



# The challenge of communicating unwelcome climate messages

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# Tyndall Working Paper

## The Challenge of Communicating Unwelcome Climate Messages

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## Preface

This Working Paper is aimed at those who refer to themselves as climate change communicators or educators and also those who communicate climate change as one part of their professional role, including scientists, NGO and civil society leaders, politicians, journalists and thought leaders. It is based on Deliverable 1.5 of the EU-funded HELIX project (High-End cLimate Impacts and eXtremes).<sup>1</sup>

Thanks are due to those who participated at the HELIX project workshop on the challenge of communicating unwelcome climate messages (Madingley Hall, Cambridge. April 16<sup>th</sup>-17<sup>th</sup> 2015) and in particular those who also commented on this Working Paper, including: Simon Sharpe for clarifying the discussion of alternative forms of risk assessment, Chris Rapley for clarifying the perspective of the UCL Commission on Communicating Climate Science and Susanne Moser for extensive and detailed comments on the draft as a whole.

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<sup>1</sup> <http://helixclimate.eu/home>

## Executive summary

While societal and political acceptance of the reality of anthropogenic climate change is widespread, at least in developed countries, the urgency and scale of the challenges that recent science indicates it may represent are far less recognised. With the probability that global mean temperature rise can be kept below the internationally recognised 2°C target continuing to diminish, and growing evidence of limits to adaptation, citizens as well as economic and political decision makers need to engage with knowledge about the likelihood and implications of severe future impacts, and the scale of mitigation required to avoid them, the likes of which few want to hear. A further unwelcome message is that scientific uncertainty may in many cases remain, and continue to prevent accurate predictions about impacts from being made. Communication based on ‘information-deficit’ or ‘linear-rational’ models has failed to motivate either citizens, the business community or political decision makers sufficiently. Better engagement of policymakers, planners, business leaders and wider society with climate scientists and other experts, to evaluate evidence and move towards more adaptive responses, requires new approaches to communication. The EU-funded HELIX project brought together around 30 individuals from a range of disciplinary and organisational backgrounds for a workshop to discuss how unwelcome messages related to ‘high-end’ scenarios can most effectively be communicated and engaged with.

Overall, it was agreed that care is needed to emphasise the full extent of climate risks, not always captured in current scientific communication. Instead of highlighting a range of impacts, the seriousness of which is uncertain, it is more effective to say: ‘There is an awful possible future and we can’t rule it out’. Participants suggested that the specific circumstances in which particular audiences find themselves need to be the starting point of communication efforts. Honest assessments of the prospects of high-end climate change should be offered, but unless emotional and psychological implications are acknowledged and handled sensitively, and the complexity of dealing with the thousands of decisions that might be affected by such change simplified, confronting audiences with the prospect of a 4°C world is more likely to provoke rejection, fatalism and disengagement than adaptive responses. Communicators must be more than ‘narrators of doom’, but recognise the need for ‘active hope’, constructed from realistic goals, imaginable paths, doable tasks and a meaningful role in addressing the problems at hand. New, more dialogical forms of communication, with various audiences in a range of venues are needed, in which new high-end climate messages can be conveyed and processed with citizens and decision makers. Ideally, these processes should be facilitated by highly skilled individuals or teams. These currently less common forms of communication will require additional investment and training, a role that HELIX is also recognising and undertaking. Moving climate change communication into this new Dialogue-Emotions-Values in Context (DEVCO) mode is a major challenge, but the worse climate news gets, the more prominent and continuous attention will need to be to enable society effectively to address climate risks.

## 1. Introduction: What unwelcome messages do we have to convey?

‘There is not a politician on earth wants to tell his or her constituents, "We've probably already blown our chance to avoid substantial suffering, but if we work really hard and devote our lives to the cause, we can somewhat reduce the even worse suffering that awaits our grandchildren." [crowd roars]’ (Roberts 2015a).

In international climate policy, a rise of 2°C above pre-industrial global mean temperature is widely considered to constitute unacceptably dangerous climate change (Jordan *et al.* 2014, Randalls 2011, Shaw 2014). Unless climate sensitivity turns out to be at the lower end of the current range of estimates, however, exceedance of this threshold is highly likely in coming decades. Temperature data gathered globally from January to September suggest that 2015 is highly likely to be the warmest year on record, and the first to breach 1°C above pre-industrial (Met Office 2015). On current emission trends, it is also increasingly likely that warming would not stop at 2°C, but continue to 4°C or even beyond if positive feedbacks take effect. Even relatively conservative institutions such as the World Bank (2012), the International Energy Agency (IEA 2013) and the international accountancy firm PWC (2014)<sup>2</sup> have begun to warn of the dangers of, and urgent need to act to avoid, a rise of 4°C. The impacts brought by such a temperature rise - severe drought, unprecedented heat waves, and major floods in many regions, with serious impacts on ecosystems and associated services - are considered beyond adaptation in many cases (Klein *et al.* 2014), and widely viewed as ‘incompatible with a global organised community’ (Anderson and Bows 2011). The higher global temperatures rise, the more impacts are likely to be pervasive, systemic, and irreversible (Field *et al.* 2014, Smith *et al.* 2009). Although physical impacts will vary from country to country, and some may find impacts within their own borders relatively limited or in some cases even benign, in a highly globalised economy impacts of climate change will spread, affecting interdependent supply chains and flows of people and investment (Moser and Finzi Hart 2015).

Despite these stark risks and growing urgency, media coverage of the issue has fallen since 2009.<sup>3</sup> When polled, citizens globally often report climate change well down their list of priority issues<sup>4</sup>, and a third of people report never having discussed climate change with anyone (Haddock research, cited in Marshall 2014). With some notable exceptions, much of the business community currently appears relatively unconcerned (Confino 2015).<sup>5</sup> The emission reduction commitments being made by governments ahead of the Paris UN conference in December 2015 have been projected to put the world on course for a 2.7°C increase at best (UNFCCC 2015)<sup>6</sup> – though some accuse scientists of making unrealistically

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<sup>2</sup> ‘To avoid two degrees of warming, the global economy now needs to decarbonise at 6.2% a year, more than five times faster than the current rate, every year from now till 2100. On our current burn rate we blow our carbon budget by 2034, sixty six years ahead of schedule. This trajectory, based on IPCC data, takes us to four degrees of warming by the end of the century’ (PWC 2014).

<sup>3</sup> According to the Daily Climate global database (<http://www.dailyclimate.org/>), 2011 coverage was 20% down on the previous year and 42% down on 2009.

<sup>4</sup> <http://data.myworld2015.org/>

<sup>5</sup> Many businesses, including 54 per cent of FTSE 100 firms, have not built climate change adaptation into their business strategy or continuity planning (London Assembly Economy Committee 2015).

<sup>6</sup> Climate Action Tracker 23 Nov 16 <http://climateactiontracker.org/global.html>

favourable assumptions to make politically agreed targets appear more feasible (Geden 2015).

Work by scientists involved in the HELIX project suggests that the likelihood of high levels of warming and greater extremes, potentially occurring sooner than previously thought – e.g. 3°C in the 2040s (Jackson *et al.* 2015), 4°C rise in 2060s (Betts *et al.* 2011) – may be higher than is generally appreciated. Yet arguably these risks are not being communicated adequately, either to political and economic decision makers or to wider publics, all of whom are still regularly informed that holding temperature rise to below 2°C, with a reasonable probability of success, is technically and economically feasible (Field *et al.* 2015).<sup>7</sup> Such a comforting message neglects the extreme economic, political and social challenges associated with rapid decarbonisation and leaving untouched a third of oil reserves, half of gas reserves and over 80% of coal from 2010 to 2050 (McGlade and Ekins 2015). It also neglects the technical challenges associated with negative emissions technologies (NETs) that much modelling of 2°C scenarios assumes – rather heroically - will become available, but are as yet undeveloped (Geden 2015, Sanford *et al.* 2014).<sup>8</sup> Close reading of the latest reports from the Intergovernmental Panel on Climate Change (IPCC), the scientific body charged with informing governments about climate change, suggests that the impacts corresponding to high level of temperature increase are not only still largely unknown, but also, rather astonishingly, effectively unstudied (King *et al.* 2015).

A further unwelcome message is that the kind of scientific uncertainty that has been used by those reluctant to respond to unwelcome climate messages as an excuse for delay may not be eliminated or significantly reduced through continuous research and this may continue to prevent accurate predictions from being made (Hallegatte 2009). This should encourage greater use of scenario planning, to enable robust decision-making (Dessai *et al.* 2008). Moreover, to date the IPCC fails to provide guidance on the relative likelihood of the scenarios of future concentrations of greenhouse gases and other drivers of warming on which its climate change projections are based (Sanford *et al.* 2014). Instead, by treating each Representative Concentration Pathways (RCP) as equivalently plausible, the ‘2°C remains feasible’ narrative is reinforced. Since some scenarios are projected to lead to very divergent futures in terms of impacts, effective responses to manage climate risk depend heavily, in some cases, on the scenario actually realized. ‘Policymakers thus have no clear scientific guidance for confronting and managing the growing risk of high-magnitude warming’ (Sanford *et al.* 2014: 1).

Underestimating the likelihood and consequences of exceeding 2°C suggests a lower risk future than may in fact unfold, which, in turn, may lead to insufficient or even ‘maladaptive’ policy and planning: i.e. initiatives which may foster adaptation in the short-term but which insidiously affect systems’ long-term vulnerability and/or adaptive capacity (Field *et al.* 2014, Magnan 2014). One particularly uncomfortable message may be that rather than proceeding incrementally, seeking to defend what is valued in the present day, adaptation

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<sup>7</sup> Ambitious mitigation to limit warming to less than 2°C above preindustrial levels is economically feasible. .. Cost-effective mitigation pathways to limit warming to 2°C require reducing emissions of greenhouse gases by 40–70% below current levels by 2050 (Field *et al.* 2015).

<sup>8</sup> The IPCC scenarios keeping below 2°C require the removal of between 2 and 10 gigatons of CO<sub>2</sub> from the atmosphere annually by 2050, using bioenergy with carbon capture and storage (BECCS). By way of comparison, all the world's oceans combined absorb about 9 gigatons a year; all the world's terrestrial carbon sinks combined absorb about 10 gigatons a year.

may need to be ‘transformational’, requiring the abandonment of some currently cherished policy objectives, land uses and practices. Whatever the rhetorical power of promising technical fixes through a new, green industrial revolution, wider cultural and social change will also be necessary to prevent rebound effects from causing unintended emissions increases (Berners-Lee and Clark 2013).

Communicators of climate change thus need to prepare for the likelihood that bad news in the present day - for example that the 1°C mark is to be breached in 2015 - will be superseded by worse, and that even when better news emerges – about emission curves beginning to peak, for example - the persistent action needed to lower global emissions sufficiently will require that there is no ‘let-up’ in communication effort.

The EU-funded HELIX project (High-End cLimate Impacts and eXtremes) brought together individuals from a range of disciplinary and organisational backgrounds for a one-and-a-half day workshop in Cambridge, UK, to discuss how the challenges associated with ‘high-end’ scenarios can most effectively be communicated. This briefing note is inspired by the presentations, comments of respondents and facilitated workshop activities that occurred. However, **not every participant in the event can be assumed to endorse all the conclusions drawn.** Section 2 outlines the audiences for which the findings and implications of high-end scenarios are particularly relevant. Section 3 and 4 highlight the risks and opportunities associated with such communication efforts, as identified in recent literature, and also some of the wider lessons of climate communications literature. Section 5 then reports on discussion points and recommendations emerging in the workshop, and elaborates on some of the literature of specific relevance to such discussions. Recommendations emerging from the workshop are highlighted in text boxes, with elaboration and referencing provided in the main body of text. Section 6 concludes by distilling some principles that should underpin communication in the context of high-end scenarios.



## 2. To which ‘audiences’ are these unwelcome messages most relevant?

Naming that which is unwelcome goes against the social norm to assume a better future, to motivate with what is bright and happy, and to not disturb audiences’ psychological peace of mind. Breaking the ‘climate silence’ (Marshall 2014) is thus a difficult and courageous act. The workshop attempted to differentiate between different audiences, who stand to be disturbed by the unwelcome messages outlined above:

### *Policymakers*

Politicians and global institutions are committed to continuing prosperity and economic growth. Higher-end climate impacts jeopardise these goals, and thus threaten political legitimacy. This danger is increasingly recognised by the more enlightened of these institutions, such as the World Bank:

‘The task of promoting human development, of ending poverty, increasing global prosperity, and reducing global inequality will be very challenging in a 2°C world, but in a 4°C world there is serious doubt whether this can be achieved at all’ (World Bank 2014: xiii).

That current development paths may be unsustainable represents a profoundly uncomfortable message. Whatever the rhetorical power of promising technical fixes through a new, green industrial revolution, wider cultural and social change will also prove necessary, requiring a degree of political leadership that has been lacking to date.

### *Land-use and infrastructure planners*

Land-use and infrastructure planners have made and continue to make decisions that profoundly shape current and future societal resilience to climate impacts. A stronger prospect of more climate change occurring sooner than previously thought places a greater priority on considering substantial and continuing adaptation activities, and in particular on considering adaptation decisions with long lifetimes. Although a variety of issues regarding these decisions have been raised in the academic literature, according to Stafford Smith *et al.* (2011), these have yet to be fully absorbed by practitioners. Climate change in the foreseeable future will be an ongoing phenomenon, requiring an on-going adaptation process (Pittock and Jones 2000: 32).

### *Industry leaders*

As noted in the introduction, despite the profound implications of climate change for business, with some notable exceptions, such as Paul Polman of Unilever, Peter Agnefjäll, of IKEA Group, climate change appears low on industry CEOs’ list of concerns. In 2014, climate change did not make it into the top 19 risks CEOs were questioned about in a PwC annual survey, owing to a low level of interest in the subject being expressed in the previous

year. Over-regulation tops the list of perceived risks, with 78% saying that it threatens their organisation's growth prospects (PwC 2015, Confino 2015).

Industry stands to be affected, however, by indirect as well as direct impacts from climate change. Increasing water scarcity, extreme flooding, land loss and heatwaves are expected to become increasingly commonplace in the critical food-producing and industrialising regions which provide the basis for many of our supply chains, notably China, India and Indonesia. In turn, there will be a cascade effect of rising costs of materials and goods, and loss of trade and earnings, which will bring considerable costs (London Assembly Economy Committee 2015).

### ***Civil Society Leaders***

Many, including environmental NGOs, argue that communication efforts should focus on the various non-climate benefits (energy security, health, financial, social interaction etc.) from climate policy measures and more sustainable lifestyles (Whitmarsh *et al.* 2010). While such an approach may indeed be effective, it comes with a danger of 'bright-siding', which underestimates the extent of change needed. The challenge is to find 'a balance that minimises the hand wringing but acknowledges the enormous, unprecedented challenges that climate change poses' (Corner 2014).

### ***Diverse Publics***

Policy action, be it mitigation or adaptation, depends in most countries on public acceptance of the reality of the climate threat and the urgent need to respond (Ming-Lee *et al.* 2015, Brugger *et al.* 2015). The UN Framework Convention on Climate Change commits its signatories to promote and facilitate 'the development and implementation of ... public participation in addressing climate change and its effects and developing adequate responses' (Article 6). As is highlighted below, however, there is no single 'public' to consider when it comes to climate-related attitudes and beliefs. Segmentation analyses have identified a spectrum of concern ranging from 'alarmed', 'concerned' and 'cautious', to 'disengaged', 'doubtful' and 'dismissive' (e.g. Leiserowitz *et al.* 2008). Each segment has a unique perspective on climate change and appropriate policy responses.

Academics in developed countries tend to assume widespread awareness of the phenomenon of climate change. However, climate change awareness and risk perception have been shown to be unevenly distributed around the world. While high levels of awareness (over 90%) were reported in developed countries, including North America, Europe and Japan, majorities of populations in developing countries from Africa to the Middle East and Asia - including more than 65% of respondents in countries such as Egypt, Bangladesh, Nigeria and India - have never heard of climate change (Ming Lee *et al.* 2015).

### 3. The risks and opportunities of communicating unwelcome messages

Communicating unwelcome climate messages carries risks and opportunities. Though the literature on the topic of psychological responses to the prospect of ‘high end’ climate impacts is only just beginning to emerge, Hamilton and Kasser (2009) usefully suggest that broadly three types of ‘coping strategy’ are likely to emerge: denial, maladaptation, and adaptive responses. Following Hamilton and Kasser (2009: 5), **the objective of communication can be framed as being to facilitate and encourage the more adaptive responses**. Although Hamilton and Kasser do not specify this, it can be argued that denial, maladaptation and adaptive strategies are as likely to be followed by *organisational* and *political decision makers* as by individual members of the public.

*Denial strategies* aim primarily at suppressing anxiety associated with predictions of climate disruption by not allowing such information to be accepted in the conscious mind. ‘By denying the facts, no emotions need be felt’ (Hamilton and Kasser 2009: 2). As expressed by Marshall (2014), we ‘don’t even think about it’. Commonly associated with climate sceptics with strong ideological objections to the implications that follow accepting high-end predictions – a greater degree of state intervention and shift away from consumerist values - it is also a common response from individual citizens without such commitments. As the science blogger David Roberts has expressed it: ‘Messages about high-end impacts sound “extreme”, and our instinctive heuristics conflate “extreme” with “wrong.” People display the same kind of avoidance when they find out that they or a loved one are seriously ill’ (Roberts 2011).

*Maladaptive coping strategies* involve acknowledging and accepting unwelcome predictions about climate change up to a point, but blunting some aspects of the science or the associated emotions to reduce emotional impact.<sup>9</sup> Individuals (including, presumably, political decision makers), may seek comfort in inner narratives such as “Humans have solved these sorts of problems before”, or “It won’t affect me much”. Rosemary Randall of Carbon Conversations refers to a further subtype: Regress. This is the child-like hope that other people, government or a ‘superhero’ or miracle techno-fix such as geoengineering will come to the rescue. Alternatively, *distancing strategies* may emphasise the time lapse before the consequences of climate change are felt, and the physical remove at which they occur. Climate change is a ‘creeping problem’ (Moser and Dilling 2004), with the lack of a definite beginning, end, or deadline requiring that we respondents create our own timeline. ‘Not surprisingly, we do so in ways that remove the compulsion to act’ (Marshall 2014: 64).

Under the umbrella of maladaptive coping it is possible to differentiate several strategies. *Diversionary strategies* include minor behaviour changes that allow an individual (or institutional decision maker) to reassure themselves that a response has been made. Weber (2006) dubs this the ‘single action bias’. Alternatively, diversion may come through outright pleasure seeking. *Blame-shifting* is a form of moral disengagement whereby individuals disavow their responsibility for the problem or the solution, as in the case of actors in developed countries blaming China for its rapid, fossil-fuel intensive development.

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<sup>9</sup> This is thus a more psychological phenomenon than the more concrete type of action referred to in the IPCC definition of the term maladaptation.

*Indifference strategies* operate with the unconscious narrative that “if I don’t care I won’t feel bad.” Such resignation can induce passivity, including a reluctance to engage in pro-environmental behaviour (Homburg *et al.* 2007). *Unrealistic optimism/wishful thinking* is a further sub-category worth highlighting. Taylor defines “unrealistic optimism” as a proclivity that leads those affected to predict what we would prefer to see, rather than what is objectively most likely to happen (Taylor 1989: 33). The uncertainty inherent in predictions opens the door to wishful, or ‘motivated’ thinking about how dangerous climate change really is (Markowitz and Shariff 2012, Lench *et al.* 2014, Harris *et al.* 2009).

These methods of coping can be unhelpful to the individual and at the same time lead to a worsening environmental (and socio-cultural) situation because they block potential social responses to climate change, perpetuate a social norm that suggests no action is needed, or actively contribute to ecologically damaging behaviours.

The third set of strategies is *adaptive coping*, deployed when individuals accept both the science, the projections, and the accompanying emotions, and then try to act on the basis of both (Hamilton and Kasser 2009: 2). They are adaptive, both in promoting psychological adjustment to new circumstances and in stimulating actions appropriate to the new reality. Adaptive coping strategies are akin to the later phases of mourning and involve acceptance of, rather than resistance to, some of the pain and distress that follows recognition of the facts of climate science and their meaning. Such strong negative emotions, although uncomfortable, are more likely to give rise to effective responses consistent with the new reality (Macy and Johnstone 2012).<sup>10</sup>

Individuals, and arguably whole cultures too, may deploy the above strategies sequentially, having to pass through stages of denial and maladaptation to finally acting adaptively. This is by no means necessarily a smooth sequence. Even those who have deeply accepted climate science and projections go back and forth in and out of denial, grief, anger, engagement, acceptance etc. The way individuals cope with a 4°C world will be influenced by how societies and their institutions respond to the new environment. If only a minority are pursuing adaptive coping while others persist in denial or maladaptive strategies, the former may feel isolated and disempowered, and governments and other institutions will be under less pressure to undertake climate actions, particularly those with long lifetimes. Thus, facilitating the majority to take at least small steps on an action pathway may overcome this paralysis (Stafford Smith *et al.* 2011: 201).

Survey and other evidence in Western countries (Maibach *et al.* 2009) suggests that a minority of the population resists or ignores the evidence of climate science, while a majority adopts maladaptive coping strategies. However, a review of 75 studies (Moser 2014a) from across the world indicates how frequently individuals are reporting perceived changes in the environment, or believe they have experienced impacts - despite a documented tendency to ‘distancing’. Many individuals around the world have accurately detected recent changes in local temperature anomalies (Howe *et al.* 2013), with research also suggesting that perceived

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<sup>10</sup> In addition to encouraging adaptive coping strategies, Crompton and Kasser (2009) propose another type of response: acting in ways that promote a shift in intrinsic values towards greater empathy towards our descendants, vulnerable people in poor countries and non-human animals.

local warming can influence risk perceptions (Zaval *et al.* 2014). From this, Moser concludes that society may currently be in transition from a prevalence of threat denial to increasing acceptance. Hamilton and Kasser suggest that the shift from complacency to anxiety is likely to accelerate, and at some point, governments, non-government institutions and professional organisations will recognise the benefits of promoting and supporting adaptive coping strategies.

Taking action and thereby exerting some control over a threatening situation is known to be an effective response to emotional distress (Jacobson, Martell and Dimidjian 2001). The sense of shared purpose associated with working more collaboratively with others to protect the common interest can also reduce the “burden of knowing”. Problem-solving as an appropriate coping strategy might impel people to work with others so as to prepare for a changed climate, through political activism or joining local groups or councils that might develop mitigation and adaptation measures. Little work so far has considered how this might be achieved.

Thus, given the gap between the increasingly grim implications of climate science and the persistent human tendencies to cope with such realities, the question of how the unwelcome messages from high-end climate research can best be framed for decision-makers and publics alike is an essential precursor to appropriate mitigation and adaptation responses.

## 4. Lessons from climate communication efforts to date

Most communicators of climate change have been either physical scientists or environmental groups, generally lacking in awareness of social science scholarship and insights from communication and behavioural research that could usefully inform their efforts. In addition, professional divisions due to specialization, disciplinary boundaries, institutional disincentives, and other factors contributed to a lack of exchange among those *doing* the communicating and those *researching* it (Moser 2010).

When confronted with perceived failures of communication, scientists have tended to rely on delivering more facts (or the reiterating the same ones), on the assumption that it is information that drives understanding, acceptance, and ultimately appropriate behaviour, according to the so-called ‘information-deficit’ model. Although useful in some circumstances - e.g. for correcting error or misunderstanding, for establishing credentials (UCL 2014), or where basic scientific understanding of climate change has yet to develop, as in many developing countries – this approach is long discredited as an effective means to engage audiences (Wynne and Irwin 1996). Public information campaigns that put the onus on individuals to make lifestyle changes have caused resentment when equivalent effort is apparently not being expected of government, business and fossil fuel companies (Lorenzoni *et al.* 2007).

Similarly, with regards to the interface between science and policy making, the traditional ‘linear-rational’ model, according to which value-neutral, objective science ‘speaks truth to power’ and governments develop or amend policy accordingly, has been discredited. If decision stakes and uncertainties are high, ‘post-normal’ science/ ‘co-production’ is instead recommended as the ideal, in order to foster consensus and eventual implementation of effective environmental policies (see e.g. Hulme 2009). In this model, open consultation across society establishes the dimensions of risk that actually matter to people, followed by an assessment and explanation by experts of the risks of different degrees of climate change, and a stage in which policymakers and politicians are required to argue and negotiate in public about what level of risk is tolerable (*ibid*).

Despite losing much credibility among academics, the ‘information-deficit’ and ‘linear rational’ models have retained a hold on practice, partly because they have been effective in terms of raising awareness, leading to the establishment of significant institutions such as the UN Framework Convention on Climate Change and various policies and practices in public and private sectors. Alternatives to linear models tend to be more demanding, are yet to be tested at scale, and many science communicators are ill-trained to use them. The new *Future Earth* initiative being developed by the International Council of Science as a follow-on to its previous Global Change programmes testifies to the difficulty of displacing the linear-rational model (Rapley, pers. comm.). Despite repeated references to ‘co-production with society’, *Future Earth* inherited a range of science projects created without co-design and found itself under time pressure to agree its objectives. However, it is now building training programs and other initiatives in an attempt to move away from the old model (Moser, pers. comm), and is now coordinated by science and stakeholder committees.

Existing literature also offers a warning against relying too heavily on geoscientific language to frame the results of modelling future climate change. The risk here may be regarded as

two-fold. Firstly, communicating in terms of natural scientific indicators such as global mean temperature limits fails to resonate with lay audiences (Shaw 2014). Secondly, such language tends to present climate change as unstoppable and catastrophic, underestimating the potential for human agency. O'Neill *et al.* (2010: 1000) highlight how:

‘Catastrophic reporting reinforces the hierarchical preeminence of the geosciences and, conversely, the knowledge claims of the geosciences provide legitimacy and credibility to catastrophic framing. This serves to reinforce the message of climate change as an unfolding, almost predetermined, disaster’.

In general, researchers have stressed the need for caution in using fear to communicate climate change, unless it is accompanied by a clear action strategy to reduce risk (e.g. O'Neill and Nicholson Cole 2009). ‘Fear messaging’ can be counter-productive, leading to defensive avoidance (‘this is too scary to think about’) or ‘reactance’ (‘somebody is trying to manipulate me’). When such messages are initially accepted, they can generate a state of prolonged worry and anxiety, over time changing to numbness, desensitisation and disengagement from the issue altogether’ (UCL 2014: 60).

### *Differentiating according to audience*

The specific needs of different audiences have received increasing attention, from different audiences themselves and from non-scientist ‘messengers’ seeking to ‘make climate change their own.’ Policy-makers at different levels of government, business managers, religious leaders, environmentalists, or minorities ‘have diverse interests and goals vis-a-vis climate change, need different information, frame the issue differently, appeal to different values, and can enact different measures and behaviours’ (Moser 2010).

In contrast to ‘one size fits all’ large-scale public information campaigns that fail to appreciate audience characteristics, communication in facilitated small group settings has proved effective in generating behavioural change - as would be expected with already attentive people with some readiness to change. Carbon Conversations Groups<sup>11</sup> in the UK offer a supportive group experience that helps people halve their personal carbon footprint, dealing with the difficulties of change by connecting to values, emotions and identity. The groups are based on a psychological understanding of how people change, offering:

- space for people to explore what climate change means for themselves, their families and their aspirations
- permission to share hopes, doubts and anxieties
- time to work through the conflicts between intention, social pressure and identity
- reliable, well-researched information and practical guidance on what will make a difference
- support in creating a personal plan for change.

The wider communication challenge is to deploy such psychological understanding at a scale beyond local support groups who are already ‘carbon capable’ (Whitmarsh *et al.* 2009).

Numerous factors that influence individual- and/or group-level responses to climate change have been identified, including experiential, physical, psychological and socio-cultural

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<sup>11</sup> <http://www.carbonconversations.org/what-carbon-conversations>

variables (Wolf and Moser 2011, Ming-Lee 2015). As noted in the previous section, climate change communications research has produced a number of audience segmentation studies and case studies (e.g. Leiserowitz *et al* 2008, Roser-Renouf *et al.* 2014, Rose *et al.* 2007, Metag *et al.* 2015). These suggest that different audiences require distinct frames, goals, messages and messengers, and indeed actions to implement. Individuals accept and trust messages more readily when conveyed by people with similar views, e.g., Republicans trusting Republican/conservative messengers; Democrats believing Democratic/liberal leaders; business leaders responding to other business leaders (Agyeman *et al.* 2007, Arroyo and Preston 2007). Appealing to different audiences with tailored communication can also potentially bring together coalitions to work toward a desired common policy goal (Moser 2007). Environmental campaigners have latterly become more aware of ‘how poorly environmental language works outside its own constituency’ (Marshall 2014: 129), and how taking climate action could appeal more to politically conservative audiences if they were allowed the chance to frame it in terms of their own values. The Climate Outreach and Information Network (COIN) is unusual for having attempted to communicate to more right of centre audiences through a series of workshops instead of speaking to the already supportive (see e.g. Corner 2013). The scale of this challenge is daunting, however. It is not possible to have a focus group with everyone, and so professionally targeted communications as well as cognitive-deficit modes remain the norm in practice.

Abstract concepts such as ‘adaptation’ need to be rendered meaningful in real, imaginable, practical, and acceptable terms to both institutional decision-makers and lay audiences. There is some evidence that the term ‘adaptation’ may be less effective or even counter-productive. Few studies have explicitly tested how adaptation is perceived or understood, which of the alternative terms or phrases are most resonant and why, and which are more or less well understood (Moser 2014a). Some research suggest that the ‘preparedness’ frame may be more compelling than ‘adaptation’, which 100 climate and sustainability leaders, social science and communication experts in the US subjectively judged to be ‘negative and demobilizing’ (ecoAmerica 2012).

It should also be recognised that not everyone wants to protect the status quo, especially those already struggling against economic and social injustice. Such groups would respond to narratives of positive change, in which responses to climate change do not just protect what is already established but also create a more just and equitable world (Marshall 2014, Movement Strategy Center 2015, Pelling 2009).

Based on place attachment theory and experiences with place-based education, some have theorized that landscape-based discourse has the potential to create new and productive space for political action on climate change. Schweizer *et al.* (2013) use insights from place-based education and experiential learning to explain the rhetorical power of national parks in the United States. Given their compelling cultural presence in the shared (both virtual and material) experience of identifying as an ‘American,’ Schweizer *et al.* suggest that climate change communication in U.S. national parks has the potential to promote public awareness and lifestyle modifications.

Evidence also highlights the potential of immersive, experiential activities to heighten concern and generate commitment to behavioural change. In a study conducted by Glasgow University Media Group (GUMG) and Chatham House (Happer *et al.* 2012), members of the British public were submerged in an alternative news environment with stories that had not



yet occurred but which they were advised would very likely occur in the near future. Authentic news broadcasts were constructed about massive floods in Bangladesh, and extreme weather and energy black-outs in the UK. The scenario involving Bangladeshi climate refugees proved particularly effective in shifting perceptions beyond climate change as a vague and theoretical issue to one which might have real and serious consequences for participants and their communities. Ethnicity was a key factor in heightening such concern and commitment to behavioural changes (Happer *et al.* 2012), with Bangladeshi participants' existing feelings of pressure from living as a minority making them more sensitive to possible backlashes against increased migration.

The lessons of communication scholarship and experience so far have been neatly encapsulated as follows:

'To be effective, messages and the mental models that are imbedded in them must help overcome the challenges of communicating climate change. The distant problem must be brought home; the invisible causes and impacts must be made visible; the inconceivable solutions must be illustrated; perceived and real barriers to action must be shown as something 'people like me' have overcome. Third, messages are more than the words or information conveyed. Messages are accompanied by, and inseparable from, imagery, the tone of voice, and the emotions that are being evoked ...' (Moser 2010: 40).

## 5. Towards better communication of unwelcome messages

As noted in section 3, literature on the communication of high-end change is beginning to emerge. It suggests that communicators must take care to be more than mere ‘narrators of doom’ (Moser 2014b: 407), and that to overcome feelings of ‘overwhelm’, anxiety, fear, and helplessness in the face of ongoing crises,

‘people need true hope. Such hope can only be constructed from realistic goals, a clear or at least imaginable path, from doable tasks and a meaningful role in addressing the problems at hand’ (Moser 2014b: 407).

Similarly, Stafford-Smith *et al.* (2011: 204-5) note how ‘simply presenting people with the prospect of a 4°C world is unhelpful and disempowering unless the complexity of dealing with the thousands of decisions that might be affected by climate change can be simplified’.

On the basis of these insights, participants in the workshop discussed how unwelcome messages associated with high-end climate change could most effectively be conveyed to different audiences. A number of recommendations emerged, one of them specifically about the manner in which the risks currently being run are communicated to high-level decision makers, especially by organisations such as the IPCC. This one is outlined first, before turning to other conclusions. Findings and recommendations emerging from the workshop are highlighted in text boxes, with elaboration and referencing provided in the main body of text.

### ***1. The full extent of climate risk needs to be framed and communicated better***

The currently dominant approach to the framing and communicating of climate risk, as embodied by the work of the IPCC, has important weaknesses. Climate science is too often framed in terms of attempted prediction, or the ‘central tendency’ (what is ‘most likely’). This is despite the fact that it is the ‘worst-case’, not accurate prediction, that is often most relevant to risk-based decision making. On this, however, there is currently relatively little communication. The Royal Society’s *Climate Change Q&A*, for example, concentrates on what can be predicted, rather than offering a risk assessment of the worst case (Royal Society 2014). Close reading of the latest IPCC report suggest that the impacts corresponding to high levels of temperature increase are not only relatively uncommunicated, but actually – and astonishingly - relatively unstudied (King *et al.* 2015).

Also arguably underplayed in current IPCC assessments is that the risks of climate change *tend to increase over time*. It is therefore important to recognize how probabilities change, and avoid using the year 2100 as an arbitrary cut-off point - especially for the higher emission scenarios - because in some cases impacts and the probability of major climate system disruption will still be increasing (King *et al.* 2015).

Predictions/projections and risk assessments tend to differ in the order in which key questions are asked. Scientific predictions typically ask first what is most likely to happen, and then how that (most likely case) may cause impacts. A risk assessment does the opposite, asking first what would affect us most severely, and then how likely that might be (as a function of time, if it happens to change over time). The two approaches reflect different underlying motivations about what information is considered important and lead to very different answers. Instead of highlighting a range of impacts, the seriousness of which is uncertain, it is **more effective to say: ‘There is an awful possible future and we can’t rule it out’.**

A new framework that has a number of advantages was presented (see King *et al.* 2015). Unlike the IPCC, it makes a judgment about the relative likelihood of different emissions pathways. Its consideration of the systemic risks arising from interactions between changes in the physical climate and complex human systems is in large part a security risk assessment, something that the scientists in the IPCC’s working groups are not necessarily competent to perform. Recognizing the depth of uncertainty about the future state of complex systems, the framework uses the tools of scenario exercises and war-gaming to help consider what might happen.

The same analysis presented at the workshop notes that there may also be a dangers in the way climate scientists currently express probabilities and in the documented tendency of the lay public to discount low-probability, high impact outcomes. While the IPCC defines ‘likely’ as 66-90% probability, and ‘unlikely’ as 10-33% probability, when lay individuals were asked what they thought ‘unlikely’ meant for the probability of a land-falling hurricane, the most common response was 1-10%. ‘If the scientific community tends to underestimate the severity of impacts under uncertainty, and the public tends to adjust probability of a severe event downward, the net effect may be a serious under-appreciation of the potential severity of climate change impacts among the public and decision-makers’ (King *et al.* 2014: 48).

**2. *New narratives of high-end climate change and analytical frameworks are needed to inform robust scenario planning and decision making.***

Since some scenarios are projected to lead to very divergent futures in terms of impacts, effective responses to manage climate risk depend heavily, in some cases, on the scenario actually realized. As Stafford-Smith et al. (2011) have highlighted, simply presenting the prospect of a 4°C world as an increasingly likely one is unhelpful and disempowering unless the complexity of dealing with the thousands of decisions that might be affected by climate change can be simplified.

**Greater knowledge from climate science is of little use without analytical tools and wherewithal to use that knowledge.** Infrastructure and land-use planners need to be reminded of the sophisticated analytical frameworks that are available for robust decision making that can reduce complexity in dealing with the wide range of decisions sensitive to future climate change (e.g. Hallegatte 2009; Stafford-Smith *et al.* 2011).

In situations where near-term decisions have long-term consequences, adaptation planning needs to move from incremental to transformative as a contingency under scenarios of truly disruptive climate change. Pioneering examples include plans for relocation of development from floodplains around London after 2060 and the creation of water-efficient maize for Africa, both of which require planning and investment now to manage impacts in decades to come (Stanford *et al.* 2014).

As an over-arching narrative, there is potential in the ABC Framework: **Aim to stay below**

**3. *The impacts important to specific decision makers need to be communicated, in language they recognise.***

A risk assessment aims to inform those with the power to reduce or manage risks. Assessments of specific, local, or sectoral risks of climate change may be directed at those with specific, local or sectoral responsibility. Assessments of the risk of climate change as a whole should report directly to those with responsibility for governance as a whole. At the national level, this means the head of government, the Cabinet, or national security council. Globally, it means institutions where heads of government meet to make decisions (cf. King *et al.* 2015).

2°C; **B**uild and budget (infrastructure) assuming 3-4°C; **C**ontingency plan for 5-7°C of warming (Mabey *et al.* 2011).<sup>12</sup> This has potential to motivate difficult but much-needed dialogue and planning for the impacts of climate change under high-magnitude warming, addressing the risk that planners and decision-makers may cling to ‘unrealistic optimism’ as a maladaptive coping strategy (see section 3). Building a science-based dialogue over the costs and challenges of transformative adaptation may even have the effect of motivating greater mitigation effort (Mabey et al. 2011).

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<sup>12</sup> Contingency planning for 5-7°C presumably takes planning into the realm of climate engineering, a topic which the workshop did not address.

Politicians' efforts to communicate the value of climate policy now frequently make use of risk language, such as emission reduction policies acting as an 'insurance policy'. Such language speaks particularly well to the business sector, familiar as it is with assessing investment, insurance and other types of risk. The *Risky Business* initiative, explicitly aimed at business, uses a risk management frame to report on the risks for agriculture, energy and coastal real estate in the US. The initial report (Houser *et al.* 2014) received widespread coverage in the US and UK business press, helping to shift the climate change story out of its 'environment ghetto' (Painter, undated). This enlargement of the story into other areas, including financial investments and energy security, demonstrates one of the best ways of engaging a wider audience and making it more relevant to their lives.

According to PwC, a company with considerable experience with engaging the business community on the climate challenge:

'Science debates have alienated many from the real issues. In reality, when working on climate risk assessments with companies, [we] don't hear much debate about climate sensitivity or the heat of the ocean in 50 years' time. It's not the language of business decisions. [...] Instead, companies talk in terms of operational performance, asset management, business continuity, security of supply of commodities, energy and water, workforce health and well-being. How will investment in resilience and climate mitigation today, show a rate of return in the future? It's okay that there are many uncertainties - businesses are experts at making decisions around uncertainty, and in scenario planning. Bridging this communication divide will be critical for action' (Herweijer 2013).

During the 2011 Thailand floods, 10,000 factories, including many crucial to global electronics and hard drive manufacturing were put out of action, and total national output in fell by 36%. The event cost Nissan £67 million in supply chain recovery costs. 'The language of climate change is about the issues that make politicians sit up, take notice, and take action. And these are the figures: not 2°C. ... Temperature and precipitation and modelling outputs is the language of climate science, and there's a difference'.<sup>13</sup>

Business should therefore be encouraged by communicators to take a 'context-first approach', looking at thresholds and tolerances within particular operations. This will afford a very good understanding of the types of action that can be taken in different scenarios without having to know precisely what that future holds (London Assembly Economy Committee 2015)

***4. Opportunities for peer-to-peer learning and individuals recognised in their own networks should be used.***

Peer-to-peer networks also have great potential to sensitise and inform decision makers, including spatial planners and others. The *Mayors Adapt* EU cities initiative (<http://mayors-adapt.eu/>) and the Urban Sustainability Directors Network (USDN) are two such initiatives.

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<sup>13</sup> John Firth, CEO Acclimatise, presentation at *Our Common Future Under Climate Change*, Paris, 7-10 July 2015 <http://www.acclimatise.uk.com/network/article/video-acclimatise-ceo-john-firth-on-climate-change-adaptation-its-not-an-environmental-issue>.

Technological developments also open up new possibilities for learning and peer-to-peer interaction across long distances. For example, the World Bank has now offered a massive open on-line course (MOOC) based on its series of reports *Turn Down the Heat* to a global audience for two years running.<sup>14</sup> Two tracks are offered: one to interested citizens and one to policy makers in more of a leadership role. Peer-to-peer interaction on dedicated web forums is encouraged. The reception has been generally positive, albeit with some disquiet being expressed on the forums about the upbeat message from World Bank teaching staff on the course that the 2°C target is still feasible.<sup>15</sup> MOOCs are of course still ‘narrowcasting’, aimed at the very technical attentive user. They do, however, offer opportunity for resonating globally as well as with the local context of users in specific regions.

Wider transformations in the cultural sphere, above all in social and digital media, are ‘having ambiguous, but potentially very constructive, consequences for the ways in which stories about climate change develop and travel. Among other things, these changes encourage more plural and dynamic accounts of our understanding of climate change’ (Smith *et al.* 2011: 7).

***5. For wider publics, messaging should not always start with climate, but with places and resources people value, then how climate affects them.***

That said, there is still a place for basic education about climate change, as highlighted by research indicating how many people have yet to learn of it. Ming-Lee *et al.* (2015) suggest that improving basic education, climate literacy and public understanding of the local dimensions of climate change are vital to public engagement and support for climate action. Beyond these strategies, heterogeneities in the key predictors of climate change risk perceptions across countries suggest that each country has its own relatively unique set of correlates. Therefore, national and regional programmes aiming to increase citizen engagement with climate change must be tailored to the unique context of each country, especially in the developing world (Ming-Lee *et al.* 2015). The cognitive-deficit model has a critical role in the real world of communication in places where awareness is low.

At its root, the public discussion of climate science is as much about what sort of world we wish to live in, and hence about values, as it is about immediate and longer-term material risks to human wellbeing. This needs to be clearly acknowledged and addressed.

***6. Narrative-based immersive events and experiential learning should be encouraged.***

Workshop participants highlighted the potential for virtual reality - as developed in devices such as the Oculus Rift - for conveying scientific findings relating to possible futures and possible solutions. The potential for large-scale (inter-active) theatre events (e.g. secret cinema) was also emphasized.

<sup>14</sup> <https://www.coursera.org/course/warmerworld>

<sup>15</sup> The lead author of this paper participated in the 2015 MOOC.

Rarefied graphs and data speak well to the rational brain of specialists trained to interpret them, but are in danger of losing a sense of cultural and social transformation, even if they also offer important starting points (Bell 2013). Advocates for action on climate change therefore have to speak to both rational and emotional sides of the brain. As in the GUMG and Chatham House exercise described in section 4, they need to translate data into a form that will engage and motivate the emotional brain using the tools of immediacy, proximity, social meaning, stories and metaphors that draw on experience (Marshall 2014: 50). Ideally, policy makers should also participate in events such as scenario workshops, where stories are jointly constructed and played out. Such tailored and resource-intensive activities are difficult to do at any scale, but can be practical for small elite target audiences.

Creating widespread opportunities to learn experientially about sustainability can help to foster such commitment by:

- providing engaging and authentic learning experiences that make abstract issues of sustainability real and relevant to people and stimulate new interest in learning about their causes and consequences;
- improving affinity with the natural world through learning experiences that demonstrate the interdependence of human and natural systems and the ecological impacts of unsustainability, both for people and for the planet;
- improving understanding of physical, emotional and spiritual human needs and of the need to reconcile these with the ecological needs of the planet;
- making learning about human and ecological sustainability personally meaningful and communally supportive in ways that inspire committed and enduring engagement and action.

### ***7. More dialogue is needed, less debate and lecturing.***

Fuller engagement with unwelcome climate messages and their policy implications requires a more strategic approach than has been witnessed to date.

Firstly there is a requirement for more listening and mutual sharing, whereby communication becomes a genuine dialogue (Moser and Berzonsky 2015), and effort is made to understand intended audiences and their decision needs prior to communication design. Secondly, there is a need to draw from a range of skills including natural science, decision science, social science as well as communications specialists.

Individuals who are able to generate their own ‘unwelcome messages’ in dialogic forums informed by scientific input, rather than receiving lectures, are more likely to accept them (Moser and Berzonsky 2015).

The kind of approach favoured by participants in the workshop has much in common with the approach to climate risk, uncertainty communication and decision making advocated by Pidgeon and Fischhoff (2011). In Pidgeon and Fischhoff’s model, a more strategic organisation should aim to meet basic research needs in risk and uncertainty analysis, risk perception, and risk communication as well as immediate policy goals - operating as a ‘boundary organisation’ between academia and public policy (House of Commons Science and Technology Committee 2014).

Such a two-way dialogic approach is inevitably resource and time intensive, and may therefore be too expensive to be used for communicating on climate science to the public on a significant scale (ibid). On the other hand, if more selectively used (i.e. with key leaders and elites), it may prove to be far more effective than so-called mass communication, which encounters too many barriers to be effective for the purposes of communicating unwelcome messages.

#### **8. 'Friendly communicators' must recognise emotions, loss and the need for 'active hope'**

Knowledge of the implications of high-end climate scenarios constitutes a burden for those who are generating it, attempting to communicate it, and hearing about it as lay individuals. Emotions of anxiety, fear, guilt, loss, interdependency and helplessness are likely to be aroused in 'accept[ing] the fact that the world we have known is going to change in hideous and damaging ways' (McKibben 2010: 176). Sensitive handling of such emotions is required by both scientists conducting research and those seeking to communicate the science. If scientists fail to acknowledge the emotional weight of unwelcome climate science, something powerful will be lost, and lay audiences may well become suspicious or simply shut down. Scientists must act as 'friendly communicators', being emotionally honest, talking openly about their hopes, fear, and anxieties, and willing to tell personal stories. Communicators should talk about their personal journey, especially if they have come to their conviction from a position of doubt.

In order to avoid the tendency for denial or maladaptive responses, **audiences themselves need more 'safe spaces' to make emotional connections that open up energy and engagement.** 'When people are able to tell the truth about what they know, see and feel is happening to their world, a transformation occurs. There is an increased determination to act and a renewed appetite for life' (Macey and Johnstone 2012: 70).

Rather than being dismissed as alarmist, the climate change communication specialist Susanne Moser's recent attempts to engage at a more emotional level have met with gratitude (Moser 2014b).

In his 2015 encyclical, *Care for Our Common Home*, Pope Francis (2015: 16) has stated that '[o]ur goal is not to amass information or to satisfy curiosity, but rather to become painfully aware, to dare to turn what is happening to the world into our own personal suffering and thus to discover what each of us can do about it'.

Talking in such personal terms may cause a certain discomfort among scientists, some of whom may fear some loss of professional reputation. But the numbers willing to take this risk, and suffering no loss of reputation, are growing.<sup>16</sup> Lord Stern introduced his two-week old granddaughter at a TEDx talk in New York, asking what kind of century she would be living through.<sup>17</sup>

<sup>16</sup> See entries on the website <http://isthisshowyoufeel.weebly.com/this-is-how-scientists-feel.html>

<sup>17</sup> [www.ted.com/talks/lord\\_nicholas\\_stern\\_the\\_state\\_of\\_the\\_climate\\_and\\_what\\_we\\_might\\_do\\_about\\_it?language=en](http://www.ted.com/talks/lord_nicholas_stern_the_state_of_the_climate_and_what_we_might_do_about_it?language=en)



## 6. Practical principles for communicating unwelcome climate messages

As expressed by Susanne Moser in her presentation to the HELIX workshop, to avoid being ‘narrators of doom’ but instead foster adaptive coping strategies, communicators must move:

1. from delivering unwelcome messages...  
...to participating in *difficult dialogues*
2. from delivering scientific findings...  
... to making a *human connection*
3. from thinking we just speak to the mind...  
... to deliberately *engaging the heart*
4. from merely giving bad news...  
... to taking people on an *emotional journey*
5. from triggering fight-or-flight  
... to motivating *active engagement*

This kind of approach could be termed Dialogue-Emotions-Values in Context (DEVCO).

In addition to accepting these, the workshop also concluded that ideally stakeholder or audience involvement should extend upstream, to involve a co-production of the science behind the messages as well, to maximise the prospects of acceptance and engagement. We are watching the *Future Earth* project with interest to see how this can be realised for the traditional environmental sciences of global environmental change.

These suggested principles apply when communicating to high-level policy makers as much as to lay publics. They present **significant new demands on communicators**, and the venues in which they communicate, requiring a **move beyond traditional formats** for communication such as lectures and debates. To build a relationship with *particular audiences* takes more time and *attention to process*; first to hear particular concerns, then to offer a small modicum of science and conceive of possible solutions. This is likely to **need a facilitation by highly skilled individuals or teams, and greater investment in training and outreach activities**. To this end, HELIX is training early career researchers in values-based communication.

Following Moser and Berzonsky (forthcoming), a further six ingredients underpinning a strategy based on active hope may be highlighted:

### i) **Clear-eyed diagnosis:** *Where are we at?*

As we have noted, impacts corresponding to high-end of temperature rise are relatively unstudied. Efforts beyond the HELIX project and its sister projects IMPRESSIONS<sup>18</sup> and RISES-AM<sup>19</sup> will therefore need to be encouraged to understand these further.

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<sup>18</sup> <http://www.impressions-project.eu/>

<sup>19</sup> <http://www.risesam.eu/>

**ii) Vision of a worthwhile outcome:** *What is achievable?*

Recently some have expressed disquiet about the implications of acknowledging that the 2°C target may have slipped beyond reach. Acknowledging as much arguably risks inducing a fatalism about the future that could reduce mitigation effort (Jordan *et al.* 2012). But this need not be the case if the nature of the climate challenge is well communicated. As David Roberts has expressed it:

‘Sorry ... but no one’s allowed to give up — our children and grandchildren will still be fighting this battle. Even if it does become finally, physically impossible to hit 2°C, so what? Carbon emissions still need to be driven to zero as quickly as possible to avoid even higher temperatures. The fight remains the same, no matter the temperature outcome’ (Roberts 2015b).

Scientists who regularly communicate about climate risks owe it to their audiences to make it clear that there are significant differences between a lower and higher-emission future, and what can be done to address the risks of each (Huertas 2015). For hope to be maintained, there must be a sense in which unwelcome outcomes are uncertain, not assured.

**iii) Feasible path:** *How can we get from here to there?*

Currently, serious public discussion of alternative pathways to a liveable future is scarce. Importantly, these need not dwell on the negative aspects of such pathways. More positive narratives about societal transformation, such as Jonathan Porritt’s book *The World We Made* (Porritt 2013), are possible.

**iv) Strategy for setbacks and interim goals:** *What to do when the going gets tough?*

An important element of any journey is to discuss what the possible setbacks and disappointments along the way might be, and how to prepare for and buffer against them, or what the possible responses might be, should they arise (Moser 2015b).

**v) Doing it together:** *What will you (and others) do?*

Individuals deal with climate change largely in private, with little public or political discourse against which to calibrate personal views. That being so, individuals easily come to assume that few people are concerned enough to contemplate radical solutions. There is a need to nurture ‘communities of conviction’ to overcome the reluctance of individuals of influence to fully engage with unwelcome climate messages. Marshall (2014) argues that by looking to other communities (such as faith groups) which provide support for their members, allowing their personal beliefs to be validated by their peers, lessons can be learned for communicating on climate change.

## **Conclusions**

This Working Paper has highlighted the scale of the communication challenge in a context where high-end climate change is an increasingly likely prospect. This unwelcome prospect requires communicators to engage audiences with messages that no-one wants to hear - that impacts may be more serious than those that scientists and media have described to date, and that whatever mitigation and adaptation has happened so far, or is planned, is not enough. As atmospheric carbon stocks accumulate, inertia in the earth system will continue to deliver high-end climate change even after global emissions have peaked.

This requires a scaling up of communication efforts. While there is evidence for the effectiveness of small group-based communication approaches, where individuals are able to engage in dialogues that recognise emotions and values in context, there is clearly a limit to how far these can be operationalised. Given resource constraints, such efforts should be targeted at key opinion leaders and decision makers, rather than those who in important respects are already persuaded. There is also scope for local and expert communicators, scientists and the IPCC to modify and improve their existing stakeholder outreach practices by recognising the importance of DEVCO in appealing to more than the rational brain. The organisation of FutureEarth, with different regional centres for Europe, Middle East and North Africa, Asia, North America, Latin America and Africa offers a new opportunity for global change research to be communicated better, taking into account local and regional contexts. Capacity building of communications skills is key to success. The potential of online platforms to connect different constituencies around the world using more of a DEVCO approach could also be more fruitfully explored.

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