

although this would be an unusually fine performance. On the average it may be taken that 60-watt hour per ton-mile will be required from 12 units per 200-ton train-mile. It is thus obvious that the cost of power to the railway company, if it generates it in its own station, will considerably exceed the 3d. which we have allowed; and, in order to keep it down to this figure, current at the outside would have to be purchased at a price of about $\frac{1}{2}$ d. or at the most not exceeding $\frac{1}{2}$ d. Now, although electrical engineers very frequently mention their costs of production at under $\frac{1}{2}$ d., it will nearly always be found that such figures are based upon insufficient capital charges, and the only way in which it is possible to obtain figures at all approaching the $\frac{1}{2}$ d. required is by having current generated upon such a large scale as would result from the combination of several railway companies, together with a large load for electric lighting and power purposes. It is doubtful if at the present time in London there are any stations producing current, taking all things, including capital charges, into account, at less than $\frac{1}{2}$ d. per unit. It is obvious that the cost of power at the present time is a very important factor in the electrification problem.

The above figures, of course, only give the actual running-costs. Another estimate of the comparative costs of the two systems is as follows:—

	Steam. d.	Electric. d.
Coal or equivalent electric power	7.25	5.15
Water	0.25	...
Train-crew	6.00	3.35
Maintenance	3.25	2.00
Supplies	0.25	0.10
Total per train-mile	17.00	10.60

This assumes the consumption on the steam locomotive of 4 lb. to 5 lb. of coal, and at the electric power-house of 2 lb. of coal per indicated horse-power hour, taking into account the difference in the quality of the two coals, which would be a saving of about 50 per cent. in favour of electricity.

Another of the savings which is important is that in repairs and maintenance, and the following estimate has been prepared to show this:—

	Steam. Per Cent.	Electric. Per Cent.
Boiler	20	0
Running-gear	20	20
Machinery	30	15
Lagging and painting	12	5
Smoke-box	5	0
Tender	13	0
Total	100	40

Extract from the Railway Magazine for March, 1905.

It would be interesting to know whether the directors and officers of the North-eastern Railway are satisfied with the results that have so far attended the electrification of a portion of the system.

The accounts for the past half-year show that the receipts from passengers have increased about £9,000, whilst the cost of electric working has been £22,824. There is a saving of £42,386 in locomotive expenses, and a reduction of train-mileage amounting to 675,232 miles; of this, however, only 232,090 is saving on passenger-train running, so that only £14,500 of the reduced locomotive expenses can be charged as a saving on passenger account.

The balance-sheet therefore works out like this:—

Dr.	£	Cr.	£
To Cost of electric traction	22,525	By Additional passenger receipts (all credited to electric traction)	9,157
Six months' interest on capital expended on cost of converting line (£241,376), and rolling-stock, 88 vehicles (say £44,000), at 4 per cent. per annum	5,707	Saving on locomotive expenses	14,500
Loss of first-class traffic, as shown by balance-sheet, because of accommodation not being provided on electric trains	6,300	Loss on working for six months	10,875
	<u>£34,532</u>		<u>£34,532</u>

The electric-train-mileage was 588,786, and the electric-car-mileage 2,189,571. The cost of running per electric-train-mile is almost 10d. The locomotive running-expenses per steam-train-mile amount to a trifle over 8 $\frac{1}{2}$ d. per train-mile.

Extract from the Railway Magazine, December, 1906.

Just as, ten years ago, electric traction on tramways was creating great interest throughout the country, so now the application of the same system of propulsion for railway purposes is being seriously considered by most of our large railway companies.

It still remains to be shown that it is cheaper than steam traction so far as long-distance lines are concerned; but the writer considers there is little doubt that, for dealing with local traffic in the neighbourhood of large cities, the adoption of electric traction is an absolute necessity if the railways are to retain the traffic which is, so to speak, ready-made and only waiting greater facilities.