

## WESTERN RAILWAY MUMBAI



The Western Railway was created on November 5, 1951 by the merger of several state-owned railways, including the Bombay, Baroda, and Central India Railway (BB&CI), and the Saurashtra, Rajputana and Jaipur railways. The BB&CI Railway was itself inaugurated in 1855, starting with the construction of a 29 mile (47 km) broad gauge track from Ankleshwar to Utran in Gujarat state on the west coast. In 1864, the railway was extended to Mumbai.

Subsequently, the project was further extended beyond Vadodara in a north easterly direction towards Godhra, Ratlam, Nagda.

The first suburban service in Mumbai with steam traction was introduced in April 1867. It was extended to Churchgate in 1870. By 1900, 45 trains in each direction were carrying over one million passengers annually.

In 2002 the Jaipur and Ajmer divisions of the Western Railway became part of the newly-created North Western Railway, and in April 2003 the Kota division of the Western Railway became part of the newly-created West Central Railway.

At present, Western Railway serves the entire state of Gujarat, some portions of Western Madhya Pradesh, and coastal Maharashtra. The Western coast of India served by Western Railway has a number of ports, most important among them being Kandla, Okha, Porbandar, Bhavnagar, Pipava in Gujarat state and Mumbai in Maharashtra.

The suburban section of Western Railway in Mumbai extends from Churchgate, the city's business and residential centre, to Dahanu Road covering a distance of 120 km and having 38 stations. The first electric train on this section was introduced in 1928 between Churchgate and Borivali.

The Western Railway has its headquarters at Churchgate in Mumbai. The railway system is divided into six operating divisions viz Mumbai, Vadodara, Ratlam, Ahmedabad , Rajkot and Bhavnagar.

**(ii) Energy Consumption**

(Include information on total energy consumption (i.e. coal, oil, gas, electricity and money value). Information on energy consumption in terms of percentage of manufacturing cost should also be presented. Also, it should highlight the Specific Energy Consumption for the period 2004-2005, 2005-2006 & 2006-2007 Good Computer Graphic Presentation related to Specific Energy Consumption may also be incorporated.)

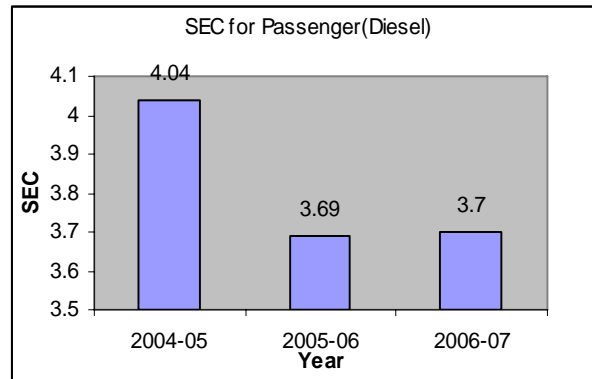
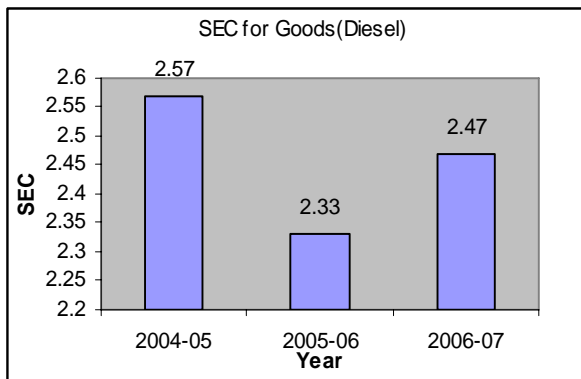
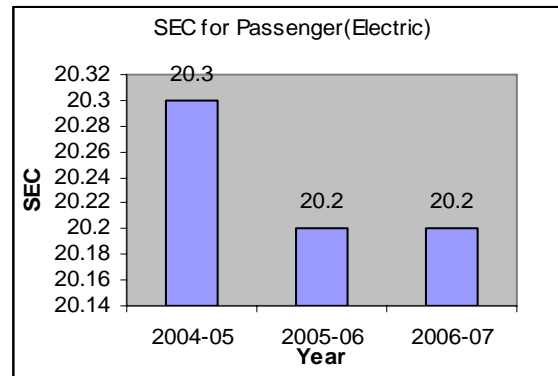
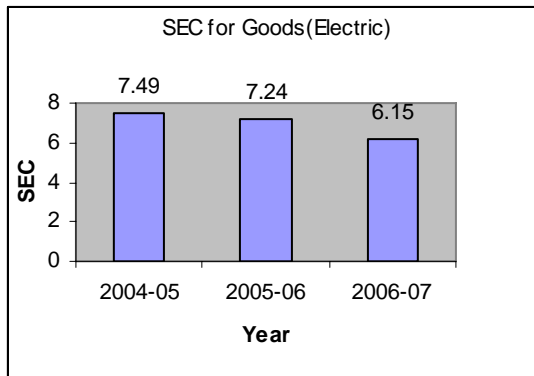
**Energy Consumption and Energy Conservation Achievement**

<b>SPECIFIC ENERGY CONSUMPTION REDUCTION</b>			
<b>TRACTION (ELECTRIC)</b>	<b>2004-05</b>	<b>2005-06</b>	<b>2006-07</b>
Unit Consumed ( Laks kWh / year)	7809.37	8135.89	8358.17
Money Value (Rs. Lakhs / year)	36906.51	38123.92	40782.61
GTKM for GOODS ( in thousand)	43840696	48612437	55333978
GTKM for Passenger ( in thousand)	20329388	20803803	22950380
SEC for GOODS (kWh/1000 GTKM)	7.49	7.24	6.15
SEC for Passenger (kWh/1000 GTKM)	20.3	20.2	20.2

<b>SPECIFIC ENERGY CONSUMPTION REDUCTION</b>			
<b>TRACTION (DIESEL)</b>	<b>2004-05</b>	<b>2005-06</b>	<b>2006-07</b>
Diesel Consumed ( kL / year)	98415	95404	108491
Money Value (Rs. Lakhs / year)	27307	20090	24399
GTKM for GOODS ( in thousand)	15058301	18654238	21490649
GTKM for Passenger ( in thousand)	8522484	8856057	9753814
SEC for GOODS (Litres/1000 GTKM)	2.57	2.33	2.47

<b>SEC for Passenger (Litres/1000 GTKM)</b>	<b>4.04</b>	<b>3.69</b>	<b>3.7</b>
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## Graphical Representation



### iii. Major Activities Implemented to reduce energy consumption, Economy in Energy Expenditure and Implementation of Energy Conservation Measures:-

#### Electric Traction

##### a-Tariff containing measures:

Energy tariff plays a vital role in economy & efficiency of traction system. Dual purpose initiatives have been taken to avail the incentives available on power factor as well as reduction in demand and minimization of loss.

##### b- Demand side management to conserve energy:

Western railway continuously monitors the demand of the substations with the demand approaching /overshooting buzzers to alert the Traction power controllers to control the Maximum demand by the way of extension of feed.

By effective energy management, the Demand has been restricted to save the demand charges for Railways and thereby helping the supply authorities in managing the system without extra burden of exceeding demand or losses.

In addition to that, Western railway by effective switching off the standby transformers, the losses have been restricted. The savings particulars are as under:-

1. Western Railway has issued instructions to **switch off the standby transformer** at the traction substation. This has resulted in saving of 1625820 units per annum to the tune of Rs.80 Lakhs for the year 2006-07 by **loss minimization measures**.
2. Western Railway has provided **capacitor bank** at Traction substation
3. Rationalization of Demand

**c- Provision of Energy Saving Devices:**

Western Railway draws power on 25 kV AC Traction Substations. Capacitor Banks have been provided on 24 Traction Substations. Since the installation of Capacitor Banks, the power factor has been improved in the order of 0.9 to 0.98 resulting into a handsome saving in restricting the power consumption. The benefits achieved are as under:-

- Saving in restricting demand (the unit charges \* improvement in pf from pre-installation)
- Saving on account of avoided losses due to improved power factor

$$(kWH*(1-(pf_1/pf_2)^2))$$

**d- Improvement in Operational efficiency by training the Locomotive operation staff resulting in improvement in Specific Energy Consumption (SEC).**

Western Railway has taken initiatives on energy efficiency in operation of Electric Locomotives by –

- Regular counseling of operation staff like drivers
- Provision of Coasting Boards
- Installation of Energy Meters on Electric Locomotives to monitor the energy consumption
- Comparing the unit wise SECs and take corrective measures.

**e- Introduction of 3-phase Technology**

Western Railway has adopted 3-phase technology, reducing about 30% energy consumption due to regeneration on AC locos and AC EMU.

**Non Traction Energy**

- In all 713 electrified stations provision of 30% & 705 lighting circuits for platforms have been done.

- 103 nos. of solar water heaters provided in running rooms/canteens/hospitals/retiring rooms in consecutive year 2004-05 and 05-06 separately.
- 68 pumps in 2004-05, 51 pumps in 2005-06 and 17 pumps in 2006-07 have been automated.
- Segregation of staff quarters by direct metering from SEBs wherever feasible. 2566, 3049 & 6920 quarters have been segregated in year 2004, 2005 and 2006 respectively.
- Replacement of overage wiring, window AC and water cooler by new ones.
- Substitution of electric illumination by natural illumination in sheds/workshops/offices up to feasible limit.
- Switching off streetlights in full moon nights.
- Switching off stand by transformers.
- Provision of capacitor banks for improvement of power factor.

**(iv) Environment and Safety**

Western Railway hauled **29.6 Million** Tons of load through **electric traction** during year 06-07 which constitutes about 71.5 % of total tonnage hauled by W.Rly. By using electric traction more and more, Western Railway has saved the environment pollution.

Specific matter concerned to safety has been reported as per the best of my knowledge.