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Psychology, Climate Change and Sustainable Behaviour

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This year marks an important crossroads for climate policy. Most member states of the European Union have accepted the case for major cuts in greenhouse gas emissions. In Britain, for example, the new Committee on Climate Change has recommended at least an 80 percent cut in national emissions by 2050.ⁱ In the United States, the inauguration of the Obama administration also signals a more proactive policy agenda, with the new president calling for an 83 percent reduction in 2005 greenhouse gas emissions levels by 2050.ⁱⁱ Finally, with the hope that developing nations such as India and China will join future international agreements, the Parties of the United Nations Framework Convention on Climate Change meet in Copenhagen this December to discuss and frame international climate policy and cooperation for many years to come.

The recommendations of the Copenhagen Climate Science Summit held in March stress that societies must undergo major transformations if the world is to have any hope of avoiding dangerous climate change.ⁱⁱⁱ Yet despite the obvious human, social, and cultural drivers of climate change—including household energy use; transportation; unsustainable food, manufacturing, and consumption patterns; and population growth—proposed solutions are largely dominated by technology, the physical sciences, and economics.^{iv} A key assumption is that new technologies, fostered through appropriate market instruments, will lead to the necessary reductions in emissions.

This approach overlooks or, at best, underexploits many of the known drivers of human behavior and involves simplifying assumptions with only tenuous connection to actual theories and evidence of the factors shaping social practices and behavior.^v For example, recent modeling from the UK Energy Research Centre indicates that in the United Kingdom, lifestyle change could contribute a full 30

percent cut in greenhouse gas emissions against baseline, but the analysis assumes that almost all households will take up adequate home insulation, the overheating of residential buildings will become “socially unacceptable,” and social norms will elevate low-carbon vehicles, as well as cycling, walking, and other active modes of travel.^{vi} While the analysis highlights the potential of changes, it begs a number of key questions. What represents a “sustainable lifestyle,” and how might competing visions of this be reconciled? How might desirable lifestyle changes be achieved? Will existing beliefs and choices help or hinder the uptake and diffusion of particular low-carbon technologies? And what models and evidence can policymakers draw from to encourage the development of appropriate social norms and sustainable behavior?

Of all the human sciences with a potential to contribute to the key task of understanding and informing behavior change in the environmental domain, psychology, broadly defined as the study of human beliefs and behavior, has been particularly underutilized.^{vii} A recent report from the American Psychological Association argues that a great deal of theoretical understanding and transferable knowledge already exists for encouraging sustainable behavior and coping with issues of adaptation.^{viii} However, human behavior, by its very nature, remains complex: communities and individuals are adaptable and resilient, but also governed by subtle aspects of the situation or context in which they are embedded. Psychologists and other social scientists have therefore been wary in the past of addressing some of the more normative concerns raised by environmental policy choices^{ix} e.g. attempts to persuade the public to accept nuclear energy and radioactive waste sites in the 70s and 80s. Equally, climate change is psychologically distant in time and space, involves multiple uncertainties (which can be difficult for people to comprehend), and requires

extensive cooperation at interpersonal, national, and international levels.

Understanding the full implications of these challenging aspects of human behavior and climate change requires further investigation, while much of what psychologists already know will require careful interpretation and adaptation to be useful for informing policy.

The Role and Provision of Information

One enduring assumption of much public policy in the environmental domain claims that when provided with information, people will change their behaviors in an environmentally beneficial way. It is not hard to fathom why information-based approaches remain popular. As beings defined by the capacity to communicate with others, humans obtain direct evidence daily of the apparent impact that their own words have on others. Research shows, however, that effective communication depends upon a range of complex and often subtle factors. Perhaps the most important rule of any communication campaign is to first understand the intended recipient. Opinion polling has revealed that the majority of individuals in most Western cultures perceive climate change to be an important issue.^{ix} But when placed alongside other issues, such as economic interests, climate change is not rated as a high priority.^x In addition, important differences in attitudes make it unwise to assume that there is any single public opinion on this issue. A substantial proportion of lay people believe that scientific controversy still surrounds the anthropogenic causes of climate change, and many naysayers and conspiracy theorists believe that climate change is not happening or is exaggerated by the media.^{xi} Political polarization also exists on these issues, within the United States and Europe, with those on the political right being less likely to believe in and to be concerned about global warming.^{xii} The detail and nuances that

underlie the headline results highlight the importance of examining public perceptions of climate change in greater depth than can generally be undertaken with simple opinion polls. By understanding this complexity, communications and policy developments can be better tailored and the likely impacts of these anticipated.

It is arguably impossible to encounter or even contemplate complex problems such as climate change without some kind of context or frame. Even if we assume that we receive only facts from climate scientists, these are passed to the public through the media, who filter and adapt the information as they see fit.^{xiii} Frames can be conceptualized as ways of organizing and defining ideas and knowledge in order to resonate with particular views of the world, values or ideals;^{xiv} as such, they emphasize certain aspects of an issue and de-emphasize others.^{xv} One popular framing portrays climate change in catastrophic, emotive terms. Mike Hulme, a professor at University of East Anglia, discusses the “contemporary discourse of fear” surrounding climate change and points to the frequent usage of terms such as “terror,” “catastrophe,” and “danger” when discussing climate change,^{xvi} with the implication that this type of framing may be counterproductive by encouraging audiences to switch off or become habituated to the messages that they receive.^{xvii} He and others also are concerned that fear framing may play into the hands of climate skeptics claiming that such messages are “alarmist,” and increase laypeople’s perception that climate change is exaggerated in the media.^{xviii} However, the psychological literature on this point indicates substantial evidence, from domains such as health protection, that fear framing will initiate action as long as individuals feel that they have some degree of control to act in response to the problem. When control is absent, internal psychological defenses, such as denial, can minimize fear.^{xix} Climate communicators

should therefore seek to frame emotive messages alongside positive, credible steps which people themselves can take.

Fear frames are only one particular way of conceptualizing and communicating about climate change. Alternative framings emphasize values, equity between people, and the morality of action; economic frames, such as the “New Green Deal;” and the existence of risk and scientific uncertainty.^{xx} Risk and uncertainty framings are particularly important in the current context. While climate scientists and modelers have always acknowledged and incorporated complex uncertainties and gaps in their understanding, they have preferred to avoid addressing specific risks associated with climate change in policy documents. However, the 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change characterizes scenarios and impacts by the likelihood they would occur,^{xxi} and the 2009 scenarios for the UK Climate Impacts Programme^{xxii} incorporate likelihood-based regional impacts predictions to aid adaptation decisionmaking for the very first time. Risk and uncertainty are set to underpin debates about climate change decisionmaking. In turn, engaging the lay public about climate change will need to draw on the very best guidance already developed within the field of risk communication, which advises to avoid overly technical or patronizing language and focus on communicating what really matters for protecting people, choose both qualitative and quantitative risk terms with care (possibly also testing their interpretation by potential audiences in advance), contextualize risks in everyday terms but without raising spurious comparisons, recognize heterogeneous audiences, avoid distrusted communication channels or parties, treat communication as dialogue (to listen and learn as well as inform), combine information about harmful outcomes

with actions people can take to avoid the risk, and always evaluate the effect of communication.^{xxiii}

Sustainability policy in the United Kingdom has begun to recognize the existence of multiple publics for communications and other purposes. Research conducted by DEFRA under its *Framework for Pro-Environmental Behaviors*, a document designed for decisionmakers and communicators to improve the design and implementation of policy interventions, divides the UK population into seven segments. These vary in the extent they are able and willing to act sustainably from the Positive Greens, who are very environmentally friendly and have high potential and willingness to act sustainably, to the Honestly Disengaged who are fairly disinterested, not willing to act, with an average ability to do so.^{xxiv} The DEFRA researchers further identified the types of sustainable behavior members of each segment are already likely to engage in, the types of behavior that they could be encouraged to engage in, and the motivations and barriers to this behavior. The approach is empirically grounded and important in informing policy initiatives but so far has lacked any rigorous theoretical basis. Theory would be useful here in making sense of the reasons why groups differ and when communications previously identified as effective may be usefully employed for further groups and behaviors.

The DEFRA framework also outlines 12 headline sustainable behaviors, i.e. general areas of behavior such as ‘more responsible water usage, as a list of target behaviors alongside, importantly, potential ways that these can be promoted. However, there is generally little or no information given as to the importance and effectiveness of any particular action. Turning the heating down two degrees is not equivalent to installing/increasing loft insulation. Research from the United States indicates that householders believe that biggest energy savings can be gained through

curtailment—for example, turning off lights. In reality there are much greater savings to be made through efficiency—for example, buying energy saving light bulbs.^{xxv}

There is a clear need here for psychologists and policymakers to work together when making judgments on the behaviors and technologies on which to focus national and community efforts. In this way, communications can be designed to focus on behaviors which are most important in the sense of maximizing carbon reductions as well as those which have the greatest chance of uptake and maintenance.

An Integrated Approach?

Although carefully designed, well-targeted communications are an important method of promoting sustainable behavior, they are often not enough. A variety of barriers to change prevent people from acting sustainably. For example, an individual may lack the funds to buy a more energy-efficient product, may have more immediate priorities, or simply may be reluctant to change his or her current lifestyle (see the box on page TK1). The health psychology literature makes a useful distinction between upstream and downstream interventions.^{xxvi} Downstream interventions refer to communications designed to change existing values and beliefs, while upstream interventions refer to external structural changes, including legal constraints and physical changes to the environment, that force, encourage, or more gently nudge people toward different practices and lifestyles. A successful health intervention policy or campaign will often involve elements of both,^{xxvii} and there is no reason to suspect environmental interventions will be any different in this respect.

Research has repeatedly demonstrated that one of the biggest predictors of future behavior is past behavior: people tend to be creatures of habit who stick to regular routines.^{xxviii} Overruling a habit requires deliberate intention and, as a result,

interventions that encourage people to be more conscious of their behavioral choices increase an individual's capacity to change.^{xxxix} In the United Kingdom, for example, many stores have started charging customers a small fee for plastic shopping bags, encouraging customers to consider their wastefulness. Recent research finds that the number of plastic carrier bags given out in UK supermarkets has dropped by 48 percent in the last three years.^{xxx}

Periods of transition, when routines are already in flux, provide useful opportunities to develop new, more sustainable habits. For example, an intervention in Germany that provided people with information and free tickets for public transportation shortly after they had moved was found to be particularly successful in increasing use of public transport services.^{xxxi}

Beyond overcoming undesirable old habits, it is also essential to ensure that new desirable habits are developed. Often within psychological interventions, people are encouraged to repeat their intentions to increase the likelihood that they remember them at critical decision points,^{xxxii} supporting the development of a new habit. The more often new behaviors are performed, the more they are ingrained and reinforced until becoming automatic. The idea of repetition implies a role for behavioral incentives. Providing an individual with an incentive—for example, a free bus ticket—to perform a particular behavior for a short period of time facilitates the development of a new habit that may be continued after the incentive period. Gyms, for instance, frequently use this approach to increase their membership. It equally can be applied to uptake of more sustainable habits and services.

Many environmental interventions in the past have taken either an upstream or a downstream approach. Illustrating the former, consider the low uptake of many household energy-efficiency improvements, such as increasing loft insulation, which

in the long term are likely to provide overall cost savings. In fact even with a variety of government grants and voucher schemes available in order to incentivize loft insulation, many households have not taken advantage of these opportunities. Research conducted by the Sustainable Cities Research Institute found that the main reasons identified for a poor uptake of insulation schemes were that information received was poor and communicated badly and therefore ignored.^{xxxiii}

More successfully, the introduction of the mandatory EU energy label in 1995 brought about a 7 percent drop in the average energy consumption of refrigerators and other cold appliances purchased in the United Kingdom.^{xxxiv} Yet two years later, only 24 percent of UK households reported that the label influenced their purchases.^{xxxv} Unfortunately, in the United Kingdom, there was no accompanying communication campaign alongside the introduction of energy-efficiency labeling to promote the need and reason for this policy. By contrast, in Portugal a celebrity advertising campaign accompanied the labeling; here the reported level of influence of labeling was significantly higher (35 percent). Far higher levels still (45 percent and 56 percent) were found in The Netherlands and Denmark, respectively, where rebates for early adopters accompanied labeling and communications. This demonstrates the value of an integrated approach, composed of a raft of complementary measures, in promoting behavior change.

A further interesting and potentially valuable line of research relates to the idea of behavioral spillover effects. In the past few years, there has been particular interest in the idea of “catalyst behaviors”: key behaviors that may lead to the adoption of other behaviors with a similar underlying ideology.^{xxxvi} Microgeneration is an example of a potential catalyst behavior because of its high visibility and its inherent requirement of an initial large cash output; it is thought that those who invest

in microgeneration are also more likely to follow through with other environmentally efficient behaviors. Such a proposal is intuitively appealing in that if efforts could be focused on changing certain behaviors, or perhaps more accurately, a motivational route to those behaviors, other beneficial changes may follow. Indeed a leading argument leveled against many sustainable behavioral intervention approaches is that they are developed and integrated into the current economic system, lifestyles, and patterns of consumption rather than transforming them. Approaches that target one isolated behavior with specific communications or incentives will not bring about the fundamental changes in values and thinking to mitigate climate change.^{xxxvii}

A particularly successful line of research comprised a series of meetings called “carbon conversations,” in which participants were encouraged to explore their everyday behavior and choices alongside their broader values on climate change issues.^{xxxviii} For example people who consider themselves to hold strong pro-environmental values may not think about these when purchasing everyday goods such as food. This forced participants to consider the meaning of their actions in broader terms than perhaps is normally undertaken. Initial project participants have made significant immediate savings of around a ton of CO₂ a year and present continuing plan to reduce emissions further. Although the reasons for such changes require further research, the theory of cognitive dissonance may provide some insight. This holds that people who become aware of a conflict between values or attitudes that they hold and behaviors that they have engaged in will experience discomfort and will adjust one or the other to reduce that feeling.^{xxxix} This may occur, as with carbon conversations, through an adjustment of behavior in line with values however this may also occur through adjusting values in line with behavior.

Accordingly, reflecting on the reasons for current sustainable behavior may be a key way in which related values can be changed. Indeed it may be that one of the ways that catalyst behaviors may encourage further behavior change is because these catalyst behaviors encourage adopters to consider and reflect upon their reasons for undertaking these. Further, and importantly, changes in fundamental values tend to translate into longer-term behavior changes; so by impacting values, wider change may be achieved. The lesson for policy is that it is important not to neglect the broader aims of structural changes implemented with upstream approaches and that in fact by maintaining a focus on the more downstream, informational aspects of intervention alongside structural changes, then more widespread changes may be achieved.

The Social Acceptance of Technology

Technology and technological solutions are at times credited optimistically with the potential to “solve” the climate change problem. In a widely cited article in the journal *Science*, ecologist Stephen Pacala and engineer Robert Socolow argue that deployment of a range of existing technologies, from third-generation nuclear power to more energy efficient vehicles, can yield major cuts in emissions.^{xl} While their analysis demonstrates the extent to which decarbonization might occur if diverse technologies can be deployed in time and on a major scale, it ignores the human and societal dimensions of the diffusion, acceptance, and uptake of technology.^{xli} The innovation process itself is fraught with economic and noneconomic constraints. The well-known “valley of death” between demonstration and commercialization is a case in point, with low-carbon technologies no different than any other in this regard.^{xlii} For individuals to adopt a new technology, it must have a relative advantage over

existing technologies (including not only price, but also performance and convenience); compatibility with existing needs and social norms; and visibility to potential adopters. In addition, the appropriate level of complexity and effort required to adopt the technology and opportunities to test innovation in advance must be present.^{xliii}

Research in the long-established field of social studies of science and technology also cautions that the use of technology involves often complex sociotechnical relationships.^{xliv} At a household level, many of the actions that produce greenhouse gas emissions, such as electricity use, are invisible to users in their day-to-day practices, or are conditioned by the existing energy infrastructure. Even when motivated to change, people often do not know what to do or why the adoption of a particular innovation is important, or they may lack the ability to affect change. Phasing out inefficient incandescent lighting (thought by many to provide superior illumination) has met with resistance in several countries, with some households and organizations, such as museums, stockpiling traditional bulbs for when they are no longer available.^{xlv} An innovative way to make energy use visible is smart metering, the use of devices to provide feedback on how much energy is being consumed within the home. Real-time displays in particular help consumers to monitor how much electricity they are using and understand which activities use the most energy, ultimately encouraging conservation and more sustainable purchasing behavior. Recent evaluations of smart meters provide some evidence as to their effectiveness in reducing energy usage, with overall reductions varying between 5 and 15 percent.^{xlvi} Such behavioral feedback holds considerable promise as a tool for driving change, by helping to reduce the psychological distance between our behavior and its impacts on the environment.

Public acceptability is also critical, in that it may well prove difficult or impossible to implement some low-carbon technologies without public support. Developers of new technologies often tend to assume that just creating a new machine or technical system provides an efficient answer to a defined problem, with little regard for people's perceptions of its risks and benefits or the level of societal uptake that may be required. The history of innovation is littered with examples of technologies that stalled because of public hostility.

Nuclear energy in particular is a case in point. Public concern about the risks of nuclear power grew steadily in many Western countries alongside more general worries about environmental protection and nuclear proliferation. The overly optimistic claims of its early promoters were also exposed by continuing financial difficulties, the catastrophic accidents at Three Mile Island and Chernobyl, and the unresolved problem of finding a solution for the disposal of radioactive waste. Even before Chernobyl, opposition to building more nuclear plants in the United States had increased from only 20 percent in the mid 1970s to more than 60 percent in the early 1980s.^{xlvi} During this period, researchers extensively surveyed public risk perceptions of nuclear power, finding it to be almost uniquely "dreaded," unknown to the public and to science, with relatively few perceived benefits to society. Distrust in the authorities to manage the risk responsibly has also been found to be a powerful predictor of opposition to nuclear power in national surveys. Although public attitudes to nuclear power on both sides of the Atlantic have moderated somewhat since the 1980s, there remains an essential ambivalence in many people's attitudes toward the acceptability of this most iconic of the technologies of modernity, whatever its merits as a low-carbon electricity sources when in operation.^{xlviii}

Researchers have also studied public perceptions and opposition to nuclear power within local affected communities, and these studies also show a complex set of responses.^{xlix} Opposition is often at its most intense when a nuclear facility is proposed for a site without a history of nuclear operations. By contrast, communities around existing nuclear sites tend to recognize local benefits—including jobs, improved community infrastructure, and lack of other development—that nuclear facilities bring alongside an awareness of the potential for environmental pollution and accident risks. Many of these issues of public acceptance and opposition, at local and national levels, look set to be re-played in relation to the current proposals for the renewal of nuclear energy. And similar controversies are already unfolding with regard to some renewable energy proposals, including the siting of onshore wind farms in many countries^l and UK tidal energy schemes, such as the Severn Estuary proposals. It might be tempting to dismiss local opposition to renewable energy developments in particular as a simple case of Not In My Backyard, but evidence from a variety of studies indicates that a range of factors, including concerns about destruction of landscape, knowledge of underlying geographic and environmental conditions, a lack of control over or input into the planning process, and perceived threats to community identity and autonomy, underlie opposition to such developments at the local level.^{li} Community engagement and participation will play an important role in the processes by which new energy facilities come into being.^{li} Above all, research and development of sustainable technologies and innovative climate solutions, however well intentioned, must also take at least some account of the potential for future public acceptance (or controversy), without which uptake may be delayed or derailed entirely.

Conclusions

The Copenhagen climate talks in December will need to address the rapid social transformations required to meet existing and future climate change targets. Such targets will not be attained without also squarely confronting the question of human decisionmaking and behavior. Failure to do so will lead to unintended consequences when deploying available technologies and decarbonization policies at best and a complete failure to move toward a more sustainable world at worst. Psychology and other social sciences provide important insights into climate change mitigation and adaptation. Environmental psychology itself has been relatively marginalized over the years, which highlights the importance of improving the capacity of the psychological community worldwide and of fostering further systematic research on issues related to sustainability. Further, psychologists must engage more with environmental policy and decisionmakers.^{lii}

In turn, those who seek to encourage behavior change need to be wary of simplistic or stereotypical explanations of people's motivations and actions. Many folk theories or "common sense" explanations of human motivations and behavior are not borne out by the evidence. Moreover, reliance on economic instruments and incentives is unnecessarily limited and often insufficient. Failing to ground policy interventions in empirically based knowledge about human behavior and its drivers, whether in communication and engagement programs, economic incentives, community initiatives, or deployment of new technologies, is an omission that environmental policymaking cannot afford. One practical suggestion arising from our analysis is that national governments must consider these issues when drawing up policies for shaping future low carbon energy provision and demand management, as well as adaptation policy. In line with this, the 4th assessment report of the IPCC

concluded in 2007 that ‘changes in lifestyle and behaviour patterns can contribute to climate change mitigation across all sectors’.^{liii} However, the evidence base in the main body of the assessment report to underpin this statement was both underdeveloped and fragmented in relation to what is already known from the broader psychology and social sciences literatures, and especially in comparison to the report’s comprehensive treatment of its other topics such as climate science, technology choices and energy economics. Accordingly, we would recommend that the 5th Assessment Report from the IPCC, currently being outlined, should take up and systematically address behavioral and social aspects of potential future scenarios. By reviewing in detail scientific and other evidence on the role that can be played by behavior change and its drivers within the societal and technological transformations that are deemed necessary for a carbon-limited future, approaches to both climate change mitigation and adaptation can more fully address human and social drivers, alongside the more physical and economic interventions.

Some segments of the policy and research community have already recognized that human behavior will be critical in the fight against climate change. DEFRA’s *Framework for Pro-Environmental Behaviours* is one example, while its *Act on CO₂* campaign aims to inform and encourage low carbon choices by consumers.^{liii} In the United States, the House Committee on Science and Technology recently passed legislation to establish a social and behavioral program at the Department of Energy, while a recent report by the U.S. National Academy of Sciences points to the urgent need for behavioral research to understand (for example) the reasons why existing energy-efficiency measures are not always adopted by consumers, even when it would be economically sensible for them to do so.^{liv}

Behavioral research as its own narrowly focused niche will not be sufficient. Addressing human behavior and climate change requires interdisciplinary and integrated approaches that draw on diverse disciplines, including psychology, behavioral economics, environmental sciences and geography, sociology, and politics. In some cases, an economic approach to change may be the most effective option, at least in the short term, while longer term and deeper shifts are likely to be achieved through changes in values, lifestyles, and our cultures of consumption, on a far wider and systematic scale. To successfully address climate change, we must use every tool that we have, drawing on expertise from all relevant disciplines.

SIDEBAR

Perceived barriers to engagement with climate change

Many individual and societal barriers limit engagement with climate change. In an interesting study, led by Irene Lorenzoni at the University of East Anglia, researchers reviewed findings from a variety of UK data sources (including focus groups, surveys, and semi-structured interviews) to identify some of the main barriers people perceive to engaging with climate change. While not exhaustive, the constraints identified are useful in providing a preliminary outline of some of the key factors that interventions should target.

Table 1. Individual Barriers to Engaging with Climate Change

Individual Barriers	Description
Lack of knowledge	Confusion; lack of experience, understanding, and awareness; and lack of information contributed to overall lack of knowledge about the causes, consequences, and potential solutions to climate change.
Uncertainty and skepticism	Some participants perceived scientific controversy around climate change and expressed uncertainty and skepticism about the causes of climate change, as well as the seriousness, necessity, and effectiveness of actions at both individual and international level.
Distrust in information sources	Some participants distrust information received about climate change from sources such as the media. They have the idea

	that climate change is exaggerated and sensationalized and that information received is biased and subject to contradictory framings.
Externalization of responsibility and blame	In particular, government and industry are thought to be responsible for taking the lead in tackling climate change.
Belief in technology	Some participants expressed the idea that technology will solve the problem of climate change.
Belief that climate change is a distant threat	A prevalent idea is that climate change is a distant threat, both in space, in that it affects other countries and people, and in time, in that it is a nearly unimaginable, future problem.
Low prioritization of climate change	Some participants argued that there are more important immediate priorities, including family and finances.
Reluctance to change lifestyles	Many expressed concern that being more sustainable will threaten their standard of living, be inconvenient, and cost more.
Fatalism	Some argued that it is too late to do anything about climate change, and thus it is a waste of time to try and mitigate climate change.

<p>“Drop in the ocean” feeling</p>	<p>The scale of the problem leads some to feel individually helpless.</p>
<p>Social Barriers</p>	
<p>Lack of political action</p>	<p>Lack of action taken by local, national, and international governments has created a distrust of governments to take responsibility or meaningful, successful action against climate change.</p>
<p>Lack of action by business and industry</p>	<p>Many participants perceive that business and industry do not, and will not, act sustainably but will act only in the interest of profit (“Fat Cat syndrome”).</p>
<p>Free-rider effect</p>	<p>Individuals may refrain from taking an interest in, or acting on, climate change because they perceive that other people are not acting, or because they perceive that other countries are not acting.</p>
<p>Social norms and expectations</p>	<p>Current social norms include an expectation to consume. Green living is generally seen as undesirable or “weird” or “hippy.”</p>
<p>Lack of enabling initiatives</p>	<p>Existing infrastructure and economy locks people into current behavioral patterns. More sustainable facilities are costly,</p>

inconvenient, sparse, or not viable.

Source Reference: I. Lorenzoni, S. Nicholson-Cole, and L. Whitmarsh, “Barriers Perceived to Engaging with Climate Change among the UK Public and Their Policy Implications,” *Global Environmental Change* 17, nos. 34 (2007): 445–59.

ⁱ Committee on Climate Change, *Building a Low-Carbon Economy—The UK’s Contribution to Tackling Climate Change* (London: The Stationery Office, 2008).

ⁱⁱ Office of Management and Budget (OMB), *A New Era of Responsibility: Renewing America’s Promise* (Washington, DC: OMB, 2009), 100.

ⁱⁱⁱ K. Richardson et al., *Synthesis Report: Climate Change—Global Risks, Challenges & Decisions, Copenhagen 2009* (Copenhagen, Denmark: University of Copenhagen, 2009), http://en.cop15.dk/files/pdf/iaru_synthesis_report_2009.pdf (accessed 23 July 2009).

^{iv} Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Core Writing Team, R. K. Pachauri, and A. Reisinger, eds. (Geneva, Switzerland: IPCC, 2007); and N. Stern, *The Economics of Climate Change: The Stern Review* (UK: Cambridge University Press, 2007).

^v Some of the following simplifying assumptions may be familiar: providing education and information about risks is sufficient to promote less risky actions; given suitable market conditions people will act as rational economic agents; increasing wealth and consumption is the inevitable route to wellbeing and happiness; money that people personally save through participating in energy efficiency and conservation programs will automatically be invested in alternative, environmentally friendly activities.

^{vi} UK Energy Research Centre (UKERC), *Making the Transition to a Secure and Low-carbon Energy System: UKERC Energy 2050 Project* (UKERC, 2009).

^{vii} R. Gifford, “Psychology’s Essential Role in Alleviating the Impacts of Climate Change,” *Canadian Psychology* 49, no. 4 (2008): 273–80.

^{viii} J. Swim et al., *A Report by the American Psychological Association’s Task Force on the Interface Between Psychology and Global Climate Change* (Washington, DC: American Psychological Association, 2009); and National Research Council, *Human Dimensions of Global Environmental Change: Research Pathways for the Next Decade* (Washington DC: National Academies Press, 1999).

^{ix} B. Fischhoff, Psychology and Public Policy: Tool or Toolmaker? *American Psychologist*, 45, no. 5 (1990): 647-653.

^{ix} Fifty-six percent of the global public suggest that climate change is a very serious issue. In A. A. Leiserowitz, R. W. Kates, and T. M. Parris, “Do Global Attitudes and Behaviours Support Sustainable Development?” *Environment* 47, no. 9 (2005): 20–38.

^x Data from Environics International (Globe Scan), Environics International Environmental Monitor Survey Dataset (Kingston, Canada: Environics International, 2000); and Eurobarometer, *Energy Technologies: Knowledge, Perception, Measures (EUR 22396)* (Europe: European Commission, 2007). Eurobarometer asked the open-ended question, “What are the most important issues facing (OUR COUNTRY) today?” Across 25 EU countries, top answers provided were unemployment (64 percent) and crime (36 percent). Protecting the environment (possibly encompassing climate change) was only chosen by 12 percent respondents.

^{xi} MORI found that 56 percent of a UK sample agreed with the statement that, “Many leading experts still question if human activity is contributing to climate change.” Also, 18 percent of the same sample agreed with the statement that, “Human activity does not have a significant effect on the climate.” MORI, *Climate Change Questionnaire* (UK: Ipsos MORI, 2007); see also A. Leiserowitz, “American Risk Perceptions: Is Climate Change Dangerous?” *Risk Analysis* 25, no. 6 (2005): 1433–42.

Gallup uses this question, “Thinking about what is said in the news, in your view is the seriousness of global warming generally exaggerated, generally correct, or is it generally underestimated?” In the 2009 poll the percentages of U.S. citizens giving these three responses were 41, 29, and 28 percent respectively, while 2 percent have no opinion. In Gallup, *2009 Gallup Environment Survey* (US: Gallup, 2009).

Eurobarometer uses this question, “The seriousness of climate change has been

exaggerated? – agree, disagree, don't know.” In the 2008 survey the percentages of European citizens giving these three responses were 26, 65, and 9 percent respectively. In Eurobarometer, *Europeans' Attitudes towards Climate Change, Special Eurobarometer 300* (Europe: European Commission, 2008). Note that the term “global warming” is commonly used within the United States while the more inclusive term climate change is more commonly used within Europe.

^{xii} R. E. Dunlap and A. M. McCright, A Widening Gap: Republican and Democratic Views on Climate Change, *Environment* 50, 26–35; and Eurobarometer, *ibid.*

^{xiii} A. Carvalho and J. Burgess, “Cultural Circuits of Climate Change in UK Broadsheet Newspapers, 1985–2003,” *Risk Analysis* 25, no. 6 (2005): 1457–69.

^{xiv} J. Kitzinger, “Framing and Frame Analysis,” in E. Devereux, ed., *Media Studies: Key Issues and Debates* (London: Sage, 2007), 134–61.

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