs – as well as of new project ideas – among attendees. In compliance with this Agreement, the findings in this section are described here on an intentionally generic level and with no specific reference to the projects they are related to.

This section aims at summarising, mainly through categorisations, what participants wrote or said. We grouped all their insights (mainly through excerpts of their writings and/or interventions) into thematic categories (sub-sections 3.1-3.5). It should be kept in mind that the projects descriptions that participants provided may differ from the descriptions that would have been provided by the other partners involved in those projects. Moreover, we are not attempting to be representative of the experiences of all projects involved – instead we offer indicative and illustrative insights with the hope that they will trigger wider debate and reflection on the role of SSH in interdisciplinary energy projects and related proposals. We finish this section with some initial findings from the sandpits' evaluation forms (sub-section 3.6.).

3.1. Reflecting on project aims: which kinds of projects were present?

By means of the story spine form used during the first day of the sandpits, participants were asked to describe their projects' objectives. From their descriptions, excerpts where extracted that are below grouped according to the SSH, STEM or 'mixed' aspects that were reported in them. Of course, some descriptions contained a mix of these aspects.

SSH aspects of projects' objectives: *"testing theoretical approaches in the engagement of stakeholders"*; *"increase local authorities commitment with energy transition"*; *"understanding key motivational factors for long-lasting behavioural change"*; *"transposition of all the legal aspects of energy performance contracting"*; *"behavioural aspect of becoming more conscious of the [working] environment"*; *"how people perceive (and use) energy and technology"*; *"studying who people trust in (politicians, local administrators, leaders of communities, etc.) for different energy-related needs of everyday life"*; *"how people can be engaged (inclusive processes and participatory decision making)"*; *"offer new methodologies and techniques to involve people, to engage them in community energy projects and to contribute to energy transition using social innovation"*; *"understanding social and policy mechanisms fostering/hindering energy transition"*; *"obtain an insight of energy consumer behaviour and what are the parameters that really affect their behaviour"*; *"narratives analyses"*.

STEM aspects of projects' objectives: most projects descriptions were related to more efficient or new energy conversion devices, production devices and distribution systems (e.g. fuel cells, hybrid systems, microturbines, smart grids, energy storage, CO_2 capture, new materials, nano-particles, frac fluids, renewable energy production from waste, internal combustion engines). Other STEM aspects included the following: bioenergy generation and its integration with wind and solar energy; cloud infrastructure for energy-related data; *"develop set of algorithms for fault detection in distribution grids"*; *"how to simplify, collect, process and present energy-related data"*; *"develop new sensors and manage the data they generate"*.

Mixed aspects of projects' objectives (which are here meant to be related to organisational techniques and issues related to the relationships of human actors with specific technical objects or apparatuses): *"how to segment users to improve the adoption and impact of feedback solutions"*; *"bridging gap between market and research"*; *"cost and safety related issues"*; *"business models for the aggregation of RE decentralised systems"*; *"how to integrate human interaction into the energy management process"*; *"spreading of near-zero and positive energy building in the market"*; *"hardware (and embedded software) for data analysis and visualisation"*; *"valorisation of biomass fuels"*.

3.2. Which disciplines have been (and could/should be) involved, and with which tasks?

The responses given by participants on these disciplinary aspects are here grouped according to the following categories: Business studies and economics; Acceptance; Communication; Engagement; Behavioural change; Integration of SSH (and other disciplines); Understanding; and No integration.

Business studies and economics: *"business models"; "financial market models"; "how does the use of EE fit into the business models/operations"; "the formulation of business cases about the future deployment of such technologies at the large scale"; "economics studies"; "develop a business model and plan for the companies that sell metering and management services to energy utilities"; "demand management"; "service & product designers"; "market researchers".*

Acceptance: *"find strategies to convince people"; "how to make choices on energy acceptable by the citizens"; "user acceptance (e.g. aesthetics)"; "social acceptability of this technology in terms of safety"; "to increase the acceptance of [kind of energy source] as energy source"; "how to ensure a positive public perception about [field of intervention of the project]".*

Communication: *"how to communicate better with citizens"; "how to communicate about [field of intervention of the project] with local stakeholders (citizens, the city)"; "social awareness of new technologies"; "how to explain the advantages of such business models to the customers/clients"; "expertise in natural language".*

Engagement: *"how to involve citizens".*

Behavioural change: *"how to 'make a change' in terms of an individual's actions"; "how their [end-users] energy consumption behaviour can be shifted towards more responsible and rational use of energy"; "behavioural modelling".*

Integration of SSH (and other disciplines) techniques and insights: *"anthropological techniques in the fields of ICT and building energy to help architects, engineers and ICT developers to make their work more valuable and effective for end users"; "sociologists for accessibility/gender issues"; "sociologists [not defined in which forms]".*

Understanding: *"how to evaluate/understand the effect of the communication with local stakeholders"; "how the buildings retrofits will influence social aspects of the buildings users"; "understanding local culture and social structure"; "how to incorporate people needs and how we will be designing our solutions according to their needs and skills"; "the goal is to optimise the energy production and the efficiency of the energy use in order to reduce the impact (pollution) of the energy-related services and improve the social feeling in their use"; "provide the basis for more stringent emissions regulations".*

No integration: *"unfortunately, no SSH disciplines were directly involved. However, the project has an impact on society because one of the goals is the reduction of [pollutant name] emissions"; "not directly (very focused on RIA). However, all partners and project consortium had to explain to public why [name of the specific technological option the project was about] is required".*

3.3. How has (or could) interdisciplinarity been dealt with?

Participants' answers on this aspect are here grouped in the following categories: Internal organisation; External input; Not covered; and Not clear (as in not clear whether the answer is related to the internal or the external dimension, or it is related to something that took place in the past, that will take place in the future, or that could be taken into consideration for the future).

Internal organisation: *"we organised workshops between the disciplines to discuss the structure of the workplan and to reflect on outputs"; "we were mindful of the expertise of the research. Long process at the beginning of project to find common language/understanding of how to engage"; "exchange (engineering, geology, chemistry, physics...) between WPs"; "we discussed the social acceptance of [focus of the project] technologies, we collaborated planning some interviews with some stakeholders and some local communities"; "more than*

collaboration, we decided for setting up a complementary structure of our task: Economists: social responsibility of companies/public acceptance strategies (company side), Sociologists: public engagements & acceptance strategies (PA side)"; "*we helped the [specific category of business actors] to develop a questionnaire to be sent to the customers*"; "*we discussed internally to make sure we build a multidisciplinary team to tackle all aspects*"; "*both quantitative + qualitative methods needed. We used qualitative methods to help shape quantitative work. Also a comparison of stated versus actual behaviour*".

External input: "*an internship with two SSH researchers would be an added value if transformed in 'tips' for the decision makers*"; "*we introduced the support of applied anthropologists ('difficulties' to speak the same language, same terms can be misunderstood. Engineers and ICT people are used to their traditional way of working often forgetting end-users)*"; "*we discussed with sociologists and relevant researchers what can be done to implement this shift toward using less energy*"; "*so, we discussed the importance of economics and business development. We collaborated by bringing their input (e.g. product price) in the product development*".

Not covered: "*communication science was important but we did not have much budget for it in the project*"; "*honestly, the best we will do is LCA [Life Cycle Analysis] and its dissemination in congresses and website and output for the European Commission*".

Not clear: "*user/customer acceptance*"; "*business modelling, marketing*"; "*financial modelling*"; "*economics, communication studies*"; "*communication studies and education to reach the target audience and to educate them in an efficient and appropriate manner*"; "*legal assistance in writing agreements, mediation between parts, regulation in civil works*"; "*economics and business management in order to identify business models and strategies with respect to the regulatory framework*".

3.4. Barriers to be overcome: Lessons learned from interdisciplinary working and from the integration of SSH

In the final part of the story spine form, participants were asked to tackle barriers and other issues that they feel need to be solved or addressed in another consortium/EU project. We grouped the participants' story data relating to this aspect around the following categories: Recognising the importance of the 'human' factor; Interdisciplinary work; People involvement; Regimes/narratives; Data privacy issues; Funding and economic issues; and Policy.

Recognising the importance of the 'human' factor: "*highly efficient buildings alone (without e.e. users) do not necessarily bring energy saving*"; "*buildings don't use energy, people do. We should (EU should) better foster Research and Innovation Actions towards energy efficiency users/behaviour awareness campaigns, rather than technical measures on buildings*"; "*without SSH even successful solutions may not be deployed because of other barriers*"; "*community energy projects often fail because of the human factor and not because of technical issues*".

Interdisciplinary work: "*engineers/ICT developers need to understand the actual need and effectiveness of multidisciplinary work including SSH. Multidisciplinary work is the key*"; "*a wide gap in background, lexicon and theoretical framework and methodologies still exists. Communication [among scholars and researchers] is needed to integrate (not merge) different perspectives in a useful and effective way*"; "*all these disciplines need to be in the room sharing a common objective*"; "*strong connection between technicians and SSH. Specific activities to share a common perspective of vision about the issues (mutual training, warm-up meeting) among technicians and SSH*"; "*siloed mentality, not only between technical and SSH, but also across different sectors, even if under the same discipline – i.e. energy sociologists have trouble to talk to an agriculture sociologist*"; "*applying better communication skills, research efforts would have been more efficient and dedicated*".

People involvement: "*'real' people need to be involved (not just 'experts')*"; "*regular people do not know how [the] energy sector works. They just want to pay less and - if possible - be greener*"; "*innovative engagement methodologies with communities, emphasising collaboration between team and people involved in 'contextually deep' understandings*"; "*people have to be involved from the beginning*"; "*engagement of citizen in the transition to sustainable and low carbon societies and in the planning and creation of energy communities [is needed]*".

Regimes/narratives: *"incumbent industrial/political players drive specific narratives that prevent the changes needed"; "strong barrier created by the incumbent technology development"; "high criticism towards the actual [specific kind of technology] technology"*[5].

Data privacy issues: *"the lack of knowledge due to the possibility of sharing sensitive data. Data privacy protection".*

Funding and economic issues: *"financial support from EU commission"; "big issue: cost of technologies"; "lack of funds from government".*

Policy: ***"****lack of mechanisms to promote self-consumption"; "no framework for [specific kind of actor]"; "difficulties to work with DSO"; "provide policy makers with both hard facts and a language that justifies policies and how to communicate this to the public that elect them".*

3.5. Responding to Horizon 2020 calls by integrating SSH and STEM – An exercise

The second day of each sandpit was devoted to an exercise focusing on answering an actual energy- or transport-related Horizon 2020 call. Divided into groups, participants tried to imagine how SSH could play a more consistent role. To a great extent, the actions they proposed (with some similarities – as well as peculiarities – among groups) took advantage of the many opportunities and obstacles we listed above in sub-sections 3.1 to 3.4. Participants undertook these funding proposal exercises with the understanding that it would have been impossible to have ready-for-competition project proposals in the end. However, all participated (panellists included) nevertheless invested considerable effort and energy into collecting in collecting and coordinating all possible inputs. Quality presentations and detailed structures of work packages and tasks were, in some cases – and despite of the time constraints – impressively delivered by participants.

In relation to all this, two further points should be noted:

1. All projects proposals tried to engage end-users/citizens. It was not strictly required, being that not all SSH play on that field. However, it is probably the way participants felt they could more intensely (and likely conventionally) showcase the integration of SSH. Indeed the social organisation of other actors, such as policy-workers for instance, were very rarely considered if at all.

2. For the final activity (regarding funding proposal preparation), groups had a mixed SSH-STEM composition, with the only exception of two groups. One of them was composed of STEM practitioners and researchers only; the other one was 'ruled' by the SSH majority, who 'set the agenda'. While the group composed of STEM practitioners and researchers complied with the task of imagining a project quite reliant on SSH (in the same way that all the 'mixed' groups did too), the group led by SSH practitioners and researchers did it somewhat differently. Specifically, the SSH practitioners and researchers endeavoured to go beyond the call, by trying to 'fix' (by means of of solely their SSH insights) its theoretical flaws.

3.6. The evaluation questionnaire

At the end of each sandpit, participants were asked to complete an evaluation questionnaire, which is the same for all SHAPE ENERGY Platform activities. Here we report a few headline results relating to the Horizon 2020 Sandpits only[6] (Figure 4). A more extensive analysis of the evaluation questionnaires for all SHAPE ENERGY Platform activities will be carried out in Deliverable D4.5 'Evaluation report', due by November 2018.

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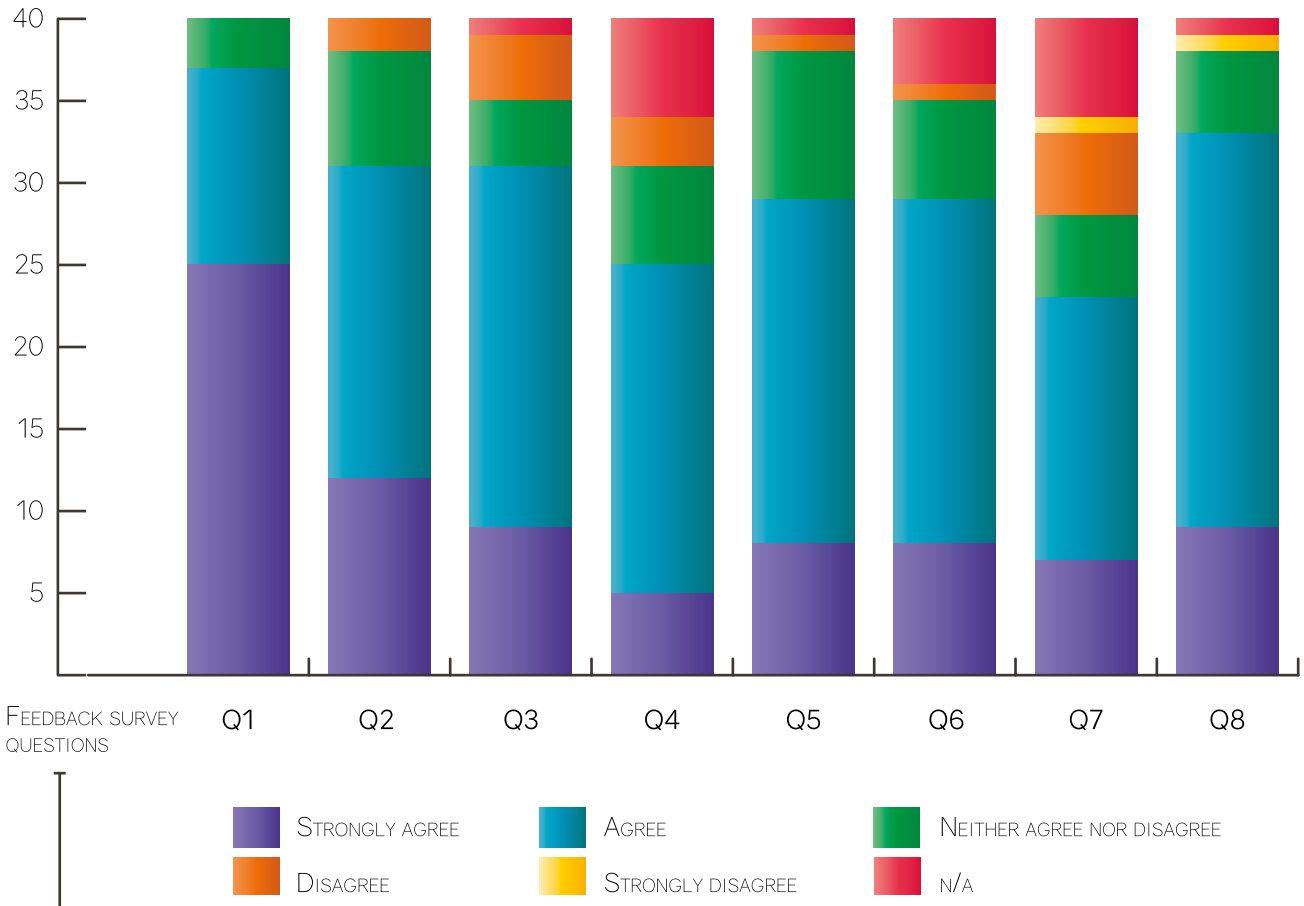
5 Differently from the previous two excerpts, it relates to counter-narratives that prevent 'old' (though still improvable) technologies to be welcomed (e.g. internal combustion engine).

6 40 questionnaires were compiled, 38 of which in the printed version and the remaining two online.



Breakdown of feedback survey questions

Q1. The activity was well organised.

Q2. I benefited from participating in the activity.

Q3. [The activity]...demonstrated or helped develop innovative approaches to encourage interdisciplinary working across sectors.

Q4. [The activity]...involved a range of stakeholders in framing the priorities of the SHAPE ENERGY Platform.

Q5. [The activity]...supported, involved and/or strengthened the community of European energy-related SSH experts.

Q6. [The activity]...actively involved and built on current relevant networks and initiatives (e.g. through who was invited/involved).

Q7. [The activity]...will be useful in informing and supporting European level energy policy, such as the Horizon 2020 vision, Energy Union strategy and The European Strategic Energy Technology Plan (SET-Plan).

Q8. [The activity]...included space for discussion of novel questions that challenge the status quo.

Figure 4: Feedback results from the sandpit evaluation questionnaire (n=40).

4. Concluding discussion

The aim of this report is to describe the design and the implementation of the SHAPE ENERGY Sandpits. The sandpits took place at two different times, each dedicated to a pair of SHAPE ENERGY topics: on 8–9 February 2018, Topic 1 'Energy efficiency and using less' and Topic 2 'Competitive, secure, low carbon energy supply' was tackled; and on 22–23 February 2018, it was Topic 3 'Energy system optimisation and smart technologies' and Topic 4 'Transport sector decarbonisation'. In total, 75 persons attended the two sandpits, representing institutions from 17 different countries.

These sandpits were essentially residential interactive workshops involving 20-30 participants, a director, a team of expert mentors, and a number of independent stakeholders. SHAPE ENERGY used sandpits to promote intensive discussion and free thinking with respect to topical EU-level energy policy problems. Through this sandpit format, our hope was to bring different disciplines and stakeholders together to: produce novel insights; to learn more about the possibilities of SSH in what has become a rather (STEM-dominated) technical landscape of EU-funded projects; and as well as to give participants the opportunity forge collaborative connections that could last well into the future.

A regular feature of discussion with participants and a frequent reference point for our own reflection (as sandpit co-ordinators) was how, and if so to what extent, SSH disciplines could interact with STEM-led project expertise. Indeed, participants were asked about other disciplines that were involved in their projects. In particular, they were asked if other *SSH* disciplines were thought to have role in the next steps of their project, or in future follow-up proposals and projects. Interestingly, responses were very much dominated by STEM-led terms of reference, which subsequently positioned SSH as have a very particular (and usually instrumental) 'offer' to neatly answering STEM-led questions. This was especially clear when hearing from STEM projects that had been confidently developing new or improved technical objects or processes. For instance, despite the evident improvement these objects and processes may represent and the benefits that they may thus bring, none had yet found a market. Whilst this should not be a surprise given that these Horizon 2020 projects primarily concern technology development and early exploratory implementation plans, it is certainly interesting to note that SSH was viewed as the mechanism by which these newly developed technological solutions could 'achieve scale' across the European market.

As such, STEM-based project representatives were keen for SSH to 'service their needs' so to speak, as part of delivering on their wider ambition of diffusing their technology more widely across societies. Implicitly – and, at times, explicitly – the ways in which this diffusion was assumed to occur was through one or both of two routes: (1) via direct market access, which was said to then require Economics and Business Management research as an evidence base to support their roll-out; and (2) via blocking the market or at least overcoming market challenges through enhanced individual choice, which was said to then utilise SSH disciplines that could help inform 'awareness-improving' activities. The foci/units of their interventions and analyses were therefore usually end-users and sometimes also policy-makers, but only in respect of policy-makers being the route by which end-user behaviour could be changed.

What does all this mean for SSH then? First of all, it is important for SSH researchers to overcome the feeling of being mistreated by STEM researchers and practitioners. Moreover, challenges will lessen for SSH researchers if their perspectives are integrated from the very beginning of a project onwards, and not simply bolted on near the project end so as to achieve e.g. funder compliance or to 'ensure' market uptake/acceptability. These aspects were repeated frequently by many, mainly SSH, participants during the sandpits (c.f. Shove, 1998). But to achieve such a shift in project design and implementation, language-related difficulties were also raised as a common barrier (in both directions) – particularly in terms of fundamentally defining the core problem that is to be investigated/targeted (c.f. Robison and Foulds, 2017).

Interestingly, when writing stories of future projects, not one participant questioned the increased presence of ICT, and therefore of society's e.g. enhanced connectedness. It is thus implicitly clear that all the futures that were imagined in the exercises were *connected* futures (c.f. Røpke *et al.*, 2010; Strengers, 2013; Viitanen and Kingston, 2014; Halpern *et al.*, 2017). This was especially evident in the exercises relating to the transport sector, where users were imagined as being able to continuously optimise their mobility

decision-making through e.g. better connected personal devices. In contrast, this was not always the case when constructing stories about energy systems.

Another clear challenge that SSH faces is how divergent it is. Indeed, SSH researchers can invest much energy and time into arguing for why SSH needs more attention, only to then have to also explain the huge amount of variation and divergence that exists across these SSH disciplines (Fox *et al.*, 2017; Sovacool, 2014). This had evidently also led to many STEM sandpit participants believing SSH to only be capable of contributing certain insights, based upon the disciplines that they had seemingly engaged with most up to that point in time (i.e. SSH-wide generalisations were put forward on the basis of the one or two [SSH] discipline-specific perspectives they had encountered).

In exploring ways in which SSH and STEM could be brought together more fruitfully, we advocate for a deeper exploration of integrative support that is based around problem-based knowledge transfer and co-creation approaches (c.f. Bonaccorsi, 2018). In an age of super-complexity, a new epistemology for academia arguably awaits; one that is open, bold, engaging, accessible, and conscious of its own insecurities. It is an epistemology for living amid uncertainty, and a new integrative SSH agenda could help provide a much more authoritative and apt knowledge base that more meaningfully deals with a world where the monetary crisis showed economists to be wrong, where climate change is showing our technologies to be insufficient, etc. Whilst there are numerous approaches out there, our experiences do lead us to advocating for newer terms of reference that are situated in a middle-ground associated with real-world problems.

To conclude, despite the content foci and the facilitation approaches adopted within the sandpits, long-established views on what SSH could offer the European energy transition prevailed. We found SSH to still often be regarded as a tool to orient the market and encourage individuals to accept a top-down policy, technology or process. Such assumptions of the role of SSH are also evidently embedded within the EU Horizon 2020 calls themselves – which of course were used as prompts for discussion and response in the sandpits – and thus we would certainly encourage the EC's Directorate-General for Research and Innovation (DG RTD) to consider the wider possibilities offered by SSH-led questions in Horizon Europe. After all, the relationship between energy and European citizens goes far beyond the simple individual (passive) use of technologies and economic markets.

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7. Appendices

7.1. Appendix 1 – Agenda of the first sandpit

SHAPE ENERGY H2020 Sandpits

8th – 9th February 2018

Valentino Castle, Turin

8th February

12:00 *Sala delle Colonne (Ground Floor)*
Registration

13:00 *Sala delle Colonne (Ground Floor)*
Lunch

14:00 *Stanza della Caccia (1st Floor)* - Plenary session
Opening
SHAPE ENERGY overview, aims and explanation of the sandpit agenda

14:30 *Stanza della Caccia (1st Floor)*
Topic 1 "Energy efficiency and using less"
Ice breaking exercises, including participants' presentation

Stanza dello Zodiaco (1st Floor)
Topic 2 "Competitive, secure, low-carbon energy supply"
Ice breaking exercises, including participants' presentation

15:30 *Stanza della Caccia (1st Floor)*
Topic 1 "Energy efficiency and using less"
Storytelling activity 1

Stanza dello Zodiaco (1st Floor)
Topic 2 "Competitive, secure, low-carbon energy supply"
Storytelling activity 1

16:00 *Sala delle Colonne (Ground Floor)*
Coffee break & networking

16:30 *Stanza della Caccia (1st Floor)*
Topic 1 "Energy efficiency and using less"
Illustrations of the output from storytelling activity

Topic 2 "Competitive, secure, low-carbon energy supply"
Guided tour of the Valentino Castle

17:30 Topic 1 "Energy efficiency and using less"
Guided tour of the Valentino Castle

Stanza dello Zodiaco (1st Floor)
Topic 2 "Competitive, secure, low-carbon energy supply"
Illustrations of the output from storytelling activity

18:30 *End of first day*

20:00 *Restaurant "IL Circolo dei Lettori"*
9, via Giambattista Bogino
Gala Dinner

9th February

09:15 *Stanza della Caccia (1st Floor)*
Topic 1 "Energy efficiency and using less"
Key issues

Stanza dello Zodiaco (1st Floor)
Topic 2 "Competitive, secure, low-carbon energy supply"
Key issues

10:00 *Stanza della Caccia (1st Floor)*
Topic 1 "Energy efficiency and using less"
Storytelling activity 2

Stanza dello Zodiaco (1st Floor)
Topic 2 "Competitive, secure, low-carbon energy supply"
Storytelling activity 2

11:00 *Sala delle Colonne (Ground Floor)*
Coffee break & networking

11:30 *Stanza della Caccia (1st Floor)*
Topic 1 "Energy efficiency and using less"
Group activity

Stanza dello Zodiaco (1st Floor)
Topic 2 "Competitive, secure, low-carbon energy supply"
Group activity

13:00 *Sala delle Colonne (Ground Floor)*
Lunch

14:00 *Stanza della Caccia (1st Floor)* - Plenary session
Discussion of activities output

15:30 *Stanza della Caccia (1st Floor)* - Plenary session
Wrap-up and lessons learned

17:00 *End of the meeting*

SHAPE ENERGY SOCIAL SCIENCES AND HUMANITIES FOR ADVANCING POLICY IN EUROPEAN ENERGY

7.2. Appendix 2 – Agenda of the second sandpit

SHAPE ENERGY H2020 Sandpits

22nd – 23rd February 2018

Valentino Castle, Turin

22nd February

12:00 *Sala delle Colonne (Ground Floor)*
Registration

13:00 *Sala delle Colonne (Ground Floor)*
Lunch

14:00 *Stanza della Caccia (1st Floor)* - Plenary session
Opening
SHAPE ENERGY overview, aims and explanation of the sandpit agenda

14:30 *Stanza della Caccia (1st Floor)*
Storytelling activity

15:00 *Stanza della Caccia (1st Floor)*
Illustrations of the output from storytelling activity

16:30 *Sala delle Colonne (Ground Floor)*
Coffee break & networking

17:00 *Stanza della Caccia (1st Floor)*
Topic 3 "Energy system optimisation and smart technologies"
Key issues

Stanza Feste e Fasti (1st Floor)
Topic 4 "Transport sector decarbonisation"
Key issues

17:30 Guided tour of the Valentino Castle

18:30 *End of first day*

20:00 *Restaurant "IL Circolo dei Lettori"*
9, via Giambattista Bogino
Gala Dinner

23rd February

09:15 *Stanza della Caccia (1st Floor)*
Keynote speech

09:45 *Stanza dei Gigli (1st Floor)*
Ice breaking exercises

10:30 *Stanza della Caccia (1st Floor)*
Topic 3 "Energy system optimisation and smart technologies"
Storytelling group activity

Stanza dello Zodiaco (1st Floor)
Topic 4 "Transport sector decarbonisation"
Storytelling group activity

11:30 *Sala delle Colonne (Ground Floor)*
Coffee break & networking

12:00 *Stanza della Caccia (1st Floor)*
Topic 3 "Energy system optimisation and smart technologies"
Storytelling group activity

Stanza dello Zodiaco (1st Floor)
Topic 4 "Transport sector decarbonisation"
Storytelling group activity

13:00 *Sala delle Colonne (Ground Floor)*
Lunch

14:00 *Stanza della Caccia (1st Floor)* - Plenary session
Discussion of activities output

15:30 *Stanza della Caccia (1st Floor)* - Plenary session
Wrap-up and lessons learned

17:00 *End of the meeting*

SHAPEENERGY SOCIAL SCIENCES AND HUMANITIES FOR ADVANCING POLICY IN EUROPEAN ENERGY

7.3. Appendix 3 – Story spine form (first day)

SHAPE ENERGY H2020 Sandpits

8th-February 2018

Story Spine 1 - Topic 1

YOUR NAME

YOUR SCIENTIFIC SECTOR

1) A few years ago I/we became part of a EU funded consortium (please tell us the name)

2) that wanted to tackle the topic of "Energy efficiency and using less" and I/my organisation joined because (describe what the promise of this project was for you/your organisation)

3) Us (describe your disciplinary background) ... researchers really wanted to work on ... (describe the research questions you wanted to tackle) ...

4) But, other (SSH) disciplines were involved as well, and to them the most interesting research questions with respect to our topic was ...

5) So, we discussed that (discuss which (SSH) disciplines and expertise were necessary), and that to make sure we used all of them (discuss how you collaborated) ...

6) Then we were able to worked together towards reaching (name the EE impacts (strategies / policies / technological solution that you developed with the project) ...

7) What we learned from this is ... (discuss what lessons on interdisciplinary working and on the use of SSH came out of the project)

8) Thanks to this collaboration we came up with knowledge and had impact that we otherwise most likely would not have achieved, such as (describe what came out especially from this interdisciplinary working if you had such collaboration; if not, then describe what you might have achieved if you had had SSH disciplines in your project working together with the other disciplines)

9) But we are not finished yet! We need to continue working on (describe what impacts, policies, strategies etc are necessary to reach the Energy Efficiency First principle) ...

10) And to be successful at that, we need to overcome ... (name the barriers and other issues that need to be solved or addressed in a next consortium/EU project)

SHAPEENERGY SOCIAL SCIENCES AND HUMANITIES FOR ADVANCING POLICY IN EUROPEAN ENERGY

7.4. Appendix 4 – Story spine form (second day)

SHAPE ENERGY

POLITECNICO DI TORINO

SHAPE ENERGY H2020 Sandpits

9th – February 2018

Story Spine 2 - Topic 1

YOUR NAME

YOUR SCIENTIFIC SECTOR

My future *energy efficient and using less* story

1) Title:

2) I/we dream of a future where a typical day will look like this ...

3) To solve the challenges envisaged in the just presented H2020 topic, many actions will be undertaken ...

4) And the following social science and humanities research will prove to be particularly valuable to achieve the change:

5) This research will have a big impact because ...

6) What I plan to do every day to make my story happen ...

SHAPE ENERGY SOCIAL SCIENCES AND HUMANITIES FOR ADVANCING POLICY IN EUROPEAN ENERGY

7.5. Appendix 5 – Abstract form (second day)

SHAPE ENERGY H2020 Sandpits

9th-February 2018

Abstract 2 - Topic 1

YOUR NAME

YOUR SCIENTIFIC SECTOR

Considering your project experience, and issues raised yesterday, make an abstract for a possible H2020 proposal, answering to the following subjects:

1) TITLE/ACRONYM

2) OBJECTIVES/PROBLEMS TO SOLVE

3) INTERDISCIPLINARY KNOWLEDGE you will use and why, and especially which SSH knowledge you will use

4) INTERDISCIPLINARY WAYS OF WORKING you will use and why

5) ACTIONS and how these are potentially more successful than traditional ones

6) IMPACTS (e.g. technical, economic, socio-economic, and ecological etc.), and how these can be achieved thanks to the interdisciplinary (including SSH) consortium and ways of working

SHAPE ENERGY SOCIAL SCIENCES AND HUMANITIES FOR ADVANCING POLICY IN EUROPEAN ENERGY

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Karlsruhe Institute of Technology

POLITECNICO DI TORINO

NTNU Norwegian University of Science and Technology

ORTA DOĞU TEKNİK ÜNİVERSİTESİ MIDDLE EAST TECHNICAL UNIVERSITY

Tomas Bata University in Zlín Faculty of Management and Economics

BSERC black sea energy research centre

energycities

friends of europe

DuneWorks

acento comunicación