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Net Zero after Covid: Behavioural Principles for Building Back Better

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Acknowledgements

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Executive Summary

The Covid-19 pandemic has led to large and highly disruptive changes for individuals, businesses and governments. This paper, prepared to accompany the CCC's Sixth Carbon Budget Advice, considers three behavioural principles that explain how people have adapted so rapidly, and how we might "build back better" as we emerge from the pandemic, with a particular focus on meeting the challenge of dramatically reducing greenhouse gas (GHG) emissions over the coming decades. The principles are:

- **The power law of practice**: People, organizations and whole industries learn to adapt to new ways of working following a surprisingly predictable pattern. This can help predict where adaptation to new ways of living and working is likely to succeed or fail.

- **The status quo effect**: People and organizations tend to prefer the current status quo, but can often adjust rapidly to prefer a new status quo. But we tend to systematically underestimate such effects, and therefore can sometimes resist changes that, in retrospect, we may ultimately prefer.

- **Unwritten rules:** Our social behaviour is guided by implicit guidelines about what is "appropriate," which can be somewhat independent of our personal values. Changing these implicit rules, alongside changes in regulation and the law, is crucial to adapting to new circumstances – and the pandemic has shown that rapid change is possible, though sometimes resisted (e.g. new norms about mask wearing, and social distancing).

These principles of behaviour explain sources of "friction" in moving from one pattern of living and working to another. But if those frictions can be overcome, these principles also indicate that people and organizations can often adapt surprisingly quickly. In the light of the enforced changes in response to Covid-19, there may be significant opportunities to lock in, and build on, positive developments, especially, though not exclusively, regarding levels of demand for transport. Moreover, actively promoting these, and further positive shifts, provides an opportunity to contribute to meeting climate objectives, such as the U.K.'s commitment to Net Zero GHG emissions by 2050. These changes, while beneficial for society, will happen more slowly, if at all, without a clear policy framework and financial support. Policy recommendations include:

- Consolidating the digital transformation and shift to flexible working, including prioritizing fast broadband, and measures to bridge the "digital divide".

- Government and business "leading by example" on digital-by-default meetings where appropriate.

- Enhancing town and city infrastructure and regulation, for walking and cycling, e-bikes and e-scooters, while introducing low/zero emissions zones.

- Active measures may be required to encourage people back on to public transport, where there has been a shift to car travel.

- Tracking levels of use, efficiency, and liking for, new patterns of living and working, to help guide future policy, and reduce negative impacts.

- Developing a shared and positive vision of the opportunities and benefits of a Net Zero 2050 future through public engagement and debate.

Covid-19, and the lockdowns and other restrictions imposed by governments around the world in response to the virus, has required a huge amount of behaviour change. Individuals, businesses and government have, despite great hardship and disruption, responded remarkably rapidly; and unprecedented and disruptive measures have often received high levels of public support, although such support has been neither unanimous nor unqualified.

The process of returning to a "new normal" is likely to be both highly unpredictable and protracted. A crucial question for society is what "new normal" we wish to, and practically can, return to. In the light of the U.K.'s commitment to Net Zero by 2050, and the need for similar targets across the world to prevent severe and irreversible climate change, it is imperative that recovery from the crisis is compatible with the reduction of GHG emissions. This report, prepared to complement the publication of the CCC's Sixth Carbon Budget Advice, outlines the implications of three behavioural principles that may help guide us to building back better, each of which has implications across a wide range of policy areas. In each case, the principles both help explain why there is "friction" which may block changes to potentially advantageous ways of living and working; but also suggest that this friction can be overcome.

The principles focus on three fundamental aspects of our individual and collective ability to change our behaviour in the light of changing circumstances: how we can change our *capabilities*, *preferences*, and the implicit *social contract* between individuals, organizations and governments. Understanding these principles will help inform the immediate process of recovery from the crisis caused by the pandemic, but is also relevant to the longer-term challenge of meeting the UK's Net Zero commitment.

Reaching Net Zero will require significant behaviour change. Yet core psychological principles, and the experience of Covid-19, indicate that we can be surprisingly adaptable.

In each case, the principles suggest that we are often (although not always) far more adaptable than we think[1] – that even quite radical changes in our ways of living and working can turn out to be practically feasible, appealing, and can command popular support.

It is equally clear, though, that the abrupt social and economic shock of lock-down has also created enormous disruption and damage to many aspects of our lives – we will also consider how, from a behavioural point of view, such difficulties can be minimized for the more gradual, but equally radical, changes required to reach Net Zero.

In this brief paper, we will consider capabilities, preferences, and the social contract in turn, the relevant behavioural principle for each, and potential implications for building back better and helping reach Net Zero emissions.

1. Changing capabilities

The "power law of practice" governs learning to live and work differently

The lockdown and later restrictions have forced individuals and organizations to adopt new ways of living and working. Many of these enforced changes will be unwelcome, although some may not. In any case, the rate of which many people and organizations have learned to adapt has been striking.
The rate at which new skills, methods of work, or activities of all kinds are acquired, whether for individuals, organizations, or entire industries, is governed by a surprisingly stable rule: the "power law of practice".[2] The rule relates how many times a new task is performed with measures of how well it is done: if a task is performed, say, twice as many times, there will be a *fixed percentage* decrease in how long it takes, how much it costs to do, and related measures.

For individuals, organizations, and entire industries, repeated activities often become faster and cheaper in highly predictable ways. So, while initially slow and expensive, new behaviours and technologies, can soon become faster and cheaper than what went before.

As we all know from everyday experience, when we start doing anything new, we are slow and ineffective. The power law of practice tells us that the rate at which we learn has a specific, predictable, shape. Roughly, we first learn rapidly; our improvements become slower as we practice the task more and more; and these improvements continue over long periods, often in highly predictable ways. The specific form of the power law turns out to be a straight line, when we plot number of repetitions against whatever measure we are interested on a log-log graph (implying, for example, that if we have done something twice as often, we will be, say, 25% quicker; and if we keep practicing for twice as long again, we will be another 25% quicker, and so on).[3]

Figure 1 shows some typical examples, ranging from how people learn a new skill (tracing in a mirror) in a lab study, how individual workers in Cuban cigar factories roll cigars more quickly with practice, to the falling cost of cars, batteries or photovoltaic power.

Figure 1 The power law of practice, for individuals and industries

(a) Tracing shapes in a mirror gets faster with practice (Snoddy, 1926)
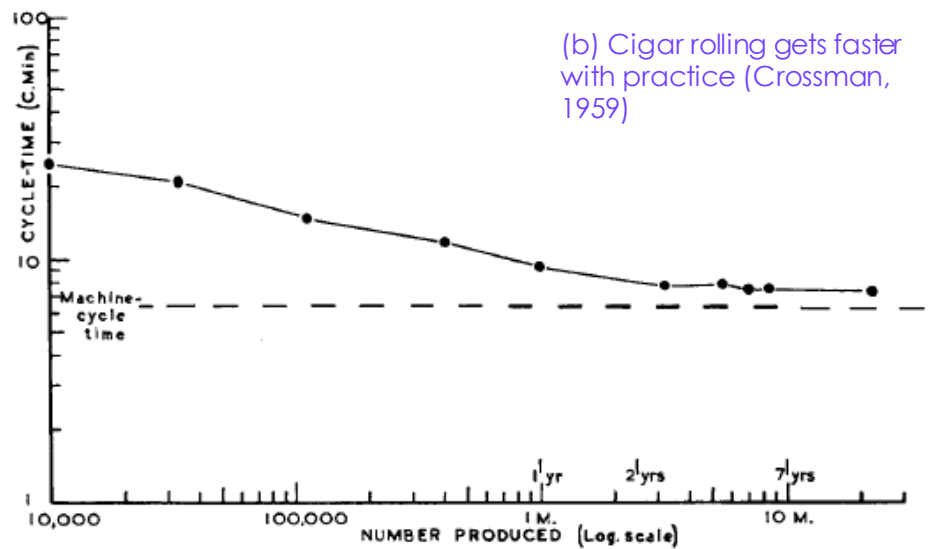

(b) Cigar rolling gets faster with practice (Crossman, 1959)
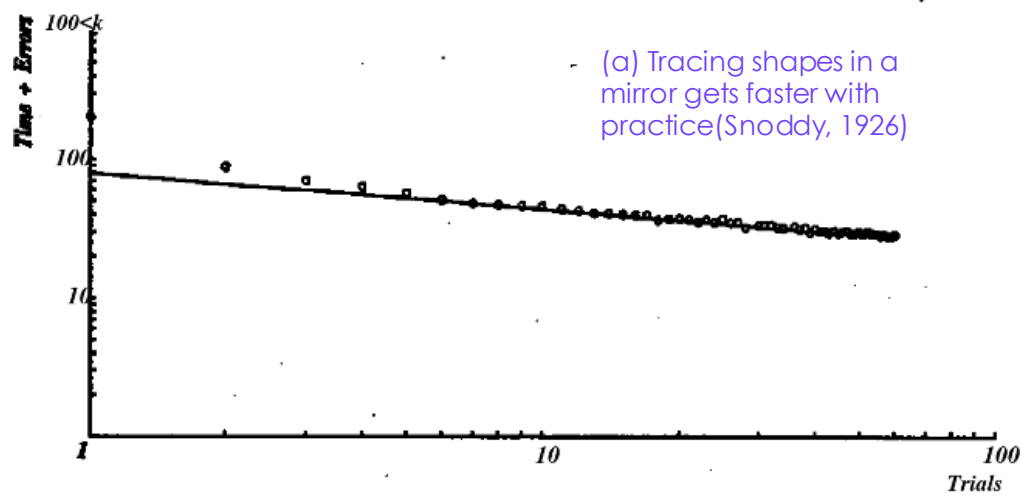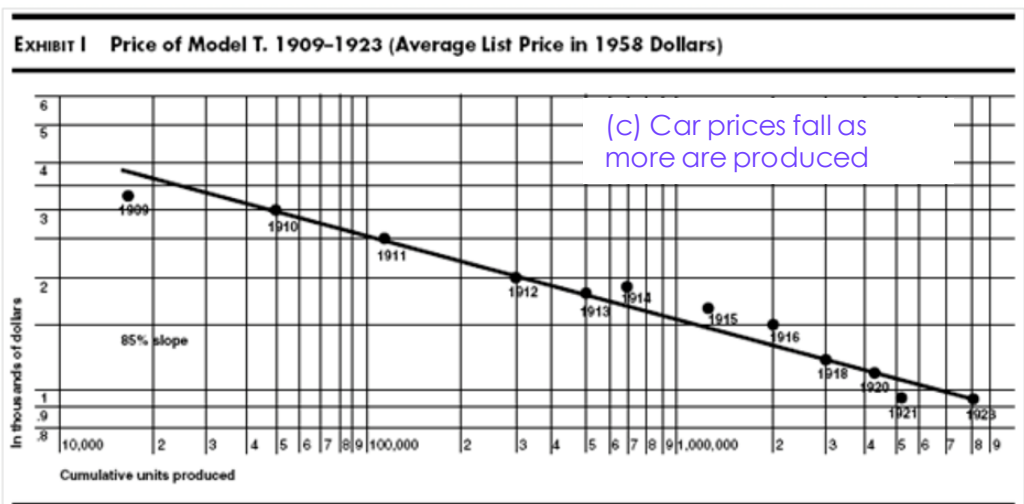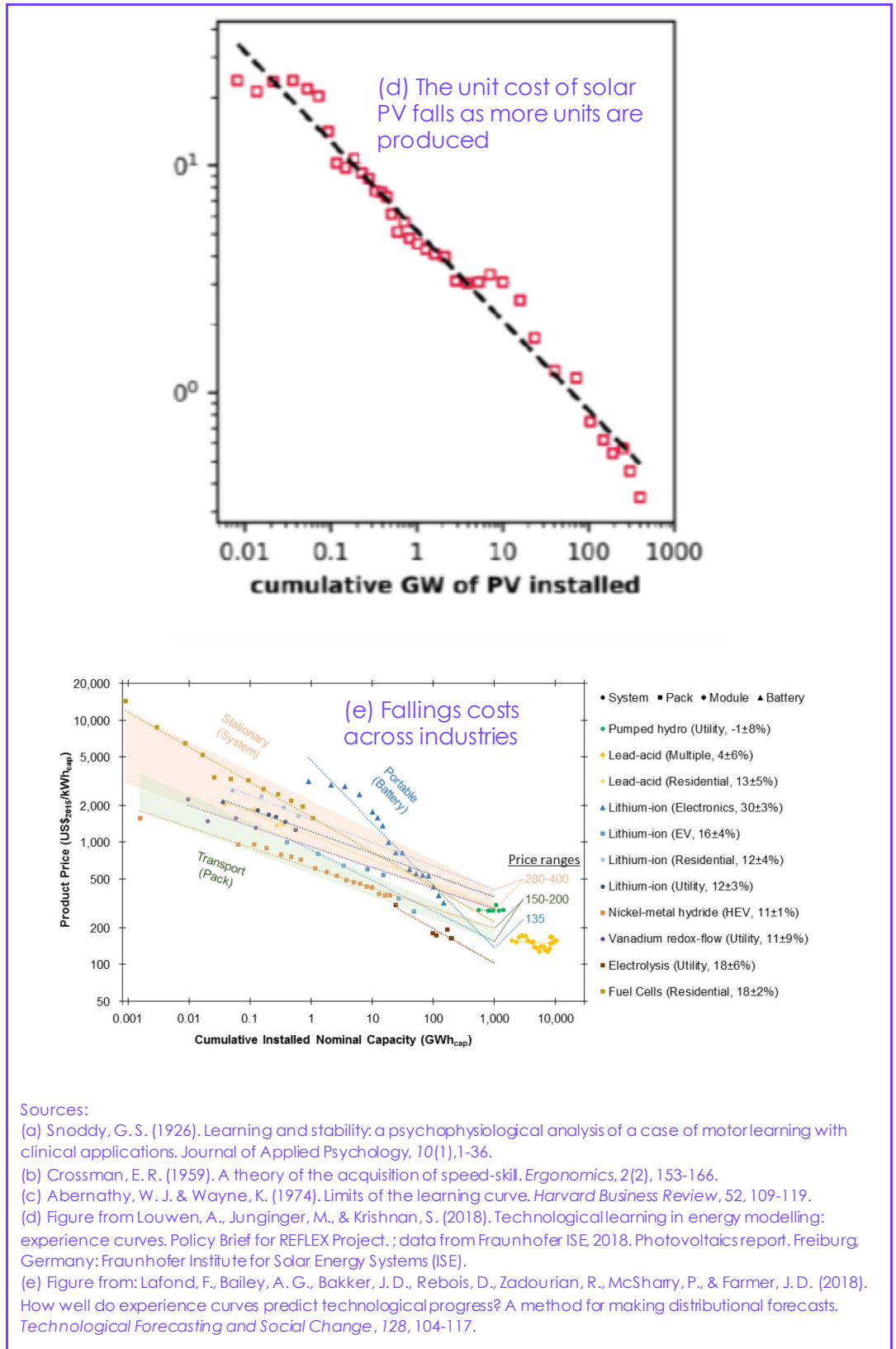
Figure 2. Practice and speed in cigar-making. Each point is the average cycle-time over one week's production for one operator. The ordinate is the total production by the operator since beginning work.

Exhibit I Price of Model T. 1909–1923 (Average List Price in 1958 Dollars)

(c) Car prices fall as more are produced

Source: https://hbr.org/1974/09/limits-of-the-learning-curve

(d) The unit cost of solar PV falls as more units are produced

(e) Fallings costs across industries

Sources:
(a) Snoddy, G. S. (1926). Learning and stability: a psychophysiological analysis of a case of motor learning with clinical applications. Journal of Applied Psychology, *10*(1),1-36.
(b) Crossman, E. R. (1959). A theory of the acquisition of speed-skill. *Ergonomics*, *2*(2), 153-166.
(c) Abernathy, W. J. & Wayne, K. (1974). Limits of the learning curve. *Harvard Business Review*, 52, 109-119.
(d) Figure from Louwen, A., Junginger, M., & Krishnan, S. (2018). Technological learning in energy modelling: experience curves. Policy Brief for REFLEX Project. ; data from Fraunhofer ISE, 2018. Photovoltaics report. Freiburg, Germany: Fraunhofer Institute for Solar Energy Systems (ISE).
(e) Figure from: Lafond, F., Bailey, A. G., Bakker, J. D., Rebois, D., Zadourian, R., McSharry, P., & Farmer, J. D. (2018). How well do experience curves predict technological progress? A method for making distributional forecasts. *Technological Forecasting and Social Change*, *128*, 104-117.

One implication of the power law is that individuals, businesses and governments focused on the short-term are likely often to be unwilling to switch to "better" ways of working – the initial costs of switching will appear daunting, creating a friction which will impede change. A second implication is that the "up front" cost might, nonetheless, be worth it in the longer term, as the benefits of practice start to bite. And, of course, it is often hard to estimate how quickly we will learn to do things differently – though the power law tells us that early indications on a learning rate can be quite predictive of how that learning rate will continue in the future.

This phenomenon is well-known in the technology sector and applies to technologies directly related to low-carbon (e.g. learning curves for wind, solar, batteries).[4] But the same is likely to be true of changes in the efficiency of new behaviours of all kinds: using videoconferencing, increasingly "digital" workflows; internet shopping; shifting travel patterns (e.g. increased cycling). Initial "start-up" costs will make transitions difficult, but once established, some may rapidly become more efficient than previous approaches (e.g. for cycling, initial costs may involve buying a bike, helmet, lights, locks etc, learning safe and rapid cycling routes, finding where a bike can safely be stored, and so on). As usual, effort is initially very great; fairly quickly reduces; and then reduces further but more slowly, through occasional innovation or gradual fine-tuning (a better bike, finding more optimal cycle routes, getting fitter, etc.). Sometimes, moreover, anticipated "hard-limits" to improved performance can turn out to be illusory – for example, the cost and speed of computer power has declined rapidly over many decades.

In normal circumstances, before switching to a new behaviour or technology the crucial question is whether the new approach will ultimately prove superior to the old. In terms of the power law of practice, the question is whether the "slope" of the power law of practice is steep or shallow; and, moreover, there may be "hard" limits beyond which performance cannot improve (e.g. human cycling speed). In the pandemic, though, new behaviours have been adopted by necessity. It is therefore important to monitor how rapidly performance is improving in different areas where behaviour has been forcibly shifted, and how rapidly that new behaviour or technology is being adopted; this will give an indication of the likely rate of future improvements, and hence which new "ways of working and living" will prove more efficient, once suitably "practiced", to be more efficient than business as usual.

The longer the restrictions on behaviour continue, of course, the more likely some new behaviours will become embedded – thus leading to permanent behavioural changes. Many examples come from the astonishingly rapid "shift-to-digital:" working from homes not offices; videoconferencing rather than face-to-face meetings; phone- or video-based medical consultations; the rise in internet shopping; increases in streaming various forms of entertainment, as cinema and live events become difficult; using internet banking and electronic payments, when branch banking becomes difficult and cash a perceived infection risk.[5] Early indications suggest that some of these changes, especially those that are accelerations of existing trends, are likely to leave permanent impacts. Many major companies have indicated they expect to return to a flexible home-office working, rather than the office as the default, and many office workers are similarly keen to have more flexibility.[6] Similarly, the medical profession is embracing remote consultations as part of future working; and food and other delivery companies have been investing heavily, in the expectation of an irreversible shift.

The power law of practice suggests, of course, that these shifts will become increasingly easy for individuals. After several months of enforced internet shopping, we find our preferred shop, get used to the website, build up a list of favourites, and so on, which makes future internet shopping increasingly painless – and, for many people, easier than high street shopping. And now that protocols, infrastructure and IT for homeworking, telemedicine, meetings by video, etc are increasingly well-established and effective, they may increasingly become the first choice for many individuals and organizations.

To build back better, we need to understand the impact of these changes on greenhouse gas emissions. What would be the emissions implications of a shift to home-working, reduced high street activity, and perhaps a flight from cities? How rapidly will people re-adopt public transport, or will they maintain new travel

habits? The CCC's Sixth Carbon Budget Advice outlines a variety of plausible scenarios concerning these and other societal changes. What occurs in practice will, of course, depend in part on government policy. For example, government can encourage and incentivise people to work from home or work flexibly where possible, or push for a full-scale return to the office, as the risks from Covid diminish.

Regarding local travel, many cities across the world, including Paris, New York and London, have closed roads and put in additional cycle lanes. The power law of practice would suggest that the longer these measures stay in place, the more efficiently they will be used, and the more demand there will be for them to be retained. For longer journeys, provision and support for e-bikes may be important; e-scooters may have a role, if safety concerns can be met; and so on. Locking in, and building upon, changes that have proved successful during lock-down and beyond, should be an immediate policy objective.[7]

The power law of practice also provides a reminder of a general lesson: that changes to ways of operating which are initially slow, costly and inefficient may become highly effective over time. This is an important motivation, in the context of Net Zero, for enhanced short- and medium-term government policy support where opportunities to move to better ways of living and working that may be socially and economically highly cost-effective in the long term. Government support for wind and solar power, subsidies of electric vehicles, have played this role. In the light of the short-term focus of firms and individuals, and the importance of collective switching to reap the benefits of "practice," supporting such projects through regulation, providing infrastructure, and potentially initial subsidy, may reap substantial long-term dividends.

Government policy can play a crucial role in shaping which new behaviours become established.

The power law also helps understand why very rapid change, such as that caused by the Covid response, is especially disruptive and problematic: many patterns of work and behaviour are simultaneously switched within days to initially slower and less effective methods, providing a huge economic and psychological "shock." Gradual, planned, transitions over periods of years, and indeed, decades, will, of course, be much less disruptive, and it is important that the pace of change is manageable. But the main lesson of Covid is that adaptation can occur surprisingly quickly – and much more quickly than we typically anticipate.

2. The status quo effect

How we prefer what we become used to

Our first behavioural principle concerned the predictable rate at which we learn individually and collectively learn new behaviours. We now turn to the observation that people often also adapt by coming to like those new behaviours, or in some case, to dislike them far less than we anticipate – a tendency that I will call the status quo effect (although the effect has a number of different causes).[8] When that status quo is altered, we may find ourselves coming to like new ways of living and working. We adapt, usually much more than we anticipate, to the new status quo. Thus, our liking for the status quo is a second source of friction that can impede change; but the principles also suggests that, once change has occurred, it may come to be preferred. Nonetheless, as we shall point out, adaptation to a new status has its limits, and these limits have important practical implications.

We tend to prefer whatever we see as the status quo. This makes us resist change – but we make often come to like it, once it has occurred.

The status quo effect has been shown in numerous lab experiments. For example, when given one of two possible objects (e.g. a mug or a chocolate bar), people tend to prefer to "stick" with what they are originally given rather than swap to the other object.[9] With respect to public goods, such as trees, status quo effects are substantial: if the status quo is that a park will be planted with dense trees, people require considerable compensation to accept sparser planting; if sparser planting is the status quo, they will pay much less for denser planting (in one study, an astonishing 75 times less).[10]

The psychological factors causing status quo effects are many. One aspect is "mere exposure," that people "get to like" abstract patterns, music, art, and even non-sense words the more frequently they encounter them.[11] Another factor is that people tend to assess their current life in comparison with their own (especially, recent) past and the lives of others around them. Hence, when there is a general change that affects the person over the long term and/or affects people around them also, this tends to have an unexpectedly small impact (so that even large changes in life, such as lottery wins, promotions, or serious disability, affect people's self-reported well-being less than would be expected)[12]. Still another factor, observed in experiments, is that people have a tendency to think that, on balance, the world is currently "as it should be", and that change away from the status quo is likely to be bad.[13,14]

Our preferences can shift to a new status quo, once it is clear that it is coming. So, for example, clear targets for the shift to electric vehicles is likely to make electric vehicles more attractive.

When thinking about the future, the status quo is determined by our expectations of what the future will look like, not simply the current state of affairs – and our reaction to that expected future functions as the "status quo" against which we judge how the future turns out.[15] So, for example, whether people are disappointed or delighted with a promotion or pay-rise depends on whether this is less, or more, than they expected. Moreover, we begin to shape our behaviour today based on the future status quo we anticipate. Thus, anticipating a future shift to electric vehicles, heat pumps, or more heavily plant-based diets, will tend to encourage individual people's present behaviour to shift in the direction of this anticipated "new normal." The same is true, of course, for companies and organizations of all kinds – indeed, often more so because the viability of current investments may depend on the long-term.

Net Zero after Covid: Behavioural Principles for Building Back Better

The Covid pandemic has, of course, created huge changes to our individual and collective status quo, many of these extremely disruptive and unwelcome. Nonetheless, it is likely that some changes will be ones that we can and will get to like; and the longer the pandemic lasts, the more established the new status quo is likely to be, and hence the less we may wish to return to prior patterns of working and living.

Some of these changes have significant implications for GHG emissions, both positive and negative:

- Flexible/remote working. Where full-time attendance in the office is the norm, workers and their managers can feel this is the only, or at least the best, way for work to be carried out. Many organizations and individuals have found that remote, or flexible, working has advantages that they wish to retain (although, for others, there is a strong desire to return to the office).

- For organizations, the status quo effect is amplified by the desire to exploit existing resources (having built or rented an office, there is an apparent imperative to use it); such effects will diminish as a new status quo takes hold.

- The status quo effect implies that companies and individuals will be able to adapt, to some extent at least, to significantly reduced commuting and business travel. Many sales people and executives have spent a great deal of their entire working lives "on the move," travelling between offices, factories, without their own and other organizations. But once they, and their organisations, have adapted to a new status quo with less or no travel, many will be very reluctant to add what may be hours of stressful travel to their working day. (Indeed, long-term commuting is, interestingly, consistently associated with lower self-reported well-being – we don't fully adapt to its negative impacts[16]).

- Increasing walking and cycling for leisure and work travel, and the appropriate adaptation of transport infrastructure, is likely to lead to a strong status quo effect. In a city with no cycle lines, residents may be sceptical of cycle lanes or pedestrianisation, for example because they might impede road traffic; in a city with many cycle lanes or many pedestrian areas, residents may, though, not wish to remove these, and allow more cars.

- Conversely, though, dramatically less use of public transport during the pandemic may be difficult to reverse, even when health issues are no longer relevant. One possibility is that, perhaps especially for longer journeys, people will shift towards cars.

- We should expect, other things being equal, that people will increasingly prefer internet shopping, digital banking, streaming and so on. These are trends that were already in evidence before the pandemic, but which have now accelerated rapidly. People will, on average, be more likely to enjoy internet supermarket shopping, and feel averse to going to the shops themselves, the more they experience it, purely due to its increased familiarity.

- There may also be aspects of life (e.g. quiet streets, clearer and cleaner air) that people value a great deal when they (perhaps briefly) experience them, as in the early part of the UK's lockdown. Some of these may have vanished before a new status quo could become established.

What lessons can be drawn for the much longer-term changes in behaviour, technology and society required for achieving Net Zero? One implication that it is important to maintain, and ideally "lock in" benign aspects of the new status quo – for example encouraging the maintenance of flexible working and less business travel, and strengthening and extending temporary shifts in favour in cycling and walking where appropriate. In the medium term, urgent priorities must include enhancing broadband across the entire United Kingdom, and addressing the "digital divide," whose impacts have been exacerbated during lock down and other restrictions.[17] Conversely, encouraging people to re-engage in large numbers with public transport, when safe to do so, may require cheaper fares, special offers and publicity campaigns.

The speed which a new status quo can become established, as evident in response to Covid-19, is encouraging for the prospects for far less urgent public acceptance of new technologies, such as electric vehicles and heat pumps, or a switch from natural gas to hydrogen. Our bias towards the status quo works against new technologies or ways of working in the early stages; but can change quickly in their favour once they gain ground. For example, while early consumer sentiment was against electric vehicles, sentiment, and take-up, appears to be changing rapidly.[18] The more rapidly electric vehicles become normal, or even dominant, among new car sales, the more quickly the status quo effect will tilt in their favour. For this reason, the recent government commitment to phase out cars powered by internal combustion engines by 2030, announced in the Prime Minister's "10 Point Plan," will be likely to have an immediate positive impact on consumer preferences for electric vehicles.

Similarly, public sentiment towards changing diets is likely to show a similar pattern. We tend to feel very committed to our current "status quo" diet – and, indeed, some surveys indicate that many people are unenthusiastic about anything more than a modest shift away from meat and dairy consumption over the coming decades.[19] In reality, though, dietary norms in the UK and elsewhere have changed very rapidly in the past few decades, for example shifting away from a traditional 'meat-and-two-veg' to a huge range of ready-meals, fast foods, and dishes from cuisines across the world.[20] Given that our dietary status quo is continually in flux, the possibility of very significant positive dietary change, from the point of view of both health and the environment, is entirely possible in the near future. In the CCC's Sixth Carbon Budget Advice, possible reductions in red and meat and dairy consumption range from 20-50% by 2050. Indeed, it is possible that even larger reductions may be realistic. In diet, as in many other areas, very large behavioural changes may be possible which may both contribute to reducing GHG emissions and improving human welfare.

Both the status quo effect, and the power law of practice, imply that for both individuals and businesses, setting clear pathways to Net Zero (such as those set out in the CCC's Sixth Carbon Budget Advice) as early as possible will be important for a rapid and smooth behavioural transition.

3. Human social behaviour

Our behaviour is guided by unwritten rules, which are continually being rewritten

We have so far focussed on individuals: how radical change forces us both to learn new skills, but also can cause us to change our preferences. But much of our behaviour is, of course, shaped by our interactions with other people, and our sense of the unwritten rules which determine which behaviours are acceptable and which are not. Social rules provide another potential source of friction which inhibits positive change. But, as with the power law of practice, and the status quo effect, unwritten rules can also help explain how change can become embedded: while we often implicitly feel these rules to be immutable, the unwritten rules can be subject to rapid "renegotiation" when circumstances demand. Indeed, Covid-19 has changed many of the rules by which we live. Handshakes and hugs have largely disappeared; wearing face masks in public has shifted from being bizarre to being normal, or indeed required; hand-sanitizer and expectations of hand-washing have increased rapidly. The implicit expectation that business meetings require in-person attendance has been replaced by the new etiquette of video meetings, with rules for muting the microphone, "raising one's hand" to speak, and the now ubiquitous use of the "chat function."

Humans are, from early childhood, continually searching for, and enforcing, social norms. Norms will often be more important than individual choices for determining our collective GHG emissions.

This tendency to find, and follow, social rules begins early in life. If two-year-old children learn on their own how to perform a simple task, then they will later adapt their behaviour to follow other people when they see others using a different strategy. By contrast, chimps and orangutans don't worry about "conforming" but stick to their current strategy.[21] Moreover, young children protest if others don't follow a rule, however arbitrary, with cries of "you have to do it like this!".[22] Human behaviour, throughout life, is strongly guided by observing, generalizing and often imposing on others, often unwritten rules concern the "way we do things round here." Indeed, learning to be part of a family, organization or society is partly a matter of picking up, and learning to follow, these hidden rules, so that we "fit in" with other's expectations.

Social norms can be remarkably flexible. Mask wearing has rapidly shifted from socially peculiar to, in many circumstances at least, socially obligatory.

This type of thinking – about discovering, following, and enforcing the conventions and norms we live by – is crucially very different from simply trying to "do what we prefer" or "achieve our goals." Indeed, the pressure to follow the social rules, once established, can operate independently of any external objective. Rules of politeness, etiquette, dress codes, pronunciation and the like are largely arbitrary – but nonetheless are powerful forces guiding human behaviour. The rules we collectively adopt can be seen as a network of implicit "social contracts." Yet such implicit contracts are always up for renegotiation. Indeed, as we've noted, the pandemic has taught us that "appropriate" behaviour can change surprisingly rapidly. With the appropriate motivation, and common consent, the social contract can be significantly rewritten.[23]

In social science, the way we reason about norms and rules has been called "the logic of appropriateness": how we figure out what is socially acceptable behaviour, from observing what other people do, and what they praise and condemn.[24] Buying an electric car, a heat pump, or changing one's diet may be slowed by the sense that "this is not what people like us do."

But when it becomes clear that these changes are becoming, or will soon become, the norm, our sense of what is socially appropriate, and hence what we are "supposed" to do, may "flip" quite rapidly. This change in norms is especially rapid when people's choices are public.

We can see the increasing numbers of the electric vehicles on the road; but any increases in heat pump uptake, hydrogen boilers, or home energy efficiency measures will be less visible. Given that both road transport and home heating need rapidly to move away from fossil fuels in the 10-15 years, highlighting that these transitions to the general public may be important in establishing these options as socially desirable. Such social desirability will be crucial for increasing the demand for low-carbon options, as well as increasing public enthusiasm for phasing out current high-carbon products such as internal combustion engines and gas boilers.

Many of the rules that govern our lives are rather loosely specified; this is where the *logic* of appropriateness is so crucial. People need to reason about what is the appropriate thing to do when rules are vague, when they can be extended to new cases, what to do when rules clash with each other, and so on. So, for example, norms of keeping to the pavement will clash with norms concerning social distancing; our typical norm to help a frail or partially-sighted person across the road may clash with social distancing rules. There is often no clear "right" answer to such questions. But, from a practical point of view, we are generally attempting to adopt the same standards as the people around us.[25] Mere statements of intent are not, of course, sufficient – governments and companies may publicly declare commitments, but employees may be sceptical that the social contract they will be held to has really changed (e.g. will they really be praised if adopting more expensive low-carbon option?). Employees are trying to work out the "unwritten" rules of the organization – "what 'we' are really supposed to do, whatever the bosses say".

Indeed, whether the "official" rules about how we should behave are fully adopted by the public is crucial to how well those rules will be followed. Rules that don't have sufficient public support may widely be flouted. Indeed, drink-driving rules were widely ignored in the UK until the advent of concerted public information campaigns changed attitudes.[26] Prior to such campaigns, the "hidden rule" for some was that modest levels of drink-driving was acceptable; and that criticising, or even reporting, a person for such behaviour was itself reprehensible. Often, particularly where behaviours are highly visible to other people, legal restrictions are largely enforced and supported. For example, in the UK in the 1970s, compulsory seat-belts were strongly opposed by many prior to their introduction, but rapidly gained public acceptance and strong support.[27]

It is important, though, that citizens see new rules as having wide, even if not universal, support and adherence, and to have a clear rationale regarding the public good; and, equally crucially, that these rules are viewed as the outcome of a legitimate and informed decision-making process. Here, in addition to normal democratic politics and media debate, national and local Citizens' Assemblies may prove especially valuable in shifting our collective sense of what is appropriate behaviour (e.g. the recent national Climate Assembly). For example, it is possible that people will be much more willing to accept frequent flyer taxes[28] or phasing out natural gas boilers, if these are outcomes of the public's own deliberations, rather than appearing to be imposed directly by government.

What counts as appropriate behaviour depends, crucially, on our role and responsibilities. Managers of a business might, for example, believe that they are "supposed" to follow a hidden (or even explicit) rule to maximize profits on behalf of their shareholders, irrespective of social or ethical concerns,[29] including GHG impacts – and this might be true irrespective of their personal views about climate change.

Moreover, they might anticipate criticism from colleagues and shareholders if they were to change corporate policy to reduce GHG emissions. But corporate norms of appropriate behaviour have been changing at an unprecedented rate, probably driven both by public opinion, and by increasingly credible international and national agreements to reduce GHG emissions. Technology companies, supermarkets, asset managers, banks, among others, have made a variety of potentially highly significant pledges about lowering admissions, under pressure from external parties and, in some cases, their own employees.[30] Moreover, major oil companies, including BP, Shell, Equinor, and Total are now proposing to partly or wholly switch from fossil fuels to renewables. And this shift in view of what is appropriate behaviour for managers and companies will be critical to generating proactive policies and investment across the economy that will most rapidly deliver Net Zero.[31]

Similar issues about changing norms arise in shifting patterns of living and working. Managers may follow the unwritten rule that they are "supposed" to bring their teams, and themselves, back to the office; may implicitly favour workers who are more "visible;" and face-to-face meetings within an organization, or with external organizations, may be seen as a "signal" of genuine commitment by the relevant parties. Clearly face-to-face interactions will rightly remain important in many aspects of work; but it is important actively to challenge and replace such norms as "defaults", and to allow the high levels of flexible and remote working that are likely both to be beneficial for workers and companies, but which can contribute significantly to reduce unnecessary transport demand, with significant impacts on GHG emissions.

The legitimacy of, and public support for, measures underpinning the route to Net Zero will require renegotiating other aspects of the "social contract" – for example, phasing out internal combustion engine vehicles by 2030; expanding low emissions zones for vehicles in city centres; phasing out natural gas, and introducing heat pumps or hydrogen, on a large scale; requiring higher standards of building insulation; changing land-use practices; and so on. Public consultation and involvement in how to achieve Net Zero is likely to be crucial is ensuring public support for such changes. Citizens' Assemblies, at local and national level, provide an interesting model, and have so far been encouraging with respect to the quality of debate and outcomes. Moreover, the earlier such discussions can begin, and the early new norms are established, the more rapidly change will be possible.

Responses to Covid have, across the world, led to restrictions on people's lives that seemed politically inconceivable prior to the pandemic. Yet many restrictions have been supported; with public pressure for more severe measures, as well as countervailing pressure for relaxation. Changes to people's lives required to meet Net Zero, by contrast, are likely mainly be both gradual, impose few restrictions, and to have many other benefits. It is interesting to note, though, that the recent Citizen's Assembly proposal to limit air travel by imposing additional costs on frequent, long-haul flyers, may be an illustration of a public willingness to countenance further restrictions if perceived to be for the common good.[32]

4. A positive vision of the future

The three behavioural principles suggest that significant change is possible – and that we may adapt more rapidly than we expect.

All three of the behavioural principles outlined here – the power law of practice, status quo effects on our preferences, and our reliance on hidden social rules – point to the importance of collectively formulating a positive vision of a Net Zero future. This will help us to persist in practicing new, initially unfamiliar, ways of living and working; will begin to shape our tastes and expectations; and motivate us collectively to revise our hidden rules of behaviour in ways that will be required to make the transition. The impact of behavioural change can potentially have substantial impacts across many sectors. Table 1 illustrates three possible pathways for reaching Net Zero by 2050, set out in the CCC's Sixth Carbon Budget Advice.

Table 1
The importance of behavioural change and technological innovation in the path to Net Zero (adapted from CCC Sixth Carbon Budget Advice)
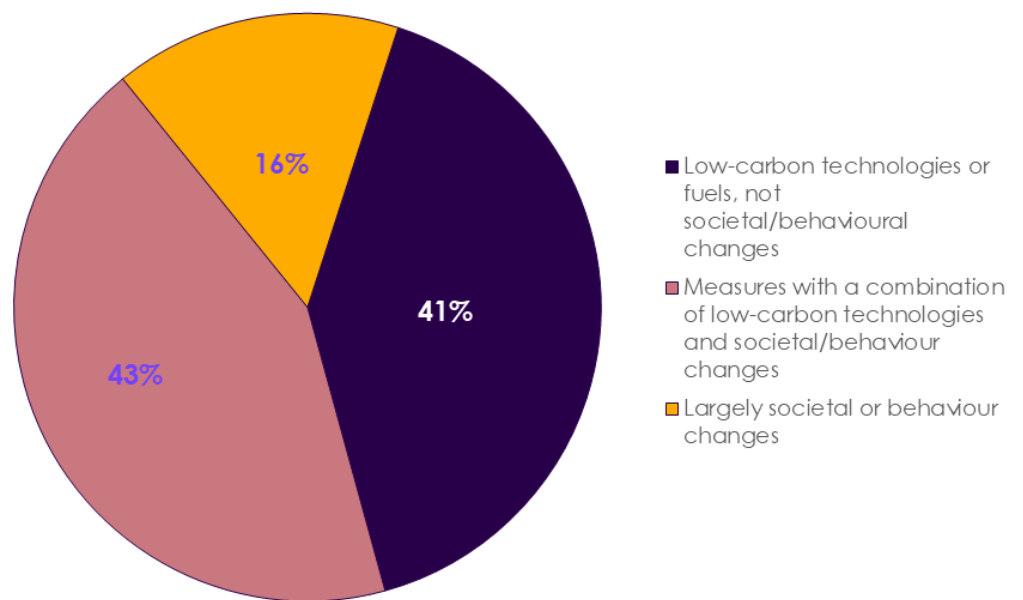
Sector	Headwinds (moderate behaviour change; moderate innovation)	Widespread Innovation (moderate behaviour change; high innovation)	Widespread Engagement (high behaviour change; moderate innovation)
Industry	Moderate levels of resource efficiency	High levels of resource efficiency – driven by innovative techniques and business models	High levels of resource efficiency – driven by consumers and business behaviour
Homes	Installing low-carbon heating (e.g. heat pump and/or hydrogen boiler) and energy efficiency. Pre-heating in 25% of eligible homes; smart controls reduce heat demand 3%.	Installing low-carbon heating (e.g. heat pump and/or hydrogen boiler) and energy efficiency Pre-heating in 50% of eligible homes; smart controls reduce heat demand 6%	Installing low-carbon heating (e.g. heat pump and/or hydrogen boiler) and energy efficiency Pre-heating in 50% of eligible homes; smart controls reduce heat demand 6%
Transport	2035 switchover date to electric vehicles; moderate shift to home-working/other modes	2030 switchover date to electric vehicles; high shift to home-working / other modes (including e-bikes)	2030 switchover date to EVs; high shift to home-working / other modes
Aviation	Passenger demand growth rises 25% by 2050 from 2018 levels	No behaviour change and continued expected passenger growth on current trajectory	No growth in leisure flights from 2018 levels, and halving of business flights (e.g. due to video-conferencing post-COVID)
Diet	20% shift-away from red meat and dairy by 2050; all replaced with plant based	20% reduction in emissions by 2030 and 50% by 2050; dairy and 20% of meat replaced with plant-based products; remaining 30% replaced by lab-grown meat	20% shift away from meat and dairy by 2030 and 50% by 2050 reduction; all replaced with plant based
Waste	50% reduction in food waste by 2030. Recycling reaches 70% across UK by 2030 (2025 in Scotland and Wales)	50% reduction in food waste by 2030; 75% by 2050 Recycling rate: Same as Headwinds to 2030, reaching 80% by 2050	50% reduction in food waste by 2030; 75% by 2050. Recycling rate: Same as Headwinds to 2030, reaching 90% by 2050

Note: Behavioural change, regarding for example diet, home-working, or aviation, could also substantially exceed Widespread Engagement Scenario.

The two key dimensions that distinguish these scenarios (and others not shown here) are behavioural change and technological innovation. Of course, shifting behaviours will be crucial not just at the level of individual consumer choices (e.g. concerning diet, public vs private transport, demands for aviation), but also on long-term purchases and investments (e.g. electric vehicles, heat pumps, home insulation). Indeed, consumer demand may help support systematic changes in how business operates. Possible examples may include demand for zero-carbon accredited services and products; demand for a shift to a circular economy; smart integration of industrial and domestic electricity usage, perhaps including battery storage from electric vehicles, to balance the grid.

In many such cases, behavioural factors (on the demand side) and technological innovation (on the supply side) are likely both to be crucial. Figure 2 gives an overview of the importance of behavioural changes in getting to Net Zero, by sector, for a "balanced" pathway, assuming intermediate levels of behavioural and technological change.

Figure 2 The contribution of behaviour change to a "Balanced" Net Zero pathway for the UK (assuming intermediate levels of behavioural change and technological innovation) (2035).

- Low-carbon technologies or fuels, not societal/behavioural changes
- Measures with a combination of low-carbon technologies and societal/behaviour changes
- Largely societal or behaviour changes

Source: CCC (2020) *The Sixth Carbon Budget*
Notes: Show for the 'Balanced Pathway' for 2035. Behaviour change in the 'Widespread Engagement' scenario is 4% higher in the same year.

Net Zero can be part of a positive vision of a healthier, happier and greener future.

Irrespective of the specific pathway taken, there is a compelling case that a Net Zero future can be far better than the present in a range of ways, independent of the benefits to the climate. Levels of urban pollution will be radically reduced by the electrification of transport; walking and cycling may be easier and safer; farming and land use may be more diverse and create greater natural amenities for the public, for biodiversity, and for reducing flooding; and renewable energy and electric transportation are likely to be cheaper than using fossil fuels. A slow shift towards plant-based foods and away from traditional meat and dairy consumption is likely to lead to significant health benefits, and may also be cheaper.

It is, moreover, possible that a much more thoroughly digitally connected world may lead to richer and cheaper access to goods and services, education, and aspects of medical care, for many people – though it remains crucial that the digital divide is addressed.

Moreover, as there will be a global push to Net Zero over the coming decades, investing in "green" technologies may be crucial to ensuring the UK's long-term economic competitiveness. There will, to be sure, be some difficult-to-decarbonize areas (e.g. aspects of heating, industry, agriculture, and aviation) where there are real economic and social costs to moving away from fossil fuels. But overall, it seems credible that leadership in pushing to Net Zero may be positive for citizens of the UK, even independent of the huge importance of being part of a global coalition to keep global temperature rises within "safe" levels.

As our collective reaction to Covid-19 has demonstrated, under the most adverse circumstances we can collectively shift our lives astonishingly rapidly – far more rapidly than is required for the slower but sustained transformation needed for Net Zero; moreover, there are, admittedly limited, aspects of these changes which, once they become the new status quo, we may actually find we prefer. Finally, it is possible to gain public support for changing aspects of the rules by which we live – both explicit rules and regulations, but equally important the hidden rules that tells us how "we" should behave – and this will require as much public engagement and debate as possible (e.g. through Citizens' Assemblies, consultations, encouraging local initiatives, and so on).

This positive vision is crucial. If we collectively recognize the appeal, and likely inevitability, of shifting to a Net Zero society, then we can recognize, too, that the apparently formidable barriers to this transition can be overcome.

5. Policy recommendations

Table 2
Policy recommendations

Locking in positive changes. Continued and enhanced support to assist transitions which are likely to be beneficial in the long term, especially those which are already underway. This includes support for:

- flexible and remote working where appropriate,

- the infrastructure and training to accelerate a "shift to digital,"

- expanding non-car-based travel (walking, cycling, e-bikes, e-scooters) to lock in positive behavioural changes.

Counteracting negative change. Active measures (campaigns, initially lower prices) may be required where people have shifted from public transport to car travel, due to Covid-19 concerns.

Anticipating and accelerating positive large-scale change. The public and policy makers are likely greatly to underestimate the degree of change that is possible, and how far such changes may be welcomed. The strong psychological tendency to assume that the future will, and should, be similar to the present needs to be actively corrected; and policies need to be ahead of, rather than behind, positive trends (e.g. switches to electric vehicles, dietary shifts, encouraging UK domestic tourism)

Building support for the new behaviours required for a Net Zero recovery.

- **A shared vision:** Open public and policy debate at national and local levels (including Citizens' Assemblies) to decide goals and road-map; and helping to re-shape how we want collectively to live and work in the future.

- **Action at every level:** encouraging national, local, organisation, individual initiatives to reduce GHG impacts. Measures will range from "nudges" to make "positive" behaviours as easy as possible; clear, reliable information about the GHG impacts of different choices; but more importantly shifting organizational norms and incentives to favour low GHG options.[33]

- **Leading from the front:** Leaders in government and industry should visibly change their own patterns of work and life. Government departments, and the public sector more broadly, can take a lead by shifting to flexible working, and influencing others to do the same via procurement.

- **Compelling case studies:** Highlighting and celebrating projects which successfully shift, or maintain, behaviour leading to lower GHG emissions and other benefits.

Research and monitoring. Which social shifts are occurring and what are their full greenhouse gas implications? How rapidly people and organizations are mastering new behaviours (the "slope" of the power law of practice will help predict the pace of future improvement). Which shifts are people coming to prefer, and which do they increasingly dislike? Who is being left behind (e.g. a shift to digital)?

Endnotes

[1] Indeed, there is a general tendency for people to underestimate the degree of change that will occur, and how easily they will adapt to it, across many dimensions. We do not "intuitively" appreciate the flexibility inherent in the three areas described here: how we learn, change our preferences, and collectively shift our unwritten social rules. This under-anticipation of how we will adapt to changed circumstances appears quite general (e.g. Ayton, Peter; Alice Pott; Najat Elwakili (February 2007). "Affective forecasting: Why can't people predict their emotions?". Thinking & Reasoning, 13(1), 62–80; Loewenstein, G., O'Donoghue, T., & Rabin, M. (2003). Projection Bias in Predicting Future Utility. The Quarterly Journal of Economics. 118(4), 1209–1248.

[2] The power law of practice is the term widely used in psychology, and is traced back to Crossman's (1959) classic data on cigar rolling in Cuba, Crossman, E. R. F. W. (1959). A theory of the acquisition of speed-skill. Ergonomics 2, 153–166. Wright (1936) had already noted that price decreases as a power law function of number of units of a particular model produced in aircraft manufacture. Wright, T. P. (1936), 'Factors affecting the cost of airplanes', Journal of the Aeronautical Sciences 3(4), 122—128. The right mathematical form to capture these data is somewhat contested – but general shape is all that matters here (e.g. Chater, N., & Brown, G. D. (1999). Scale-invariance as a unifying psychological principle. Cognition, 69(3), B17-B24; Newell, A., & Rosenbloom, P. S. (1981). Mechanisms of skill acquisition and the law of practice. Cognitive skills and their acquisition, 1(1981), 1-55.). Another well-known law, Moore's Law (see, e.g. https://ourworldindata.org/technological-progress), that the density of transistors on a silicon chip doubles every two years (and similar laws concerning computing power) focuses on the rate of progress unit of time, rather than number of "practice trials" (although the laws are equivalent if production increases exponentially with time, Sahal, D. (1979). A theory of progress functions. AIIE Transactions, 11(1), 23-29.). In cases in which Moore's Law and the Wright's power law diverge, the power law may be more accurate according to some researchers (Nagy, B., Farmer, J. D., Bui, Q. M., & Trancik, J. E. (2013). Statistical basis for predicting technological progress. PloS one, 8(2), e52669).

[3] In psychology, there are persuasive arguments that power laws can arise when we average across many people, even if each person is not individually following a power law (e.g. Heathcote, A., Brown, S., & Mewhort, D. J. K. (2000). The power law repealed: The case for an exponential law of practice. Psychonomic Bulletin & Review, 7(2), 185-207; Evans, N. J., Brown, S. D., Mewhort, D. J., & Heathcote, A. (2018). Refining the law of practice. Psychological Review, 125(4), 592). When considering social consequences, it is averaged performance that is most important, so this issue is not crucial here.

[4] For example, see Schmidt, O., Hawkes, A., Gambhir, A., & Staffell, I. (2017). The future cost of electrical energy storage based on experience rates. Nature Energy, 2(8), 1-8. Junginger, M., & Krishnan, S. (2018). Technological learning in energy modelling: experience curves. Policy Brief for REFLEX Project.

[5] The tendency of major life changes to disrupt existing habits, and allow the formation of new habits, is closely linked to the habit discontinuity hypothesis (Verplanken, B., & Roy, D. (2016). Empowering interventions to promote sustainable lifestyles: Testing the habit discontinuity hypothesis in a field experiment. Journal of Environmental Psychology, 45, 127-134.), which suggests that major life changes A particularly interesting aspect of the hypothesis is that major life changes (whether moving house, changing job, having a child, or, of course, dealing with the implications of a pandemic) provide a "window of opportunity" to establish new habits, possibly unrelated to the original life change. A further interesting psychological point is that constructing a new vision of our personal future, or the future of society, is difficult and effortful. Under the pressures of normal daily life, the future tends to be given little attention, and hence is typically assumed, by default, to be the same as the present. By contrast, when people's lives are undergoing major change there may be the time for a broader re-evaluation of the future.

6 Thomson, D. (2020). The Workforce Is About to Change Dramatically. The Atlantic (6 August). (https://www.theatlantic.com/ideas/archive/2020/08/just-small-shift-remote-work-could-change-everything/614980/

7 The UK government has committed significant funding to support this shift: https://www.gov.uk/government/news/2-billion-package-to-create-new-era-for-cycling-and-walking

8 In behavioural economics and psychology, the status quo bias is a particular type of influence of the status quo, typically viewed as an irrational attachment to the status quo (Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. Journal of Risk and Uncertainty, 1(1), 7-59.). The current usage is broader, including effects of adaptation and changing preferences.

9 Knetsch, J. L. (1989). The endowment effect and evidence of nonreversible indifference curves. American Economic Review, 79, 1277–1284. The same effect was shown earlier with lottery tickets: Knetsch, J. L., & Sinden, J. A. (1984). Willingness to pay and compensation demand: Experimental evidence of an unexpected disparity in measures of value. Quarterly Journal of Economics, 99, 507–521. The effect occurs in highly abstract philosophical examples (De Brigard, F. (2010). If you like it, does it matter if it's real?. Philosophical Psychology, 23(1), 43-57).

10 Brookshire, D. S., & Coursey, D. L. (1987). Measuring the value of a public good: an empirical comparison of elicitation procedures. The American Economic Review, 554-566.

11 Zajonc, Robert B. (1968). Attitudinal Effects of Mere Exposure. Journal of Personality and Social Psychology. 9 (2, Pt.2): 1–27. James E. Cutting, "Gustave Caillebotte, French Impressionism, and Mere Exposure," Psychonomic Bulletin & Review, 10 (2003), 319-343. Madison, G., & Schiölde, G. (2017). Repeated listening increases the liking for music regardless of its complexity: Implications for the appreciation and aesthetics of music. Frontiers in neuroscience, 11, 147. The "mere exposure" effect, while widespread, has important limits – first, increased liking through repeated exposure typically reduces and can sometimes even reverse (e.g. we become "bored" with the over-familiar); and second, increased liking only occurs for items or events which are either initially neutral or somewhat liked (so, for example, an annoying advertising "jingle" will not become better liked with repeated listening, and may even be less liked) (see Montoya, R. M., Horton, R. S., Vevea, J. L., Citkowicz, M., & Lauber, E. A. (2017). A re-examination of the mere exposure effect: The influence of repeated exposure on recognition, familiarity, and liking. Psychological bulletin, 143(5), 459-498).

12 The brain's evaluation of the world in terms of comparisons applies even for basic perceptual magnitudes such as loudness and brightness (Helson, H. (1948). Adaptation-level as a basis for a quantitative theory of frames of reference. Psychological review, 55(6), 297-313; , Laming, D. R. J. (1997). The measurement of sensation. Oxford, UK: Oxford University Press; Stewart, N., Brown, G. D., & Chater, N. (2005). Absolute identification by relative judgment. Psychological review, 112(4), 881-911., as well as more abstract dimensions such as risk or value (e.g. Stewart, N., Chater, N., & Brown, G. D. (2006). Decision by sampling. Cognitive psychology, 53(1), 1-26; Vlaev, I., Chater, N., Stewart, N., & Brown, G. D. (2011). Does the brain calculate value?. Trends in cognitive sciences, 15(11), 546-554). Adaptation effects on well-being have been widely documented regarding subjective well-being (e.g. Brickman, P., Coates, D., & Janoff-Bulman, R. (1978). Lottery winners and accident victims: Is happiness relative? Journal of Personality and Social Psychology, 36, 917–927; Diener, E., Lucas, R. E., & Scollon, C. N..(2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. American Psychologist, 61(4), 305-314.). Brown, G. D. A., Gardner, J., Oswald, A. J., & Qian, J. (2008). Does wage rank affect employees' well-being? Industrial Relations, 47(3), 355-389.

13 Eidelman, S., & Crandall, C. S. (2012). Bias in favor of the status quo. Social and Personality Psychology Compass, 6(3), 270-281.

14 Crucially, though, that our ability to adapt to a new status quo does not apply to all aspects of behaviour. As is familiar in homeostasis in biology, some "drives" appear to restore us to an absolute level, rather than adapting to new circumstances. For example, people are not generally able to adapt to significant reductions in food or sleep – indeed, the "drive" to return to "normal" may increase, rather than diminish, over time (we become increasing hungry and

tired). With respect to remote working, for example, a crucial question concerns social interactions with colleagues – will there be "pent up" desire to return to normal, or perhaps even more interaction than before? Or will people either adapt to less interaction with work colleagues, compensate through more digital interactions, or via additional time with close friends and family? These are questions that can be answered tracking whether public sentiment towards changes in living and working becomes more positive over time (i.e., we are adapting to a new status quo) or less positive (i.e., we are becoming increasing desperate to return to previous behaviour).

15 In the academic literature, this point is often expressed by saying that the "reference point" against which we evaluate the future is depending on our expectations about the future, rather than the current status quo. Here, we think of these expectations as setting a status quo vision of the future, against which the actual future outcome is compared. See, e.g. Hsee, C. K. & Tsai, C. I. (2008). Hedonomics in Consumer Behavior. In C. P. Haugtvedt, P. M. Herr & F. R. Kardes (Eds), Handbook of Consumer Psychology, (pp. 639–59). New York, NY: Psychology Press; Köszegi, B. & Rabin, M. (2006). A Model of Reference-Dependent Preferences. Quarterly Journal of Economics, 121(4): 1133–1165.

16 Stutzer, A., & Frey, B. S. (2008). Stress that doesn't pay: The commuting paradox. Scandinavian Journal of Economics, 110(2), 339-366. Chatterjee, K., Chng, S., Clark, B., Davis, A., De Vos, J., Ettema, D., Handy, S., Martin, A. & Reardon, L. (2020). Commuting and wellbeing: a critical overview of the literature with implications for policy and future research. Transport Reviews, 40(1), 5-34.

17 Watts, G. (2020). COVID-19 and the digital divide in the UK. The Lancet Digital Health, 2(8), e395-e396. Serafino, P. (2019). Exploring the UK's digital divide. Office for National Statistics, 4. https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinter netandsocialmediausage/articles/exploringtheuksdigitaldivide/2019-03-04

18 Deloitte Insights Report (2020). Electric Vehicles: Setting a Course for 2030. https://www2.deloitte.com/uk/en/insights/focus/future-of-mobility/electric-vehicle-trends-2030.html

19 A shift to a more plant-based diet will have significant impacts on GHG emissions from agriculture, especially methane; an equally pressing motivation for this shift is to improve our collective health (Public Health England document or similar?).

20 For example, Kelly, J. & Bates, C. (2016). 10 ways the UK's eating habits have changed, BBC website:

https://www.bbc.co.uk/news/magazine-35595530

21 Haun, D. B., Rekers, Y., & Tomasello, M. (2014). Children conform to the behavior of peers; other great apes stick with what they know. Psychological science, 25(12), 2160-2167.

22 Schmidt, M. F., & Tomasello, M. (2012). Young children enforce social norms. Current Directions in Psychological Science, 21(4), 232-236; Marjanovic, Z., Greenglass, E. R. & Coffey, S. (2007) The relevance of psychosocial variables and working conditions in predicting nurses' coping strategies during the SARS crisis: An online questionnaire survey. International Journal of Nursing Studies, 44, 991-998.

23 Interestingly, once new patterns are established, they are often resistant to change even when their rationale is removed (see, e.g. Harvey, N. (2020, in press). Behavioural fatigue: Real phenomenon, naïve construct, or policy contrivance. Frontiers in Psychology.)

24 According to the logic of appropriateness, rather than asking: "what do I prefer to do in this situation, given my particular goals and values?" we often ask ourselves "what is the appropriate thing to do – i.e., what should a person like me do in a situation like this?" The logic of appropriateness was introduced in political science and management (James G. March and Johan P. Olsen, "The Logic of Appropriateness", pp. 689–708 in Michael Moran, Martin Rein, and Robert E. Goodin (eds.) The Oxford Handbook of Public Policy. Oxford: Oxford University Press, 2006.); but, of course, the general idea that people are motivated to conform and follow social rules has a long history in sociology and social psychology.

25 The reasoning in everyday social interactions is analogous to reasoning in the law – often rules, and past cases, don't precisely specify how the law should be applied in a new case (arising from the unavoidably "open-textured" nature of language, Hart, H. L. A. (1961). The concept of law. Oxford, UK: Clarendon Press.). Nonetheless, people are remarkably adept at critiquing and justifying behaviour as appropriate or inappropriate. Often appropriateness is justified by references to consequences, but this is not necessarily the case. For example, while the appropriateness of mask wearing may be justified by appeal to supposed effectiveness in suppressing the spread of Covid-19, some people have equally strong intuitions that mask-wearing is inappropriate, perhaps because it is seen as signalling negative character traits, such as unfriendliness, vulnerability, or even lack of courage. And often the mere prevalence, or rarity, of a behaviour is judged as "sufficient" argument concerning whether it is appropriate (e.g. wearing this year's fashion, rather than last year's) – an example of the status quo effect noted earlier.

26 Cismaru, M., Lavack, A.M. and Markewich, E. (2009), "Social marketing campaigns aimed at preventing drunk driving: A review and recommendations", International Marketing Review, 26(3), 292-311.

27 Park, W. (2020) Why people object to laws that save lives. BBC Future (September 3). https://www.bbc.com/future/article/20200902-why-people-object-to-laws-that-save-lives

28 Conversely, frequent long-haul flights can be viewed as indicating importance of one's role, and commitment to the company – so that frequent flights are viewed as not only appropriate but praise-worthy. An important question is how far such norms become re-established after the enforced reduction of travel during the pandemic. Governments may be able to lead by example, here; and also actively to encourage reduced long-haul and other travel where possible.

29 The "Friedman Doctrine" was originally outlined in Friedman, M. (September 13, 1970). "A Friedman Doctrine: The Social Responsibility of Business is to Increase Its Profits". The New York Times Magazine.

30 So-called "Big Tech" companies, including Microsoft, Apple and Google, have made environmental pledges (https://www.axios.com/big-tech-climate-change-google-amazon-facebook-0c29ab2f-1fd3-477b-b6db-550e472aafdc.html); the world's largest asset manager, BlackRock, has made commitments to sustainable investing on both ethical and financial grounds (https://www.blackrock.com/corporate/literature/investor-education/sustainable-investing-resilience.pdf); the world's largest investment bank, JP Morgan, has committed to aligning its investment strategy with the Paris climate agreement. https://www.environmentalleader.com/2020/10/jpmorgan-chase-adopts-financing-commitment-aligned-with-the-paris-agreement/#:~:text=The%20Paris%20Agreement%20aims%20to,net%2Dzero%20emissions%20by%202050. Of course, as with government commitments, it is too early to be sure how such commitments will be implemented and what impact they will have.

31 Other important recent examples of rapid shifts in views of "appropriateness" have been evident in the #metoo movement and Black Lives Matter.

32 Climate Assembly UK (September, 2020). The Path to Net Zero. https://www.climateassembly.uk/report/read/

33 Carmichael, R. (2019). Behaviour change, public engagement and Net Zero. A report for the Climate Change Committee. https://www.theccc.org.uk/wp-content/uploads/2019/10/Behaviour-change-public-engagement-and-Net-Zero-Imperial-College-London.pdf).

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