



## Transport and adaptive capacity: An integrated approach to UK policy evaluation

Posted by [Chris Vernon](#) on May 10, 2009 - 10:30am in [The Oil Drum: Europe](#)

Topic: [Environment/Sustainability](#)

Tags: [adaptation](#), [climate change](#), [oil dependence](#), [peak oil](#), [sustainability](#), [transportation](#), [united kingdom](#) [[list all tags](#)]

This is a guest post from Robin Lovelace ([lovelacerobin@yahoo.com](mailto:lovelacerobin@yahoo.com)), a graduate student at the University of York, UK. As part of his Environmental Science and Management MSc Robin was asked to pick a policy area and discuss how it could adapt to climate change. Due in part to the Oil Drum, he decided to include peak oil in the discussion, with a reluctant 'OK' from Professor Mike Ashmore. Robin is a qualified bicycle mechanic, writing part-time for [Interclimate](#), starting an interdisciplinary PhD in energy research next year and wants to save the world.

---

Writing about transport and climate change in the UK I soon realized that climate change cannot be viewed in isolation from other phenomena such as peak oil. I also realized that adaptation should not be seen narrowly as coping with new atmospheric conditions. We need to build [adaptive capacity](#) in general to deal with a range of pressures (Holling et al. 2002), including peak oil and climate change.

While the central findings relate to local, regional and national policy in the UK, I believe they apply across the industrial world. On the individual level, it shows that we need to integrate our transport choices with the rest of our lives: health, happiness and living near one's place. In a globalised capitalist economy, [some](#) find themselves pushed around the world by market forces. It is now time to follow the advice of a wise man: "Find your place on the planet. Dig in, and take responsibility from there." [Gary Snyder](#).

### Central findings

- Transport policy needs to be integrated into other policy areas, especially energy security, public health and community links if it is to adapt to climate change.
- Physical and technological limits to change must be considered before creating transport policy to adapt to climate change.
- The UK's existing transport system is vulnerable to climate change and peak oil. Considering only climate change may result in ineffective policy.
- Physical risks threaten the transport infrastructure of the UK. New light railways, walkways and bicycle paths should be located above flood plains.
- Economic risks can be overcome by a move towards non-motorized transport.
- Social risks include the possibility that people are unwilling to adapt. Plans must be made now to allow a smooth transition away from the car.
- Climate change offers a unique opportunity to improve the UK's transport policy.
- **The central message is that transport policy must focus on simple technologies that are proven to work on a large scale today.**

### Introduction

There is an ongoing political furore over the future of the UK's transport policy. Debates rage over the third runway at Heathrow, EU vehicle emission targets, and recently (March, 2009), a plan to [subsidise car disposal](#).

Relatively little has been said about the transportation sector and adaptation to climate change. [Government literature](#) on the subject is totally inadequate. This essay was written primarily to move the debate forward. I hope that the information below leads people to reconsider the sustainability of their own means of transport. By sustainability, I mean "the capacity to create, test and maintain adaptive capacity" (Holling et al., 2002).

This essay aims to show how the UK's transportation system can adapt to climate change.

For too long climate change has been viewed in isolation from parallel phenomena that may be equally important to human wellbeing.

For example, analyses that ignore resource depletion may recommend resource-intensive solutions to climate change, such as [personal flying machines](#). In the light of 21st century resource depletion, such recommendations would not only be misguided, they would be dangerous.

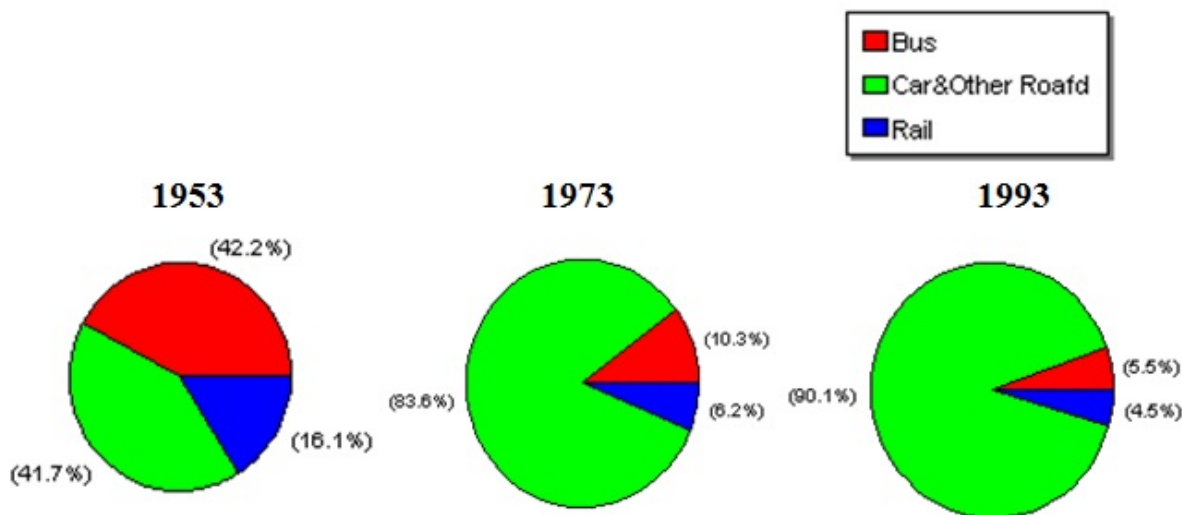
A [comprehensive review](#) of the policies available has been done by the UK [Energy Research Council](#) (March, 2009), neatly described on the [The Guardian](#) newspaper. The report concludes that behavioural change is likely to be the most desirable option in the short term.

## A reality check

"For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled." Richard Feynman

Consideration of physical and technological limits focusses attention on the more realistic options available.

The current transportation system has become dominated by the personal automobile (Figure 1).



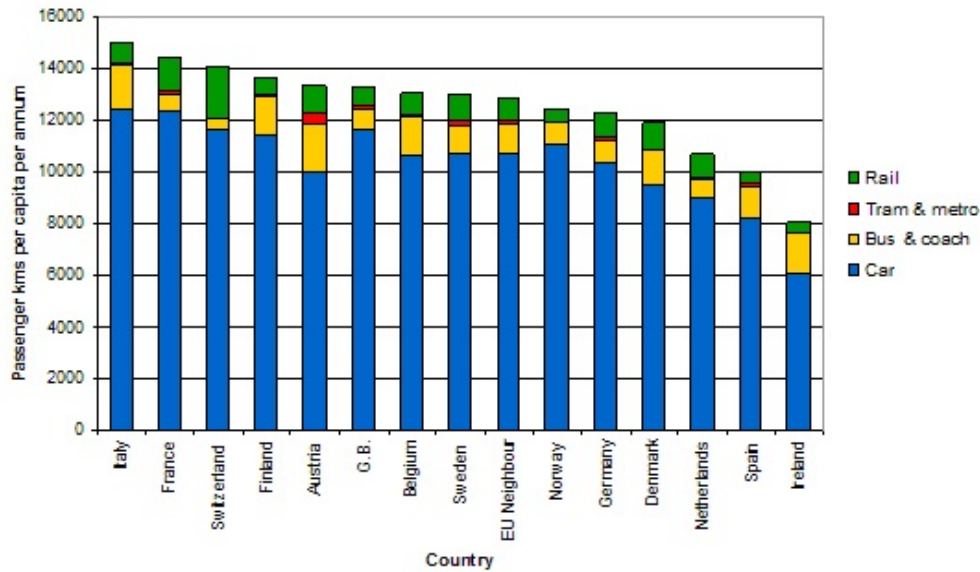
**Figure 1:** Percentage of passenger miles travelled by car, bus and rail between 1953 and 1993 (DfT, 1995). [Click to enlarge](#)

Not only do cars transport UK citizens over a larger distance than any other form of transport

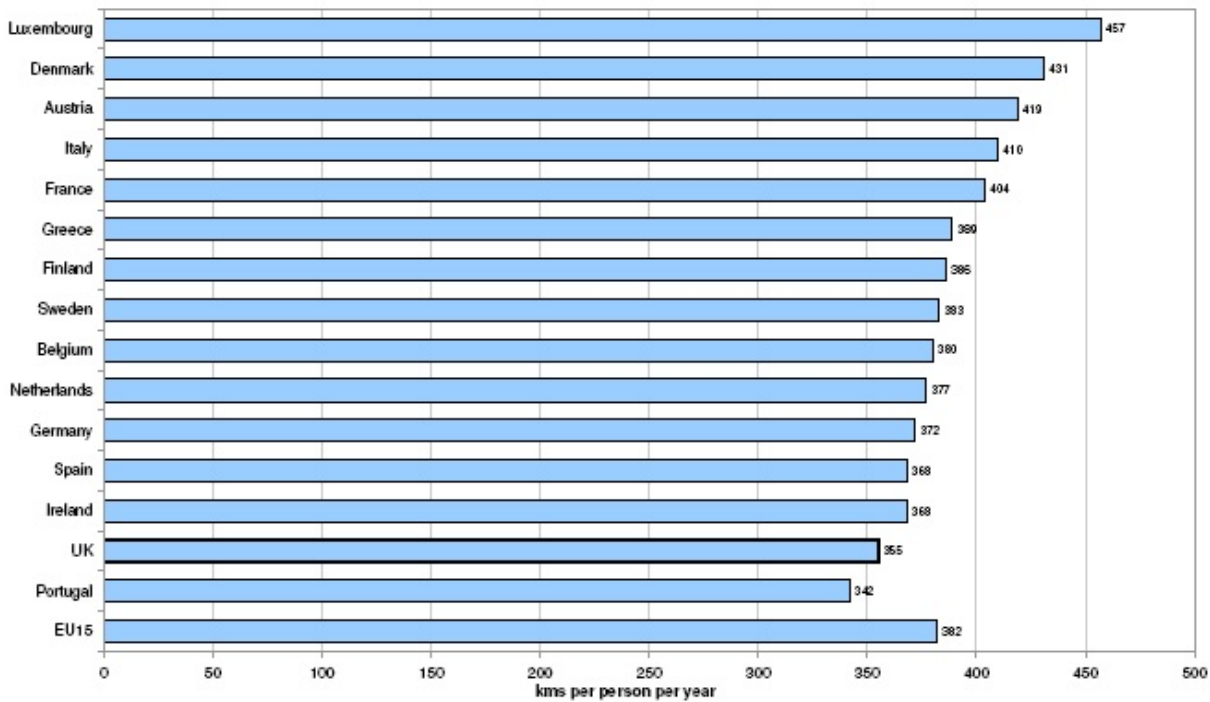
$4 \times 10^{11}$  passenger kilometres, or 88% of the total. The transport infrastructure of every city, town and village is designed around the car. Car ownership is 38% in the UK, compared with 1% in China, and 48% in the USA. The car dominates motorized transport (Figure 2). Obesity, caused partly by car dependence, could cost the UK £45 billion per year by 2050. Adaptive capacity depends on the nation's baseline health levels and community interconnection (Holling et al. 2002). Therefore car dependence can be seen as an important barrier to adaptation.

Britons fly more frequently than almost any other citizens on Earth, which acts against the build-up of community links and may increase social isolation (Gössling, 2002). Community links make a country resilient to any stressor, including climate change.

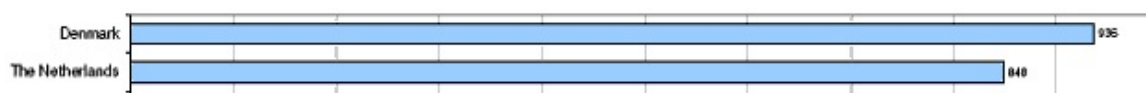
2a

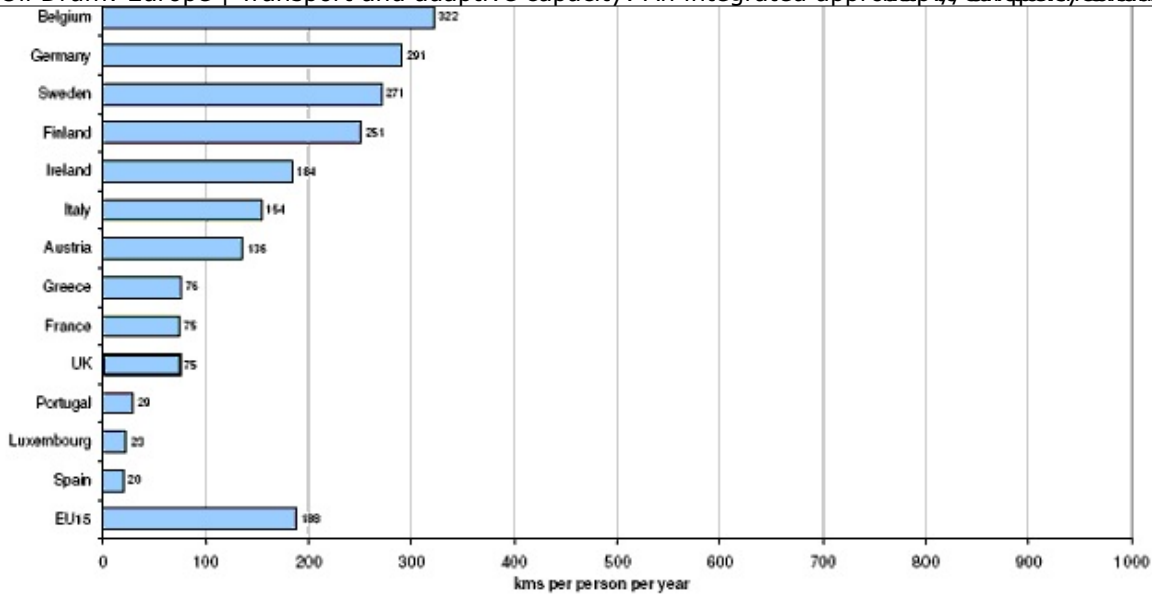


2b



2c



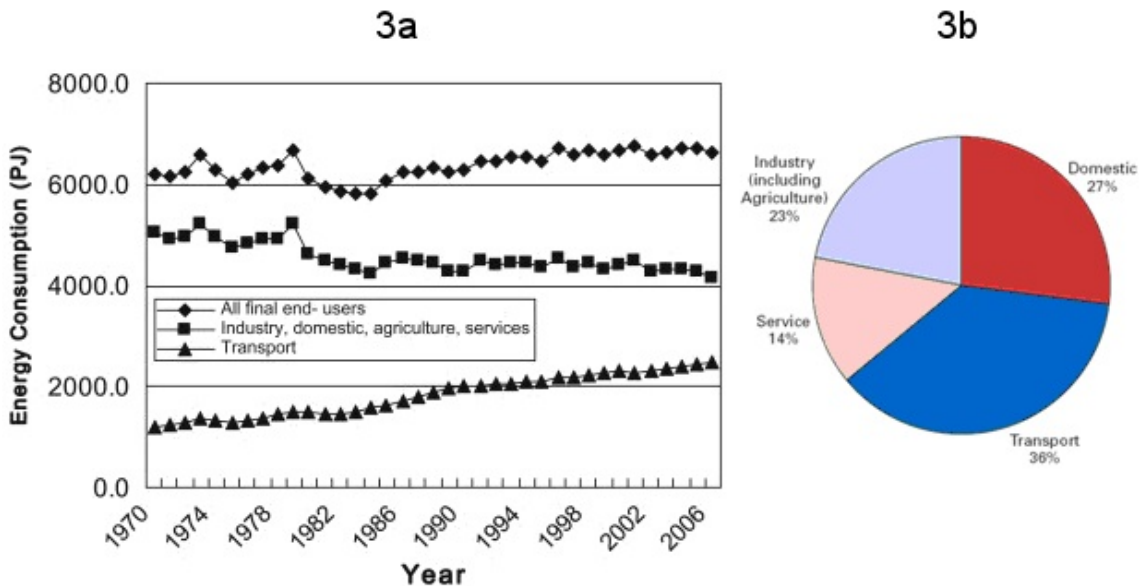


**Figure 2:** Distances travelled by car, bus, rail, tram, foot and by bicycle per capita in a selection of EU member states (CFIT, 2007). Figure 2a is restricted to motorized transport. Figure 2b and 2c are restricted to walking and cycling respectively. Click to enlarge.

**Physical limits** cannot possibly be broken. It is important to consider physical limits to avoid wasting resources on projects that are destined to fail.

Resource constraints, especially peak oil, will be the most important set of physical limitations imposed on the UK’s transportation sector. With this in mind, the increasing share of the UK’s energy budget consumed by transport is especially worrying (Figure 3).

The current transportation system has become dominated by the personal automobile (Figure 1).



**Figure 3:** Energy consumption by the transport sector. 3a shows energy consumption by end-user in the UK between 1970 and 2006 (Gasparatov et al., 2009). Transport has progressively burned more high quality fuel as other sectors’ energy use remains constant and even as efficiency improves. 3b shows predicted final energy usage in the UK in 2010 (BERR, 2007). Click to enlarge.

21st century resource depletion means that some of the complex technologies touted as ‘solutions’ to peak oil (e.g. biofuels, electric cars, and hydrogen cars) cannot be effective at the global level on

**Technological limits** can be overcome by research. Unfortunately, the timescale between drawing up an idea, and putting it into production is long. Energy systems are subject to an especially high level of inertia and have historically adapted only on inter-decadal timescales (Smil, 2008). By focussing attention on simple, low energy technologies that already work (e.g. walkways, rickshaws, bicycles, and buses), government and industry can avoid wasting scarce resources.

In the long term, complete decarbonisation of the transport sector is necessary as fossil fuels become depleted over the 21st century.

## What do we want from the transport sector anyway?

[The government's transport bureaucrats](#) appear to see the sole goal of transport as the moving individuals from one place to another. However, the transport system is more than an array of individual teleportation devices: it is the fabric of our social space (Illich, 1974). The transport sector affects the following goals.

- Financial viability
- Congestion mitigation
- Safety
- Noise reduction
- Air quality
- Climate protection
- Nature conservation

Adaptation will only be possible if climate change does not [exceed a certain level of severity](#). Therefore a whole range of factors add to a society's adaptive capacity. Because of this, I would like to add some additional goals to the 7 identified above:

- Energy security
- Social cohesion
- Public health

## Risks to the current transportation sector

“A people can be just as dangerously overpowered by the wattage of its tools as by the caloric content of its foods, but it is much harder to confess to a national overindulgence in wattage than to a sickening diet.” Ivan Illich

Some of the physical threats to the transport sector are as follow:

- Increased frequency, duration and intensity of heat waves and floods pose threats to transport infrastructure.
- Increased winter-time rainfall may cause increased flooding of roads and railway track.
- Transport hardware will be exposed to increased risk from flood damage as garages, bike shops and bus and train depots become inundated.

Combine climate change with peak oil and the current global depression: it becomes clear that the UK's economy is in trouble. The economic threats to the transport sector include:

- The haulage industry could strike as it did in 2008. Combined with other problems, this could lead to food shortages in some parts of Britain.

- Oil price shocks could leave car-dependent families and businesses stranded, while import restriction could leave petrol stations dry.
- Planned investment in transport infrastructure may be cancelled as liquid capital dries up.

Economic turmoil can lead to social turmoil. A possibility is that instead of adapting by finding new forms of transport, people will simply give up and decide that we are 'doomed'. Such pessimistic fatalism poses a significant risk to the sustainability (capacity to adapt) of the UK's transport system.

- There may be a switch in attitudes from 'there is no problem' to 'we are all doomed'.
- People may become depressed and simply increase their vice-dosage of food, alcohol, porn or television, preventing adaptation.
- People in a position to help others adapt to new transport systems (e.g. bike mechanics, coach-company operators, politicians) may be unable to act.

## Opportunities

"In Chinese the word crisis is composed of two characters. One represents danger, and the other represents opportunity." John F. Kennedy

One of the major attractions of the personal automobile is that it keeps people warm and dry when the weather is cold and wet. Warmer summers could remove the one of excuses people offer for not travelling by bike or foot.

On the economic side, the lack of money in the system may provide a unique opportunity for people to admit the shortcomings of the current set-up. Already, the uptake of cycling for economic reasons has soared. Continued economic strife could lead a significant proportion of the population to ditch the car in favour of more healthy alternatives. This shift to walking and cycling would increase the adaptive capacity of the UK in terms of: health, community ties and energy security.

The government takeover of the banks may create investment opportunities for the greater good. Schemes such as safe walkways and cycle routes above floodplains rely on such government funding.

## Recommended pathways of adaptation

It is now clear that we need an integrated climate policy that tackles the range of problems that we face in the 21st century. A series of isolated and incompatible plans for each UK policy area is of little use to policy makers. These are some of my recommendations

- Transport in the UK should become less oil dependent.
- The UK's transport infrastructure should be made more resilient to climate change.
- Simple and effective transportation technology should be pursued through government funding of science.

Detailed versions of these recommendations are available online [here](#) in a longer version of this report.

## Conclusion

The central message is that the focus must be on technologies that are proven to work today.

A complete restructuring of the UK's transportation sector is needed to increase the adaptive capacity of the nation's means of transport, economy and society. In the context of climate change and peak oil, current government policy amounts to a cornucopian faith in unproven technology and wishful thinking regarding fuel supplies. If politicians follow outdated transport policies until the bitter end, they lock future generations in to a system that will collapse.

Fortunately, integrated approaches to transport are more appealing than the fossilised approaches they replace. The wide range of actions that could be taken includes measures that simultaneously create jobs and exportable industry, reduce energy dependence, increase public health and recreate broken communities. Action can be taken at many scales, and not just through the national government. The road ahead will be rocky, but it is certainly not impassable or totally new.

It is clear that the industrial car-based model cannot achieve the goals of transport policy in current atmospheric conditions, let alone in the future. We must implement sustainable transport systems now. This essay simply gives some starting ideas.

## References

- Banister R. (2008). The sustainable mobility paradigm. *Transport Policy* 15(2): 73-80
- Doll J. (2008). Externalities of the transport sector and the role of hydrogen in a sustainable transport vision. *Energy Policy*, Volume 36, Issue 11
- Gasparatos et al. (2009). A longitudinal analysis of the UK transport sector, 1970–2010. *Energy Policy*, 37(2)
- Gossop, J. (2006). *Famine in the West*, Available online as an E-book for £2.99 from: <http://peakfood.co.uk/buy-ebook/>. This book was reviewed by Jonathan Porritt as “a robust and authoritative antidote to the dangerously irrelevant “business as usual” bullshit that dominates so much of today’s debate about the future of farming.”
- Gössling S. (2002). Global environmental consequences of tourism. *Global Environmental Change*, 12(4), 283-302
- Holling C.S. et al. (2002). Sustainability and Panarchies, in Chapter 3 of Holling C.S. and Gunderson, L.H. (2002), *Panarchy*, New York: Island Press
- Illich I. (1974). *Energy and Equity*. First published in *Le Monde*, but now found published in full in various places on the internet.
- NHS (2005). Making the case: improving health through transport, *Cyberspace: NHS*. Last accessed 07/03/09 from: [http://www.healthandtransportgroup.co.uk/articles/makingcase\\_health\\_transport.pdf](http://www.healthandtransportgroup.co.uk/articles/makingcase_health_transport.pdf)
- Smil V. (2008). Moore's curse and the great energy delusion. *The American*, November, 2008. Available online on Vaclav's website: [http://home.cc.umanitoba.ca/~vsmil/publications\\_pdf.html](http://home.cc.umanitoba.ca/~vsmil/publications_pdf.html)



This work is licensed under a [Creative Commons Attribution-Share Alike 3.0 United States License](http://creativecommons.org/licenses/by-sa/3.0/).