

# KEEPING AN EYE ON CARBON

**The railways' green credentials have become an important part of the marketing of rail as a mode of transport. But depending on the source of the energy used by a train, its carbon footprint can vary greatly.**

John Reed **explains**

The amount of energy used by the rail sector is increasingly under the spotlight, as climate change and energy price increases rise up the political agenda. Train operators such as Virgin are keen to flag the green credentials of their service, with high-profile campaigns asking commuters to trade in flight boarding cards for free train tickets – and claims of carbon reductions of around 75 per cent over air travel.

In March this year, the EU Commission set out a proposal to reduce carbon emissions by 20 per cent whilst improving energy efficiency by 20 per cent by 2020 (European Commission, [http://ec.europa.eu/index\\_en.htm](http://ec.europa.eu/index_en.htm)). Transport is expected to deliver a portion of these carbon savings and, while rail is recognised as one of the most energy efficient forms of travel, it is being increasingly challenged by other transport modes as they step up their performance and marketing around fuel efficiency.

Effective measurement of corporate social responsibility demands that organisations balance their economic and environmental performance. Around 40 per cent of the rail network is electrified in the UK, according to Network Rail, but it is important to realise that, depending on the original source of the electricity, the carbon footprint can vary enormously. Emissions can range from close to zero for renewable sources to over a kilo of CO<sub>2</sub> for each kilowatt hour, for coal-fired power stations, according to the EU's proposals (source: Parliamentary Office of Science and Technology newsletter number 268).

Train operating companies can reduce the amount of energy they use by changing their operations, optimising their engineering and revising their management procedures. But if these reductions cannot be effectively measured and reported, then they risk being discounted by consumers and regulators.

Working alongside Spanish Railway Operator, RENFE Operadora, Capgemini has analysed how 10 European countries purchase their traction energy by conducting interviews



Rail is 'greener' when its energy comes from a clean source.

with their railway and infrastructure managers. The study revealed significant variation across Europe, and highlighted the UK as one of the worst performing markets in terms of the transparency of energy procurement.

Analysis showed that there are two main factors that determine how well the energy procurement model incentivises efficiency, whether it is procured directly from the power supplier and whether there is a high level of information about when and where energy is used. We found three energy procurement models in operation across Europe: indirect procurement with low levels of information available about the source of the energy; direct procurement with low levels of information; and direct procurement with high levels of information. The first, indirect procurement with low levels of information, is employed in the UK and is characterised by low levels of information on how energy is consumed by rolling stock. This has a cost in terms of transparency which makes incentivising energy efficiency improvements difficult.

Countries such as Germany champion direct procurement with high levels of information. This has the advantage of complete transparency of energy costs and provides the ability to identify system losses. To reach this position, however, requires heavy capital investment in systems and infrastructure and explains why the majority of the rest of Europe falls somewhere between countries like the UK and Germany in directly procuring energy but with low levels of information on usage.

So what can the UK railway industry do to improve its energy efficiency? Atoc and Network Rail are currently seeking to optimise the way energy is procured without changing the procurement model. The intention is for train operating companies to participate in the procurement strategy definition with Network Rail, rather than for Network Rail to carry out the work independently as in the past. We found that a similar process has successfully led to continuous improvement in Sweden.

But, from our analysis, it is clear that to deliver a step change in efficiency, UK rail operators must shift to the German-style model with direct procurement and high information levels to maximise economic and environmental returns now and in the long term. Understanding what is required, however, is very different from understanding how to achieve it.

Delivering a major improvement in performance will require major transformation programmes that may see the development and delivery of complex programmes by organisations that have never worked together before. Past experience shows that 80 per cent of such transformation programmes fail due to a failure by the implementing organisation to assess not only the rational aspects (why do it?), but also importantly the political (who will help me?) and emotional (why should I?) elements.

Train operating companies collectively spend large amounts of money each year on energy procurement, so there is a clear benefit from reducing these costs. Whilst the risks of embarking on ambitious transformation programmes are well recognised, the risks of sticking to the UK's current procurement model are potentially far higher if we are to ensure that Britain's railways continue to be acknowledged and used as the leading form of green transport.

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