Hypocrites in the air: should climate change academics lead by example?

(applies similarly to any politician, civil servant, journalist, NGO or business leader calling for stringent mitigation)

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From the World Bank and PricewaterhouseCoopers through to Stern and the International Energy Agency, analyses increasingly demonstrate how, without urgent and radical reductions in emissions, global temperatures are set to rise by 4°C or higher – with, as the IEA emphasise, "devastating" repercussions for the planet.

But whose responsibility is it to initiate such radical mitigation?

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My partner and I recently arrived in Sicily for a couple of weeks' camping and rock climbing – not exactly sun-kissed limestone (15°C and damp), but still a little warmer than the Arctic blasts battering the UK at the moment.

As we try to avoid flying we've travelled here by train: Manchester to London and then onto Paris, overnight Paris to Rome, a day strolling between the Pantheon and the Colosseum, before another overnight train to Palermo in the North West corner of Sicily.

The journey took longer than flying, but we get a day each way to explore Rome and overnight travel to and from Sicily, so in terms of price and time it isn't *that* different to flying. But when it comes to emissions I stand by the arguments I made following my train trip to Shanghai in 2011 (for work on that occasion). At a system level*, trains have an order of magnitude lower emissions than the metal bird alternative* – the saving is that significant.

If my arguments are valid, surely those of us intimately engaged in climate change should, at the very least, curtail our use of the most carbon-profligate activity (*per hour*) humankind has thus far developed.

For those interested, the arguments I previously posted on the Tyndall Centre website are repeated below. In addition, I've included a few thoughts in response to the comeback often made – "*those of us with children can't afford the longer journey times as we have overriding parental commitments".*

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Slow and low – the way to go:

A systems view of travel emissions

When planning the journey from Broadbottom (UK), to Shanghai, and also since my return, I have been asked frequently about the associated emissions:

- *I thought trains weren't much better than planes, what's the difference?*
- *Was it worth the effort for whatever you saved?*

On the face of it, these and many similar queries are completely reasonable questions to ask. But, in my view, they miss the point, and without trying to be overly provocative (that's for later), I don't think they are so reasonable – particularly from the array of informed experts who asked them. So why do I think the questions are unreasonable – and what would I suggest as an alternative framing for assessing emissions from travel?

Analysis

The following blog-style analysis is a mix of provocation, parody and some different ways of thinking about emissions from our travel. I've tried to make a coherent case on the basis of argument, but some of the language may not be what you would typically find in an academic paper. Nonetheless, I stand by the well-intentioned thrust of the case and if anyone has any substantive disagreements I'd be pleased to hear them. It is intended to hold a mirror up to the climate change community – and as with all mirrors, it can make for grim viewing. I know: it's a fit 36-year-old who looks in the mirror – but a less fit grey-haired and 49-year-old bloke who stares back at me!

My concerns about the questions I've been asked fall into three broad and related categories. They were asked by folk who work intimately on climate change as a *system.* But not one person asked a systems-level question, *'How are you going to compare the plane and train emissions?'* - or - *'Have you thought about rebound, where time saved via faster travel is spent on additional carbon-emitting activities?'*

Instead, all of the questions relegated climate change to a purely technical, quantitative or efficiency issue – none of which address what we need to do to reduce *total* emissions

The opportunity costs, rebound effect, carbon intensity of time, technical and financial lock-in/lock-out, early adoption, role models, diffusion and so on, are all concepts the climate change community are familiar with. Asking emissions questions without direct or indirect recourse to any of these is, in my view, neither responsible nor reasonable.

Unreasonable reasonableness – another Rumsfeldian paradox

The first argument for my concluding the reasonable questions aren't so reasonable relates to it being academics working on climate change (amongst others) who asked them.

For the last decade the language of climate change used in proposals for funding, research council calls, brochures, government documents and so on, has been awash with terms such as 'whole systems', 'systems thinking', 'interdisciplinary', and the like. Put us in a room and we'll espouse eloquently the virtues of such approaches, noting if we're to tackle big issues like climate change we have to think on a systems level. But as soon as there's something that can be readily quantified we're like moths to a flame: here's something familiar to our 2000 years of reductionism, some knowledge – but without understanding. The virtues of systems thinking that we were waxing lyrical about moments before are quickly forgotten in the mad scrabble to get to the numbers. We know what to do with numbers and, as Lord Kelvin so persuasively put it, *'When you measure what you are speaking of and express it in numbers, you know that on which you are discoursing, but when you cannot measure it and express it in numbers your knowledge is of a very meagre and unsatisfactory kind.'* Well I'm not sure this always holds, and when we do use numbers they have to be meaningful. Isolated numbers tell us little about the system, and worse, they can lead to decisions based only on the bit we can measure. This may be worse than doing nothing or taking random action; at the very least numbers have to be contextual.

So having made the argument that systems thinking requires some systems thinking itself, the following sections outline more precisely defined and technical matters that underpin my concern that the climate change community continues to take overly narrow views of systems-level issues. In 2011, we ought to know better.

System saving no.1: Relative dimensions in distance, time and emissions

If we accept temperature as an adequate proxy for our various concerns about climate change, then there is broad acceptance we must stay below a 2°C increase in global temperature. Thus the climate is only really concerned with our cumulative emissions over a relatively short period of time – a period longer than the Broadbottom–Shanghai train journey, but stretching only about as far as 2020 for 2°C (and for 4°C sometime around 2030). *There is some maths behind these dates linked to how high we are already on the emissions curves, the 'real' emission growth trend, realistic peaks and the proportion of our carbon budget we've squandered already* (see*: beyond dangerous climate change*).

Coming back to the train and its emissions relative to other transport modes: from a systems perspective, it's a good enough approximation to consider the CO_2 per passenger kilometre for planes, trains and automobiles to be similar. Ok, alone in a Ferrari with your foot to the floor will be many times worse than being sardined into one of EasyJet's relatively new aircraft. Similarly, four people cosying up in a small Fiat Panda will knock the socks off any scheduled airline (that is, have much lower CO_2 emissions). But put a couple of academics in a diesel family saloon and any disparity in emissions between the modes over the same distance will be lost in the system noise. *The difference, of course, arises from the distance we deem reasonable to travel – and really this is less about the distance and more about the time.*

Attending an 'essential' conference to save the world from climate change in Venice, Cancun or some other holiday resort, is perfectly do-able by plane. However, the rising emission trends don't seem to have registered the sterling work we have achieved at such events. Perhaps if we flew to more of them, emissions would really start to come down – we may even spot some flying pigs *en route*. Instead, junk the plane and get together with a few other UK speakers heading to the same event, cram yourself in a trusty Fiat Panda and set off for Venice. Somewhere around Dartford, what was previously 'essential' begins to take on a different hue, and by Dover a whole new meaning has evolved. *Essential* has become a relative term, dependent on: Can we get there by plane? Are our friends also attending? Is it somewhere nice to visit (or name-drop)? Will we be taxied around? Are we staying in a plush hotel?

This is where the first major saving resides: slow forms of travel fundamentally change our perception of the essential. We consequently travel less (at least in distance), and given that air travel is the most emission-profligate activity

per hour (short of Formula 1 and possibly space tourism) the emission-related opportunity costs are knocked into a cocked hat. Of course, as climate change specialists we are exempt from such analysis – our message truly is essential – so we're the exception that should be able to carry on emitting as before.

Ah, yes, and business folk – we need them to drive the economy. Tourists are yet another really important economic driver (not to mention the great cultural gains from staying in western-style hotels with like-minded folk and observing other cultures pass by the windscreens of our air conditioned taxis). Next there are the pop stars and celebrities - the world would be such a dull place if they weren't able to prance about at international festivals. The football and tennis players must test their mettle in the international arena – and of course they need their fans to cheer them on.

We can then turn to whole industrial sectors' that put forward an equally bewildering array of 'reasons' why they should be the exceptions and exempt from major emission reductions. This extends to government departments, climate change think tanks and some NGOs – with the remaining less deserving sectors and individuals taking up the slack. It really is a puzzler as to why emissions keep on rising – all the more so since fuel prices have rocketed to levels way in excess of any carbon price economists previously told us would collapse the economy! Still, a few more international conferences and guidance from the carbon-market gurus will have us turn the corner on this one, I'm sure.

Obviously these caricatures are so far from reality that we don't recognise ourselves in any of them – but nevertheless the message is clear. Travelling slowly forces us to travel much less, to be much more selective in what events we attend, and to endeavour to get more out of those trips we do take. Fewer trips and potentially longer stays: not rocket science – just climate change basics.

System saving no.2: Iteration, adaptive capacity and indulgences – how to avoid carbon lock-in

It may be apocryphal, but I have heard from several reputable sources that China is in the process of constructing 150 new international airports. This perhaps sounds implausible, but China's population is approximately 22 times the UK's, and the UK has around 25 international airports. Proportionately, China would need 550 international airports to match the per capita equivalent of the UK. Suddenly their construction rate seems less implausible. Either way, flying to Shanghai sends a very clear market signal: expand your airport. And that is exactly what they're doing right now, so they're reading our repeated signal loud and clear.

But how is that worse than expanding the rail network? Firstly, there is potential to radically improve the efficiency of train travel – until very recently efficiency has not been a major concern for the industry. This is not the case for aviation. Jet engines and current plane designs have pushed the orthodox design envelope about as far as it can go; so 1 to 2 per cent per annum improvement is about as much as can be wrung out of the aviation industry in the short to medium term. In the longer term things may change, but this will not be within the short timeframe associated with climate change. Consequently, flying now locks the future into a high-carbon aviation infrastructure. By contrast, trains have substantial efficiency potential (though this may be compromised with the very high-speed trains) and, more significantly, trains can run on electricity (many already do) and electricity can be low-carbon (some of it already is). Trains can also have regenerative breaking (tricky with aircraft) and overnight trains can be used to flatten demand curves (and cut back on hotel emissions). Planes are currently locked into high-carbon kerosene whilst trains already have several low-carbon options.

So there you have it. Jump on a plane and you send a suite of very clear market signals. *Please buy* some more aircraft that will operate for 20-to-30 years and have a design life of 40 years. *Please build* some more airports. *Please divert* public transport funds so passengers (and shoppers) can travel to the airport on low-carbon trains or trams. *Please expand* the airport car park for when bags are just too heavy to lug on a tram. *Please keep* producing the black stuff – without it we will have invested billions in an industry dependent on kerosene; lock-in *par excellence*. They don't tell you all this on the back of the ticket – though there may be some *oh so useful* advice on carbon offsetting. Again, is it any wonder that emissions aren't coming down when we, the high-emitters, can buy indulgences so easily and cheaply?

System saving no. 3a: Opportunity costs constrain carbon

Here we turn to the old chestnut, opportunity costs. Basically if I had flown – and assuming the direct emissions per capita were the same between the plane and the Trans-Siberian Express – then what would I have been doing for the time I wasn't on the train?

Let's say the plane took two days – one day each way (UK to Shanghai), while the train took a total of 20 days (10 each way), leaving an opportunity cost period of 18 days. If at home, I certainly would have been taking the train to and from work each day. I'd probably have had around four longer UK trips, typically at around 650 kilometres per return

trip. I'd have visited a few rock-climbing venues in my immediate vicinity around the Peak District (say 200–300 kilometres in total, probably shared with a couple of others in the car); I'd have watched a few movies, listened to the radio a lot – and all the usual stuff. The total distance travelled would be equivalent to 3000–5000 kilometres, that is, very roughly 10–20 per cent of the Trans-Siberian trip distance. But if I was a regular flyer, in 20 days I may have taken a flight or two, and if I was one of the great and the good this would have been business or first class. Added to this (if we treat offsetting with the disdain it deserves) the opportunity-cost emissions could easily have exceeded those from the full return journey to China by train. And if offsetting had been used, I take the view that the emissions would have been still higher (increased lock-in, reduced incentive for the 'donor' to change behaviour and the economic multiplier effect for the 'recipient' - see: *the inconvenient truth of carbon offsetting*). All of this assumes that during my 12 days in China I emitted roughly the same quantity of CO_2 per day as if I'd remained at home in the UK. This is probably not too unreasonable, but again if I were one of the great and good, I'd no doubt would have had much higher emissions from further business-class travel to champion my low carbon message in yet more exotic venues.

By including opportunity costs, this slow-travel stuff really starts to notch up the carbon savings for those of us who travel a lot – particularly if it includes international travel.

System saving no. 3b: The slippery slope: thinking low-carbon engenders thinking low-carbon which engenders …

A final point worthy of a brief note: making the transition from fast to slower forms of long-distance travel may engender slower forms of travel elsewhere. Once we've made such a transition, it becomes more 'natural' to avoid taxis and instead to seek out the public transport, walking or cycling options we espouse for others. Taxis are another market signal for more roads. Jamming our bodies onto the Tube (or Beijing subway), or waiting for the reliable late-night bus from Norwich station to the University of East Anglia, all give much lower carbon signals, especially if supported with the occasional letter, either chastising the London Mayor for not doing more with the Tube and local trains, or complimenting Norwich bus planners – or however we think admonishment and praise should be meted out.

So there you have it: my potted account as to why I think the climate change community needs to put its own house in order before wagging its hypocritical finger at others or espousing low-carbon solutions to ministers that we simply wouldn't accept for ourselves.

Final thoughts: Can slow travel be justified in a busy university life?

My guess is that a common retort to my ramblings will be, 'it's ok for him, I'm too busy to take such a long time off work, it's just not practical - I've got to live in the real world.' But the real world has us flying half way around the world to give banal 20 minute presentations to audiences who know what we're going to say. Even if our talks are riveting canters through the intellectual surf, are they really so important that we have to be there in person and in an instant, before launching off to dispense our pearls of wisdom to another packed house in another exotic location? Isn't our situation emblematic of the problems (such as fast and self-important lives for the few, no time for thinking, reflexivity and humility) that we are abjectly failing to shed any light on?

My life is perhaps not as busy as some, but I still clock up a fair few work hours, have meetings to attend, admin to do and research to deliver on. The train was certainly not as simple to organise as a plane – though next time it would be much easier, and I wouldn't worry so much about getting everything perfect and having back-up plans in place. Long and unusual journeys inevitably take more planning, not least to ensure the time spent travelling can be productive. And in terms of cost, the reimbursement system is just not set yet up to support such journeys, so you'll likely have to dip into your pocket, as long train journeys typically cost more than taking to the air. Moreover, receipts don't come with purchases of strange foods from sellers on station platforms and odd bits of accommodation.

So what of the work you can do while travelling? I had planned and expected my many hours of mildly enforced confinement to provide a good working environment. But I wasn't prepared for what turned out to be the most productive period of my academic career, particularly on the return journey. During the outward trip, I read a range of papers and managed to write another on shipping and climate change. However, after having spent 12 days in China bombarded with fresh experiences, new ways of thinking and new information, the return journey was a wonderful opportunity to begin to make sense of it all, embedding much of it in a paper which a colleague and I had been working on for the past year. This was the first time I had actually put pen to paper with regard to that research.

The train's ability to remove many of the choices that clutter my daily life gave me the seclusion and concentration I needed to set to work on what has proved a very challenging paper. By the time Moscow arrived, I had completed

about 75 per cent of the writing; this would have taken another six months had I flown to Shanghai.

From a productivity perspective, the 20-day train journey easily trumped the two-day flight. Counter-intuitive perhaps, but I remain convinced that a carefully planned train journey not only delivers lower emissions by an order of magnitude, but facilitates the process of research in a way that universities and daily life simply can't match. Add to that the 'slower' ethos that such journeys engender, and I think there may be early signs of making a meaningful transition to a low-carbon future – or at least a bridging ethos – while we wait for the panacea of low-carbon technologies to become the norm.

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Addendum: *Children, families and slow travel …*

Amongst the wealth of responses to the original blog, a recurrent theme was "*I really can't see how those of us with young children could spend so much time travelling slowly when we could, by flying, be back home quickly and spend more time with our families".* On a more altruistic note, several colleagues with children suggested that they *"should perhaps avoid any longer-distance travel, as the emotional pull to return quickly is inevitably very strong".*

I certainly can empathise with the challenge of balancing work and family pulls on our time. Ultimately, climate change is mostly about families and friends – but surely not only ours in the here and now?

If the science is broadly correct and the emissions trends continue, then we're heading for enormous changes for many families even in the short term. These families may not be our own - much more likely they'll be those who have not contributed to the problem, have little income and live in areas geographically more vulnerable to climate change impacts. So the choice is about whose family and friends matter most. We choose to fly back to be with our family as quickly as possible - so as not to be away for more than a few days. But the repercussions (ok, not on a 1-to-1 basis perhaps) are for another family in another place to lose their home, suffer food and water shortages, social and community pressures and wider conflicts – to put at risk the very fabric of their families and communities.

Moreover, our reducing time away from our families by using fast and high carbon travel also has longer-term repercussions for our own children. Are we rushing back for the sake of our own families or for *'our'* individual engagement with our own families? This is a subtle but I think important distinction. Are we concerned about our families only whilst we're around to enjoy and benefit from them, or are we more altruistically concerned regardless of our own immediate returns? When we're dead and buried our children will likely still be here dealing with the legacy of our inaction today; do we discount their futures at such a rate as to always favour those family activities that 'we' can join in with?

I'm not talking about this solely in an abstract manner; most of my immediate family have gone on to more ethereal activity leaving me with an uncle in Scotland and another in Australia who is getting on in years and not in the best of health. I last saw him in 2004 and have since stuck to the difficult decision not to return to visit him. Ok I may relent one day, but for now I'm unable to reconcile my desire to share family memories with my fine Ozzie uncle and the fact that my visiting him jeopardises others' abilities to lead good lives with their families.

Life in a changing climate is awash with such thorny issues and tough decisions. To me the guiding principle (supported by the maths) is that those of us responsible for the lion's share of emissions are the same group that need to drive emissions down – and fast.

Technology alone cannot deliver the low carbon promise land in a timely manner. The future is in our hands now, our lifestyles, behaviours, practices and habits. If we are truly concerned about families (others as well as our own – now and in the future), then perhaps the overseas trip is not as 'essential' as when we could travel quickly by plane. Alternatively, if we still consider it an important trip, we must assess whether the additional time away from our family as a consequence of slower travel is compensated by the value of our message. The decisions just got tougher. Of course, it could be that we are that shining example of an exception to the rule – enlightened beings preaching real mitigation to our parishioners 32 thousand feet below.

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Is it really surprising that the *hoi polloi* are indifferent to our pronouncements and politicians pay only lip service to our analysis, when those of us working on climate change exhibit no desire to forego our own high-carbon lifestyles?