



A wide range of options for further long-term electrification has been drawn up by Network Rail in a draft report.

Top of the list are the Great Western and Midland main lines which are shown to have high benefit-to-cost ratios.

But Network Rail also recognises the value of infill schemes.

In Scotland, the main focus is on electrification of priority schemes in the Central Belt, allowing electric traction between Edinburgh and Glasgow via Falkirk, and an extension to Dunblane and Alloa.

At the moment, about 40% of the network in Britain (in terms of track miles) is electrified.

Much of the cross-country network, key freight routes and diversionary routes are not.

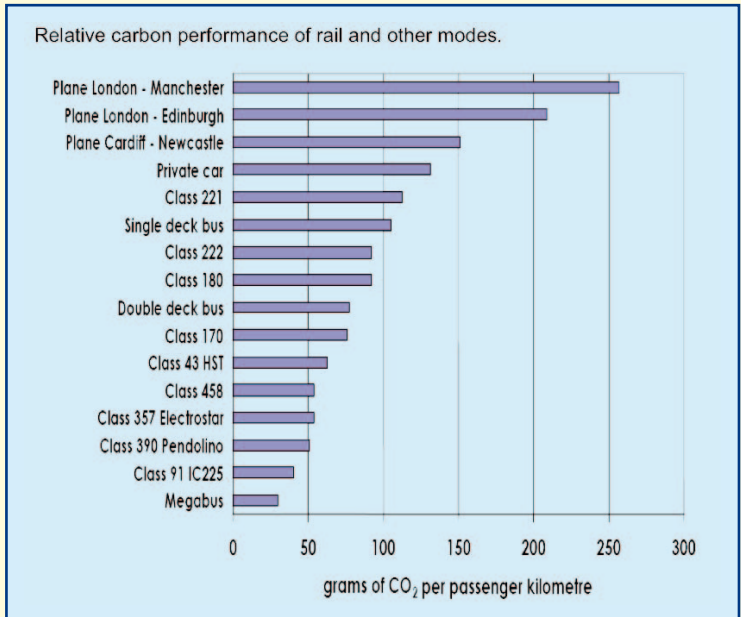
NR set out to identify benefits of a strategic approach, both in saving money and in improving the environmental performance of the transport system, improving air quality and reducing noise.

But NR admits that in the present economic climate, there will be big questions about the affordability of the schemes and their potential for long-term cost savings.

Chief executive Ian Coucher said: "Electric trains, on average, emit 20 to 30% less carbon than diesel trains, and their superior braking and accelerating can help reduce journey times.

"They provide more seats for passengers, making a greater contribution to increasing the overall capacity of the railway. Passengers and freight operators would also both benefit from an improved service in other ways, such as through

# Options for electrification



**FACT AND FICTION:** This Department for Transport chart shows that rail outperforms other modes. But the DfT has invented a 'megabus' category which looks like an attempt to justify its continued illogical preference for buses over trains

the creation of more diversionary routes."NR was expecting feedback by 14 July and will publish its final strategy later this year.

At present, a significant proportion of passengers and the majority of freight is carried by diesel traction which is more costly and produces more pollution than its electric equivalent.

Compared to diesel, an electric service will have lower rolling stock operating costs (fuel savings currently estimated as between 19 and 26 pence lower per vehicle mile, and maintenance costs at approximately 20 pence less per vehicle mile for passenger vehicles), higher levels of vehicle reliability and availability, and lower leasing costs.

The superior performance of electric vehicles can also provide jour-

ney time savings. While these may be modest for high-speed long-distance services, they can be more significant in urban areas where frequent stops make acceleration savings more significant and, if the savings are significant on a particular route, train diagrams could be saved.

For freight services the use of loops may be avoided. Electric trains have more seats than diesel loco-hauled trains, making a greater contribution to accommodating anticipated growth in demand.

Electrification also has a role to play in reducing carbon emissions. Electric vehicles, on average, emit 20% to 30% less CO<sub>2</sub> emissions than their diesel counterparts. They also tend to be quieter in operation.

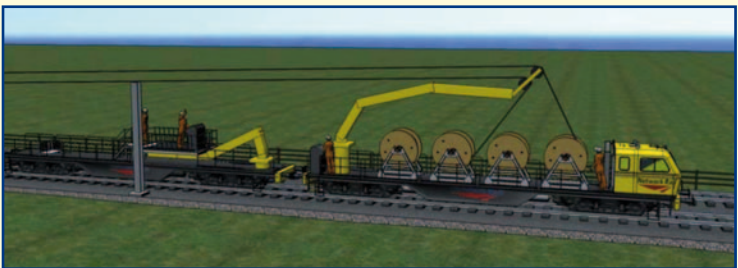
The full report can be found on the Network Rail website.

## THE FACTORY TRAIN CONCEPT

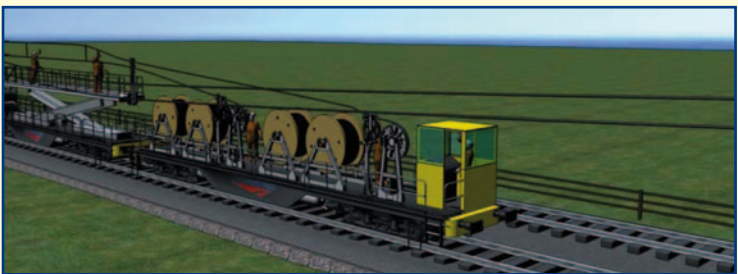
The factory train concept has been developed so electrification work can be done within midweek night possessions (equivalent of one tension length per six-hour productive shift) and with the adjacent line open, so minimising disruption. The factory train requires restocking at the end of each shift and will return to its main depot to be reloaded with materials ready for the next shift. Once the electrification programme is complete, most of the factory train modules will be used for maintenance and renewal.



**Module 1: Piling and structures installation.** Module 1 would consist of four parts, two master vehicles both capable of operating as either a piling vehicle or a structures mounting vehicle and two flatbed match wagons for transporting at least 15 piles and at least 15 mast structures. The module can be split, providing two separate piling-structures vehicles.



**Module 2: Feed-aerial earth wire cable, registration assembly.** This module comprises three vehicles. One master vehicle will house eight cable drum carriers and two manipulator arms capable of positioning the cables behind, above or in front of the masts. One slave vehicle will be fitted with welfare facilities and a mobile elevated working platform basket for attaching the cables to the mast. The second master vehicle is fitted with racking, a crane and an elevated working platform basket.



**Module 3: Contact and catenary wire installation vehicle.** This module has a master vehicle with four cable drum mounts and two manipulator arms capable of positioning the contact and catenary wire at different heights between four and six metres, a self-powered access vehicle with elevated working platform basket and welfare facilities, and a further master vehicle with long scissor platform. The fourth, final multi-purpose module provides flexibility to complete final pieces of work using versatile elevated working platform basket capable of reaching anywhere in the overhead line area as well as a crane capable of lifting transformers. Measuring systems and a measuring pantograph will be used to record accurate as-built data.

## Other

Other countries already have higher proportions of electrified track than Britain and they are pressing ahead with more schemes.

Germany and Switzerland have signed an agreement for electrification and infrastructure upgrades between Munich and Lindau.

Tilting trains will be able to run at 100 mph, cutting München-Zürich journey times from four hours 10 minutes to three hours 15 minutes by 2015. Services will be increased from three to six return trips a day, which is expected to lead to a doubling of passenger numbers. Work will begin

## countries press ahead

next year to electrify the 96-mile Geltendorf-Memmingen-Lindau line and upgrade the parallel Buchloe-Kempton-Lindau route. A new Lindau-Reutin through station will eliminate the need for reversals and locomotive changes at the current Lindau main station on an island in the Bodensee.

The total cost of the work is put at £178million. Switzerland has agreed to provide a £42million interest-free loan running to 2025, and Bavaria is lending £47million.

Even in Iran, a £673million contract to electrify the Tehran-Mashhad route and supply 70 electric locomotives has been agreed.

The Islamic Republic of Iran Railways will also install ETCS level two signalling equipment under

the 30-month electrification project. The maximum speed of passenger trains will be raised from 100 mph to 125 mph, halving journey times on the 575-mile long route to six hours.

In the long term, a new high speed line will be built to cut journey times to below three hours.

Canada is also considering more electrification, especially around Montreal.

GO Transit of Ontario, Canada will begin a study this summer on electrifying its entire train system. Metrolinx has announced that this study, to be complete by winter 2010, will be overseen by an external advisory committee including community representatives, technical and environmental experts.