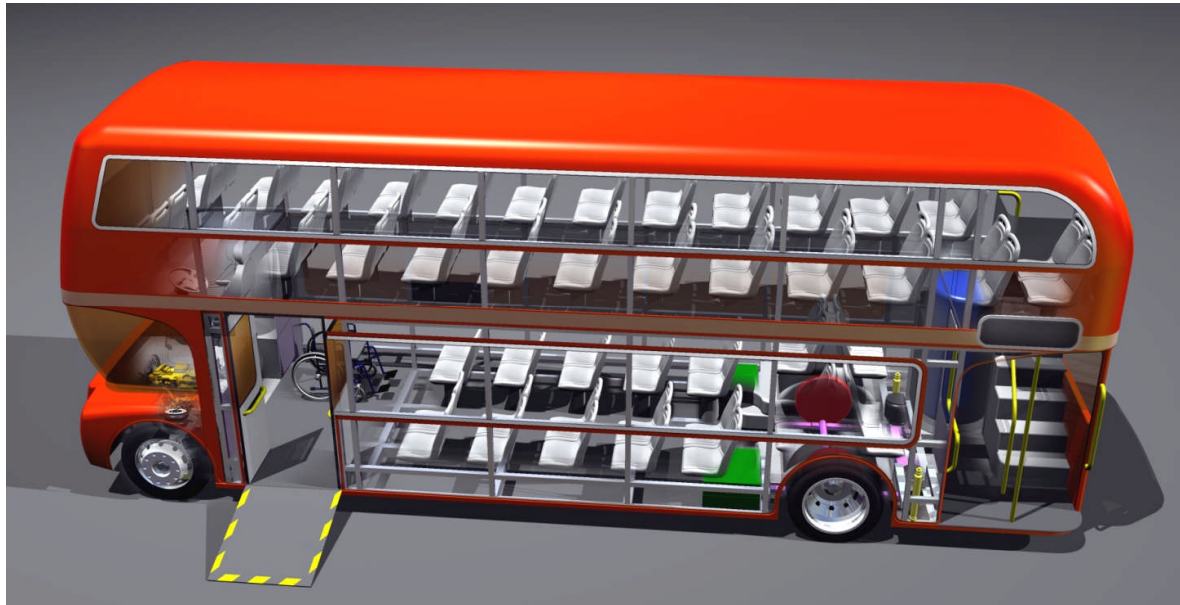


## Taking stock – the New Bus for London

2012-02-03

It is now over four years since we did our first neo-Routemaster concept, so it seems timely to re-visit this much trampled patch of ground. Much has happened, much been said and a not inconsiderable amount of time and cash has been expended. So where to begin?



### **Is a single picture worth 20,300 words?**

We would contend that it is, given the right image. Our Capoco RMXL design study, with the full colour 3D CAD cutaway seen above, was a Xmas bit-of-fun for the December 2007 Autocar magazine. The modest £750 fee we received perhaps gives signal to the seriousness of the original intent. It should be noted that it only had the driver onboard as any more staff would clearly be uneconomic. It was after all just vapour-ware so smart electronics were to manage the open platform, with a mix of warning beams followed by phasers set to stun!

But as a UK bus industry grandee later commented, when studying this cutaway view, “That image is what made it real; made it possible.” So yes, maybe that image is worth the 20,300 words of Policy Exchange’s “Replacing the Routemaster” call to arms.

The firestorm of popular and political reaction took us by surprise. Having traded new bus designs for some 35 years over five continents, this was indeed unusual behaviour. Radio interviews and newspaper articles followed. TfL feedback reached us about the hydrogen fuelled engine and the open platform – “unsafe and impractical” – but we were never sure which way round. In either event, it seemed a bizarre and naive call, since at that very time, London’s roads had both the hydrogen fuel cell Mercedes Citaro and the heritage RML buses running with paying passengers.

There then followed a surprisingly vituperous and protracted flow of bile, particularly in the factional blogs, from the Articulated Left versus the Platform Right. It could possibly be said that this one pivotal image served as firelighter to a bonfire of profanities.

### ***L’eminence rouge, the Routemaster bus***

Capoco has studied this fine vehicle for many years and trust us (we’re bus designers) it is a quite exquisite mechanical design. But this is a program that took place from 1947 to 1959, and even after this glacial development, most of the fleet were off the road in the early 1960s with service problems. Any commercial operation would have been long defunct thru lack of revenue

and the corrosive effects of penalty clauses. Also no-one else, be it near or far, wanted to buy it so build volumes were uneconomically small.

So slow was the RM development, by the time it was ready, both LT and the rest of the bus industry were removing open platforms, fitting rear engines and front entrance doors. This would permit significant savings by avoiding the critical double manning. Even with just the driver, over half the running costs are the onboard labour, which dwarf the fuel, oil, tyre, glass and servicing costs. The last thing one needs is more staff to recruit, train and pay – finding sufficient drivers is hard enough already.

### **Bus Facts of Life**

Buses are relatively long life vehicles so their resale value and subsequent use are critical. This process is known as cascading where a bus starts life with tourists around Trafalgar Square and finishes moving toddlers around Tredgar. This brings to light the great divide between London and the rest, which are termed UK Provincial buses. The former has 2 doors whilst the latter only 1 door.

So many a London bus is retired to the provinces, especially as some TfL tenders will opt for new buses on a route. This conversion requires panelling over the exit door hole and fitting 4 seats in the now empty space. Provincial buses want as many seats as possible, which may prove a problem with NB4L. It will have two redundant doors, plus a redundant staircase. There will be a lot of dead, non revenue earning real estate back there. No problem in the days of a monopolistic LT, but today's commercial operators like to move their fleets around to suit demand.

This is why the staircase on the current London deckers is too far forward and this causes all that tiresome cross flow congestion in the forward saloon. If one was building just for London, the stairs would be more rearward, opposite the exit door allowing two separate streams of people, on and off. If TfL could not enforce this optimum staircase position for London, in the face of stolid operator resistance, how are they going to force a whole new custom bus on them, and then have it sourced from but a single supplier?

The other horrible issue here is the various operating company idiosyncrasies. These are the bane of all the bus manufacturers as the five large UK PLC operating companies like their own specifications to suit their own garages and their own fleets. So whilst TfL may believe they have negotiated a fixed price of the NB4L, it may well be that variation orders start arriving at Wrightbus just when they are being overwhelmed by demand. It would require a veritable saint to avoid much sucking of teeth and "That's going to cost you". Currently the whole *modus operandi* of the UK bus market is having several competing bus operators purchasing very keenly from several competing bus manufacturers.

The export of buses is also good business and this has been proposed for the NB4L. Given the price of the device, this will probably only be into the developed markets, notably Europe and North America. Last time we checked, these were left hand drive markets.

Now a bus is made from three modules - front, centre & rear. To convert from RHD to LHD, the front door and driver's cab are fairly readily swapped. The centre is no problem as the exit door is flipped in a similar manner. The really complex bit is the rear module where all the greasy bits live. On most buses these are left in peace when it is swapped RHD to LHD since the rear end is largely symmetrical.

However some buses, and these now include NB4L, have asymmetric rear ends, both mechanically & visually. Converting these takes a great deal more effort and expense, so generally nobody bothers. There are tens of thousands of 3 door buses on the continent that

have a RH rearmost door and the engine in the LH rear corner. They never come to the UK as they are the wrong way about, and it would cost too much to re-do the whole job all over again.

So given that double decks are not the norm in many territories anyway, the main chance for NB4L seeing foreign shores is into Hong Kong due to the UK legacy there. That move would require a terrific re-engineering challenge as they fit massive air conditioning units, which would then fail to operate properly with an open platform.....

## **UK Bus Manufacturers**

If all of the UK manufacturing industry was as successful as the indigenous bus makers, we would all be so much happier. The domestic market is dominated by home grown manufacturers, who also export rather well around the globe.

Alexander Dennis Limited (ADL) are far and away the leading UK bus builders, with an aggregate of 300 years of bus building experience across their 3 main companies. They are the biggest builder of double decks in the world and their UK model, the Enviro 400, is the top seller double deck in the world. The hybrid version of this bus, the Enviro 400H, has been operating in London for some five years and is the top selling 'low carbon' bus – single or double deck – in all of Europe.

ADL use a series hybrid propulsion from BAE Systems called HybriDrive. This is the top selling bus hybrid drive in the world, again covering both single and double deck. It uses a Cummins 4 cylinder, an unusual approach they adopted, in collaboration with Capoco, some 10 years ago. It drives successfully from one end of the UK to the other, without requiring any 'rests' on the hard shoulder.

Wrightbus have been in recent years a very innovative bus body builder and shown considerable initiative with new technology. But the fact remains they are still essentially bodybuilders, rather than complete bus manufacturers, so build on imported chassis from Volvo, MAN, Scania and VDL. The Society of Motor Manufacturers & Traders records show the Wrightbus are over 25 times smaller than ADL, over this period 2007 to 11, with only 200 to their name versus 5,000 ADL registrations.

Wrightbus' small size and admirable fleet-of-foot approach is ideal for the few hydrogen buses now on test, but to hand them a monopoly over London's double deck fleet, the backbone of the capital's 8,300 bus fleet, is dubious. Since Wrightbus have their own clever body technology, it seems unlikely that any practical licence deal could be arranged.

They too have chosen the same Cummins diesel engine, but only for the first time in this NB4L project. Rather than use the BAE system, they utilise the Siemens hybrid system. All this hybrid technology is relatively new (so expensive) and rapidly changing. So whilst Wrightbus are projecting a 40% fuel saving on the new London bus, their ADL competition is now getting savings of 60% in current service, and up to 80% in future. It is a very dynamic, commercial world so getting involved in commissioning your own bespoke technical solution is a seriously risky business.....unless it is an OPM project of course, as in Other Peoples' Money.

It is pertinent to note that Wrightbus seemed to have abandoned their hybrid double deck some years ago, after building just a few units, until this handy funding came along for the NB4L. They have just re-entered the UK hybrid double deck market. It is not a total surprise to see they are using the very same Cummins & Siemens combination that they have developed for this NB4L program.

There is a real risk here of market distortion, not just of the London market, but also the whole UK hybrid bus market. How does one ensure that the luxurious R&D program funding from TfL is not leveraged into other commercial projects?

## Transport for London

The old London Transport was a single monolithic structure that could decide to create, design, develop, build and operate its own buses as it saw fit. Those days are long gone.

The routes are now competitively tendered by the Big Five UK operating PLCs plus the various state-backed outfits from continental Europe. These operators bid for routes offering buses as they see fit from a range of possible manufacturers. As long as the buses meet the TfL specification, they are free to purchase stock from wherever they see fit.

So how will the NB4L be competitively tendered? Will it be optional to use this unique Wrightbus product? If so, might the operators just say no thanks, as it will be more expensive to buy and operate. If the NB4L is mandatory, then TfL will have sponsored a commercial monopoly using public funds. Might this have certain EU competition hurdles to overcome? Or will the other commercial bidders into London also be offered a handy wedge of the public's folding stuff to develop similar competitors?

TfL seemed to go thru a range of behavioural phases on this project. At first they appeared somewhat reactionary, seeming to need some time to change trenches, but then adopted a Jeeves & Wooster stance. Politely pointing out that for cost reasons, Sir, the rear door sometimes would have to be closed. And if I could be so bold, Sir, if it only has one rear staircase then one's chum Gussie Fink-Nottle, after paying his tuppence, would need to walk 30 yards to gain his favourite upstairs front seat. So more features were gradually added and there was the real risk of the thoroughbred morphing into a camel.

Finally a number of the TfL team succumbed to the mode that the industry refers to as Bus Nut and were clearly becoming over-excited at the prospect of having their very own New Bus. As RM begat NB4L, it was the Second Coming. Wide and happy smiles all round!

One aspect that did them little credit was then to denigrate the efforts of the current commercial UK bus operating and manufacturing industry. Comments were noted such as 'getting away from chief executives picking standard buses from catalogues'. Sure, a bespoke Bentley is nicer than a catalogue Black Cab, but the commercial pressures are real, harsh and inescapable, unless you are fortunate to enjoy access to the public purse. The successful UK builders - ADL, Wrightbus & Optare - have good sales volumes of 'bog standard buses' spread across 5 continents, but could never afford a program like NB4L so it was discourteous to criticise from such a privileged position.

It is fair to say that in the scheme of things the NB4L budget is, in Peter Hendy's own words, absolute peanuts, though some might more enjoy chickenfeed. The current TfL bus operating subsidy is running at £2m a day so the project's £12m does not even cover a week's running of the fleet. In contrast, the Cross River Tram survey cost up around £18m, just for the initial studies of planned further studies. Transport is a big, expensive and vital business for London and the wider UK.

## Technology advances

It is really important that buses and the bus industry up their game so inducements to advance their technology is vital. TfL surely have a role in this and they have exercised it perfectly with both the low floor revolution and the introduction of hybrid powertrains. The strategic model was to indicate to the market that these developments would have a favourable reception. Then the various bus manufacturers, seeing at least an amber light if not green, then quickly developed commercial products to answer these market needs.

They did not get involved in fiddling with the market and developing their own bespoke hardware. Even the military have moved to COTS, aka Commercial Off The Shelf, equipment

where ever possible. This they learnt from numerous huge overspends on much delayed programs when they tried to do bespoke programs on their own terms. We are in Nimrod territory here. Listen, is that the sound of advancing diggers in the background?

There is no real new technology in the NB4L, except for the rear platform...when open. When closed, it is a regular three door, two staircase double decker bus that can be efficiently operated by one person. So the whole confection of the project – both the design & its state funded development - only makes sense with the unique open platform and therefore with two crew. In today's harsh financial climate, that really looks rather a struggle and to ramp up the operating costs by 50% looks to be a rather eccentric luxury. The real and present threat here is a rather heady, expensive project that will join a number of earlier technical tours-de-force that have blighted public sector UK procurement contracts.

### **That much heralded competition**

This rather lengthy process started with the design competition, as promised, in 2008. It attracted 700 entries and the £80k total prize money purchased the product IPR of nine 'whole bus' designs. This was followed by the manufacturing competition to see who would build the final selected design. The six original manufacturers were whittled down to just two – ADL and Wrightbus.

But it was, in fact, a three way pitch, as there were two, not the commonly assumed one, tenders from ADL. One ADL design proposal was in collaboration with Capoco, the other with Fosters & Aston Martin so encompassed both the TfL design competition winners. Our own company has probably a unique global presence as a specialist bus & coach design company. But Fosters are a hugely successful practice with great London connections, from the iconic Gherkin to City Hall itself. Aston Martin know a thing or two about building stylish aluminium vehicles and have recently been judged the UK's coolest brand.

It was therefore a surprising choice that continues to puzzle (and irritate!) us that after a few years of speculative design, competitions and tendering, the design contract was awarded to Heatherwick Studio, given they took no part in said process. It would make more sense if they had teamed up with Wrightbus on a joint submission before the final contract award. But the manufacturing contract award was Dec 2009, and Heatherwick Studio were only appointed in January 2010. And bizarrely they were appointed by TfL, not Wrightbus who had no previous knowledge of the outfit.

One does hope that the TfL selection of Heatherwick Studio was a lot more rigorous than that used by certain parties for their similar contract for four newspaper stalls in Royal Borough of Kensington & Chelsea (search: rbkc & Heatherwick). That example gave the impression that it was granted on the basis for there was no comparable design talent in all of London, and indeed all the UK, hence did not need any competitive quotes.

“Thomas Heatherwick has been chosen as the designer because of his proven skills. It is unlikely that such high design quality could be found elsewhere. For this reason there has been no advertising or competition by the Council for the supply of the stalls.”

Yiks, really? We were of the persuasion that there were quite a few bright product designers & builders in our fair city. Anyway, surely this could not hold true here as the whole point was the clear commitment to an open & public design competition. So how was this design contract let and what was the brief? And indeed how much have TfL paid Heatherwick Studio over the period Jan 2010 to 2012?

Naturally we still think that the ADL Capoco submission, as shown below in teaser images, would have been the far better bus. Based on the world's top selling double deck, using the world's top selling hybrid drive, it is difficult to see the downside.

As with our first concept, it has a solid front corner pillar upstairs. They are thankfully rare events, but deckers do hit trees, sometimes with fatal results. So this area is Kevlar armoured to protect both passenger and bus. Better, dare we say, than the glass structure on the incoming NB4L example.

However, ignoring these petty rivalries, the same over-arching issues apply to which ever bus design was adopted. It is an unfortunate combination of libertarian private sector thinking applying the public's tax revenues in an otherwise healthy commercial market.

## Conclusions

The original design competition was a really good idea, and it elicited hundreds of enthusiastic designs from young and old. Buses are indeed our urban future transport and we need to see them as such. The next decade will precipitate some really severe energy crises. Hopefully we will realise that burning fuel in traffic jams is exactly the same as burning food in the streets. Fuel is food, and food is fuel; they are interchangeable and both are going to be in short supply.

As it turned out, the manufacturing competition was an equally bad idea. It has strangely adopted a Stalinist command economy approach rather than allowing the free market to address the issue. Only by throwing a really significant sum at this project did it arrive in such a timely manner. It has probably cost some 4 (four) times more than a normal commercial program by this top down delivery. This is why LT, and all other City States, got out of bus design and manufacturing decades ago.

There is no novelty in the 3 door and 2 staircase layout. There are scores of double deck buses running Berlin to this pattern, except flipped left to right at the back end. The *raison d'être* of the open platform – to allow escape when blocked in traffic – is dubious at best. Firstly TfL are rightly agin the practice, and as many a European colleague has pointed out, the answer is to remove the congestion, not the door.

Artics are not the devil's work and on the right route, they do work well. But it is the rather tired epithet of horses-for-courses and in many places in London they were too gross. It is surprising that their builders have not pointed out they offer the lowest CO<sup>2</sup> per passenger of any diesel bus in the UK. These figures were available thru the Low Carbon Vehicle Partnership that prepared the whole Low Carbon Bus process.

The artics' disappearance was not quite Act One, Scene One as it is understood that would have needed some £13m to pay off the outstanding vehicle leases. It is still surprising, given that London buses are normally on five year contracts, that the all the artics have already gone and their final disappearance was so nicely timed. They left thru one door whilst NB4L arrived thru the other.

This reprise is certainly not wedded to any party, be they political or industrial. It is solely a reflection on these last four years which have been rather tumultuous, for the usually placid world of bus design. It also hopes to serve as a comment on the TfL procurement policies OK, there are some tetchy points above, but given we kicked the thread off, we hopefully will be indulged in a little bitter sweet reminiscing.

So it has been great that the ever so 'umble Clapham omnibus has been the topic of interest, rather than the man thereon. A comment made by another major UK bus industry figure had it about right "It's a folly." In reality, this first batch should also be the last and TfL speedily withdraw from designing & commissioning its own hardware. All credit to Wrightbus & Heatherwick Studio for taking it on – very good work if can get it – but it should never have been offered in the first place.

