time to face up to the realities of climate change – an appeal to the professions

Very few people appear to have recognised the full implications of the 'elephant in the room' of global climate change – the unquestionable need for a speedy transition to near-zero carbon lifestyles and human activity is an ecological truth that dare not speak its name, says Mayer Hillman

Populations around the world now face a dire predicament. Rapidly spreading and intensifying use of the sun's energy accumulated over millions of years in the form of coal, oil and gas has enabled most people to improve their material standards and quality of life – but at what cost?

Alarming climatic changes, on a scale never witnessed before in an equivalently short period of human history, are inexorably leading to ecological catastrophe. Carbon dioxide emissions released into the global atmosphere have reached such a dangerous level of concentration that the possibility of its prevention is now in the past. *The deteriorating condition of the planet is far too advanced for any further attempts at denying both the unsustainability of a largely 'business-as-usual' strategy and our individual responsibility to act in light of this. Without the most drastic reversal of current policies, emissions will go on adding considerably to their rising concentration.*

Nearly all the hottest years since the start of the last century have been recorded in the last 15 years. It has been calculated that temperatures around the world would be out of control if the global temperature were to exceed a rise of 1.5-2.0ºC above the pre-industrial revolution level. Yet Intergovernmental Panel on Climate Change (IPCC) scenarios now have outcomes indicating a mean surface temperature rise of as much as 4.8ºC by the end of this century.[1] The fact that these figures are global averages, with countries in extreme latitudes likely to experience sharper increases, provides even more alarming grounds for concern.

James Hansen, the eminent US climate scientist, has calculated that the concentration of carbon dioxide emissions must be brought down to 350 ppmv (parts per million by volume). That would only be possible if a proven and globally applicable way could be found of extracting emissions from the atmosphere and burying them permanently – all within the requirements of the necessary funds and the very limited time available to do so as the concentration goes on rising. At present, this has already passed an irreversible tipping point of *400 ppmv*.

Evidence of this process is reflected in an increasing frequency of extreme weather events. The effects are already apparent in sea level rises and coastal inundation, growing ocean acidification, severe droughts, desertification, flooding, and the

retreat of glaciers. They can be seen too in the methane release from tundra regions in northern latitudes and melting of the polar ice sheets to such an extent that in 2012 the volume of sea ice in the Arctic was 44% below the 1981-2010 average.[2] These outcomes are beginning to shrink the habitable land mass on which a burgeoning and materially aspirational future population, forecast to rise by a third later this century, will have to live.

Lack of awareness of the extent of the horrendous consequences of irreversible climate change is widespread. The growth of urban areas in the form we now see has been made possible only by exploiting with gay abandon the planet's finite reserves of fossil fuels, including coal, which are projected to still provide around 80% of the world's energy needs in 2035.[3] Few seem to be aware of this 'elephant in the room' and therefore even begun to understand the speed with which near-to-zero carbon styles of living and industrial activity must be achieved.

Prospects for future generations

No other aggregation of human behaviour in recorded history can begin to match the appalling legacy we are in the process of bequeathing to future generations as a consequence of our near-total failure to face up to the implications of climate change. Indeed, the preceding evidential observations support the prediction that most, if not all, the following outcomes are now inevitable:

- regions of the world becoming uninhabitable at an accelerating rate, leading to hundreds of millions of ecological refugees having to seek entry into countries that have been relatively spared the worst depredations of climate change yet whose populations will be highly unlikely to welcome them;
- extensive water and food shortages, including degradation of soil quality and, owing to acidification, a marked decline in the protein available from the sea;
- likely wars of survival with catastrophic loss of life;
- widespread decrease in species diversity and genetic variability; and
- a world in which evidence of our failure to have met the challenge of climate change gets progressively and inescapably obvious – and grimmer.

Current misleading assumptions informing public policy

The interpretation of the available evidence is all too often distorted as a result of an instinctive wish to find an escape route from having to come to terms with these predictable outcomes, particularly where political considerations of likely adverse impacts weigh against action. In this area of policy, the undesirable consequences can all too often be laid at the door of decision-makers subscribing to many challengeable assumptions – close to tenets of faith. These have enabled maintenance of the view that transfer to near zero-carbon lifestyles, practices and patterns of development is not necessary and certainly not urgent.

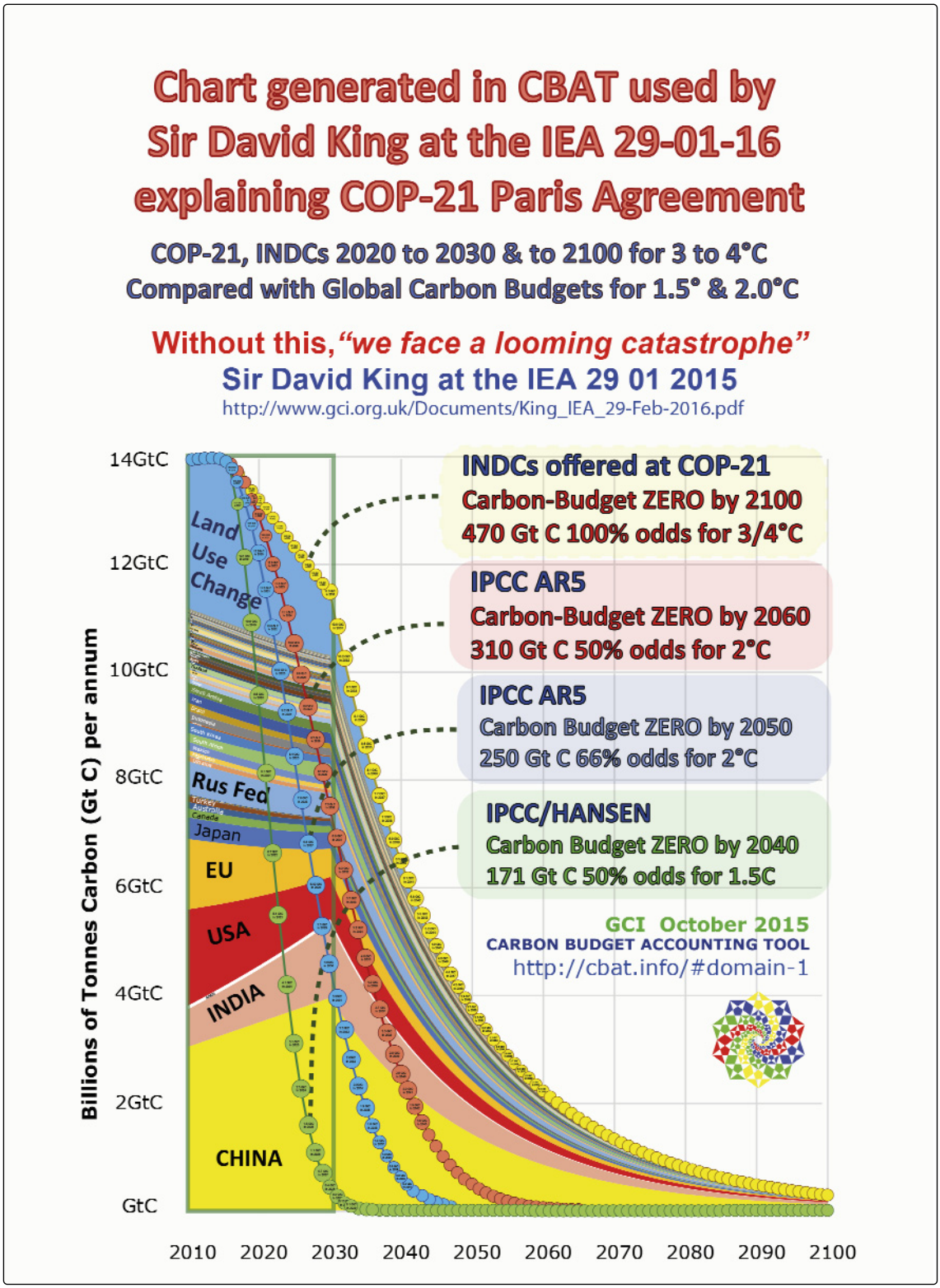
It may be that those who go along with these assumptions are in denial of irrefutable facts, or need to believe that they are insufficiently relevant to the primary function of government, which is seen as the furtherance of economic activity and a burgeoning global market. Such aspirations are endorsed not only by all the main political parties in the UK, but around the world. Not surprisingly, it has the near-wholehearted support of a public which clearly would prefer climate scientists to be proved wrong in their predictions, and hope that the need for dramatic change has been exaggerated.

Carbon dioxide emissions and reduction targets

Recent advances in climate science appear to justify questioning the adequacy of the current UK target of an 80% reduction in carbon dioxide emissions by 2050, to keep the global temperature within a 2ºC rise and thereby avoid runaway effects. There is now a greater understanding of decline in the extent to which the oceans, forests and soil are functioning as carbon sinks for emissions from burning fossil fuels, and a new appreciation of the dangers of not comprehensively factoring into the modelling process used to determine the government target feedback mechanisms such as those arising from the loss of reflective snow and ice in the Arctic. Adjustments to include such critical elements seem highly likely to prove the UK Meteorological Office's and the IPCC's global temperature change predictions to be woeful under-estimates.

Further cause for alarm on this subject is contained in a presentation to an International Energy Agency conference earlier this year by Sir David King, the UK Government's Special Representative and chief negotiator for the UK Government at the UN Climate Negotiations in Paris. He concluded that we now face a 'looming catastrophe for humankind'.[4]

Fig. 1, on the facing page – which Sir David King used in his presentation – is derived from the Global Commons Institute's CBAT (Carbon Budget Allocation Tool) model.[5] It shows, in the yellow point-curve, the emissions pathway resulting from the commitments up to 2030 made by most governments in Paris. If then projected beyond that year a roughly realistic pathway into the future can be drawn. What this adds up to is a 3-4°C temperature rise. To stay below 1.5°C, with a 50-50 chance of success, the emissions per annum on the curve with the sharpest fall by 2035 would be necessary for the world to be greenhouse-gas-neutral. From this analysis, it would seem to be



Global Commons Institute/Aubrey Meyer

Fig. 1 Graph generated using the Carbon Budget Allocation Tool showing the projected outcomes from the Paris Climate Change Agreement in comparison with required pathways for selected global temperature increases – a fully detailed 'zoomable' version is available online at http://mayerhillman.com/mayer_tcp_detail

near-impossible to limit the rise to 1.5°C. The curves represented by the blue and red dots indicate two different probabilities of the fall required to stay below 2.0°C with the same chance. So somewhere between the red, the blue and the yellow curves is the pathway we need to be on if we are going to secure our future. That is a substantial difference between those pathways and the pathway, shown in yellow, of the simple adding-up of the so-called 'Intended Nationally Determined Contributions' (INDCs) to decarbonisation. It is clear that a far more proactive strategy than is currently being contemplated is needed.

It is assumed that progress is made by modest reductions in greenhouse gas emissions on the principle that 'every little bit counts', and that this process will play an invaluable part in eventually leading to *sufficient* reductions to prevent climate change getting out of control. Reference is repeatedly made to the need for '*sustainable*' developments and practices, implying that, owing to their relatively low carbon requirements, they can be maintained in perpetuity. The use of such an adjective is intended to give supportive legitimacy to what is proposed. However, that could only be justified if all related activities associated with these developments were *zero*-carbon. But that is just not possible: consider references to 'sustainable tourism' or the growth of so-called 'world cities' – in both instances aimed at promoting ever more geographically spread activity by more people from all over the world – all too often excluding mention not only of its heavy dependence on flying but also of its contribution to climate change.

'Impressive though recent efficiency gains are, switching to energy renewables and low-carbon developments makes no contribution to *reducing the concentration* of emissions. They can only reduce the *rate* at which the concentration continues to rise'

Attempts to encourage journeys to be switched to rail from the more carbon dioxide emitting air and car forms of travel have largely failed as the characteristics and attractions of *all* carbon-based modes – including those claimed to be justified on the grounds that per passenger-kilometre they are more energy efficient – have simply led to more travel, especially in long-distance journeys. The misjudgement that most journeys by car were previously made by public transport has also resulted in an ephemeral chase based on the false assumption that this process can therefore be reversed.

The most misleading aspect of thinking in this domain of policy relates to the phrase 'carbon (dioxide) emission reductions' as part of a strategy of 'meeting the challenge of climate change'. Progress continues to be measured in terms of these reductions, which are then carelessly interpreted as contributing to the goal of zero emissions. However, it is essential to bear in mind that carbon dioxide that is emitted into the atmosphere remains there for over a hundred years. Impressive though recent efficiency gains are, switching to energy renewables and low-carbon developments makes no contribution to *reducing the concentration* of emissions. They can only reduce the *rate* at which the concentration continues to rise.

Delivering prosperity

The public are not discouraged from looking forward to ever-rising improvements in their material standards and life choices well into the future, with expectations of more spacious housing and appliances in the home, higher-performance cars and trains, and more opportunities for air travel to destinations around the world. Indeed, in the next 20 years, globally, GDP per person is predicted to double.[3]

In this context, it is considered perfectly reasonable – almost a right – for individuals to make decisions from an entirely 'self-interest' perspective, with little if any regard to the effects on other people's quality of life, on community health, on the physical environment and, by no means least, on accelerating climate change in spite of the unavoidable consequences. Indeed, it is assumed that high dependence on fossil fuel based activities cannot be questioned if there are no acceptable, less damaging alternative means of engaging in them – 'how else can I realistically get to Australia?'.

Economic growth

All the main political parties in the UK regularly affirm their belief that economic growth is the primary way of improving the public's standard of living, and therefore that every effort must be made to promote it. Moreover, *it is seen as unnecessary for the sectoral components of that growth to be differentiated according to their contribution to climate change; and as a consequence an adequate response to climate change does not have to (nor must it be allowed to) limit it.*

Such an approach is based on the assumption that, as evidence grows of advances being made in lowering the unit of energy required to perform a task, there is no limit to the degree to which such reductions can be made. It follows from this perspective that the powerful link between GDP

and greenhouse gas emissions can be reduced sufficiently owing to the existence of ever more means of de-coupling the link, and that *a stratagem will assuredly be found in due course for making compatible the goals of economic growth and adequately protecting the global environment.*

Valuing externalities

An effective market-based approach requires setting a global price for carbon so that everyone has the right incentives to play their part. Decision-making can then drive improvement measures, with the market operating cost-effectively. Policy on taxation, too, can be applied more effectively to ensure that a charge on activities based on the 'polluter pays' principle can be justifiably imposed, with more carbon-intensive activities costing more.

However, this requires attaching a realistic price that adequately compensates for the impacts of the emissions over the hundred or so years they remain in the atmosphere, i.e. covering all the costs of the short- *and* long-term impacts caused by the emission of carbon dioxide and other gases into the atmosphere. At present, no value is given to cover the unquantifiable but nevertheless adverse effects, such as the rise in prices of food crops following a switch from agricultural land being used for biofuels, and the mass migration and resettlement of ecological refugees having to leave their homes in future years.

In the absence of a 'realistic' price – certainly far higher than that currently used, for instance, in carbon transfer payments – sharply limiting carbon-based activities by rationing would appear to be a far more effective and equitable way forward.

Voluntary versus mandatory behavioural change

The question arises as to whether industry and commerce can be motivated to *choose* to deliver sufficient reductions to halt the process of climate change. Can everyone be relied upon to voluntarily largely stop maintaining high fossil fuel based lifestyles once adequately educated about climate change and the factors contributing to it? Such an approach is exemplified in the Transition Towns movement, in which members reduce their carbon footprint as much as they are prepared to do *voluntarily* and thereby set an example for others to emulate. However, realism suggests that only a small proportion of the population are going to respond in this way, especially when they see others not joining them in, for instance, making the changes required in long-distance commuting and flying.

It is surely wishful thinking to believe that the goal of zero carbon dioxide emissions, which is the first step that has to be taken to prevent the runaway effect of climate change, can be achieved without some form of compulsion. Yet, in this area of policy, compulsion is highly unlikely to gain sufficient popular support from the electorate in a democracy which reflects the will of the majority. That would require most people voting in favour of, for instance, speedily making their homes over to zero emissions from their heating, hot water and electrical power requirements and having the means and the will to do so and putting an end to their energy-intensive patterns of travel.

It seems unrealistic to expect many individuals, communities or indeed countries to act unilaterally when others are not doing so, or to expect a significant proportion of individuals or businesses to impose on themselves a self-denying ordinance of carbon rationing. To be effective, fair and commensurate, surely rationing has to be *mandatory* to ensure that everybody contributes their fair share.

The role of technology

Against a background of the numerous advances made in the last few decades in reducing the carbon content of our activities, it is salutary to note that this has by no means resulted in an *overall* reduction in emissions. However, it continues to be widely believed that science and technology can be relied upon to find further ways of lowering the amount of fossil fuels the world population needs to meet its aspirations and that this can lead to a *sufficient* reduction of emissions so that the pursuit of economic growth can continue into the foreseeable future. Such expected advances include the development of renewable sources of energy such as bio-energy, using fuels more efficiently, burying carbon dioxide emissions, geo-engineering, and using gas as a less carbon-intensive means of electricity generation, thus enabling a relatively smooth transition to zero-carbon futures.

Such an attractive outcome is highly unlikely to be realised. Standing in the way is the fact that there is no level playing field enabling comparisons to be made. Considerable government subsidies continue to be given to the fossil fuel and nuclear industries, well in excess of those given to the energy renewables sector: no charge is included to cover the long-term hidden and largely unknown costs of damage from climate change caused by burning the fuels, nor to meet the costs of keeping safe repositories of nuclear radioactive waste for thousands of years.

The application of many of what have hitherto been thought to be worthy technological advances, such as combined capture and storage, is having to be reappraised. New evidence is indicating many unforeseen technical and cost problems associated with sequestration, the dangerous methane leakage from shale gas production, extraction of oil from tar sands proving too carbon-intensive and unacceptable on environmental grounds, biomass being too dependent on land currently used for food crops, and nuclear-based electricity being too costly and risky.

The widely held view that human ingenuity through the medium of technology is unbounded and that zero emissions can without doubt be reached has induced a dangerously complacent view that all is well in hand. Additionally, faith may well be misplaced in assuming that any adverse consequences of the pursuit of economic growth can be dealt with at a later date when technological advances will have made it far easier to do so and when the world will be in a better position to afford such action out of the proceeds of future growth.

Claims of future generations

It is thought that the increasingly energy-dependent lifestyles of the world's population will improve if more fossil fuels are found, as the rising demand for them can then be more readily met. In the case of the UK for instance, concerns about the dangers of increasing dependence on the imports of fossil fuels from overseas would be lessened.

However, this comforting thought overlooks the fact that the more resources that are found, the more will be burned, thereby adding to the concentration of greenhouse gases in an already dangerously overloaded global atmosphere. Mark Carney, the current Governor of the Bank of England, has drawn attention to reliable evidence that no more than 20% of the world's reserves already identified can be safely used.[6] The disturbing absence of impact of his statement on share prices can only be explained by a near-absolute confidence that international carbon reduction negotiations will fail.

Allied to this is the concern, increasingly expressed, that we are using the planet's oil reserves at such a rate that there will be little left within 40 years or so. It is clear from this perspective that here the 'we' relates to the availability of oil solely for *our* generation. What about the claims of future generations? They may well have more essential uses for these finite reserves when compared with the way in which we are using them now. In so far as decision-makers presumably believe that life on earth will be able to continue to be enjoyed for hundreds if not thousands of years into the future, surely these claims should be factored into calculations of what, at predicted levels of consumption, is being left for them? *Clearly, a major cultural shift is called for, requiring far greater account to be taken of the longer-term implications of our lifestyles, especially those that will affect the quality of life of future generations.*

The outcome of subscribing to these questionable assumptions is that the essential transition to near-zero fossil fuel use is rendered increasingly difficult to achieve in the rapidly declining, if not negative, time available.

There is little doubt that, if airline emissions continue to grow unchecked at an annual rate of 5.5% (as projected by the International Civil Aviation Organisation), they alone, in spite of the success or failure of any other attempts at emissions control, will raise human emissions and atmosphere concentrations to runaway rates of global temperature rise exceeding 5ºC by 2100.[7]

More disturbing is the public preference for an optimistic view of the future, matching the electoral interest of governments in promoting such an outlook.

Grounds for optimism?

A search through the statements of highly influential policy-makers, practitioners, scientists, industrialists and others in related fields in recent years reveals *widespread denial of the increasingly undeniable trends indicating that it could well be already too late to reverse the trend of the rising concentration of greenhouse gas concentrations in the atmosphere and prevent worsening and even catastrophic damage*. Unless, following the Hansen Budget of 175 gigatonnes of carbon (GtC) (zero emissions by 2030 – see Fig. 1), we slash emissions drastically, we can only slow down the speed with which the rise in concentrations and temperature continues.

Nevertheless, a near-universally supported view is that we must under all circumstances retain optimism about the future and that progress is not possible without hope of a successful outcome. The Obama 'yes we can' clarion call, providing grounds for optimism borne out of wishful thinking that we still have time to avoid significant damaging change, is widespread. Examples are not difficult to find:

- *Aero 2075: Flying into the Bright Future* (Institution of Mechanical Engineers report, 2011);
- 'Let's be optimistic!' (Connie Hedegaard in 2013, at the time European Commissioner for Climate Change, in answer to a private request for information on means whereby the process that is melting the ice caps can be reversed);
- 'The next [crisis] must be the catalyst to actually build the world that will keep us safe.' (Naomi Klein, in *This Changes Everything: Capitalism vs the Climate*, 2014);
- *Prosperous Living for the World in 2050* (a UK Government International Climate Fund supported report, 2015);
- 'Early action by human beings can save the world from its [climate change's] worst impacts' (US Secretary of State John Kerry, 2015);
- 'We must change, we can change, we will change' (former US Vice-President Al Gore, at a Green Alliance meeting in London, 2015);
- 'There is now some sense of hope' (leader in *The Observer* on the agreement of 196 countries reached at the end of the UN Framework Convention on Climate Change Conference in Paris, 2015);

- The Paris climate agreement kindled 'a huge flame of hope' (Christiana Figueres, Executive Secretary of the UN Framework Convention on Climate Change, 2015).

Who would draw the conclusion from these influential sources that prospects for the future are diminishing year-on-year as the concentration of greenhouse gases continues to rise? Is it any wonder that, in the main, government, industry, the media and academia maintain a Panglossian as opposed to a Cassandra-like perspective, even when it is manifestly contradicted by hard evidence to the contrary: at the time of writing this article, news had just come through that the temperature at the North Pole at the turn of the year was 50ºC higher than its average during the last few decades.[8]

The only strategy with any prospect of success

What are the implications of this depressing diagnosis of our predicament? Is there a way of coming to terms with the distorting influence of the fallacious assumptions noted above? Can a strategy be devised that will assuredly limit the damage of climate change, and do so in an equitable and smooth way? If there is, it would have to feature prominently in policy and practice in all sectors of economies currently dependent on fossil fuels.

Only governments have the authority and power to set such a process in train. It would entail taking immediate steps to reach international agreement on achieving the essential massive switch to very low- if not zero-carbon lifestyles. At the same time, as the reliably safe atmospheric concentration of greenhouse gases has certainly already been exceeded, this must lend impetus for high-speed implementation. What is essentially needed is a framework within which the contribution of each proposal for change is evaluated and individual lifestyles are modified substantially.

Based on principles of precaution and equity set out in the United Nations Framework Convention on Climate Change, the Global Commons Institute's (GCI's) Contraction & Convergence (C&C) proposal provides just such a framework. It was first put forward by Aubrey Meyer nearly 25 years ago.[9] It requires the imposition of a global cap on greenhouse gas emissions and, given the finite capacity of the planet's atmosphere to safely absorb further gases, sharing the small quantity that it is still safe to burn among the world's populations. C&C's national manifestation would be in the form of an annual government *allowance* on an equal *per capita* basis. This is surely the only moral, politically practical and therefore realistic approach to take: it is certainly superior to any market-based approach, owing to its foundation in equity.

The application of some form of rationing is the outcome of policy derived from the principle that no-one has a right to more than their fair share and everyone has a personal responsibility not to exceed it. It must not be merely an aspiration but an imperative within which each of our energy-dependent lifestyles is determined.

The concept, first proposed in 1992, was set down in some detail in 2004.[10] As the ration is reduced each year, demand for fossil fuel dependent services, products and activities inevitably falls away, easing considerably the political and practical problems associated with any scarcity of fossil fuels and the security of their supply – and obviating the need to meet current and future demand.

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The allowance is intended to act as a parallel currency complementary to real money and contributing to an ecologically virtuous circle. A key feature is buying and selling – a 'conserver gains' principle replacing the conventional 'polluter pays' principle: those who lead less energy-intensive lives and those who invest in energy efficiency and energy renewables are, by definition, less likely to use all their allowance. They will not only spend less on fuel but also have the added incentive of increasing their incomes by selling the unused units of their allowance.

But the cost of buying these units will inevitably rise in line with the annual reduction of the allowance, as it will be determined by the availability of the surplus set against the demand for it. The process will act in a way that encourages even wealthy individuals to adopt green practices far more effectively than they would through regulation, pricing, exhortation, 'nudging' people to make better informed decisions, or appeals to conscience.

We cannot go on deceiving ourselves that the essential reduction to a far lower level of per-capita emissions can be achieved in the absence of everyone being subject to a mandatory requirement

to comply. Although it is very difficult to predict how people would use their allowance given all the competing claims on it for travel, heating, hot water, lighting, power, and so on, it is highly likely that high-energy use areas of current lifestyles, such as most current transport activity, would be the first to deliver dramatic reductions.

Whose responsibility?

The absolute need for international collaboration aimed at protecting the global environment cannot be denied, but progress is only possible if it is clearly based on principles of social justice and care about the future in the light of the finite capacity of the atmosphere to safely absorb more emissions.

Encouraging statements by politicians, professional institutions and religious leaders abound, giving the impression that they are aware of the gravity of the situation – urging government to act more responsibly as current stewards of the planet; promoting the adoption of sustainable strategies to ensure worldwide delivery of low-carbon economies; and spelling out their commitment to the cause of survival. However, there is a poor prospect of success unless initiatives can count on the willing support of each country's population. At present, when put to the test, the responses from all sectors of society reveal, at best, tokenism rather than sufficiency of action.

Public attitudes

Public expectations about the future give every impression that no substantial changes in the carbon-based aspects of our lifestyles are anticipated. This state of mind reflects a degree of complacency, reinforced by the logic of the view that, in the face of a global requirement for change, the unilateral decisions of individuals make as good as no difference. The reasonable fall-back position is to point to this area of policy being the prime responsibility of government. While true, it does not address the fact that, for electoral reasons, governments are strongly motivated to provide what the public want and to take the enabling steps for that to occur in the best ways possible.

Partly as a result of this, the public only seem prepared to take limited action. This is not so surprising given that they are effectively encouraged not to even think about the significance of their behaviour in this regard. To cite just one small example: at the end of last year, a leader in the *Observer* newspaper informed its readers of the outcome of 'an historic agreement [in Paris] offering us a real chance of reversing the effects of climate change', while, on another page, it proudly trumpeted the fact that its readers 'fly more often than those of other quality titles – typically three times a year'. Advertising in the media promoting energy-intensive activities such as international tourism plays a crucially damaging role. The aim is to whet the public's appetite by drawing attention to the attractions of destinations all over the world and by giving the impression that lives will be more fulfilled by visiting them – a perception reinforced by making no reference to realisation of the link with climate change.

The public are also encouraged to believe that they have an inalienable right to travel as far and as frequently as they wish. One has only to ask people approaching retirement about their plans for the future: the intention to travel abroad, ideally to distant countries, is almost invariably cited.

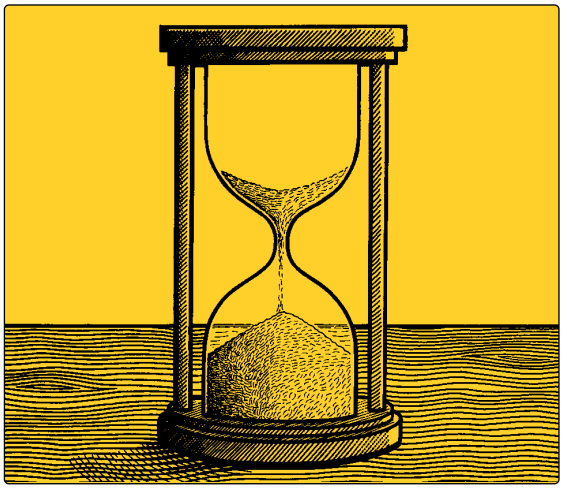
Can there be any justification for the most relevant institutions in society continuing to fail to alert the public to the largely unavoidable links between their lifestyles and climate change, especially when it is all too apparent that social constraints are both insufficient and ineffective?

Governments acting in the national interest

Obviously governments should intervene to ensure that our lifestyles are compatible with the planet's capacity to absorb greenhouse gas emissions if serious destabilisation of the global environment is to be avoided. However, it also has a pressing desire to curry favour with a public intent on doing what they want – helping people to meet their wishes as far as is possible and letting them get on with their lives as they wish, with minimum intrusion on their individual freedoms. Moreover, in democratic societies, the approval and acquiescence of the majority of the population is generally seen as an essential precursor of government decision-making.

Yet it is very apparent that the decisions of individuals are made with little, if any, regard to their social and environmental consequences, complemented by an instinctive wish to 'have their cake and eat it'. This limits government action, as can be seen in the failure to inform the public of the gravity of the situation. Claims that governments cannot move too far ahead of public opinion are clearly unacceptable in this context: governments have a greater responsibility to push the public up the learning curve on the subject. One likely explanation for this failure is that politicians wish to stay well clear of statements revealing concern about the future for fear of its electoral effects – voters prefer to choose representatives who appear optimistic and exude confidence in their ability to deal with difficult problems.

Although one would hope that government is aware of the gravity of the issue of climate change, it also sees its hands as tied to a significant degree by its dependence on the support of industry, which in turn sees its primary aim as delivering profits to its shareholders – ignoring adverse effects unless required by law to take them into account. At the same



Clifford Harper

time, government also has to consider the effects of its decisions on the economy and employment. Attention has to be paid to the trades unions, which see their primary role as looking after the interests of their members in terms of pay and conditions and job security, even when the jobs involve the growth and spread of carbon-based lifestyles.

Nevertheless, the critical contradiction between support for what the public and industry want and policy on climate change is all too apparent. Decisions to facilitate future transport activity, as reflected in the aim of catering for the predicted huge increases in demand, are a case in point. The UK Government sees the problem it must solve as a capacity crisis best met by establishing the best locations for expansion. It has therefore reached a long-term strategic decision to build an effective and efficient infrastructure aimed at raising economic output by improving the country's competitiveness and 'connectivity', the latter an objective with no limits as it has infinite application in terms of reaching more distant destinations and at faster speeds.

To that end, it has set up the National Infrastructure Commission[11] to look at, among other things, ways of meeting the public's and industry's demand for greater opportunities for more distant and faster travel. In the process, it has to maintain the fiction that there is no contradiction between its policies directed to deliver this and its policies on climate change. Indeed, the outcome can be rightly interpreted as a means of subsidising carbon-intensive lifestyles.

An example of this contradiction lies in the time being taken in choosing the location of a third runway for London. Its promoters calculate that the delay will lead to the loss of billions of pounds that would otherwise have been gained in the economy; yet it is clear that during its lifetime the additional runaway will add significantly to the global concentration of carbon dioxide emissions.

'A reappraisal of the relevance of climate change to current transport, planning and construction has to be undertaken. The implications are far more significant than may be initially apparent'

The role of related professions

The foregoing evidence points to the failure of successive governments to accept the fact that the policies that have been taken are leading inexorably to a catastrophic outcome. In coming to terms with the significance of this failure, what challenge does this pose for public servants, academics and consultants in the relevant professions of engineering, planning, transport and architecture, as well as those in construction and vehicle manufacture? Although aware of the climate change implications of their work, it is very difficult for them to challenge decisions on expanding the country's infrastructure, for instance to meet the 'looming crisis' of what is seen to stem from insufficient air, high-speed rail and road capacity – nor is it in their short-term interest to do so.

Certainly a reappraisal of the relevance of climate change to current transport, planning and construction has to be undertaken. The implications are far more significant than may be initially apparent. Every aspect of policy and practice is directly or indirectly related to energy use and must therefore be evaluated. The decision-making process must critically take into account the volume of carbon dioxide emissions over energy consumption lifetimes – in manufacture, construction and use.

What has been the response of these professions in terms of the initiatives they have been taking? They are, after all, in a good position to recognise the significance of the limit on carbon dioxide emissions that the planet's atmosphere can safely absorb and a consequent rapidly shrinking global carbon budget. In these circumstances, should they be prepared to be involved in mega-project commissions that they know will result in an increase in the scale of the climate change challenge? Is it sufficient for them to justify their decisions by shielding behind the statement that this is an area of policy that they can ignore by asserting that it is wholly the responsibility of government? If the motivation for not addressing this issue is the outcome in terms of their income

and employment, some reassurance can be drawn from the fact that there is likely to be much demand for jobs in related activity. For instance, much more account will be taken in future of the significance of the carbon embedded in the existing building stock, providing for the inevitably huge increase in investment in low- or zero-carbon settlements and lifestyles, provision for local, short-distance green travel, and building construction mainly using timber. Interest could also arise in alternative uses for redundant infrastructure such as multi-storey car parks and out-of-town shopping centres that rely on motorised transport to reach them.

If the professions are prepared to accept or take on commissions or contracts to facilitate fossil fuel dependent activity, an alternative could, of course, be to aim to focus on lowering the developments' carbon dioxide emissions content. However, this could only be interpreted as making a real contribution to the problem if they delivered *zero* emissions: otherwise, the outcome would still be incompatible with tackling the threat of climate change meaningfully as the global concentration of emissions would still rise, albeit to a lesser extent than may have been the case in the past. Consider, however, the consequences of the adoption of carbon rationing with a smaller allowance being given annually. Investment in projects already sanctioned to provide greater transport capacity would have to be critically reappraised, and commissions for new infrastructure to facilitate meeting public demand (for instance for long-distance fossil-fuel-dependent travel, especially by air and rail) would fall dramatically.

Difficulty in responding to this challenge would, of course, be lessened if the emissions reductions needed could easily be met by means already available or in prospect. *However, it is clear that the goal of zero emissions must be reached as soon as possible. This entails the adoption of a very different strategy, in which the fact that little if any spare capacity remains in the global atmosphere is faced head on.* Does this not put an onus on these professions to support at the very least a moratorium on the construction of high-carbon mega-projects? If the professions and institutions most closely linked to high carbon content developments do not feel able to rise to the occasion, is there not an obligation on them to indicate whom they consider better equipped to shoulder responsibility for calling the government to account on this subject?

We must not continue to ignore the writing on the wall, passing the buck between individuals, industry, commerce and government. We must stop pretending or implying through our decisions that the significance of this crucial aspect of work is insufficiently relevant in our prioritising of issues – and that time is on our side to get things right and the harm being caused is unavoidable or marginal.

Conclusions

In a special issue of this journal on climate change which I edited in 1998, I wrote:

'We urgently need to move beyond the rhetoric of sustainability and take the path towards living within the planet's limited capacity to absorb greenhouse gases. It is difficult to believe that burying our heads in the sand to avoid facing reality is an appropriate posture... The magnitude of the problem is daunting and its implications lie far outside our experience – and it is therefore disastrously prone to dismissal. But if we do not deliver... we must witness and bear the costs of escalating damage from climate change – as well as the burden on our consciences.' [12]

In outlining my 'personal vision of changes we can anticipate in the 21st century' in the first issue of *Town & Country Planning* at the start of the new millennium, my concluding statement was:

'What is the most important lesson we can learn from the last century which we should be acting on now? Could it be that most if not all governments in the world have sought to promote the prosperity of their populations through the medium of economic growth but that this approach is fundamentally flawed in concept?

'We have sufficient evidence that economic growth is too closely tied to consumption of resources to prevent ecological disaster. … Put another way, we want to maintain our preferred profligate patterns of activity even though we know in our heart of hearts that they are unsustainable as well as inequitable.

'Indeed, the history of the last few decades suggests that, when presented with unpalatable evidence of the undesirable effects of our decisions, we bury our collective heads in the sand in the hope that the problem will go away.' [13]

In the concluding paragraph of the Penguin book Tina Fawcett and I wrote in 2004, we said;

'Our present and future decisions about the use of fossil-fuels will have a major impact on the quality of life of people in the next few decades and the generations succeeding us. We have a moral responsibility to act with this inescapable truth in mind. Future generations will justifiably sit in judgement on what we chose to do in the early part of this century in full knowledge – as accessories before the fact – of the devastating consequences of continuing with our energy-profligate lifestyles.' [14]

What has changed since these statements were made? One thing is certainly clear: many more years have been lost in coming to terms with reality.

The implications of our failure to limit global carbon dioxide emissions to what the atmosphere can safely absorb are dire. The time is long over for

denial that apocalyptic disaster is inevitable unless we take drastic steps immediately to reduce further fossil fuel use to close to zero. This puts a very different perspective on the way ahead from one based simply on setting targets for percentage reductions in emissions for each future decade, particularly as, during the period of implementation, concentrations of emissions continue to rise. It leads to the realisation that *we are all to varying degrees complicit unless we stop investing in and working in planning, design and construction of infrastructure that caters for carbon-based activities and lifestyles, especially those that are energy-intensive.*

It is both a moral choice and one of survival. We cannot continue to ignore the significance of the growing problem facing us, as if there is no tomorrow, and simply turn a blind eye to the damage we are causing. The longer we procrastinate, the greater the certainty of environmental degradation, social upheaval and economic chaos.

If a measuring template were available, every year's delay could be seen to leave in its wake a permanent loss of biodiversity, quality of life and, in all likelihood, loss of actual life on an alarming scale. *We are faced with the awesome challenge of reversing the process in which priorities are given first to 'self', then to the national interest, then the global interest, and lastly to future generations.*

What will we do in the decades ahead when justifiably challenged by our children and grandchildren on our wanton disregard for the impact of our decisions on them and our woeful failure to have acted in time?

Indeed, it could be reasonably argued that a fundamental principle of public policy must reflect a recognition of our responsibility to future generations. The accumulation of irrefutable evidence on climate change is making it progressively unacceptable to attempt to excuse ourselves either by claiming that 'we did not know' the consequences of our actions or, in many respects even more reprehensibly, by just pleading guilty – and even joking about it. It is indefensible to be involved in activities that will inevitably gravely prejudice the survival and future quality of life of human beings and other species on the planet.

We must recognise the form of collective amnesia standing in the way of clearly seeing realities and the most challenging problems we are kicking into the long grass. It is incumbent on us all to 'consider our position' with respect to our professional conduct and our personal lives. The professions involved in the process of catering for the growth in demand for fossil-fuel-based economies and lifestyles – in land use, planning, transport, construction and all related aspects such as international trade and tourism, research and teaching – cannot be excused. They must not shield themselves behind the failure of government, whose primary responsibility it so obviously is, as justification for taking on contracts and commissions which will make it even more difficult for the world to live within its means. If they do not feel able to rise to the occasion, whom do they think more suited to do so?

In all conscience, we are currently locked into a process that will inevitably result in bequeathing a dying planet to the next generation – and it cannot any longer be denied that we are all to varying degrees culpable.

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Notes

1 See *Synthesis Report. Summary for Policymakers*. Fifth Assessment Report. Intergovernmental Panel on Climate Change, 2014. www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

2 'State of the cryosphere: sea ice'. Webpage. National Snow and Ice Data Center, Boulder, USA. https://nsidc.org/cryosphere/sotc/sea_ice.html

3 *BP Energy Outlook. 2016 Edition: Outlook to 2035*. BP, Feb. 2016. www.bp.com/content/dam/bp/pdf/energy-economics/energy-outlook-2016/bp-energy-outlook-2016.pdf

4 Sir David King: 'Towards decarbonising the global economy: the direction of travel after COP21'. 'Big IdEAS' Lecture, International Energy Agency, Jan. 2016. www.youtube.com/watch?v=YtAWA4eor0A

5 See 'Contraction & Convergence (C&C). Climate Truth and Reconciliation', describing the Carbon Budget Analysis Tool (CBAT), at http://cbat.info/#domain-1

6 J. Shankleman: 'Mark Carney: most fossil fuel reserves can't be burned'. *The Guardian*, 13 Oct. 2014. www.theguardian.com/environment/2014/oct/13/mark-carney-fossil-fuel-reserves-burned-carbon-bubble

7 See a letter from Aubrey Mayer to Willesden Magistrate's Court, at http://mayerhillman.com/letter_to_londonnorthwestmc

8 See the 'North Pole' Wikipedia page at https://en.wikipedia.org/wiki/North_Pole; and M. Casey: 'Temperatures spike almost 50 degrees in North Pole'. *Fox News Science*, 1 Jan. 2016. www.foxnews.com/science/2016/01/01/temperatures-spike-almost-50-degrees-in-north-pole.html

9 A. Meyer: *Contraction & Convergence: The Global Solution to Climate Change*. Schumacher Briefing. Green Books, 2000

10 M. Hillman and T. Fawcett: *How We Can Save the Planet*. Penguin Books, 2004. See also M. Hillman: 'Carbon rationing: the only realistic strategy'. In *Climate Action*. Sustainable Development International and United Nations Environment Programme, 2007

11 See the National Infrastructure Commission website, at www.gov.uk/government/organisations/national-infrastructure-commission

12 M. Hillman: 'Why climate change must top the agenda'. *Town & Country Planning*, 1998, Vol. 67, Oct., 287-8 (Introductory article to Special Issue on Climate Change)

13 M. Hillman: 'Coming to terms with 21st century reality'. *Town & Country Planning*, 2000, Vol. 69, Jan., 26

14 *How We Can Save the Planet* (see note 10)