

Book review:

Richard Gilbert and Anthony Perl (2008) Transport Revolutions: Moving People and Freight without Oil

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Having read this book, one is left with a feeling that the important issues raised should have been at the forefront of policy debates for many decades, not just now. The basic argument is that transport must move away from its almost complete dependence of oil to alternative energy sources. Transport consumes nearly 60% of all oil (2005), and it is in a very vulnerable position as it is dependent on this one source, a potentially unstable set of supply conditions, volatile prices, and substantial increases in demand. This is not a good business strategy, and the risks and uncertainties seem to have grown substantially in the last two years with oil prices rising by nearly three times to around \$150 per barrel.

More fundamentally, Richard Gilbert and Anthony Perl claim that World oil production will peak in 2012. They are not alone in this view, even though it is extremely difficult to obtain accurate figures from many of the producers on their reserves. Matthew Simmons (2005) came to the same conclusion in 2003 through his detailed analysis of available information on Saudi Arabia's reserves that account for about 25% of the World's total. The main criticism of "peak oil" is that with higher prices and improvements in technology, new fields will be found, more oil will be recovered, and oil shales and tar sands will become economic. But the problem here is the speed at which change is needed and the levels of investment required to bridge the gap between cheap oil and expensive oil. This is the argument taken up in this book, and applied to the transport sector where there has been a naïve assumption of unconstrained availability of cheap oil.

The first part of the book is a historical perspective on previous transport revolutions and an assessment of how we have got to where we are. The authors are optimistic about the ease with which potentially damaging transitions in transport have been achieved in the past, with the advent of railways in the UK (1830-1850), and the switch to the car in the US (1940s). Here, the manufacturing industry was able to switch from car production to wartime production (zero cars and petrol rationing), and then back again to car production with a vengeance after the War to create employment, output and wealth. The more recent revolutions have been in aviation (1950s), high speed rail (1960-1980s) and freight. All this provides a fascinating history of growth in an era of cheap oil, where the reader is blitzed with information, but the text is also interspersed with humour and examples to make it more accessible. The description of transport today attempts with mixed success to give a rather factual and global perspective of some of the

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main trends, issues and challenges. Although informative, the overall effect is numbing for the reader, and could perhaps be seen as a resource for reference rather than an authoritative statement of transport today.

The second part begins to tackle the oil challenge, where the key proposition is made that the future for transport is electric. Central to their case are two claims, one that oil use is about three times as high as the rate of new discovery (p124), and the other is their dependence on two key graphs in the book (Figures 3.7 and 3.8), where much is made of the Uppsala Projection. This is based on the work of Kjell Aleklett and Colin Campbell (2003, but not cited), with some additional material from the more established International Energy Agency (IEA) reports. These key elements in the book need to be very clearly argued using all major sources of information, as it provides the main rationale for the need to change thinking about the energy sources used in transport. Aleklett (2008) uses a depletion model to forecast peak oil production of 90 Mbpd in 2011, with production declining to about 50-60 Mbpd in 2030 and demand being maintained at about 80 Mbpd. The message is clear, even if the numbers are uncertain.

Gilbert and Perl go through the alternative energy sources (p146), and they are rightly critical of hydrogen for its inefficiency and losses through the numerous transformation processes (57% losses even with the most favourable assumptions). The focus then switches to the three types of electric vehicles, based on battery technology, plug in hybrids with some on board generation, and grid connected vehicles. It is suggested that an increase of 15-40% would be need in electricity generation to facilitate a complete switch in the passenger car fleet in a high income country. There is some debate over how the electricity would be generated, but little detail is specified.

There is then a lengthy exposition on transport's adverse impacts on climate change and the global environmental arguments for reducing oil dependence. This chapter again provides a mass of information that is up to date and frightening in its articulation of the scale of the mountain that needs climbing. Technological improvements have been more than outweighed by heavier and more powerful vehicles, and the authors try to explain the difference between the potential for reduction (considerable) and the reality (marginal since 1986 in the US). They emphasise the clear links between energy use and climate change, but add the new dimensions of energy and oil availability. Even though there have been dramatic reductions in all emissions (except CO₂) in the US and in the EU (except CO₂ and PM₁₀), all the improvements need to be set against the growth in traffic. The net effect is less compelling. The potential for further reductions is highlighted by the fact that energy use in road transport in the EU is still only a third of the levels in the US. The final part of the book looks forward to the next transport revolutions with chapters on the US and China to 2025. Here the potential for electricity and other non oil sources are discussed through innovations in forms of transport and greater efficiencies in the use of energy. The picture painted for the US is optimistic, as there is still tremendous potential for greater energy efficiency, but it is also suggested that there would be more local production (an end to globalisation?), the need for a new transport agency, and the end to highway and airport expansion. The new electric infrastructure would be paid for out of this transfer of funds and some increases in fuel taxes. There would need to be a new generation of rail investment and a substantial upgrading of existing tracks in the US - a second rail revolution, similar to the one seen in Japan and Europe, and elsewhere. In China, the evidence base is less clear, and not much is said on the organisational and institutional frameworks within which change might take place. Most of the interesting narrative here is on the means to facilitate change.

In the end there is a plea for leadership and a return to Malcolm Gladwell's (2002) notion of tipping points. It is always strange that the crucial issue of leadership comes at the end, but there are interesting issues raised here about the different strategies for the Middle East, the impact of US fuel price increases, China's role and the proposed oil depletion protocol, and the hope that is

being placed on the new US President. Throughout the message is clear, namely that we must change our mobility arrangements, and move fundamentally away from today's oil intensive transport paradigm. As Aleklett concludes (2008, p88), "we have climbed high on the "Oil Ladder" and yet we must descend one way or another. It may be too late for a gentle descent, but there may still be time to build a thick crash mat to cushion the fall."

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