

The antidote to half-truths, distortion and nonsense

Railfuture member David J C MacKay's new book has been praised as a welcome breath of fresh air – to replace the hot air that usually surrounds a discussion on energy use.

As a professor in the physics department at Cambridge University he is well-placed to provide some words of wisdom.

This is a small extract from the "fabulous, witty, no-nonsense, valuable" book, called *Sustainable Energy – without the hot air*.

At its best, shared public transport is far more energy-efficient than individual car-driving. A diesel-powered coach, carrying 49 passengers and doing 10 miles per gallon at 65 miles per hour, uses 6kilowatt-hour per 100passenger-kilometre – 13 times better than the single-person car.

Vancouver's trolleybuses consume 270kWh per vehicle-km, and have an average speed of 15km/h. If the trolleybus has 40 passengers on board, then it's passenger transport cost is 7kWh per 100p-km.

The Vancouver SeaBus has a transport cost of 83kWh per vehicle-km at a speed of 13.5km/h. It can seat 400 people, so its passenger transport cost when full is 21kWh per 100p-km.

London Underground trains, at peak times use 4.4kWh per 100p-km – 18 times better than individual cars.

Even high-speed trains, which violate two of our energy-saving principles by going twice as fast as the car and weighing a lot, are much more energy efficient: if the electric high-speed train is full, its energy cost is 3kWh per 100p-km – that's 27 times smaller than the car's!

However, we must be realistic in our planning. Some trains, coaches, and buses are not full. So the average energy cost of public transport is bigger than the best-case figures just mentioned.

What's the average energy consumption of public transport systems, and what's a realistic appraisal of how good they could be?

In 2006-7, the total energy cost of all London's underground trains, including lighting, lifts, depots, and workshops, was 15kWh per 100p-km – five times better than our baseline car. In 2006-7 the energy cost of all London buses was 32kWh per 100p-km.

Energy cost is not the only thing that matters, of course.

Passengers care about speed: and the underground trains delivered higher speeds (an average of 33km/h) than buses (18km/h).

Managers care about financial costs: the staff costs, per passenger-km, of underground trains are less than those of buses. The



David MacKay Picture: David Stern
total energy consumption of the Croydon Tramlink system in 2006-7 (including the tram depot and facilities at tram-stops) was 9kWh per 100p-km, with an average speed of 25km/h.

How good could public transport be? Perhaps we can get a rough indication by looking at the data from Japan.

At 19kWh per 100p-km and 6kWh per 100p-km, bus and rail both look promising.

Rail has the nice advantage that it can solve both of our goals – reduction in energy consumption, and independence from fossil fuels. Buses and coaches have obvious advantages of simplicity and flexibility, but keeping this flexibility at the same time as getting buses and coaches to work without fossil fuels may be a challenge.

To summarise, public transport (especially electric trains, trams, and buses) seems a promising way to deliver passenger transportation – better in terms of energy per passenger-km, perhaps five or 10 times better than cars.

Sustainable Energy – without the hot air costs £20 and was published by UIT in December. ISBN: 9780954452933 / 978-1-906860-01-1 It is also available online at www.withouthotair.com/

Scotland

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■ ■ Fares, concessionary travel and 'consultation'

Ongoing controversy surrounds the Scottish Government's extension of First ScotRail's franchise from 2011 to 2014 agreed without a business plan and in "closed door" discussions between First ScotRail, Transport Scotland and the Transport Minister.

The Scottish Parliament's public audit committee is now investigating "shortcomings" in the franchising process identified in a November report by Audit Scotland.

In October 2008, seven months after agreeing the franchise extension, Transport Scotland belatedly published, a 25-item questionnaire seeking views on disbursing £70million of First ScotRail "reinvestment" (included as part of the deal).

While the value of "retrospective consultation" may be questioned, Railfuture Scotland felt question 11 merited particular attention: "Which pilot scheme changes to fares should we make to encourage modal shift?"

Railfuture Scotland argued that ScotRail should consider:

- Offering last minute "turn up and fill up" bargain-priced tickets on selected longer distance trains habitually leaving with empty seats.
- Removing the unnecessary and unfair 09.15 "peak" restriction against reduced fares in remoter areas which have very few trains per day.
- Ending the perverse fare discrimination against purchase of single journey tickets which are 99% of the return fare, for instance between Glasgow and Edinburgh.
- Removing the irrational discrimination against those who don't return by train the same day. On the Glasgow-Edinburgh route, returning next day costs nearly double the price of a same-day off-peak return.

Many potential rail travellers shun complex, restrictive and inflexible rail tickets and travel by other more realistically priced means. The amount of rail revenue theoretically "lost" by reducing restrictions would be small and more than compensated for by more passengers on existing stock.

Railfuture Scotland has also outlined the case for including rail travel within the National bus-only Concessionary Travel Scheme. Rail managements have often claimed they are not worried by being excluded from this scheme. Yet figures from the Office of Rail Regulation for 2004-2007, since the introduction in Scotland of the national free bus concessionary travel (anywhere/any time/ any distance), show a decline of 12% in passengers travelling on the Far North Line stations to Thurso and 11% to Wick.

Even more insidiously, many people without concessionary cards now choose to travel by bus, rather than rail, so that they can travel with their concessionary-card friends and relatives. Senior Railcard sales are reportedly suffering, given that paying 66% of the cost of a train ticket cannot compare with free, almost as fast buses. English-Welsh concessionary schemes supposedly offering only local travel, in practice allow long-distance journeys to be made. Some Scottish Councils, have now discontinued or severely curtailed concessionary rail funding since the Government-supported free bus journeys appear to offer a reasonable alternative.

We believe that the 73.6% Government subvention given to bus operators for each journey, should also be available to all UK train operating companies. Card holders would only pay the necessary topping-up cost for the journey, if they thought rail travel worth while. Cost implications for Government would be broadly neutral, since a passenger cannot be simultaneously on a bus and a train! While "capacity issues" have been raised by some railway defeatists, we believe these can be overcome where, or when they arise.

Concessionary travel is now a "growth market" with an influential socio-political voice. Train operating companies and the Association of Train Operators should display leadership and courage by lobbying for their own industry. This would get overwhelming public support and backing from political representatives if this case for "transport justice" was forcefully put to them.