

---

# 10 The Underlying Structures of Low Carbon Mobility

**Peter Newman**

Curtin University Sustainability Policy Institute (CUSP), Curtin University, Australia.

## Introduction

Carbon structural adjustment is as difficult and controversial as are financial structural adjustment programs in developing countries (Bird, 2001). The process of financial change is painful because it by necessity challenges the very structures and foundations on which economies have been built. Carbon structural adjustment is also much needed but is not yet a program of the International Monetary Fund (IMF) or World Bank. The same kind of fundamental change that came from the UN-inspired Breton Woods conference in 1944 on ending poverty is now on the agenda from the Paris Conference of the Parties (COP 21) in 2015 on ending dependence on fossil fuels.

The main focus of most carbon structural adjustment policy has been the need to replace coal-fired power stations with combinations of technological change (renewable energy, energy efficiency and new energy storage systems) and structural change such as finance, regulation and incentive programs (IPCC, 2014; Hargroves, 2015). These are now well underway and coal is clearly decoupling from wealth due to the structural success of these alternative technologies and institutional systems (IEA, 2016). Although oil and mobility has also been on the same agenda, it has received far less attention on structures, with most attention on technology, new vehicles and new fuels (e.g. WBCSD, 2004). Mobility structures are now being addressed much more since the Intergovernmental Panel on Climate Change (IPCC) and the International Energy Agency (IEA) began to focus more on such matters (IPCC, 2014; IEA, 2014).

This chapter will seek to understand how the structures of mobility, both existing and new, are helping or hindering a low carbon transition. It will assess why three underlying transport structural changes: peak car use, the second rail revolution and the decoupling of wealth and car use, are happening. And these

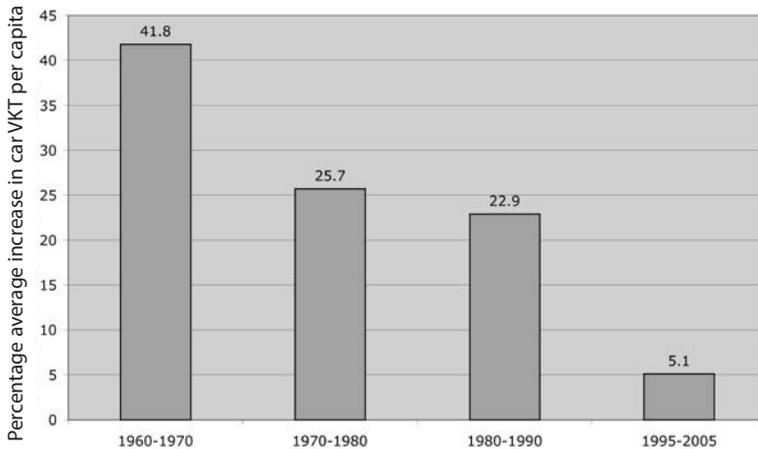
will be explained in terms of three underlying urban structural changes: the re-urbanisation of cities, the economic trends towards the knowledge economy and the cultural trend towards smart phones and tablets. The shift of modes and the re-urbanisation processes together are replacing the previous era of urban car dependence with a polycentric low carbon city. The chapter will end by suggesting how this momentum can continue and enable a low carbon mobility transition.

## Low carbon mobility: Transport structural adjustment

The most recent data on urban passenger mobility shows the start of some rather extraordinary and unexpected trends. Each of these are providing some hope for low carbon mobility structural change that will be explained further below.

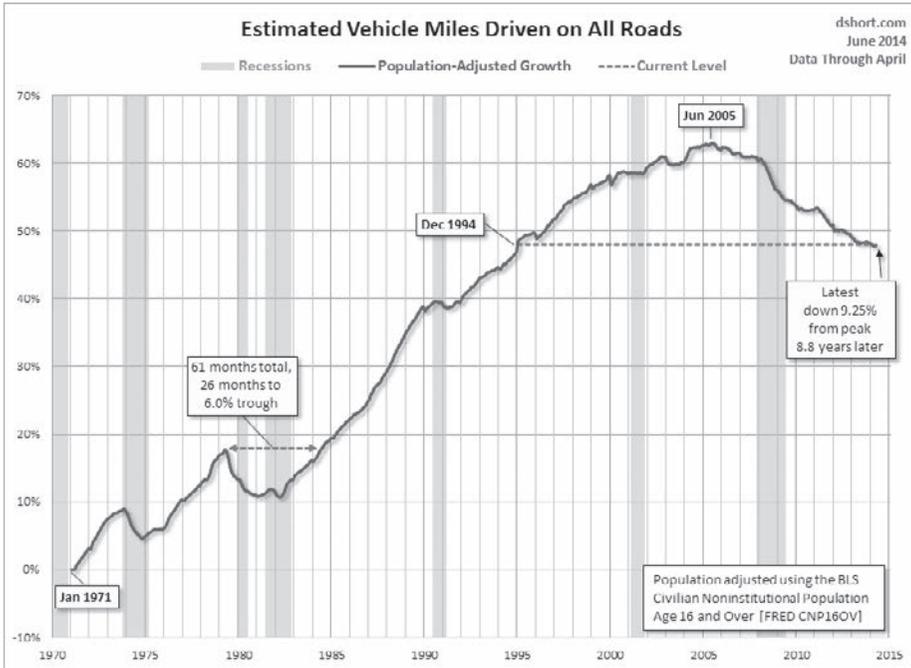
### Peak car

The Global Cities Database, developed by Jeff Kenworthy and many research students, presents data on cities, transport, energy and land use for nearly 40 years (Kenworthy & Laube, 2001; Kenworthy *et al.*, 1999). This research illustrates an interesting trend downwards in car use growth from 1950 to 2005 (Figure 10.1).

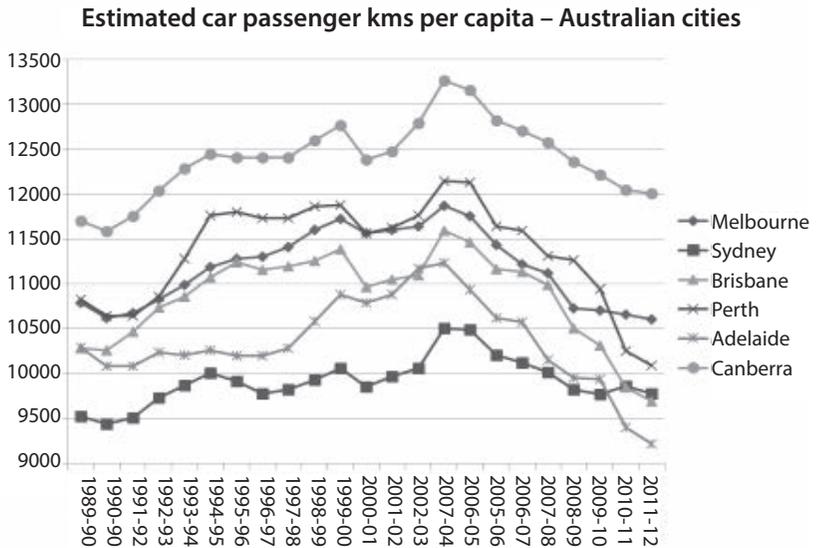


**Figure 10.1:** Car use growth trends in developed cities from 1960 to 2005. Source: Global Cities Database (Kenworthy & Laube, 2001; Newman & Kenworthy, 2015).

It became particularly interesting from 2004, when the US, most of Europe and Australia saw a *reduction* in car use per person for the first time in a hundred years. Figure 10.2 shows the US data and Figure 10.3 shows the Australian data with every city, including the congestion-free cities of Canberra, Darwin and Hobart, all going into reverse on car use. The same patterns have been seen in Europe (Jones, 2016). Newman and Kenworthy (2015) present evidence to suggest that the first signs of this trend can also be seen in emerging cities across Eastern Europe, Latin America, China and India.



**Figure 10.2:** Car use per person peaks and declines in the US. Source: compiled from US Department of Transportation data.



**Figure 10.3:** Car use per person declines in Australian cities. Source: BITRE, 2012.