Mobility and climate: a need for action

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16 November 2015

From the movement of people to the transport of freight, mobility is a major source of greenhouse gas emissions, and therefore a contributor to climate change. Professor Kevin Anderson assesses where we stand today and the prospects for the future of our mobility.

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In 1988, the United Nations set up the Intergovernmental Panel on Climate Change, the IPCC. The first report from the IPCC, which is basically the collective global expertise on issues of climate change, came out in 1990. From that report we knew everything we needed to know in terms of what we must act to reduce our carbon dioxide emissions. Now this year, a quarter of a century later, our emissions this year will be 60% higher than they were in 1990. Since the last report in 2007, we've put 200 billion tonnes of carbon dioxide into the atmosphere.

Rising carbon emissions

So now in 2015, the situation is much, much more serious than it was in 1990. We have used up a large proportion of what we call the carbon budget – how much carbon dioxide we can put into the atmosphere for a given temperature rise – and so now we have very little carbon budget left; so the changes we need to make now, in 2015, are much more severe, much more draconian, and more difficult for modern society than they would have been if we'd started to act in 1990. But we have actually chosen as a community to fail on climate change, and we're now left where we are in 2015: with a much more difficult challenge. That is what the Paris negotiations in November and December will have to try and deal with. Mobility – our travelling, but also the movement of our goods, whether that is computers, or clothes from China, or cars moving across Europe from Germany, or from France to the UK; our own personal travel and the movement of freight – probably represents something like a third of our emissions. But if we think more specifically in terms of somewhere like the EU, then about 12% to 15% of our carbon dioxide emissions actually come from our private use of cars. So cars are a major source of emissions within the EU. And then beyond that we also have aviation, which is another major source of emissions. In the UK it is about 6% – a little bit more, a little bit less – it depends each year. About 6% of all our carbon dioxide emissions just from flying, and we must remember that only a very few people fly, so a small percentage of the population are responsible for a very significant chunk, 6%. And then if we're talking about shipping, shipping is another 3% or 4% globally; aviation is probably 2% or 3% globally.

So mobility is a really important contributor of carbon dioxide emissions. We are doing quite a lot about electricity generation – France already has a large nuclear programme and the majority of your electricity is very low-carbon; there is a movement towards more renewables in the electricity system. But when it comes to car transport, when it comes to planes, when it comes to ships, we are still just increasing our carbon dioxide emissions year on year. So for mobility, though there are many things we could be doing – except in aviation, which is very difficult – at the moment we are moving in the wrong direction in terms of mobility. So mobility is a major part of the problem, and it is getting worse.

IT: a mixed blessing for the climate

There are many new technologies that we can now use, what we often refer to as IT technologies, for instance, computers that allow us to use email or social media, that allow us to communicate in different ways, but also video-conferencing, and facilities like this. So in theory at least we could be using these as a form of communication that would not require us to physically move from one place to another. But these in themselves of course use a lot of energy, a lot of electricity. Some estimates have been made for the computer services around the globe, and they use about as much energy as does the aviation industry, so the computer servers themselves are a real problem. But having said that, if you can make a low-carbon electricity system like you have in France or we have in Iceland or in Scandinavia, then it can be that you can power the IT system – for our computers, our virtual conferencing facilities, we can power those - through lower carbon electricity. But there's also another issue, in that these IT facilities, they can help us avoid doing lots of travel, so particularly for academics or for people in businesses and so forth, maybe they can travel less, and they can use more of the IT for communicating with colleagues in other countries or other parts of the world, or indeed even just a few miles away, rather than having to travel to visit them. But they also help facilitate better communication with each other, which then can often lead to us thinking, well we'd better meet with them physically. So it has also been a mechanism for encouraging us to travel more. So how we use the technology will have the impact on whether it is good or bad for climate change. At the moment, I would say the IT technology, the opportunities we have, we are using those in addition to physical travel and probably also they increase the amount of physical travel that we actually do.

Using technology to avoid travel

So they are not being used in a way to reduce our emissions, but there are ways we could be using them like that. And there are also economic benefits in that it is expensive to be travelling, not just in the purchase of the ticket and the journey itself but from the time perspective. Most of that travel time is not that productive, so maybe if we can use IT - virtual conferencing facilities, then we can avoid those travel times. That can be quite good for companies, quite good for people with busy lives, or who have families they want to spend more time with and less time travelling. At the moment, as I say, I think they are not really helping on climate change, they're probably not helping also in terms of keeping costs down and they're not helping in terms of us having less busy, less hectic lives – they're making things probably worse at the moment.

A strain on power transmission systems

If we carry on not acting on climate change we're going to get more impacts, and those impacts will play out in terms of how we travel, our forms of mobility, as well as in many other areas of our lives. For instance, we've just had this very recently in the UK when the weather was very hot. Our train lines in the UK were not designed for these levels of temperature we had. We had the hottest day on record in July just recently and the train lines were expanding more than they had been designed for, so they started to buckle. So that means the trains can't run on those train lines. Also, our tarmac in the UK – and this would also happen in France if the temperatures keep rising – is not being designed for the temperatures we are seeing. So it starts to melt and you get more damage to the roads, you get more friction with the tyres, so the cars use up more energy as well. So there are simple infrastructural issues like this. But in addition to that, as we move towards more electric systems, electric cars or electric

trains, it could be that the cables that run underground are cooled by soil moisture – moisture that is in the ground. If you have prolonged heatwaves, that moisture evaporates, the cables can no longer be cooled, and they cannot transmit as much power. Now that's occurring at the same time, during a heatwave, that our fridges are requiring more power and our refrigerators and our air-conditioning units and the water pumps to give us cold water to shower to keep ourselves cool, and maybe our electric cars or our trains or our trams. So any electrical system could really struggle with increased temperature, unless we start to find alternative ways to cool the cables. So what I'm really saying here is that the infrastructure that we have built across much of Europe but many parts of the world, is designed for the climate that we had in the past; they've not been designed for the climates that we are moving towards. There will be many ways that our infrastructure does not work particularly well, and these – probably like a perfect storm – they will all build on each other, where everyone's fridges are working harder, whilst you're having maybe electric cars or electric trains, and the temperature's rising, and all of these things pull together to make it so the system will probably start to fail. That's a very expensive thing to overcome to avoid that, or when it does happen of course it can be quite disastrous for a modern society when suddenly it finds that it does not have energy. So I think there are lots of issues about how the climate will impact our lives and some of those will play out certainly in terms of mobility. In addition to that, we are likely to see, particularly in some of the northern cities – northern parts of France, across into Germany, Scandinavia and the UK, and we are already seeing some early signs of this – we are likely to see people moving from places in the world where it is very difficult to survive, or very uncomfortable. These may be a long way away, as we're seeing now with some of the refugees, but also even within Europe, we see people moving north within Europe because it's more comfortable to live in mid or northern France than in the south of France. So these will put additional pressures on our existing infrastructures: on our train lines, on our commuting facilities and so forth. So there will be many issues, some of which are related directly to temperature, some of which are related to how we respond to a rise in temperature and changes in rainfall patterns and those sorts of things. Early signs are that we will put increasing pressure on already quite overstretched infrastructure systems that keep our modern society running. If, as at the moment, we are failing to address issues of climate change, what is going to happen is that we are going to get increasing levels of warming, increasing stresses in the way that we have to live our lives in our cities and so forth. The later we leave it, the more difficult it will be to respond. In the interim, what we will have done is built more high-carbon infrastructure.

More investment in high-carbon infrastructure

Again as an example I can use the UK. There's been a lot of discussion in the UK about where they're going to put the additional runway capacity, additional airports, in the UK, but also with new roads, with new rail networks and with new ports. We're putting all of these things in place; these are all high-carbon infrastructures that we're putting in place. Then by about 2020, 2030, when we start to see some really big impacts hitting our cities, which are already hitting other parts of the world now, we'll start to say, 'Oh, well we shouldn't have done this, it was a waste of money; we now have to find alternative ways of doing things.' But we will already have locked in certain types of behaviours, certain ways of doing things. We'll have bought the technologies that allow us to use these infrastructures. Our ships will have been built, we'll have bought more petrol and diesel cars. So unless we start to make the changes now, what we are doing is we are locking ourselves into a difficult future in terms of emissions but also then a much more difficult future in terms of rapidly moving away from those. If we don't do something now, we'll have to adapt much more quickly and severely at some later date. Because without a doubt, what we are absolutely clear about: the climate is changing, and it will go on changing. Regardless of what we think in terms of politics and economics, the physics of the climate will force us in the end to make changes.

Improving existing vehicles to reduce carbon emissions

So if we then think about, well what would we need to do now? There are many things we could do within the car fleet now, for instance, that do not require us to immediately change the technologies. A

lot of people talk about 'we must go to electric cars'. I think if we move to electric cars that is a positive move. But that still means that we have a car that weighs 1,500kg, carrying a person that weighs 70 to 100kg, maybe 6km or 7km. That's not a great way of moving one person: the idea of taking all that machinery from one place to another. So I think we have to have a concern about swapping from a mobility system – a car system that's just big, internal combustion engine petrol/diesel cars – for electric cars. That may be good for emissions but it's not good for many other things about how we live our lives, so we have to think about that. Even with those technologies themselves, there are many vehicles that are sold in Europe now whose emissions are about 100g per km of carbon dioxide or less. There are about 300 models of cars that are made across Europe that are 300g or less carbon dioxide per km. Yet the average car that is sold in Europe now is probably 140-150g. The average car on the road in France, as in the UK, is probably 160g, 180g in Germany and Scandinavia, and 210-212g in the US. And yet we are already making cars at no price premium - that use exactly the same infrastructure, that use petrol or diesel - that are much more efficient. And these are made at every model size except for the sports SUV, the very fast four-wheel drive. For every other vehicle, we can have much more efficient versions. But the European Parliament, the governments have not put in legislation to drive us towards these more efficient vehicles. They allow us a choice. I think we could make probably a 50% to 70% reduction in our emissions in about 10 or 12 years if we had very strict emissions standards using existing technologies, without any new technology, and a natural rate at which we replace our cars. We've done some detailed work on this to show you can deliver that. That is really important, and we could do that very quickly. But on top of that we also need to change those technologies as well. So we need to phase in more electric cars.

Finding the right mechanism for change

So there are many things that we can do here that would move our technologies, particularly in the car fleet, towards being much more efficient. But we have to be quite careful here that if we do this via price, and that's a very common way that people talk about this – let's price inefficient cars out of the market by putting the price of fuel up – then that is very difficult in terms of equity, because people who are much poorer cannot afford the latest cars. So if we just used prices, people like me, the middle classes, the relatively wealthy people, can buy our way out of the problem and the people who are poorer will really struggle. So we have to find the mechanisms to make these changes that are equitable. And at the moment I don't think the policy makers have really thought this through. And yet we have lots of ways of doing this. Emissions standards, rather than using prices, they force industry to make changes to those technologies. Those technologies would then penetrate quite rapidly the existing car fleet, for instance, and then in three or four years' time, those cars become second-hand cars and poorer people can afford to buy them. So the route by using standards can be much better in terms of equity than driving those changes by using prices. So I think we have to be very careful about what mechanisms we use, to not make other problems in our society as you make these transitions.

A message of hope

But if we put all this together, this is a real message of hope in that we have all of the facilities, certainly within the car fleet, but also within normal transport in our own countries, to make very rapid reductions in our emissions. When I say that, I'm talking about 50%-70% in 10 years or so. Sometimes by using existing technologies – but the best that's available, and there's no price premium for those. Sometimes by moving towards more electric vehicles, and you start to see that in Paris – there are some electric vehicles and plug-in points. So there are many ways we can use those existing technologies. But also, with IT, we can travel less. We could also start to cycle more, to walk more, to make our cities more attractive to walking and cycling. Again, you can see that in Copenhagen or Amsterdam, it's a much more attractive city to walk or cycle around than if you went to London or, to a certain extent, to Paris, which is still quite a busy city in terms of traffic. There are many, many cities in Europe that are still dominated by cars, but there are many other examples that are dominated by pedestrian walkways, by cycling or by public transport. So if you put all this together on the mobility side there are many, many things we can do to get mobility in line with what we'd need to do to avoid dangerous climate change,

to keep our carbon emissions down. But all of this requires proactive, innovative government and a public that is prepared to support the government as it puts these policies into place.

Changing lifestyle

There are also many things we can do in how we live our lives. We're not going to solve this problem just with technology. We have to start to think about how it is that we do what we do, and why it is that we do that, and are there ways we can live our lives that are lower-carbon? When we think about transport, we still travel a long way to work. So are there ways we can live nearer our work, live in our cities? And again, if you look across European cities there are big differences. If you look at somewhere like London, a lot of people commute into London many miles. Where I live, I commute probably 20-23 kilometres every day by train. I could alternatively live in the city centre but in the English cities, people have generally moved away from the city centre, away from the places of work, and we now expect to have to drive or to travel to go to work. We will have to think about changing our city planning, our town planning, to encourage us to live in good comfortable environments but perhaps nearer to work. Also, our habits of when we go to work. When we look across many European cities and elsewhere in the world, we see certain 'rush hours' as everyone tries to go in a particular one-hour period so all of the transport system is full. The underground system in Paris or London, or the road networks are all congested for one hour and then it's quieter till the evening. So maybe we have to think about how we start to adjust our work patterns to fit with using the existing infrastructure in a more sensible way, that can make it more efficient and therefore lower carbon – and also more pleasant to use.

Towards a new way of working

There are many complexities about trying to change our system and we have to try and make the changes that work for us all. So it may well be that you are in an office and some of the people in that office have families and may want to get back in the evening to spend time with their children before they go to bed. But it may well be that in those offices there are other people that do not have children and who would happily sleep-in in the morning and go back home later in the evening. So we can adjust the way we live our lives, or there are perhaps some days when people could work from home. We may also have to think about working different numbers of hours, so at the moment, although we have had all this productivity over lots of years and improvements in technology, generally the hours certainly in the last 20 or 30 years haven't changed that significantly in some European cities and some countries within Europe.

Changing the way we change

But the complexities cannot be dealt with necessarily just by the politicians. They need to be thought about by the directors, by the leaders of companies, organisations and institutions. I work in a university and we really still work the same way as if we worked in an office outside. But we have lots of opportunity for working quite different hours, in different ways. So I think we need to be a little bit more innovative in how we think about these things and, ultimately, in the end, we must try and make it so it improves the quality of life of individuals, rather than just impose upon them changes that just may make things quite difficult for them.

Mobility

For the Mobile Lives Forum, mobility is understood as the process of how individuals travel across distances in order to deploy through time and space the activities that make up their lifestyles. These travel practices are embedded in socio-technical systems, produced by transport and communication industries and techniques, and by normative discourses on these practices, with considerable social, environmental and spatial impacts.

En savoir plus x

Movement

Movement is the crossing of space by people, objects, capital, ideas and other information. It is either oriented, and therefore occurs between an origin and one or more destinations, or it is more akin to the idea of simply wandering, with no real origin or destination.

En savoir plus x

Lifestyle

A lifestyle is a composition of daily activities and experiences that give sense and meaning to the life of a person or a group in time and space.

En savoir plus x

Associated Thematics :

Lifestyles

- Digital technologies
- Crises
- Work

Policies

- Cars
- Ecological transition

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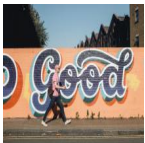
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To cite this publication :

Kevin Anderson (16 November 2015), « Mobility and climate: a need for action », Préparer la transition mobilitaire. Consulté le 25 April 2024, URL: https://forumviesmobiles.org/en/videos/2964/mobility-and-climate-need-action

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