THE SEVEN DIMENSIONS OF CLIMATE CHANGE

Introducing a new way to think, talk, and act

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About the RSA

The RSA: an enlightenment organisation committed to finding innovative practical solutions to today's social challenges. Through its ideas, research and 27,000-strong Fellowship it seeks to understand and enhance human capability so we can close the gap between today's reality and people's hopes for a better world.

About COIN

The Climate Outreach & Information Network (COIN) is a charity that engages people from different backgrounds to understand and take action on climate change. We have established a reputation as leading specialists on climate change communication, and we work to develop meaningful narratives about climate change that engage a wide range of different people and organisations.

About the authors

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Executive Summary

This is a crucial year for climate change. 2014 broke national and global temperature records, and with both a UK general election and key international negotiations in Paris at the end of 2015, the policy levers for making progress are once again on display. But this time, climate leadership must go beyond endlessly drawing attention to the problem and issuing generic calls for 'action'. Instead, we must ask why the calls to action are not being heeded, and propose and demonstrate solutions to *that* problem.

We need to move the debate towards competing (but ultimately more plausible) ideas of how, where, when, and through whom the action needs to take place. In short, we need to reimagine the world's toughest problem. This means seeing the problem more holistically, and working on multiple fronts simultaneously, while communicating clearly and intelligently – a goal this report seeks to contribute towards.

Our starting point is that climate change is not only (or even mostly) about 'the environment'. A better approach is to start thinking and talking about climate change as a shared challenge with multiple identities – and in this report we explore the 'Seven Dimensions' which we think illuminate this unique challenge: Science, Behaviour, Technology, Culture, Law, Economy and Democracy. For each 'dimension', we ask what the key challenges are, how progress can be made, and how it links to the other six dimensions.

- From ***Science*** we need a new social contract between scientists and society; moving away from a 'hands-off' view of expecting 'more facts' to somehow produce deeper engagement with climate policies.

- With ***Behaviour*** we need to face up to 'stealth denial' – the fact that the majority of those who understand the problem intellectually don't live as though they do.

- From ***Technology*** we need deep decarbonisation at scale – we need more and better tools to decarbonise energy, and as quickly as possible.

- Our ***Democracy*** needs to overcome the governance trap – people expect the government to act but government thinks people don't care about the issue enough; and climate change is a collective action 'tragedy of the commons' problem at almost every level.

- Our ***Economy*** needs to invest in the future; this is mostly about moving money away from fossil fuels towards renewables, but is also about getting beyond the fetishisation of economic growth and reimagining economic models and purposes.

- In ***Law*** we need a constraint on extraction at a global level, ie a legal mechanism to keep fossil fuels in the ground, but we need to be mindful of the steps towards that, and the financial impact ('carbon bubble').

- Throughout our ***Culture***: we need to break 'climate silence' and normalise discussions on the issue; moving away from whether it's happening to what we're doing about it.

The purpose of this reframing of climate change as an issue with 'Seven Dimensions' is to:

1. Highlight the systemic nature of the challenge, and the range of possible solutions

2. Allow people who might otherwise be disengaged from the challenge to see themselves in it, and identify their scope for action within that domain, rather than be daunted by 'climate change' as a whole.

3. Encourage necessary conversations between individuals and groups across these dimensions, with an emphasis on moving beyond unilateral (eg Science alone) or bi-lateral (eg Economy to Democracy) connections. Climate change must move from being a scientific to a social fact before any significant progress can be made, which requires a multi-lateral approach.

4. To differentiate it from broader environmental concerns, but also to clarify what it really means – for people, business and governments – to 'act' on climate change with conviction.

This discussion document reflects a **work in progress** and as such we welcome critical engagement with the ideas presented to help inform the public discussion, and to shape our final report later this year. This document is part of a wider project called The Seven Dimensions of Climate Change – a research and outreach project devised by the RSA, undertaken with the support and input of the Climate Outreach and Information Network (COIN) and funded by The Climate Change Collaboration.[1]

This project comprises a range of public and private events, as well as a variety of written outputs. This discussion document seeks to contextualise and inform these project elements, and will form the basis of a final report on the project as a whole, later in 2015. The project builds on the learnings of a major RSA report at the end of 2013 titled *A New Agenda on Climate Change: Facing up to Stealth Denial and Winding Down on Fossil Fuels*, as well as COIN publications such as *Climate Silence (and how to break it)*.[2]

[1] The initial expression of the idea was Rowson, J. (2014) Seven Dimensions for Action on Climate Change, *The Guardian*, Sustainable Business, 14 February [Online] Available at: www.theguardian.com/sustainable-business/behavioural-insights/2014/feb/14/seven-dimensions-action-climate-change

[2] Rowson, J. (2013) *A New Agenda on Climate Change*. London: RSA. [Online] Available at: www.thersa.org/action-research-centre/learning,-cognition-and-creativity/social-brain/reports/a-new-agenda-on-climate-change; Corner, A. (2012). *Climate Silence (and how to break it)*. Climate Outreach & Information Network. [Online] Available at: http://www.climateoutreach.org.uk/portfolio-item/climate-silence-and-how-to-break-it/

Introduction: The moment, message and messengers

"Less haste, more speed."
- popular saying

When people say we should 'do something' about climate change, they typically mean that it's happening, it's caused principally by human activity, it is already having harmful effects that are likely to get much worse, and we can and should do something about it. 'Doing something about it' means reducing risk, which has two elements: decreasing the hazard (mitigation) and minimising the harm (adaptation) of a rise in average global temperatures.

Urgency is always to some extent in the eye of the beholder, but what makes this moment in time particularly important is the growing sense that we only have a few years to decrease the hazard before we give up completely and focus on minimising the harm.[3] So we need 'action', and 'quickly', but that message doesn't really get us anywhere. Mostly, this is because climate change is not enmeshed in the public consciousness in the way it would need to be for everybody to feel that that this message of urgency was *for them*.

Climate change came of age as primarily a scientific and 'environmental' issue, entering the public, political and media discourse via warnings from climate scientists like James Hansen, and the early advocacy of modern environmental groups such as Friends of the Earth and Greenpeace in the late 80s/early 90s. At first glance this might seem an unenlightening statement. Of course climate change rose to public prominence in this way: isn't it fundamentally about scientific predictions and the effect of human actions on 'the environment'?

Yes and no. Science certainly underpins our understanding of how changes in the climate take place, and environmental advocacy groups are the obvious candidates for raising public awareness about our impact on the natural world. Climate change is a scientific fact, and increasingly a physical reality: with 2014 confirmed as the hottest year on record, the era of the 'anthropocene' is upon us.[4]

But if - for better or worse – human activity is now the dominant influence on our planetary system, it is a strikingly one-way relationship. Because despite the fact that virtually no facet of our societal functioning is unaffected by a changing climate, it is not yet what sociologists call "a social fact". We are changing the climate, but it's not yet changing us. It's not an integral

[3] Anderson, K. (22 October 2014) Letter to the PM outlining how 2°C demands an 80% cut in EU emissions by 2030. *kevinanderson.info*. [Online] Available at: http://kevinanderson.info/blog/letter-to-the-pm-outlining-how-2c-demands-an-80-cut-in-eu-emissions-by-2030/

[4] Hamilton, C. (31 May 2012) *Climate Engineering in the Anthropocene*. RSA Events. [Online] Available at: www.thersa.org/events/audio-and-past-events/2012/climate-engineering-in-the-anthropocene

part of the way we shape our social practices, nor a significant enough cultural norm to act as a constraint on our behaviour.[5]

And the signifiers of climate change – overwhelmingly scientific and environmental – are part of the problem; we are supposed to see ourselves in the melting ice, the plaintive polar bears and the hockey-stick graphs. But most of us simply don't. There has been a fundamental failure in the way in which the idea of climate change has been communicated, based on a misunderstanding both of human nature and the systemic nature of the challenge.

What climate change means – and by extension how we should collectively mobilise a meaningful response to it – remains stubbornly stuck, like a broken record, on a problematic vision of 'The Science' translating into a comically generic call to 'Action', with most of the difficult ethical, cultural, political and economic questions left implicit, for policymakers to work out (as if they were best-equipped for such a task).

As argued in *A New Agenda on Climate Change*, a major cause and consequence of this inertia is that even those who broadly accept the facts of climate change struggle to see themselves as part of either the problem or the solution. No wonder then that our societal response has been lacking precisely those personal qualities – passion, honesty, tenacity, and vision – that the issue demands of us.[6]

Climate change is both a completely unique collective action problem, and also something that is implicated in every aspect of our lives, but the messengers are invariably scientists and environmentalists. We need a way of thinking and speaking – a radical reframing – that captures the fact that climate change is not merely another 'environmental issue'.

In part, this is driven by necessity: a recent analysis of long-term international trends in public opinion concluded that although scepticism about climate change is 'stable' at a fairly low level in most countries around the world, climate 'fatigue' is now a dominant theme.[7] People are simply not enthused by the issue – or at least, not enthused *enough* to respond in a way that reflects the urgency and magnitude of the challenge.

'Framing' is rapidly becoming a buzzword in debates about climate change, and will not by itself keep fossil fuels in the ground. But without a new sense of collective purpose that embraces the diverse elements of human experience – without new vocabulary and cultural currency that allows us to overcome climate fatigue, a social silence, and stealth denial – enduring solutions more substantive than conceptual reframing simply won't be forthcoming.

In this spirit, we introduce the notion of 'Seven Dimensions of Climate Change' – and outline why together they might offer precisely the kind of radical reframing required.

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[5] Durkheim, E. (1982) [1895]. S. Lukes (ed.) *The Rules of Sociological Method and Selected Texts on Sociology and its Method*. W. D. Halls (translator). New York: Free Press.

[6] Rowson, J. (2013) *A New Agenda on Climate Change*. London: RSA. [Online] Available at: www.thersa.org/action-research-centre/learning,-cognition-and-creativity/social-brain/reports/a-new-agenda-on-climate-change

[7] Capstick, S., Whitmarsh, L., Poortinga, W., Pidgeon, N. and Upham, P. (November 2014) International trends in public perceptions of climate change over the past quarter century. *Wiley Interdisciplinary Reviews: Climate Change*. DOI: 10.1002/wcc.321.

Why seven dimensions?

"We should make everything as simple as possible, but not simpler."
- Albert Einstein

We tend to forget that the last part of Einstein's celebrated injunction to make things as simple as possible. So when considering what do to do about climate change, perhaps we should ask ourselves: how simple is this challenge?

The Grist journalist David Roberts says climate change is inherently simple: "Do something, or we're screwed!"[8] Amusing, and true, but too simple because the call to "do something" gets complicated as soon as you ask: what exactly does that "something" mean? On the other hand, when a professor of climate change, Mike Hulme, writes "all human practices and disputes now can be expressed through the medium of climate change," the challenge begins to sound like a philosophical inquiry into what it means to be human.[9] That may also be true, but it's not simple enough to help clarify what – if anything – we should respond to the problem.

So what's the right kind of simple?

First, we need a form of simplicity that rejects the conflation of climate change with environmentalism by presenting a more energising set of associations. The environmental framing is unhelpful because the psychological, social and economic phenomena driving fossil fuel production are obscured by debates about the killing of badgers, the dredging of rivers and the protection of otters. Moreover, as long as environmentalists are the public face of climate change it is too easy to conveniently and unfairly dismiss a universal moral imperative as a tribal anti-capitalist agenda.

Second, the right kind of simple would offer a vision of human behaviour informed by political consciousness, so that calls for "behaviour change" connect with the deep roots of the problem in fossil fuel production, rather than a disproportionate emphasis on energy efficiency. As argued in *A New Agenda on Climate Change*, taking 'rebound effects' seriously[10] means the touchstone for any given intervention is not "Will this reduce localised emissions" but rather, "Will this intervention help to keep coal, gas and oil in the ground?"[11]

Third, the right kind of simple would promote systems thinking, such that the climate problem is not viewed as having discrete independent elements, but rather multiple inter-connected

[8] David Roberts talk (April 2012) 'Change is simple, we do something or we're screwed!' TEDxThe EvergreenStateCollege. [Online] Available at: www.youtube.com/watch?v=A7ktYbVwr90

[9] Hulme, M. (2009) *Why we disagree about climate change: understanding controversy, inaction and opportunity*. Cambridge University Press.

[10] See Rowson, J. (2013) *A New agenda on climate change*, pp.41-45 for a detailed discussion. The basic idea is that apparent gains in using less energy in one place is often offset or even undermined completely by unintended consequences of these savings, elsewhere in the system.

[11] McKibben, B. (2 August 2012) Global Warming's Terrifying New Math. *Rolling Stone*, 1192. [Online] Available at: www.rollingstone.com/politics/news/global-warmings-terrifying-new-math-20120719

dimensions that are always present and can be teased out of almost any major discussion on energy or climate policy. The Seven Dimensions of Climate Change are not some extra layer of complexity to be added to an already overwrought debate: they are ways of delineating components that were already there, but obscured by the all-encompassing nature of the challenge.

Fourth, the right kind of simple would make climate change feel less tribal, such that groups emphasising the humanistic, psychological, ethical dimensions of the challenge recognise that they share the problem with those emphasising the more technological and technocratic approaches to the problem. In this respect, the right kind of simple would acknowledge it is both a technical problem and an adaptive challenge and facilitates conversations between these mindsets.[12]

Thinking in seven dimensions is like the apocryphal tale of the blind men drawing vastly different conclusions about an elephant based on the incomplete evidence available to them. We may accept that 'science says' we are facing unprecedented risks (Science), and agree that low-carbon energy infrastructure is required (Technology). But how much will it cost (Economics)? And whose consent will we seek to implement it (Democracy)? Will competing ideas about aesthetics and values impede or facilitate the energy transformation (Culture)? And will any of it matter if the new equipment is simply not engaged with – or old habits rapidly return (Behaviour)? Perhaps, we will need to *force* new practices (Law) – but then our old friend 'Democracy' returns to the fray.

The goal is therefore to capture the complexity of climate change in a discrete (but deeply inter-related) number of recognisable dimensions.[13] The seven selected are not exhaustive or exclusive, but together they are fundamental and capacious enough to capture all the major aspects of the challenge. There are certainly other fundamental themes like timing, fairness, health, security, food and demographics that have to be part of the story, but these cut across the dimensions, which have been chosen to optimally balance 'distinctiveness' with 'inter-dependence'. On any major climate issue, making the particular challenges in each dimension more explicit may help us to gain traction because it obliges us to highlight how that challenge is informed by the constraints and opportunities in the other dimensions.

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[12] For a more detailed description of this distinction between technical problems and adaptive challenges, and why it matters, see: Rowson, J. (2012) *Transforming Behaviour Change: Beyond Nudge and Neuromania.* London: RSA. pp.17-20. [Online] Available at: www.thersa.org/__data/assets/pdf_file/0006/553542/RSA-Transforming-Behaviour-Change.pdf

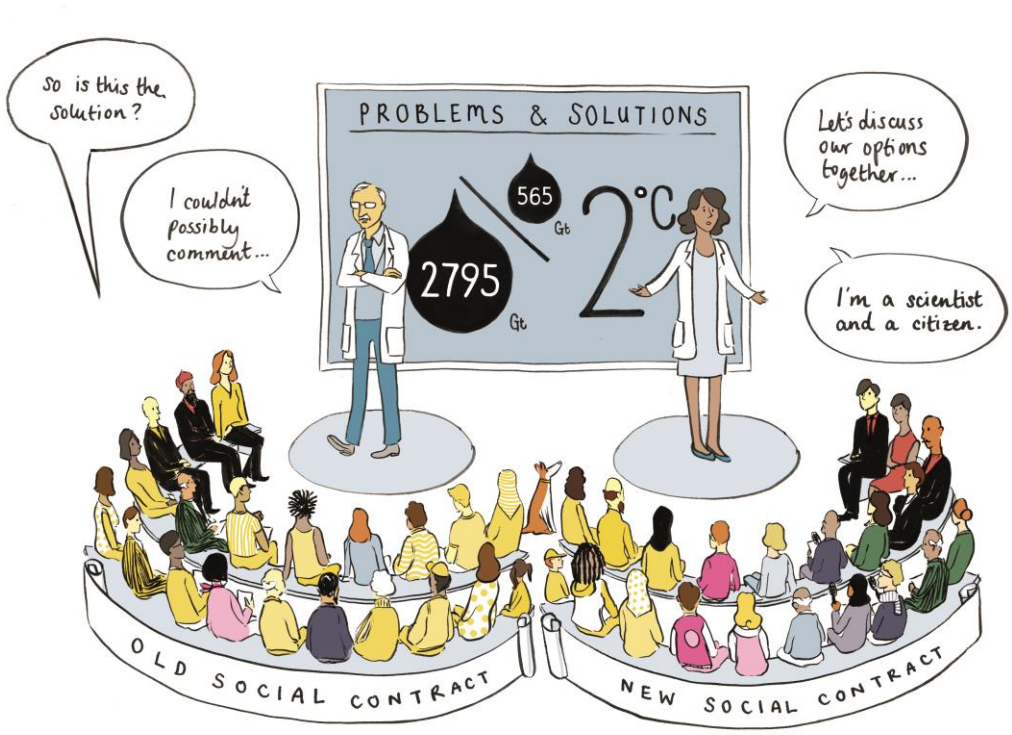
[13] The selection of seven distinct but overlapping elements was distantly inspired by George Miller's celebrated paper on working memory 'The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information'. First published in 1956: *Psychological Review*, 63, 81-97. [Online] Available at: http://psychclassics.yorku.ca/Miller/

Seven Dimensions in Focus

In what follows we can only scratch the surface of the major issues within each dimension, and in each case we have focused on what we believe is the central strategic challenge within that dimension. Our priority at this stage of the project is to illustrate what it might mean to change the tone, content and pattern of the climate discussion overall, rather than resolve particular tactical questions within or between dimensions.

1. Science: Forging a new social contract

"Facts are not science — as the dictionary is not literature."
- Martin H. Fischer



Science is the closest thing we have to an objective reference point. The problem is that much of the current public debate on climate change still tacitly assumes a naïve view of science as a single uncontested method for delivering unequivocal verdicts, with scientists speaking pristine

truth to receptive power in a rational language that is commonly understood by both, and which can therefore be straightforwardly implemented by policymakers.[14] This default presumption of what is sometimes called 'the technocratic linear model' is perhaps why those relatively unfamiliar with the climate debate might think "If the scientists are so sure about it, why don't governments just 'get on with it?"

The reason is that such a view is a caricature of the real world. In reality, scientists and policymakers are trained, encultured and even indoctrinated in certain ways of thinking, acting, reasoning and communicating – often in ways that are by no means always helpful when it comes to issues as complex as climate change. For a 'wicked' problem like climate change (that resists straightforward analyses or solutions), the sometimes myopic gaze of science can cloud, rather than clear, the discursive waters. The temperature measurements, ice core data and model predictions provided by science are essential to decisions about how to respond to climate change. But they are the beginning, not the end, of the story – and simply furnishing society with science is no guarantee that any response will be forthcoming.

With precisely these kind of limitations in mind, Jane Lubchenco, in her celebrated inaugural address as President of the American Association for the Advancement of Science in 1997, articulated the need for 'a new social contract' between science and society as follows:

"Urgent and unprecedented environmental and social changes challenge scientists to define a new social contract. This contract represents a commitment on the part of all scientists to devote their energies and talents to the most pressing problems of the day in proportion to their importance, in exchange for public funding. The new and unmet needs of society include more comprehensive information, understanding, and technologies for society to move towards a more sustainable biosphere – one which is ecologically sound, economically feasible, and socially just. New research, faster and more effective transmission of new and existing knowledge to policy- and decision-makers, and better communication of this knowledge to the public will all be required to meet this challenge."[15]

Lubchenco's quotation opens the recent UCL report called *Time for Change, Climate Science Reconsidered*, which argues that climate scientists should refocus their efforts on what society *requires* of them, paying close heed to the social science and psychological evidence that illuminates *how* such evidence should be communicated and presented.[16]

But in reality this is much easier said than done. As Corner and Groves have argued, climate change communication is trapped uneasily between the norms that govern scientific practice

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[14] IPCC (2013) *Climate Change 2013: The Physical Science Basis. Contribution of Working Group 1 to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press. [Online] Available at: www.ipcc.ch/report/ar5/wg1/

[15] Lubchenco, J. (1998) Entering the Century of the Environment: A New Social Contract for Science. *Science 23*, 279(5350) pp.491-497. The text is modified from Lubchenko's Presidential Address at the Annual Meeting of the American Association of the Advancement of Science, 15 February 1997. [Online] available at: www.sciencemag.org/content/279/5350/491.full

[16] Rapley, C.G., de Meyer, K., Carney, J., Clarke, R., Howarth, C., Smith, N., Stilgoe, J., Youngs, S., Brierley, C., Haugvaldstad, A., Lotto, B., Michie, S., Shipworth, M. and Tuckett, D. (2014) *Time for Change? Climate Science Reconsidered*. Report of the UCL Policy Commission on Communicating Climate Science. [Online] Available at: hwww.ucl.ac.uk/public-policy/policy_commissions/Communication-climate-science

and the need to engage the public.[17] The UCL report goes some way towards this goal, advocating for communication informed by policy co-production (with scientists involved more closely in the policy-making process, with all its unscientific trade-offs, questionable economic forecasting and political guesswork) and a change in institutional forms, for instance a unified body of Climate Scientists. It therefore stands as a critical step towards easing the tension between the norms of science and the expectations of society, but the notion of a new social contract could go even further.

The growing body of social science evidence on how to communicate climate change more effectively points to the benefit of telling human stories about the impacts of climate change that connect with the values of diverse audiences; of constructing narratives that situate individual-level behaviour change as part of a coordinated global strategy for reducing fossil-fuel production; and of promoting representatives from disparate social and political backgrounds to act as culturally congruent conduits for communicating climate change.[18]

But are these aims that scientists – even equipped with a radical new social contract – could reasonably pursue? Or is the key to a new social contract *new societal institutions* where the science and politics of climate change can co-exist? Defining, imagining and then implementing these institutions may be a challenge, but it is one that climate change demands we meet. Taking the 'science of science communication' seriously is as important as heeding the warnings of scientists themselves.

As COIN has argued in previous reports,[19] the purpose of these new, hybrid institutions would be to catalyse new conversations about climate change. These events would not be designed to make an economic case, communicate scientific facts or win an argument, but to allow people to express and discuss their concerns, fears, dreams and hopes for the future. They would embed scientific inquiry into the nature of the problem and how it could be solved, in more complex debates about how we should live in a climate-changed world. And in that way, they would likely offer fertile place to explore the links between Science and the other six dimensions of climate change.[20]

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[17] Groves, C. and Corner, A. J. (2014). Breaking the climate change communication deadlock. *Nature*, 4, 743-745.

[18] See, for example: Talking Climate www.talkingclimate.org or ecoAmerica and Center for Research on Environmental Decisions, Earth Institute, Columbia University (CRED). (2014) *Connecting on Climate: A Guide to Effective Climate Change Communication.* New York: CRED/Washington, D.C. and San Francisco, CA: ecoAmerica. [Online] Available at: http://ecoamerica.org/wp-content/uploads/2014/12/ecoAmerica-CRED-2014-Connecting-on-Climate.pdf

[19] Corner, A. (2012) op. cit.

[20] Groves, C. and Corner, A. (2014) op. cit.

2. Law: Constraining extraction or 'keeping the stuff in the ground'

"I fought the law, and the law won."
- Sonny Curtis

Towards the end of 2015 world leaders will try to reach a universal and binding global agreement at a major UN climate summit in Paris. Some are optimistic that this time things will be different, and point to the resolve of the UN secretary Ban Ki Moon, global climate marches, recent progress in the joint US-China agreement and global conference in Lima as promising signs for reaching a legally binding global agreement that will help the world achieve the two degree target.

International agreements, grounded in working legal systems, act as a powerful constraint at scale. Our best hope for rapid climate mitigation probably still lies in international law, ideally with agreement on a global carbon budget and national commitments commensurate with the need to keep most of our remaining fossil fuels in the ground. We also need law to help administer effective carbon taxes, to reinterpret the fiduciary duty of private-sector trustees to balance short-term shareholder value with longer-term risks, and perhaps even to create the crime of 'ecocide' that could, for instance, help to limit deforestation.

There seems to be growing agreement that an emphasis on controlling 'emissions' is misplaced if not downright delusional unless we also talk about 'extraction'. Reducing emissions in one place is unlikely to mean reducing emissions overall as long as the material causing the emissions is still being extracted and burnt somewhere in the world. Indeed, despite several

decades of efficiency improvements, technological developments and global agreements, fossil fuel extraction continues unabated and the global emissions curve continues its exponential rise.

In Naomi Klein's recent book *This Changes Everything*, she coined the term 'extractivism' to refer to the mindset (as much as the machinery) that underpins climate change. We have rapidly grown comfortable with the idea that planetary resources are primarily for our own consumption – global economic growth is literally *powered by* fossil fuels which we extract and do not replenish.[21]

The global economic engine can only be meaningfully constrained by a comprehensive system of law. However, it's not likely to come from an international agreement in the near future. Because while the overall goal of a safer and more stable planet is shared, the decarbonisation pathways to get there inevitably create winners and losers in ways that render it politically exacting if not impossible. Those most responsible for causing the problem are those least likely to be seriously affected in the first instance – sometimes called the problem of 'split incentives'. We link law to extraction here because unless we can get some form of constraint on extraction at scale – whether by legislating against extraction, or a price for carbon within a functional carbon market that makes extraction costly and pointless, achieving global emissions targets looks impossible.

Although Klein focuses on the need for a 'rolling blockade' of the extractivist system (that rises up wherever the opportunity to oppose fossil fuel infrastructure presents itself), the 'local' activism that she describes is often backed by regional legislation that contradicts the extractivist mindset. So where it exists (one example might be planning constraints on where 'fracking' wells can be dug), law is a powerful practical tool for keeping fossil fuels in the ground.[22] Even a grassroots 'people's uprising' against fossil fuels would need to be backed by a web of legislation – pointing to the powerful connections between the dimension of Law and Democracy. In this respect, the news is relatively positive:

"One exciting development that offers real hope is that, in contrast to the slow pace of international negotiations to combat climate change, national legislation to tackle climate change is advancing at a startling rate. Remarkably, by the end of 2013, almost 500 climate-related laws had been passed in 66 countries covering almost 90 percent of global greenhouse gases released by human activities.[23] This surprising legislative momentum is happening across all continents. And, encouragingly, this progress is being led by the big emerging and developing countries, such as China and Mexico, which together will represent 8 billion of the projected 9 billion people on Earth in 2050."[24]

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[21] Klein, N. (2014) *This Changes Everything: Capitalism vs The Climate*. Penguin, Allen Lane

[22] Ibid.

[23] Nachmany, M., Fankhauser, S., Townshend, T., Collins, M., Landesman, T., Matthews, A., Pavese, C., Rietig, K., Schleifer, P. and Setzer, J. (2014) *The GLOBE Climate Legislation Study: A Review of Climate Change in 66 Countries. Fourth edition.* London: GLOBE International and the Grantham Research Institute, London School of Economics. [Online] Available at: www.globeinternational.org/studies/legislation/climate

[24] CNN Wire Staff (4 May 2011) UN: Earth's population to hit 9 billion by 2050, 10 billion by 2100. CNN. [Online] Available at: www.edition.cnn.com/2011/US/05/03/united.nations.population.forecast/

Numbers of laws passed is not in itself a reliable gauge of progress, however, and the need for a global deal that impacts on extraction remains. Rather than viewing climate change through a pollution paradigm, when it comes to law it looks more like nuclear non-proliferation. It is about stopping the development of a kind of arms race, and focusing on energy super-powers, including the US, China and Russia – which unsurprisingly also host a large proportion of the world's remaining fossil fuel reserves and have most to lose from a view of climate change that focuses on constraints on extraction. A recent study clarifies where exactly the remaining fossil fuels in question are, and what percentage of them are unburnable.[25]

There are two major conundrums with respect to law: how to create a robust constraint on extraction in a way that doesn't sink the global economy, 'the carbon bubble',[26] and timing – legally speaking, what is the priority? For the sake of the human habitat as a whole, we may believe that only value and system change will address the root causes of climate change. But Professor Robin Hanhel argues that if we simply don't have time to rethink the entire system, making good use of available legal systems is crucially important, starting in Paris 2015.[27]

[25] Carrington, D. (2015) Leave fossil fuels buried to prevent climate change, study urges. *The Guardian*, Climate change section, 7 January [Online] Available at: www.theguardian.com/environment/2015/jan/07/much-worlds-fossil-fuel-reserve-must-stay-buried-prevent-climate-change-study-says

[26] See final section of this paper for more details, or read McKibben, B. (2012) op. cit.

[27] Robin Hanhel is an interesting case of somebody on the radical left who understands that we cannot deal with climate change with the tools and preferences of the radical left alone. See www.thersa.org/events/audio-and-past-events/2014/the-political-economy-of-climate-change and also his open letter to Environmental NGOs: www.newpol.org/content/open-letter-climate-justice-movement and see www.ecoequity.org/ for his perspective on the idea of 'fairness' that would need to underpin any global deal.

3. Economy: Investing in the future

"Follow the money."
- popular saying

The economy matters, because whatever one's political view, capitalism is currently the planet's operating system, and given the time constraints, we will need to respond to the climate change problem from within the system that created it.[28] That means following capital flows, recognising the harm they can do, and rapidly redirecting them so that they help us move towards a viable future.[29] In practice that will mean divesting from fossil fuels and reinvesting in renewables, while transparently linking growth strategies to ecological constraints. Indeed, it no longer makes sense to separate questions of economic planning and ecological constraints at all.[30]

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[28] 'Operating system' is merely an explanatory metaphor here, based on thinking of the planet functioning like a computer with hardware. It doesn't follow that capitalism is somehow necessarily fundamental to the functioning of the planet, nor that it is the most important thing about the planet.

[29] Carbon Tracker Initiative www.carbontracker.org/

[30] Rowson, J. (2014) Memo to Policy reviewers: Economic policy is energy and environmental policy too. *RSA blogs*, 2 July [blog] Available at: www.rsablogs.org.uk/2014/socialbrain/the-spirit-industrial-revolution-great-energy/

While the penny hasn't dropped on this relationship to the extent that it should have, recent research on the digital economy, the sharing economy and the circular economy give more reasons for hope: there are practical ideas for starting to break the bond between economic activity and emissions, and companies like Unilever and M&S are building this challenge into their business models.[31] It also seems that many parts of the finance world are waking up to the fact that fossil fuels no longer represent a sound financial investment and the 'clean trillion' initiative highlights that the goal is not just to divest in fossil fuels but to tell a more positive story of reinvestment.[32] Moreover, a recent substantial international report, *Better Growth, Better Climate*, makes a strong case for how we can significantly improve carbon productivity such that exacting emissions targets begin to look both more achievable and more attractive for policymakers around the world.[33]

The question of whether economic growth is principally part of the problem or fundamentally part of the solution is a debate that will trundle on without political resolve[34] and in the meantime we have to direct money towards things that will help, and away from things causing harm. The idea of 'investing in the future' is therefore central and the methodology of 'backcasting' (as contrasted with forecasting) may become more salient. In light of where the world has to be ecologically in 2050, let's say, what follows for where we should put our money now?

That kind of approach is not without its problems though, not least because the growing trend towards the valuation of 'ecosystem services' – literally, putting a price on nature – has predictably attracted criticism. The gradual monetising of nature is viewed by many as a wrong-headed attempt to reconcile the natural world with market economics – rather than the other way around.[35]

It is a deep irony that although the term 'priceless' is frequently used in the English language, it refers to material objects rather than natural resources. But while research is increasingly able to find ways of making the intangible properties of nature visible through programmes of valuation, there is a risk that nature may then become equivalent to any other commodity: to be bought, sold and traded.

A promising compromise might be studies that attempt to derive the psychological benefits of nature (eg green spaces), as the value of nature is coupled with subjective wellbeing, not cash value.[36]It might also be possible to think harder about properly valuing 'the core economy'

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[31] Rowson, J. (2014) Speed dating with the Circular Economy. *RSA blogs*, 22 April [blog] Available at: www.rsablogs.org.uk/2014/socialbrain/speed-dating-circular-economy/

[32] Clean Trillion www.ceres.org/issues/clean-trillion

[33] Davis, M. and Wynn, G. (Eds.) (2014) *Better Growth Better Climate. The New Climate Economy Report. The Global Report.* Washington, DC: New Climate Economy [Online] Available at: www.newclimateeconomy.report/wp-content/uploads/2014/08/NCE_GlobalReport.pdf

[34] Rowson, J. (2012) The Understandable Madness of Economic Growth. *RSA blogs*, March 26 [blog] Available at: www.rsablogs.org.uk/2012/socialbrain/losing-religion-pursuit-economic-growth-delusional/

[35] Transcript of George Monbiot's SPERI Annual Lecture hosted by the Sheffield Political Economy Research Institute, University of Sheffield. (24 July 2013) 'Put a price on nature? We must stop this neoliberal road to ruin.' *The Guardian*, Environment section. [Online] Available at: www.theguardian.com/environment/georgemonbiot/2014/jul/24/price-nature-neoliberal-capital-road-ruin

[36] White, M.P. et al. (2013) Would you be happier living in a greener urban area? A fixed-effects analysis of panel data. *Psychological Science*, 24(6), pp.920-8.

which represents the 'hidden wealth' in the economy that we currently undervalue, including time and care based exchanges.[37]

Finally, a key question in the economic dimension, which connects closely with all the others, is divestment. In recent months several major institutions, including the British Medical Association, several major universities and a range of religious organisations have committed to withdrawing funds from fossil fuel stocks. Some see this as an essential process of stigmatisation to highlight that the core of the problem is the social acceptability of fossil fuels. Others see it as vacuous posturing because alternatives are not always fully or credibly articulated. The challenge in both cases is to present a credible vision of the future in terms of energy needs and ecological viability.[38]

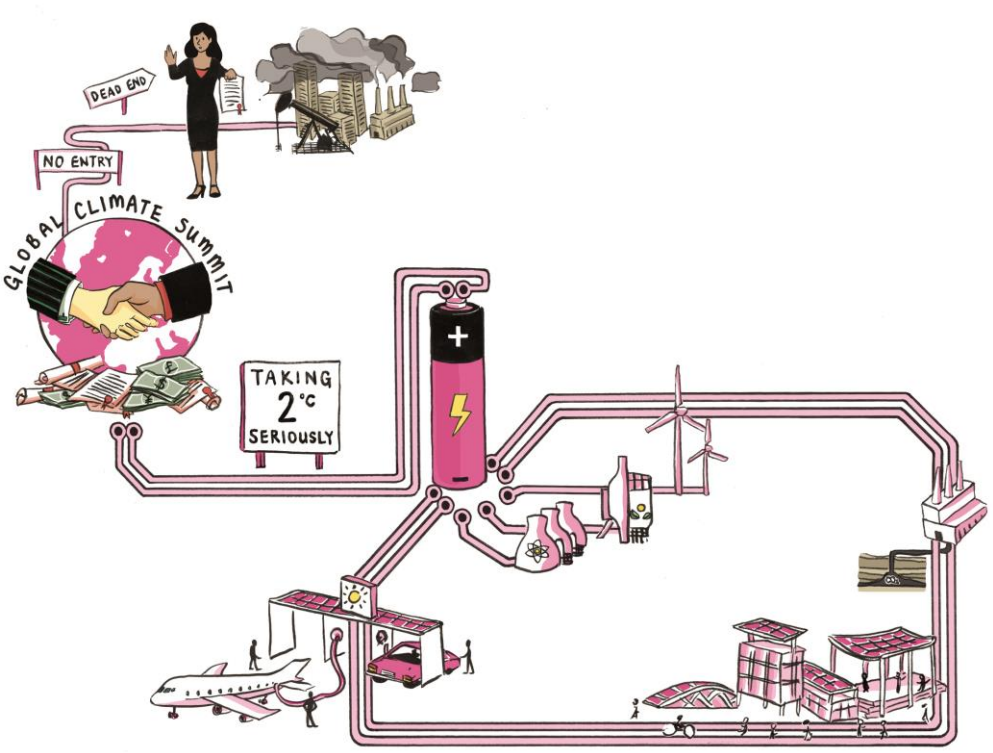
As the 'currency' with which all our exchanges – financial, cultural, or otherwise – are made, economics affects almost every other dimension. Certainly, the basic question of "can we afford it?" runs through every policy discussion on energy and climate change, and in a similar way through everyday decision-making about where to invest savings or which travel choice to make. The challenge then, is to find a way of making economic decision-making *indistinguishable from* decision-making for sustainability. For as long as these pull in opposite directions, progress on all the other dimensions will be slow.

[37] Halpern, D. (2010) *The Hidden Wealth of Nations*. RSA Events. [Online] Available at: www.youtube.com/watch?v=xZSXlYcJLjg Nef core economy; http://b.3cdn.net/nefoundation/82c90c4bb4d6147dc3_1fm6bxppl.pdf

[38] For challenges relating to the energy security, fuel prices and emissions targets see www.rsablogs.org.uk/2013/socialbrain/green-priorities/ For details of divestment processes, purposes and possible consequences see www.smithschool.ox.ac.uk/research-programmes/stranded-assets/SAP-divestment-report-final.pdf

4. Technology: Scaling up 'deep decarbonisation'

"Modern technology/ owes ecology/ an apology."
- Alan M. Eddison



A recent major international report, headed by the economist Jeffrey Sachs, suggests the main barrier to achieving the kind of 'deep decarbonisation' needed to keep us within the (disputed, but nonetheless ubiquitous) 'two degrees' target, is technological.[39]

"The analysis by the 15 Country Research Teams confirms that the technical feasibility of deep decarbonisation rests on the large-scale deployment of several low-carbon technologies, some of which are not yet fully commercialised or affordable. For this reason, countries and the international community as a whole must undertake a major research, development, demonstration, and diffusion (RDD&D) effort to develop low-carbon technologies and ensure their widespread availability and their affordability."[40]

Deep decarbonisation means transformation of land, infrastructure, transport and energy at scale, driven by technological change, but the speed, scale and efficacy of such transformation

[39] Jordan, A., Rayner, T., Schroeder, H., Adger, N., Anderson, K., Bows, A., Le Quéré, C., Joshi, M., Mander, S., Vaughan, N. and Whitmarsh, L. (2013) Going beyond two degrees? The risks and opportunities of alternative options. *Climate Policy* 13(6) 751-769. [Online] Available at: www.tandfonline.com/doi/pdf/10.1080/14693062.2013.835705

[40] IDDRI and SDSN (2014) *Pathways to Deep Decarbonization.* Sustainable Development Solutions Network (SDSN) and Institute for Sustainable Development and International Relations (IDDRI). [Online] Available at: www.unsdsn.org/wp-content/uploads/2014/09/DDPP_Digit.pdf

is always dependent upon political will, economic incentives, social norms and behaviour change.[41]

Scaling up deep decarbonisation matters because we need innovative forms of creating, storing and transporting energy urgently. However, while we think of gadgets as speeding things up, the process of technological development – from basic research through to intellectual property battles to commercialisation – can be painfully slow.[42] The time-sensitivity of climate challenge calls for an acceleration of the most needful forms of technological development. But accelerating technological development cannot come at the expense of democratic choice – just one of many 'wicked' sub-plots within the narrative of confronting climate change.

There are an increasingly large number of positive news stories relating to technological developments for climate mitigation, particularly on solar energy. These developments will be developed further in our final report, but we can see some signs of the RSA's major change aim of endowing everyone with the 'power to create', for example in the way that off-grid solar energy is transforming rural parts of the developing world in India and Africa.[43] However, while scaling up existing and yet-to-be tested technology is clearly critical, there are deeply embedded social and cultural barriers to technological change which are as (if not more) important than the R&D investment.

Consider fracking and on-shore wind farms as examples; the issue is not so much how much energy can we produce with what degree of ecological impact; the issue is *where* such things will happen, and what are the social and cultural factors that (for good or bad) prevent them from scaling up in the way their proponents say they need to?[44]

Deep decarbonisation requires the right 'kit' and enough of it to make the requisite impact at scale. It is far from clear that we have the requisite kit, and unlikely that merely developing it (through science, technology, law, economy) is enough to ensure it can be effectively mobilised (through democracy, culture and behaviour). Viewing climate change from seven dimensions highlights that apparently technological challenges are rarely purely technical in nature.

Finally, Carbon Capture and Storage (CCS) potentially confuses this whole picture. The conventional wisdom at present seems to be that there is a reasonable chance that CCS could work at scale for a large proportion of emissions of certain types, but it is very hard to see who might pay for the necessary infrastructure investment (that economic question again) unless a functional carbon market is created, with the right kinds of incentive structure. So technology again depends upon democracy and law.[45]

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[41] IDDRI and SDSN (2014) op. cit. and Davis, M. and Wynn, G. (Eds.) (2014) op. cit.

[42] See: Climate Change and IP. WIPO: www.wipo.int/policy/en/climate_change/

[43] See: Satter, S. (2014) Watch How Solar Power is Transforming Rural India. *Climate Progress*, 10 July. [Online] Available at: www.thinkprogress.org/climate/2014/07/10/3457917/india-solar-revolution/ and Leggett, J. (2014) The economic case against fossil fuel. *The Elders*, 16 June [guest blog] [Online] available at: www.theelders.org/article/economic-case-against-fossil-fuel

[44] Devine-Wright, P. (Principle Investigator, University of Manchester) (2008) 'Beyond Nimbyism: a multidisciplinary investigation of public engagement with renewable energy technologies'. Project Summary Report. ESRC. [Online] Available at: www.esds.ac.uk/doc/6593%5Cmrdoc%5Cpdf%5C6593project_summary_report.pdf

[45] See, for instance, Vaclav Smil on carbon capture and storage (CCS): www.youtube.com/watch?v=O9zHpdkGFtQ

5. Democracy: Escaping the governance trap

"I will, if you will."
- common saying

Democracy matters because it is a mechanism for making collective decisions, and climate change is the biggest collective action problem of all time.[46] The collective action problem appears at almost every level of the issue, all the way from agreeing domestic behavioural changes within the family unit, to major international legal agreements. With this endemic problem in mind, the late Elinor Ostrom proposed a 'polycentric' approach to climate change, not relying on the global resolution of the planetary collective action problem, but rather recognising the ongoing need to resolve collective action problems at different scales of the problem as a way of illustrating the form of the solution for the problem as a whole.[47]

Thinking in terms of voter interests, on the one hand, short electoral cycles militate against the kinds of long-term thinking that climate change requires. On the other hand, if we can mobilise

[46] By focusing on 'democracy' we don't mean to tacitly include or exclude governments, especially China, that are not considered democratic, but to capture the range of influence and mechanisms through which collective decisions are made.

[47] Ostrom, E. (2009) *A Polycentric Approach for Coping with Climate Change*. World Bank. [Online] Available at: www10.iadb.org/intal/intalcdi/PE/2009/04268.pdf

the requisite political will in civil society, politicians will follow with the appropriate regulation and market signalling.

In all cases, the core problem is that we need to break the 'governance trap', an expression of Cardiff University Professor Nick Pidgeon's, whereby people want and expect government leadership (as documented endlessly in surveys), yet governments procrastinate fearing that the electorate will not support bold action. This is a kind of collective action problem that is not easy to solve within current institutional arrangements. For instance, short term electoral cycles make it very difficult for politicians both to do what feels right for the long-term and have hopes of being re-elected just a few years later. Moreover, there's very little continuity of governing institutions that bridge from one political administration to the next.

The challenge for democracy is therefore to mobilise civil society in a way that helps us to escape the governance trap.

An intriguing recent paper by Lucas et al. (2014) characterises climate denial as primarily a reaction against the challenge it poses to *implicit institutional trust* (rather than a product of lack of knowledge about the science). People project their wider notions of trust and credibility (eg, in the UN) onto the science (eg, the Intergovernmental Panel on Climate Change (IPCC)). The authors recommend opening up spaces for people to think through what a climate-changed world (socially, culturally) would be like – because in these spaces trust is built and regained, and existential questions around climate change can be considered less fearfully.

So nurturing and reintroducing public forums for talking (together) about collective problems – including funding for the physical spaces and staff needed to facilitate people interacting – can only reduce the risk of the governance trap, not enhance it. This links strongly to notions described earlier in this report, regarding the need to develop new types of societal institutions where 'the science' can coexist with its social dimensions. The experience of the Scottish independence vote was that democracy as a whole received a shot in the arm, not just the ultimate winners of the referendum: more people interacting in a non-hierarchical way is a good thing for any collective-action problem.

Community energy is a source of democratic hope, and some of the more positive visions of climate futures involve people coming together to produce their own energy as locally as possible, following a broader trend towards localisation of services. In most successful community energy schemes, people began by paying joint bills, indicating that collective action solutions to the shared problem of affordable clean energy can arise as people begin to pool ideas and resources.[48]

Perhaps even more importantly, evaluations of people's lived experience of community energy projects suggests that it is the 'community' part as much as the 'energy' aspect that people find

[48] Hillman, T. and Blume, T. (eds.) (2011) *Urban Forum Handy Guide to Community Resilience*. Urban Forum. [Online] Available at: http://www.wellbeingnetwork.org.uk/documents/2011_06_resilience_guide.pdf

rewarding. So promoting and nurturing forums for collective thinking is not only good for solving collective-action problems, but rewarding in and of itself.[49]

The importance of these forms of collective engagement is underscored by Naomi Klein's suggestion that the climate change problem was compounded by 'bad timing', arriving in public consciousness just as the public realm (eg trade unions, religious groups, political parties) was in retreat (in the late 80s). However, there is reason to believe the tide may be turning: the global climate marches of September 2014 were an encouraging reminder that swift and mass mobilisation of opinion is still possible.

On the other hand, those approximately 600,000 people were still marching for generic 'action' on climate change, rather than for any specific policy change or agreement. There is scope to make mobilisation more effective by sharpening demands, thereby making it is easier for policymakers to know how to respond to shifts in public mood on the issue. It is our hope that thinking of 'action' more specifically in terms of the seven dimensions may help in that regard.[50]

[49] For example: Seyfang, G., Park, J. J. and Smith, A. (2013) A thousand flowers blooming? An examination of community energy in the UK. *Energy Policy* 61, 977-989 [Online] Available at: www.uea.ac.uk/environmental-sciences/people/profile/g-seyfang#publicationsTab

[50] Rowson, J. (2014) Legions march for climate change, but generic calls for 'action' are futile. *RSA blogs*, 22 September [blog]. [Online] Available at: www.rsablogs.org.uk/2014/socialbrain/legions-march-climate-change-generic-calls-action-utterly-futile/

6. Culture: Breaking Climate Silence

"The human mind is a story processor, not a logic processor."
- Jonathan Haidt.[51]

Culture, the means through which we create shared meaning, matters because our response to climate change is informed by everything from its place in formal education to implicit consumerist values in advertising, to how the media frames judgments on managing risk as

[51] Haidt, J. (2012) *The Righteous Mind*. London: Penguin Books. p.281.

scientific "uncertainty".[52] Culture is the dimension where the battle for the relative importance of climate change compared to other priorities still has to be fought and won.

Climate change is not an easy subject to talk about and most people naturally prefer not to. Indeed in a national survey, the RSA found that only 60 percent of the sample had ever spoken about climate change, and of those, 71 percent had done so for less than ten minutes, and 43 percent for less than 5 minutes.[53] This last point is particularly interesting, because of what we know about conversations being cut short when they become uncomfortable, and because it highlights that there is no meaningful national conversation about climate change. Breaking the prevailing climate silence is central to making progress on climate change.[54] Here is how George Marshall of COIN puts it:

"I am constantly dropping climate change into conversations with strangers, talking about the weird weather or something similar. I'm always casual about it … but however I say it, the result is almost always the same: the words sink and die in mid-air and the conversation suddenly changes course. This is hard to describe, but anyone who tries it knows exactly what I mean. It is like an invisible force field that you only discover when you barge right into it. Few people ever do, because, without ever having been told, they have somehow learned that this topic is out of bounds."

And it's not just about how much we talk, but *how* we talk, and also how we explore the subject culturally through other artistic mediums so that it's not just about abstract targets but connects viscerally to what we care about in our everyday lives.[55] If climate change really is the fight of our lives, then we need to talk about the nature of this fight, and our respective roles in it, better, more often, and in a way that doesn't make us want to switch off or postpone worrying for another day. Climate change has thus far managed to evade our cultural antennae. But this must change if any of the more 'practical' dimensions of climate change (law, economics or technology) are to inspire an audience beyond academics, elite commentators and policy wonks.

The idea that we must collectively become much better at getting our heads around climate change is not just an abstract notion. One recent study by Lauren Feldman and her colleagues analysed the way in which climate change was covered by two prominent satirical shows (*The Daily Show* and *The Colbert Report*).[56]

Intriguingly, climate change received twice as much coverage on *The Daily Show* than it did in the mainstream press. In fact, in 2007 (at the height of media coverage of the issue), global warming ranked among the top five most-covered stories on *The Daily Show*. Maibach says that "when science is discussed on *The Daily Show* or *The Colbert Report* it becomes

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[52] Corner, A. (2014) The communication of uncertainty is hindering climate change action. *The Guardian*, Sustainable Business Sustainable Living section, 31 January. [Online] available at: www.theguardian.com/sustainable-business/climate-change-communication-uncertainty

[53] Rowson, J. (2013) op. cit.

[54] Corner, A. (2012) op. cit.

[55] See www.fortheloveof.org.uk

[56] Feldman, L. Leiserowitz, A. and Maibach, E. (2011) 'The Impact of the Daily Show and the Colbert Report on Public Attentiveness to Science and the Environment'. Paper presented at the Annual Meeting of the International Communication Association, 11 May, Boston. [Online] available at: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1838730

complementary to, instead of in competition with, popular culture and entertainment". This is certainly important. But perhaps more crucially, their analysis suggest that 'the science' has found a place to exist culturally – via satirical critiques of political decision making or corporate ineptitude.

But as one of our forthcoming events (seven serious jokes about climate change) aims to explore, there is a gaping hole where the satire of climate change should be in most British comedy. Working on introducing climate change into the cultural channels of Britain – not as 'edutainment' but simply as a target of satire in its own right – could be crucial in overcoming the social silence around the issue.

There are many broader cultural issues to explore, including the moral leadership of religious groups in a global context, recently spearheaded by the pope, and the broader questions about media responsibility to move the public debate on from whether climate change is happening, to how to minimise climate risk.[57] There is also the deeper, more humanistic perspective of the range of stories we can tell about climate change, summarised by George Marshall as follows:

"Climate change is, among the problems we face, uniquely malleable by interpretive storytelling. It contains no heroes, no enemies, no victims, no motive, no clear beginning nor end, no pivotal event, no climax, no catharsis nor denouement — other than the ones we choose to project onto it."[58]

The range of ambiguous stories surrounding the issue make it clear why people find it so hard to know what to do. But accepting that our cultural interpretation of climate change is as much about stories as it is science means that – in effect – climate change can be 'whatever we want it to be'. The dearth of stories beyond the tired tropes of 'classic' environmentalism has become the focus of a great deal of interest – and developing and then implementing new narratives about climate change that speak to diverse values and worldviews is increasingly viewed as a route by which the cultural identity of climate change can finally flower. [59]

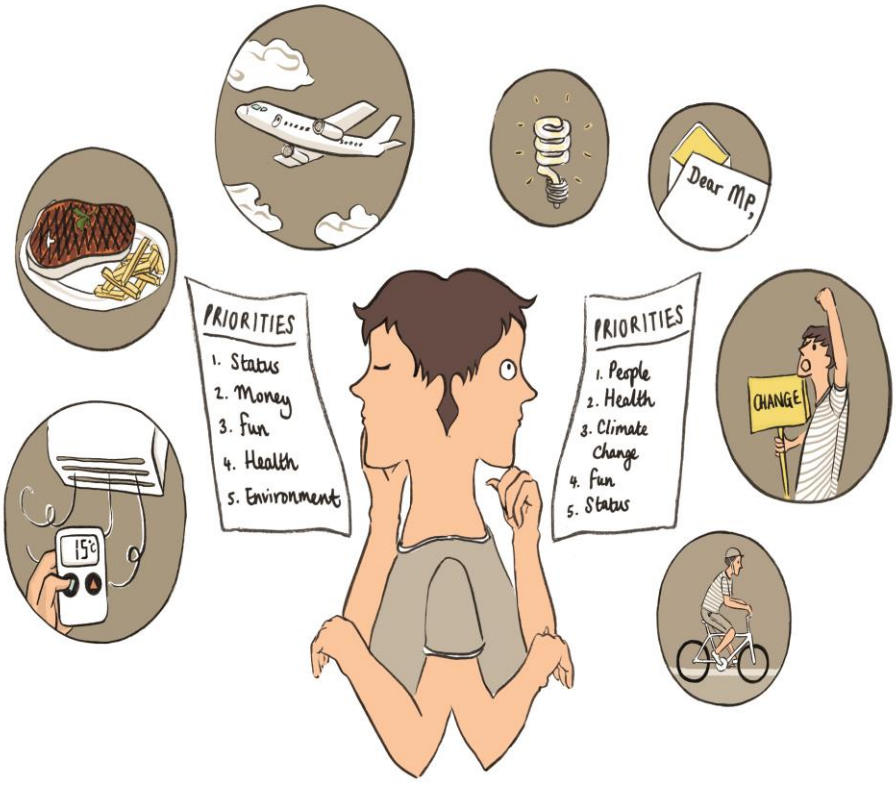
[57] Smith, J. (2014) From truth war to a game of risk. In J. Smith, R. Tyszczuk and R. Butler (eds.) *Culture and Climate Change: Narratives*. pp.15-24. Cambridge: Shed. [Online] Available at: www.open.ac.uk/researchcentres/osrc/files/osrc/NARRATIVES.pdf

[58] Marshall, G. (2014) Fifth of Eleven Stories. In J. Smith, R. Tyszczuk and R. Butler (eds.) *Culture and Climate Change: Narratives*. pp.96-97. Cambridge: Shed. [Online] Available at: http://www.open.ac.uk/researchcentres/osrc/files/osrc/NARRATIVES.pdf

[59] Corner, A. (2012) *A new conversation with the centre-right about climate change: Values, frames and narratives*. Climate Outreach & Information Network. [Online] Available at: www.climateoutreach.org.uk/coin/wp-content/uploads/2013/06/COIN-A-new-conversation-with-the-centre-right-about-climate-change_FINAL-REPORT.pdf;

7. Behaviour: Overcoming stealth denial

"We do not think ourselves into new ways of living, we live ourselves into new ways of thinking."
- Richard Rohr[60]



While it is not always clear exactly what we mean by 'behaviour', how we 'act' individually and collectively matters deeply. While our choices are shaped by the facts (science), the rules (law), the resources (money), the tools (technology), the institutions (democracy) and the ideas (culture) around us, it is ultimately what we individually and collectively choose to do (behaviour) that matters.[61]

The behavioural dimension, including the importance of changing behaviour in a way that normalises the climate challenge while recognising rebound effects on energy saving behaviour,

[60] Rohr, R. (1999). *Everything belongs*. Crossroad Publishing Company.

[61] For a brief overview of the some of the main perspectives on 'behaviour', see Rowson, J. (2013) Changing Behaviour: How deep do you want to go? *The Guardian*, Sustainable Business section, 19 November[Online] Available at: http://www.theguardian.com/sustainable-business/behavioural-insights/change-behaviour-deep-insight-sustainability

is explored in detail in *A New Agenda*. The most important point to highlight here is that behavioural questions are deeply psychological because they are refracted through all of our beliefs, biases and preferences about climate change. In this respect, we are – as George Marshall sets out in his recent book – in many ways 'wired' to deny climate change.[62]

In a 2014 speech Barack Obama said "You can ignore the facts; you can't deny the facts."[63] Well said, but what if the majority of those who don't deny them, do ignore them, which amounts to a kind of de-facto denial? We know that psychological climate resistance goes beyond merely denying the facts, including defence, denial, disassociation, disavowal.[64]

As indicated in *A New Agenda on Climate Change,* this challenging terrain is the heart of the matter, and the term used in that report – 'stealth denial' – seeks to capture the open secret that most of us hold an attitude that anthropogenic climate change is real and a serious threat that we ought to do something about, but we typically hold this view without the commensurate feelings, responsibility and agency that one might reasonably expect to co-arise.[65]

This kind of denial is not driven by conscious ideological opposition, but by a kind of disconnect between 'us' and the climate. As previous sections in this report have hopefully made clear, there is no shortage of bright ideas for climate policies that would keep us within a safe carbon budget (we know what they are, and in many ways they are *all* radical now – including doing nothing). The bigger challenge is how do 'we' (ie, anyone who wants to stay within that safe carbon budget) go about persuading people that policies like these happen.

If – as is clearly the case – there is not yet widespread support for radical climate policies, then re-stating the case for them in ever-more urgent terms is not going to be enough. Instead, we have to step back, think creatively, and be prepared to start from the values and views of an incredibly diverse global population, who will continue – climate change or no climate change – to disagree about fundamental questions that define how they perceive climate policies in the first place.

The Seven Dimensions project is trying to diversify understandings of climate change in the hope that pluralistic ownership of the issue will breed a messy but ultimately robust sense of societal engagement. The challenge is in widening the social reality of climate change, not presenting a pre-defined version of it to people and cajoling them to buy-in.

Because, as the marchers in New York in September 2014 put it: "To change *Everything* we Need *Everyone*."

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[62] Marshall, G. (2014). *Why our brains are wired to ignore climate change*. London: Bloomsbury.

[63] For Obama's full speech at **Georgetown University**, 25 June 2013 See: http://ens-newswire.com/2013/06/25/president-obamas-climate-change-speech-full-text/

[64] Weintrobe, S. (2012) *Engaging with Climate Change: Psychoanalytic and Interdisciplinary Perspectives*. Routledge.

[65] Rowson, J. (2013) op. cit.

Conclusion: Thinking in seven dimensions is easier than you think

"The whole is more than the sum of its parts."
- popular saying

Climate change is scary. Much of our legitimate fear stems from the models, measurements, probabilities and predictions of climate science as our most objective reference point. But so much of our hope rests in the applied sciences of technology to, for instance, make renewable energy at scale feasible, affordable and swift. But even the most hardened libertarian techno-optimist will recognise that we also need law, to give us regulations (without which we can't get national and international incentives for technological development or constraints on fossil fuel production at sufficient scale and speed).

There are limits to such constraints though, because the consumption-based growth imperative that shapes the global economy is not going anywhere fast, and there is no long term solution that doesn't factor in a new economic vision. There is little hope of that kind of transformative change happening unless we can mobilise and channel civic and political will in ways that allow us to take sound collective decisions, which means democracy has to deliver. But where will such will and conviction come from if not from media, social media, art, music; the ideas, ideals and visions of culture? And who is going to really 'act' to make all this happen if not people in all these dimensions of their own lives, through changes in their behaviour?

On such questions, the seven dimensions framing has a holographic quality, in that if you look through a particular lens you begin to see the other dimensions there too.

Consider Shell's recent statement (**technology**) that their business model (**economy**) relying on fossil fuel extraction remains safe from "the carbon bubble"; a scenario in which current balance sheet assets lose their massive value and become "stranded" as governments respond to explanations and predictions on devastating climatic changes (**science**) by legislating (**law**) against the extraction of fossil fuels due to political pressure (**democracy**). Shell justified themselves on the basis that energy demand is going to keep rising (**behaviour**) and implicitly on fossil fuels not becoming stigmatised due to the growth of divestment strategies (**culture**).[66]

Viewed in this way, investors with an interest in renewable energy technologies would be well advised to get talking to very different kinds of 'tribe', including student divestment movements, and this is just one of many examples. There is something in the seven dimensions for anyone to get their teeth into – this is a way of beginning to think about climate change that invites widespread debate and contestation, not the uniform agreement of a niche minority, which keeps us exactly where we are.

[66] Shell Hits Back at Carbon Bubble Claims. Guardian, [Online] Available at: http://www.theguardian.com/environment/2014/may/20/shell-hits-back-at-carbon-bubble-claims

Consider 'fracking' (**technology**) – which may yet be the defining climate change-related issue of the 2015 UK general election (**democracy**). Unlike the US, where geographical circumstance, cultural norms around extractive industries (**culture**) and federal-level legislation (**law**) have conspired to produce a highly un-regulated market, attempts to frack beneath the surface of the UK's green and pleasant lands (or, indeed, under people's houses) are likely to provoke significant controversy. Like the rolling 'Blockadia' called for by Naomi Klein in response to continued fossil fuel extraction, grassroots activism (**democracy, culture**) is likely to be supplemented by a spirited defence of existing planning laws (law), predicated on evidence about the health impacts of fracking wells (**science**). Proponents, though, will point to the economic imperative of fracking (**economics**), and question whether without it, we would collectively be willing to reduce our energy demand (**behaviour**) to deal with the shortfall of energy.

Thinking in seven dimensions in this kind of way, helps us at least be clear about the choices we face when we imagine mobilising a societal response. Disputes will still rage, because defining a framework for thinking about climate change is a completely separate matter from building consensus about what to do. But the framework we outline here at least offers the chance of not speaking past each other – surely, the first step on the path to meaningful agreement.

Taken together, if we can create a new social contract between science and society, confront the pervasiveness of stealth denial, work for deep decarbonisation at scale, break climate silence, devise effective constraints on extraction, invest in the future and escape from the governance trap, then we might really be getting somewhere on climate change. Nobody said it was going to be easy!