C R E D S

Event report: How might our research have greater real-world impact?

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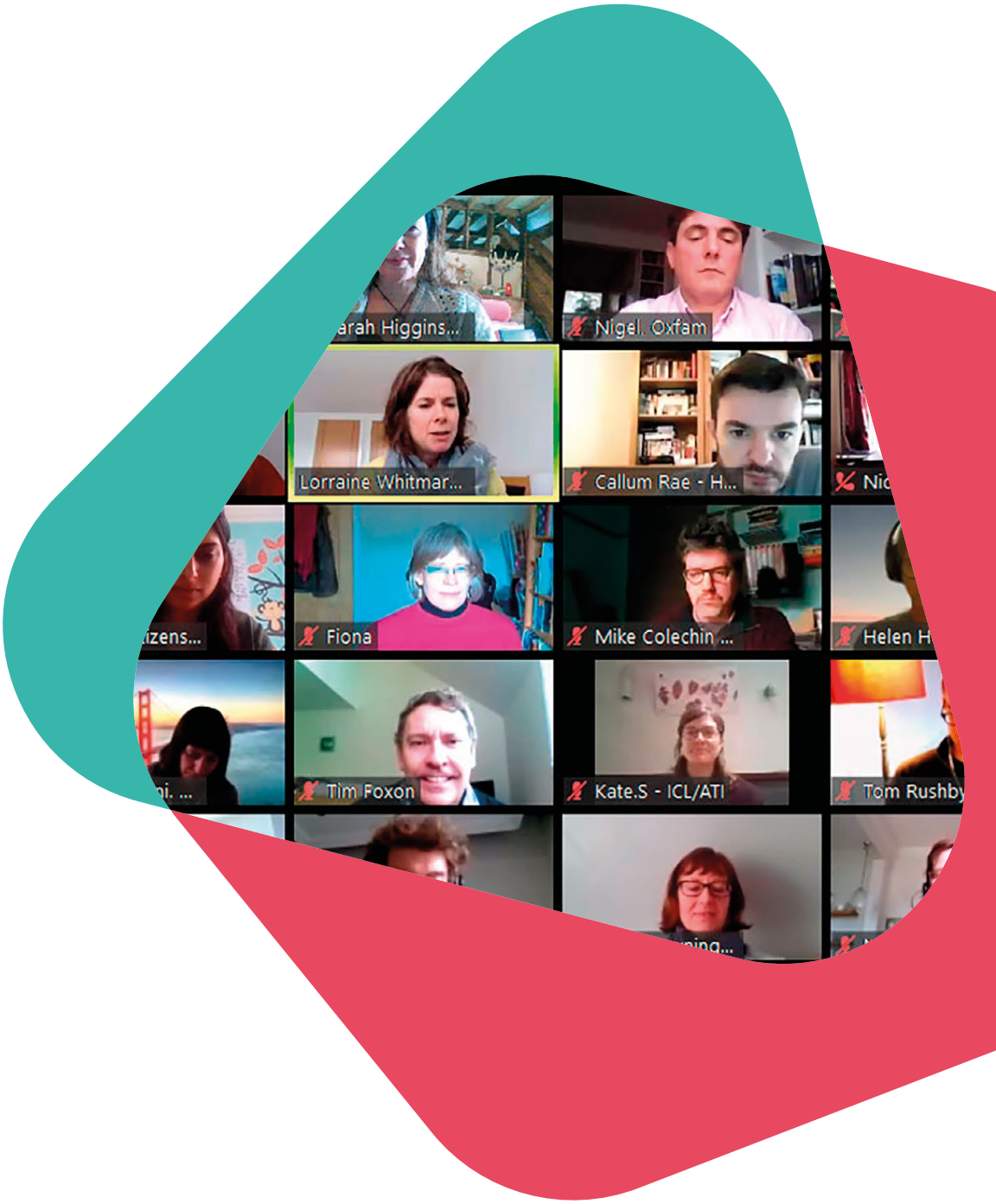

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Introduction

The idea for this CREDS event was initially generated by a working paper from UCL[1] suggesting that, despite the climate emergency, energy research has continued much as normal. The suggestion made was that energy research requires changes to the way we access data, publish, fund and conduct research to support rapid deployment a greater focus on impact. Recognising that the third sector is often better at rapid deployment than academia, we organised an event involving academics and experts from the third sector so that we could learn from each other.

The Centre for Research into Energy Demand Solutions (CREDS) was established as part of the UK Research and Innovation's Energy Programme in April 2018. Our mission is to make the UK a leader in understanding the changes in energy demand needed for the transition to a secure and affordable, low carbon energy system. To do this, our research focuses on reducing energy demand, improving energy efficiency and understanding demand-side flexibility. We are a consortium of over 20 research institutions in the UK.

CREDS has a remit to facilitate a network for the energy demand research community, known as the Energy Demand Research Network (EDRN). The aim of the network is to increase the visibility and impact of energy demand research within and outside our community. This event was organised as part of our hub role.

The event was initially planned to take place in London on 3rd April but was reorganised to take place online following the UK lockdown in March 2020 due to the COVID-19 crisis. This was therefore the first significant online event many attendees had ever been to and to guide the participants through the technology and process we hired a facilitator who specialised in Zoom and online processes, Paul Thistlethwaite.

1 Oreszczyn, T., Huebner, G. & Shipworth, D. 2020. How should energy researchers respond to the climate emergency? Preprint. doi: 10.6084/m9.figshare.12074226.v1

The main focus of the event was networking and dialogue, but we invited four speakers to spark discussion, two from academia and two from the third sector:

- Dr. Gesche Huebner, University College London: How should energy researchers respond to the climate emergency?
- Nigel Timmins, Humanitarian Director, Oxfam International: What can we learn from the principles of disaster response and how Oxfam are responding to the climate emergency?
- Dhara Vyas, Citizens Advice: Applied energy research for public and policy impact
- Prof. Lorraine Whitmarsh, Centre for Climate and Social Transformations (CAST): Change across contexts and scales

Each speaker was asked questions using Slido to enter and vote for questions.

We then divided into groups, first randomly to discuss the question 'How might our research have greater real-world impact?' and then according to preference to discuss the top six topics that emerged from those conversations. The event was evaluated using a feedback form and was deemed to have been positive and well organised.

The aim of this event report is to provide a brief overview of the main issues that arose from the presentations and the two discussion sessions. Three of the presentations are available by request – no slides were prepared for the fourth.

1. Speaker notes

Gesche Huebner

How should energy researchers respond to the climate emergency?

Gesche is a Senior Research Associate at University College London. She started by drawing a parallel between the climate emergency and the COVID-19 emergency that felt very new and urgent on the day of the event. Although different in nature, COVID-19 has demonstrated that money could be found, behaviour changed and policy altered within very short time-frames. In contrast, although climate heating has provoked local and national government and various organisations to declare an emergency, and despite increased activism such as Fridays for Future and Xtinction Rebellion which caused the government to change its 2050 carbon target to net zero, action has been slow. The climate emergency will need sustained effort over decades by governments across the world.

Energy research (which she defined as "any research around reduction of energy demand or reduction of greenhouse gas emission intensity that will help deliver a net zero carbon world by 2050") has a vital role to play but it needs to change in various ways:

- Time is of the essence (calling into question the time spent writing failed bids, negotiating access to data and writing journal papers).
- Funding for research that will help us reach net zero needs to be ring-fenced for this purpose.
- Research methods need to become more agile, recognising failure early and yielding faster impacts (such as action research or hybrid trials).
- Research scope needs to grow in ambition to deliver significant enough carbon savings in the time left to us.
- Incentives need to be better structured around deployment, impact and socio-technical research, rather than novelty.

- Research quality needs to improve so that individual projects are internally and externally valid; risk is diversified through varied research portfolios.
- Finally, a better appreciation of the broader research landscape and working collaboratively rather than competitively would provide better context for energy research.

The following actions are necessary for these changes to happen:

- On funding
  - Make quicker funding decisions.
  - Develop a triage system (like in medicine) in allocating funding.
  - Give support for crucial research more promptly.
- On developing our research portfolios
  - Greater focus on socio-technical research.
  - Greater focus on impact.
  - More research to support deployment.
  - Researchers need to examine own research portfolio and ideas critically.

Nigel Timmins

How might research have more impact in the world (notes from a humanitarian)

Nigel is the Humanitarian Director at Oxfam. He started his presentation noting that speed is often key in humanitarian work and has led to the Act-Test-Adapt approach of Real Time Reviews (RTRs). RTRs take place 6-8 weeks into a response and take no more than 14 days to complete. They have gained in popularity, compared to full evaluations, because teams need data on the ground in real time, donors want their money spent on activities and practitioners are under pressure to deliver 'value for money'.

Oxfam recently undertook a systematic review on the quality of evidence in the sector. There were a couple of important learnings. First, a lack of common standards, indicators and definitions in humanitarian practice make interventions and outcomes difficult to compare and measure. Second, much of their evidence comes from programme evaluations – where a more thorough reporting of methods – sample size, sample strategy, programme dates, locations and costs – could help improve the quality of the underlying evidence base. Third, and perhaps most interesting, was the finding that practitioners often felt overwhelmed by the evidence and, no matter its rigour, adapted their thinking or ways of working based on the recommendation of someone they trust or respect, a 'name' within the sector.

This chimes with Nigel's personal experience that data rarely wins the argument and he gave an example of an early warning system in East Africa that predicted starvation in Somalia but failed to release funding or, policy response until people started dying and the media got involved. Public pressure is necessary for change, though the data did eventually improve the timeliness and effectiveness of this particular response. His conclusion is that you need evidence with specific policy recommendations for the policy makers, but concurrently, to move those policy makers to action you need public appeal. To mobilise that, Oxfam uses tools like 'killer facts', a reality TV show and connecting grassroots activists to poor communities. This last point is how they are working with communities on key climate change challenges.

To finish his talk, Nigel compared some of the relative strengths and weaknesses of research in the third sector and academia, as summarised in the table below.

	Academic research	Third sector research
Positive	• Rigorous, statistical, quantitative • Less goal/ value driven • More objective and, therefore, authoritative • Therefore, more listened to by politicians	• Aimed to influence change – goal driven • Time-sensitive • Topical • Communicated in everyday language • Human-centred in focus, methods and communication • Strong on social sciences, qualitative
Negative	• Takes a long time • Can be obscure • Badly communicated (outlets, language, structure) • Cautious interpretation of results	• Can be cursory, superficial, jump to conclusions • Can be dismissed as exaggerated/ alarmist, unreliable, biased because it is assumed to start from an ideological stance/point to prove • Can lack scientific expertise to interpret scientific results they want to cite, and misrepresent them • Can be weak on physics, chemistry, etc, though this is changing

Dhara Vyas

Designing and planning research to influence and shape policy

Dhara is the Head of Future Energy Services at Citizen's Advice. Her talk focused on the virtuous circle between policy/ industry advocacy and consumer advice, and how using each to inform the other gave their research greater real world impact. Their aim is to contribute to a fair, affordable, inclusive, secure and sustainable energy system. She went on to talk about how Citizen's Advice is able to respond quickly to new research challenges, using COVID-19 (we were in the early stages of lockdown) as an example.

In a video, Tom McKinnes, Chief Data Analyst took us through some web traffic analysis showing the dramatic increase in people searching for advice on sick pay and universal credit, and an even more significan response to a new page called 'If you can't pay your bills because of Corona virus', making this a good tool for understanding immediately what people are worried about and when. Similar concerns were evident around the affordability of energy bills at this time, particularly pre-payment meters, which are typically used by more vulnerable customers. Citizen's Advice uses a number of sources of data to achieve its aims: commissioned research, academic research, empirical data from customer calls and 'grey' literature from the third sector and industry. They also influence policy via:

- civil servants in government and OFGEM (building relationships through regular meetings, sitting on boards and working/ steering groups, sharing research through briefings);
- politicians on the back benches, in select committees and ministers (providing briefings and evidence and responding to consultations);
- the media (to promote their message, garner support and create the political space for action);
- industry and business (both over time and on specific issues, sharing issues, trends and reports).

Their work is meant to scrutinize, influence and improve policy and business outcomes whilst raising awareness and advocating for the rights of the public, leading to changes in legislation, products and future research.

Lorraine Whitmarsh

Change across contexts and scales

Professor Lorraine Whitmarsh is Director of the Centre for Climate Change and Social Transformation (CAST). Her talk started by explaining what impact means in her area of research – behaviour, organisational and policy change and, ultimately, societal transformation, looking at a range of contexts and scales. There is a need to raise our ambition and focus on high emission activity, such as mobility (driving and flying), food choices (reducing meat and dairy consumption) and materials, as well as direct energy consumption for heating, cooling, etc. One of the reasons these areas are so hard to decarbonise is that they are embedded in cultural values and societal norms, as well as physical infrastructures and technologies. Engagement is key to having real world impact.

Some of the barriers to impact include: research timescales, inaccessible language, not engaging stakeholders in defining the research agenda (upstream & regular engagement) and other generic barriers common to many areas of research. Some particular challenges for climate change/ energy demand research is that they are complex, long term, global and value-laden, with distant impacts.

The policy implications can be highly threatening for identities, people's way of life, their financial circumstances, and so on. This is why a just transition is so very important. The UK Climate Change Committee's report estimated over 60% of the required changes for net zero are social and behavioural. Such a significant shift needs to be discussed in more engaging and positive ways to make it less threatening, such as linking to what people value and thinking about the co-benefits. Reframing the challenge around these makes messages more meaningful and motivating. We also require changes to infrastructures to make these changes normal, easy and low-cost.

A final barrier relates to trust and credibility. As researchers we need to take this on board; we are advocates for change and so we need to lead by example. A CAST study of academics' carbon footprints showed climate academics (especially senior ones) are travelling more than those not in climate science.

There is a need to democratise expertise. Public and stakeholder participation and collaboration is crucial to define what a sustainable future looks like and collaborating to deliver these visions and solutions requires a coproduction model to test out interventions. This might range from placements, advisory boards, youth panels, seed corn funding, to action research projects and being reflexive and self-critical about our own behaviour.

2. Summary of deliberations

Following the speakers, we held two group discussions: Deliberation One and Two. In Deliberation One, groups were randomly allocated and asked to discuss the question 'How might our research have greater real-world impact?' Groups were asked to write notes and also vote for their top ideas/ solutions within their group. The detailed notes of these conversations can be found in Appendix One.

The top ideas from each group were then listed and voted on by the whole meeting to come up with the discussion topics for Deliberation Two. Meeting members joined the topic in which they wanted to participate. Again, groups were asked to keep notes of their conversations, which are detailed in Appendix Two.

This summary uses the notes made by the groups and pulls together some of the key ideas from each deliberation session. While Deliberation One focuses mainly on defining the problem, Deliberation Two is more solution-focused.

2.1 Deliberation One summary

Naming and timing

We are facing a period of profound climatic change and our time to respond to it is growing short. Despite the urgency, we need to look at how we refer to and describe this crisis since how we do so can be self-defeating, or can even serve to perpetuate the socio-cultural/economic/technical dynamics that created climate change[2] in the first place. Whatever we call it, we think that the growing call from the wider population does accelerate the research process/ action link.

2 Ref Andy Stirling's work, e.g. Is the naming of climate change a dangerous self defeat?

The COVID-19 pandemic has made it clear that rapid change is possible, and that 'proper science' can respond to short timescales where necessary. Funding has been made available, research fast-tracked, agendas shifted and real-world impact prioritised. Stakeholder engagement with research has been paramount – researchers working with policy-makers and industry to respond as fast as possible both to understand and deal with the immediate threat and to work on longer-term solutions. In a similar way, the energy demand research community needs to become more agile so that it aligns better with the priorities of our research agenda and the timescales of our stakeholders.

Changing academic incentives and structures

The way academia is currently structured constitutes a systemic barrier to climate change impact. This may be a shocking statement to some but recognising the problem is the first part of the solution. This report will explore some of the things that need to change, such as the incentive structures and the focus on novelty rather than deployment and impact (e.g. applying existing research or scaling solutions that have been piloted).

Changing the funding framework

Perhaps the easiest place to start the discussion is with the academic funding framework. We feel that funding processes need to be simplified, as much time and human resource is wasted in writing proposals that are not funded. Flexible funds within programmes already exist and are helpful. Having funding pots available on an ad hoc basis for short projects would also allow us to be more responsive, as would the flexible redeployment of funding between universities and others with whom we will need to collaborate moving forward. It may also be that full time national labs such as the Fraunhofer Institute and Max-Planck Institute in Germany or National Renewable Energy Lab in the US would help academics to focus, rather than chasing funding for the next project and also help in the development of longer-term relationships with industry and the third sector. The Catapult Centres address this somewhat but this model could be strengthened.

Cross-sector collaboration/ engaging with stakeholders (policy and business)

It is generally recognised that change and impact depends on engaging with stakeholders (policy and business in the case of CREDS, different researchers need to think about their own stakeholders). Tools such as stakeholder analysis are useful to identify key individuals with whom we need to collaborate. We need to ask: who are the key people, what is of interest to them and how can our research help them solve their problems?

Whoever the stakeholders are, we need to co-design our research, bringing them onboard early to ensure ownership and research relevance, and developing a shared narrative and acting as interpreters of our research. To do this successfully, we need to understand the needs of the beneficiaries of our research and build long-term and trusting relationships.

Networks are useful for informally communicating otherwise obscure research to policy makers, though we do need to ensure accountability, responsibility and confidentiality if meetings are closed or informal, as many are. Research can also be fed through scientific advisory boards, a more formal mechanism, and researchers should be encouraged to take part if asked. Again, the need to think systemically about change across different sectors, systems and stakeholders is important.

As these sorts of contributions are not recognised in the same way (in academia at least) that publications, amount of funding won or the REF are, routes need to be developed to reward these other activities.

Data / methodologies / cross-disciplinary collaboration

As well as engaging with stakeholders external to our own sector, we need to go beyond the socio-technical to co-created transdisciplinary research. As energy demand researchers we also need to focus on standards and protocols, with regards to both data and language, creating shared understandings across disciplines of what constitutes quality research, particularly as we speed up, which has the risk of compromising the quality and depth of our findings. Data needs to be properly stored and shared with others to allow us to build upon previous research. We also need to prioritise methodologies that link to implementation and validation through pilot studies and deployment wherever possible.

Impact / comms / media

We currently have a public mandate and a rare window of opportunity. We need to communicate this public mandate to policy-makers. Although it is not the focus of CREDS, where relevant research would benefit from engagement with social movements, developing direct political bottom-up approaches, much in the way we described engaging with policy and business stakeholders above, adapted to the relevant groups.

Communication and working with the media have become critical to our work. For those involved in CREDS, support is available from the Core team. Research programmes need to include funding for knowledge exchange, impact work and effective communications so that their research reaches the outside world in accessible ways.

2.2 Deliberation Two summary

Go beyond the technical into co-created, transdisciplinary research that includes stakeholders from the start. Understanding the needs of beneficiaries.
This conversation focused on developing relationships across sectors where research is co-created so that its impact can immediately be felt and dissemination mechanisms are planned from the start. It was suggested that a pilot be run with a couple of universities to test this approach, but there are already good examples, such as:

- Area-based partnerships have a drive to action but can have huge knowledge gaps where universities can contribute. For example, Bristol Green Capital Partnership (Bristol is a progressive city whose council recognises its own limitations and universities can re-position role to link their 'subjects' with policy makers). Oxford has a very active Oxfordshire Local Enterprise partnership, where similar opportunities exist.
- Different ways of engaging with stakeholders across sectors are being identified, such as the Climate Citizens Assembly, the Leeds Climate Commission, the Centre for Sustainable Energy, Climate Xchange, Institute for Advanced Sustainability Studies and the Centre for Research into Energy Demand Solutions.

When working across disciplines and sectors, experience shows we need to build in time for people to get to know each other and work together to agree on outcomes and impacts before they start work. It takes time to build relationships and trust. This does not mean that in-depth, long term research is no longer important, merely that it needs to work on a parallel track with more urgent work. This sort of work requires inter-disciplinary facilitators, who are able and willing to facilitate conversations.

Funders need to facilitate this work too, in various ways. Researchers need to be allowed to flex and change what is happening, learning as they go and dropping what doesn't work. It would also help if funding rules that limit these sorts of relationships were reviewed, e.g. only being allowed to be led by academics. Funding of labs would also mean that researchers had more autonomy – labs would be able to adapt questions more quickly as they are already funded. Agile funding for short-term projects, encouraging collaboration not just competition and replacing the 'winner takes it all' model, are other things for funders to consider.

Learning from other countries on how to fund full time national labs (like US and Germany)
Examples cited were the Fraunhofer Institute and Max-Planck Institute in Germany or National Renewable Energy Lab in the US. The German institutes function very much like universities, but the group was not sure of the funding models. US labs may be more policy focused, implying that goalposts can be politically shifted on regime change and that research may become politically constrained.

The UK used to have something similar and NERC and STFC still operate on a similar model in some ways. They have dedicated budgets they could redeploy, institutional memory and direct policy relationships but did not always lead to rapid innovation. Could we introduce more rapid ways of working within these? UKERC was originally an attempt to fix this and the CREDS funding model may be a good hybrid too: should we be funding more big centres with mix of core & flexible funding (UKRI may be heading this way due to a lack of national labs)? However, this model is still limited by 5-year timeframes, and some things don't fit (e.g. long-term data collection).

Might we create virtual labs, some of which may then become concrete in time?

The group called for an investigation into how these labs actually work, a pulling apart of the different operational and funding models. They were also interested in a series of questions. What would stop if we shifted to this model? What would happen to finite research investment pots? How could we advocate for longer-term funding? Might it be possible for the transition to be researched as it happens (with rolling rapid review & change of direction as appropriate)? Is UKRI best placed to do this?

Structural change required to reward relevant work within academic structures

We are dealing with a time-limited problem and so shouldn't be spending our time turning all our institutional structures upside down. On the other hand, we do need to establish appropriate structures and different ways of working to meet the challenge of climate change. We need to lobby those with responsibility for academic funding and structures/ experience of a range of academic contracts. Current funding model facilitates little more than getting money in and papers out with teaching, research and impact on the side. This necessitates an unrealistic set of skills and demands on academics. Bigger pots of money are being effective but how do we change institutional structures?

Action needs to be taken by funders and publishers. Proposals and journals should also be peer reviewed from outside academia to ensure impact and relevance. We also need a more strategic approach to funding that doesn't waste people's time writing bids with limited success rates and responding to calls all coming through concurrently.

Action needs to be taken by academic institutions in relation to reward structures, which should reward research outcomes rather than bid writing. This implies the need to measure outcomes and impacts. There are significant challenges and debates relating to how to demonstrate and measure impact, particularly within limited time scales. Case studies might be one way of doing this. Horizon 2020 programmes require a description of impact but is this ever followed up? If research is designed to deliver change (behavioural change in particular) the implication is that it should deliver practical results which funders would then want to be measured. The implication is also that a lack of social change suggests the research is ineffective but understanding change is fraught with difficulty.

Media – get clear messages to the public (e.g. The Conversation)

We need to distinguish between academic and general public impact. The H-index covers scientific impact only and academic success is measured in citations. There is a need to disaggregate where the citations appear – i.e. in the paper, Twitter, etc. and decide if different social media are more appropriate for different audiences. Though some are good at it, social media is not something in which most academics are trained.

Using straightforward language can increase the impact of the message. Perhaps a public-facing abstract could be written for journalists to take verbatim into mainstream media. Writing collaborative press reviews with someone who knows how to reach the required audience, and deciding from the start of a project what audiences you want to reach with what messages, can really help increase your media impact. Universities have media and communications people who can help. It could be that publications need some sort of discussion to go alongside them, reviewing academic research in the context of public and political discourse.

Tracking our influence from the beginning of the research can be challenging – how can we do this from the very beginning as it's difficult to know how it's reaching others outside academia? This is not just a matter of the number of retweets, but monitoring if our research influences policy or industry, for example.

Other ways of opening up research might include: inviting the general public research centres to explain the work, holding regular talks and presentations so they can ask questions, working with journalists and individuals in different media groups to provide research messages in press releases.

Time scales – COVID-19 shows we CAN move quickly. Climate change has a public and policy mandate so we CAN move quickly there too?

COVID-19 is a much more imminent emergency compared to the climate crisis. There is psychological distance with climate change: a much longer time horizon. The nature of the two emergencies is very different. From a risk perspective – there are complex and interacting things going on that will take a long time to understand and unpick – there is a danger in jumping to the wrong conclusions and drawing parallels that don't apply.

Nevertheless, the response to COVID-19 highlights that radical changes are possible in a short timescale. So, what can be learned that can translate across to climate change?

A strong one is that it is possible to develop fast, non-optimal solutions, such as the responses to COVID-19. This experience may lead to a gear-change in expectations amongst some of our stakeholders and we should consider how academic processes will respond.

We might be able to learn from consultancy (in terms of timeframes and turnaround), for example. Packaging up existing research in accessible forms and re-discovering earlier research that could be relevant to the climate emergency, that may have been before its time when originated, is also possible. This will help provide fast response to calls for evidence for BEIS and other government departments.

Another strategy might be working with stakeholders who don't have the capacity to do their own research. Researchers could be embedded within these organisations (e.g. local authorities) and we could engage better with local organisations and processes.

Thinking about planning and long/medium/short-term planning horizons is also helpful. Working to shorter timescales might help us fit with policy cycles and government terms.

Academics need training and resources to help them communicate better

This group had a number of practical suggestions about how this might happen. Research units should include people whose strengths are in communication and writing, whose primary function is to do this, rather than research. Having said this, it would be useful for researchers to have a better appreciation of the requirement for external communication. Two things might help. First, it would be very valuable for academics (i.e. all ECRs in their first 5 years) to do secondments for 6 months or a year in a policy or industry environment to enable a better understanding of these areas. This could be a condition of publicly funded PhDs. Second, academics need to be trained, preferably by people from outside of academia, to get a different perspective on communication. People from outside the research can offer a helpful perspective on the work – what language to use, key messages, audience assessments, etc.

Communicating the message to other audiences also needs to be planned into the research. What additional messages might be shared from publications (i.e. once a journal is published, can you write an additional abstract/press release for media, do a blog for a website, organise an event for policy makers, etc.? Funders could specify this in calls (i.e. a mandatory section on impacts and a section on how communication will be done). CREDS is a good example of this and is actively building the capacity of its researchers (particularly ECRs) in this area.

3. Actions

Actions and recommendations

Category	Description	Who?
Our shared responsibility	The energy demand research community needs to become more agile in reaction to the climate emergency, working to the timescales of our stakeholders on subjects relevant to the current crisis.	This is the responsibility of all researchers and their stakeholders when considering what to work on and how.
Funding could be simpler, more flexible, more responsive	Several recommendations were made over the day: • Funding processes need to be simplified so that less time is wasted on writing proposals that are ultimately unsuccessful. • Funding pots for short-term projects would allow more responsive, agile research. • Researchers need to be able to respond flexibly as research develops. • Flexible redeployment of funding between universities and organisations outside academia would facilitate collaboration. • Partnerships with non-academic organisations – they should be able to lead as full (FEC) partners rather than sub-contractors. • Process people, KE/ impact work, facilitators, etc. should attract a significant proportion (~20%) of the funding allocated to any programme.	Funders esp. UKRI. CREDS will write to them.

Category	Description	Who?
Different research institutional models might help strengthen stakeholder engagement	Catapult Centres have helped to develop longer-term relationships with industry and the third sector, but the model could be strengthened. National labs, e.g. CSIRO (Australia), IRD or ADEME (France), Fraunhofer (Germany), Lawrence Berkeley National Laboratory (USA), CanmetENERGY Research Centres (Canada), may be one way to do this but more information about such models is needed. There are questions around: • The nature of governance (particularly, who sets the objectives). • How these models support rapid innovation. • Whether the funding time-frame is sufficiently stable (i.e. more than 5 years). It was proposed that some investigation take place into how such labs work.	CREDS will do some initial investigative work on how these models work and some of their pros and cons. We will send it to UKRI.
Data standards are important	Shared perspectives across disciplines is required, including on standards and protocols for data handling and transparency.	CREDS has a small, cross-theme group working on this and hopes to run some webinars. Contact Sarah Higginson if you'd like to be involved.
Trans-disciplinary research would be beneficial	A pilot was proposed with 2 universities to test the co-creation of transdisciplinary research, based on, e.g. examples from Bristol and Oxford (area-based partnerships) and Citizens' Assembly (novel ways of engaging stakeholders). • This needs effort – maybe led by inter-disciplinary facilitators – to build relationships and trust (see point above about funding allocations).	CREDS is already an example of trans-disciplinary research. We leave this to the wider Energy Demand Research Network to lead. Please let us know if you take this on! We'd love to host a webinar for you.
Policy and business collaboration are important	Researchers need to understand the needs of the beneficiaries of our research and build long-term and trusting relationships. • These activities are not currently valued in academia, so ways to reward this kind of work is required. • Support researchers to develop skills and understanding of the requirement for external communication, e.g. require academics to undertake secondments for 6/12 months in a policy or industry environment to enable a better understanding – a condition of publicly funded PhDs?	CREDS will investigate and write up some alternative policy collaboration models (e.g. Climate Xchange, What Works, Chief Scientific Advisors) and how to integrate this into our practice (e.g. through KTPs using Innovate UK, the Catapults or ERBE Centre for Doctoral Training).

Category	Description	Who?
Knowledge exchange and communication	To be impactful beyond the world of academia, knowledge needs to be shared with relevant stakeholders. For this to improve, the following recommendations were made: • Research programmes need to include funding for knowledge exchange, impact work and effective communications so that their research reaches the outside world in accessible ways. • Communication specialists should be recruited to research programmes, to focus on writing and comms. • Academics should be trained in aspects of communication, such as the role of language, identifying key messages and audiences and techniques for engaging stakeholders. • Projects / programmes should allow time for closer collaboration with existing institutional mechanisms (press offices, communications teams). • Researchers should be open to and seek out opportunities to share their research with public audiences and the media. • Provide guidance on integrating communications planning at the start of research projects. • Communicate principal messages from research to non-academic audiences also needs to be planned into the research. Funders could specify this in calls (i.e. a mandatory section on impacts and a section on how communication will be done). This might include writing an additional abstract/press release for media, writing a blog, organising an event for policy makers to share research findings as they emerge. CREDS is a good example of this. • Distinguish between academic and other impact.	CREDS has advocated for knowledge exchange work with our funders and the research community since the start of our programme and will continue to do so. We will write to the relevant CDTs to point out that DPhils, PhDs and ECRs should be supported, given top-up training and have access to capacity building within research programmes. CREDS is running a series of webinars, some of which will aim to build the capacity of researchers in relation to improving and communicating their impacts and planning knowledge exchange and stakeholder engagement from the beginning of their research.
Recognition and value for relevant work	Teaching, research and impact work have less status and are less rewarded in academia. This could be changed by: • Changing the peer-review process to include those outside academia (for relevance and impact). • More strategic funding processes to minimise time wasted on ultimately unsuccessful funding bids. • Institutions recognising research outcomes and impact as part of their reward structures. We acknowledge that this is a difficult area of monitor and that methodologies are still evolving.	CREDS will write a letter to the REF, Research England, Scottish Funding Council and the Department for the Economy.

Category	Description	Who?
Time scales	Response of research to the pandemic has raised expectations of what academic research can do in the short and medium term. These shorter time frames are a better fit with policy cycles and more responsive research is also better for engaging with businesses. In relation to how researchers meet this new expectation in response to the climate crisis, a couple of actions were identified: • Ongoing stakeholder engagement will develop relationships that allow a continuous and useful flow of information between academic institutions and others. • Current research should be made more accessible immediately, through pre-prints for example. • Earlier research that has new relevance should be revisited to propose new policies, research and initiatives.	Recognising and responding to the urgency of the climate change agenda is at the heart of the CREDS proposal. It requires all academics to work out what can be done quickly and how they can engage more consistently. Publishers also need to respond to this agenda.

About CREDS

The Centre for Research into Energy Demand Solutions (CREDS) was established as part of the UK Research and Innovation's Energy Programme in April 2018, with funding of £19.5M over 5 years. Its mission is to make the UK a leader in understanding the changes in energy demand needed for the transition to a secure and affordable, low carbon energy system. CREDS has a team of over 140 people based at 24 UK universities.

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