

North Eastern Railway

12.1 Unit profile:

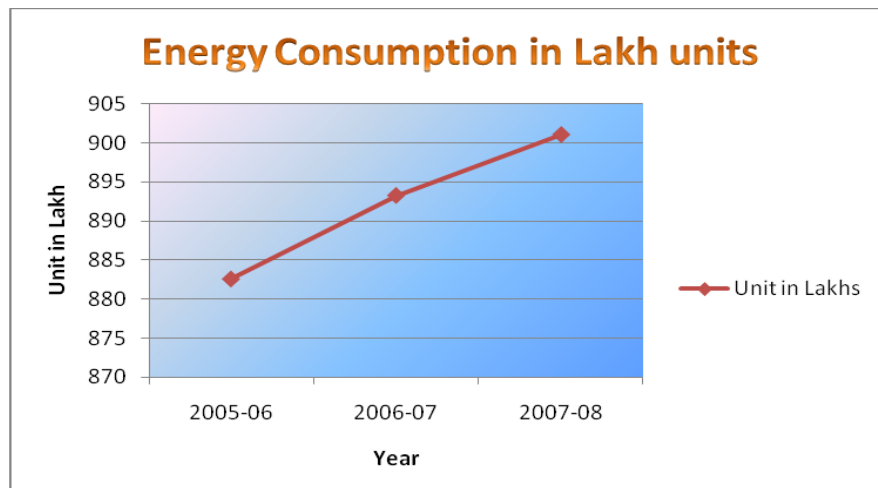
The area covered by North Eastern Railway has dense population and place of tourist interest like Gorakhpur, Nainital, Varanasai, Lucknow and others. It also provides most popular connection to Nepal Via Gorakhpur – Nautanmwa route. The electricity is purchased on this railway from Uttar Pradesh Power Corporation Limited, Bihar State Electricity Board and Uttaranachal Power Corporation . It has approximately 418 electrified stations spread in three state i.e. Uttaranachal, Uttar Pradesh and Bihar.

12.2 Electrical Energy Consumption:

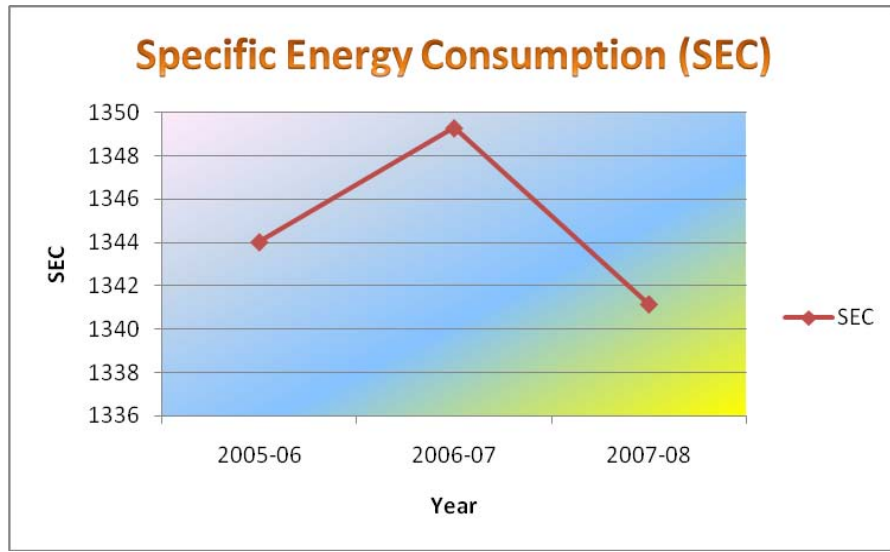
12.2.1 The breakup of electrical energy consumption in different unit of Zonal Railway are as under.

Electricity consumption in workshops.	15%
Electricity consumed in Railway Station and service Buildings.	35%
Pumping Installation.	10%
Domestic Use.	40%

12.2.2 The consumption of electricity in last three years are show in graphical form as under.

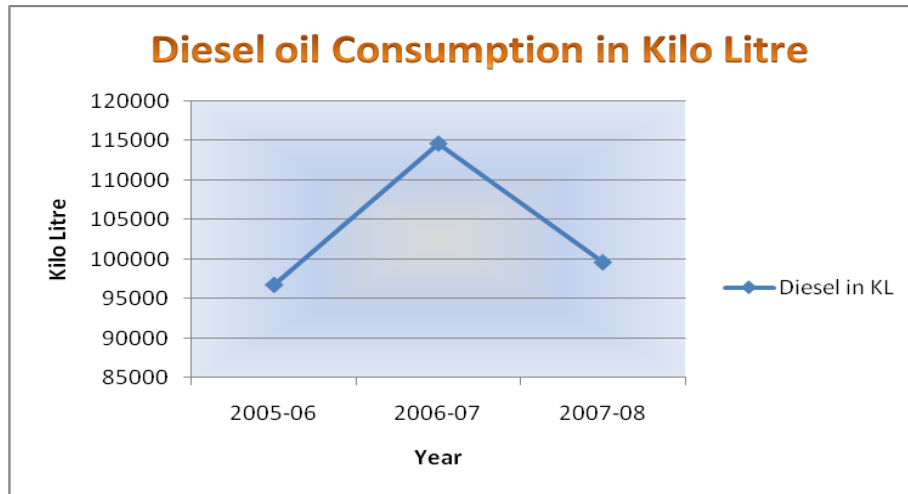


12.2.3 The specific energy consumption for last three years is shown in the following graphs.



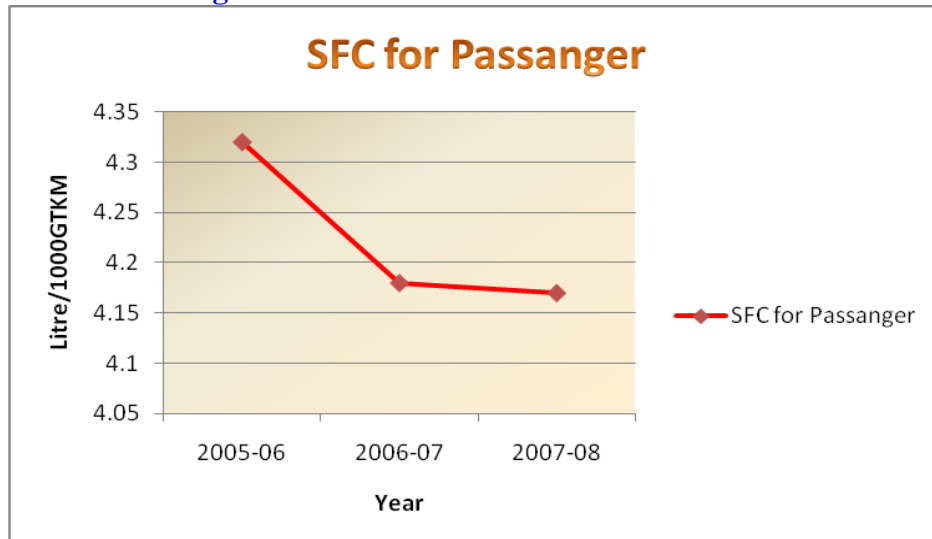
13.0 Diesel Consumption:

13.1 Diesel Consumption in last three years has been follows.

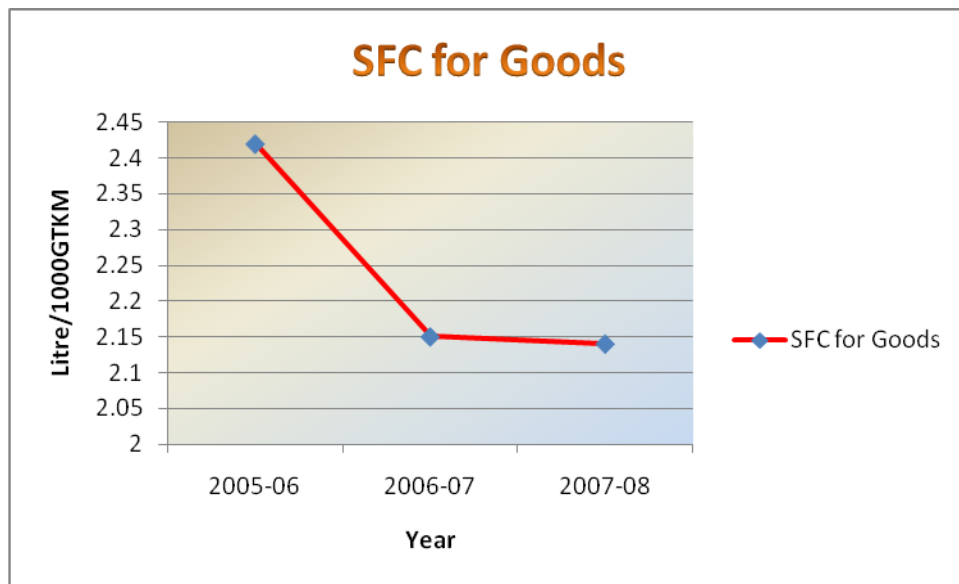


13.2 Specific Fuel Consumption (SFC):

13.2.1 SFC for Passanger:



13.2.2 SFC for Goods:



The energy management wing of North Eastern Railway has put the best effort to reduce the energy consumption in spite of –

- ❖ Increase in connected load.
- ❖ Improvement in passenger amenities e.g. improvement in illumination at station and circulating areas.
- ❖ Addition of more air conditioners in station buildings, officers chambers & in residential colonies.
- ❖ Increase in number of trains & Air-conditioned coaches.
- ❖ Increase in POH of coaches in workshops & machinery & plants.
- ❖ Increase in load in diesel sheds & railway hospitals.

The saving have been possible on account of using energy efficient appliances and ensuring credit of energy recovery/Energy Consumption in proper allocation head. Many works for provision of additional substations, reduction in length of LT power lines, increase in size of conductors, segregation of feeders and providing capacitor banks & APFC panel to improve power factor has been carried out. Further use of emergency efficient fittings at station , colonies and provision APFC panel at sub station for industrial loads are in progress which will result further saving in energy consumption.

14.0 Energy Conservation Commitment:

The energy management wing of North Eastern Railway is committed towards implementations of energy conservation measures in its establishment. The railway has also instituted award in the form of energy conservation shield as part of railway week award for the division / unit having outstanding achievement in the field of energy conservation. Similarly seminars are being organized to create awareness among the railway staff / Supervisors for optimum use of electrical energy in domestic appliances which contribute a major portion of consumption of electrical energy. Through implementation of green house concept and energy audit in service building it is proposed to reduce the energy consumption by 20% in our service buildings. The Railway has planned to electrify the maximum manned level crossing gates by providing "SOLAR PANELS". Around 214 Nos. manned level crossing gates have been electrified by solar panel and 21 Nos. are in progress in addition use of "SOLAR WATER HEATER" & "LED" based street light, occupancy sensor, Dimmer and timer in street light are also planned and are in progress.

15.0 Energy Conservation Achievements:

Following energy conservation steps have been taken during 2007-08.

- ❖ Energy saving device in Gorakhpur workshop on 16 machines, resulting recurring energy saving of 38275 Units/Annum.
- ❖ 300 KVAR APFC Panel at four substations of mechanical Workshop Gorakhpur has been installed, which has resulted power factor improvement from 0.69 to 0.87 & a saving of Rs. 58.51 Units/ Annum.
- ❖ 260 KVAR APFC Panel at Diesel Shed/IZN, 200 KVAR at DRM office/IZN, 100 KVAR at Railway Hospital/IZN, 150 KVAR at Choupla Colony/IZN has been installed, which has resulted power factor improvement from 0.79 to 0.98 & a saving of Rs. 1.34 Lac/Annum.
- ❖ One No. Energy Saving Device of 99 KW in DRM office Izzatnagar has been installed, which has resulted energy saving of 176880 Units/Annum.
- ❖ Provision of 59 timer switches in street light has been installed, which has resulted energy saving of 212400 Units/Annum.
- ❖ Replacement of 3466 nos. Incandescent lamp by CFL has been done, which has resulted energy saving of 673790 Units/Annum.
- ❖ Replacement of 1554 Nos. High Wattage Fan with Lower wattage fans in different offices over NER has been done, which has resulted energy saving of 50349 Units/Annum.
- ❖ Replacement of 916 Nos. 40 W FL fitting with T-5 fitting has been done, which has resulted energy saving of 47485 Units/Annum.

- ❖ Electrification of manned level crossing gates by Solar Panel has been done 214 Nos. & resulting saving of 369292 Units/Annum.

16.0 Energy Conservation Plans and Targets:

- ❖ Provision of microprocessor based Timer switch in street light at 61 location.
- ❖ Replacement of incandescent lamp with energy efficient 11 watt CFL – 3550 nos.
- ❖ Replacement of 8800 FL fitting with energy efficient T-5 fitting .
- ❖ Replacement of sodium vapor fitting with FL fitting/CFL (OD type)/M.H. fitting 320 nos.
- ❖ Replacement of conventional ballast by electronic ballast -3000 nos.
- ❖ Replacement of resistance type regulator with electronic regulator for
- ❖ Ceiling fans -2000 nos..
- ❖ Replacement of high wattage fan with lower wattage fans -2000nos..
- ❖ Provision of Automatic Power Factor improvement panel at 11 electric sub stations.
- ❖ Provision of Energy Saving Device at 18 Nos. machine of mechanical
- ❖ Workshop/GKP.
- ❖ Energy Audit of major places i.e. Mech. Workshop/GKP, Workshop/IZN, Diesel shed/ Gonda & Diesel shed /IZN.
- ❖ Electrification of Manned Level crossing gates by solar panel - 60 Nos.
- ❖ Automation of Pumps at 17 Locations.
- ❖ Use of energy Efficient Pumps in place of old conventional pumps at 10 Locations.
- ❖ Use of Solar street light in Colonies – 50 Nos.
- ❖ Replacement of conventional Geyser in Rest House/ Lobby/Retiring Room Hospital/Running Room By Solar Geyser of 14500 LPD at 11 Locations.
- ❖ Provision of LED based station name board in place of neon sign board - 5 nos.
- ❖ Segregation of 70/30 lighting circuit at platform – 25 stations.
- ❖ Use of Occupancy Sensors for light Control in Officers Chamber, Conference Room, Waiting hall - 30 Nos.
- ❖ Use of Copper wiring in Quarters - 1500 Nos.
- ❖ Use of Solar Electric panel of 10 KW capacity in offices-04 Nos.

17.0 Energy Conservation Policy:

- ❖ North Eastern Railway will strive to provide reliable and proper illumination at railway stations, Railway offices and staff colonies at optimum cost.

18.0 Our mission is to:

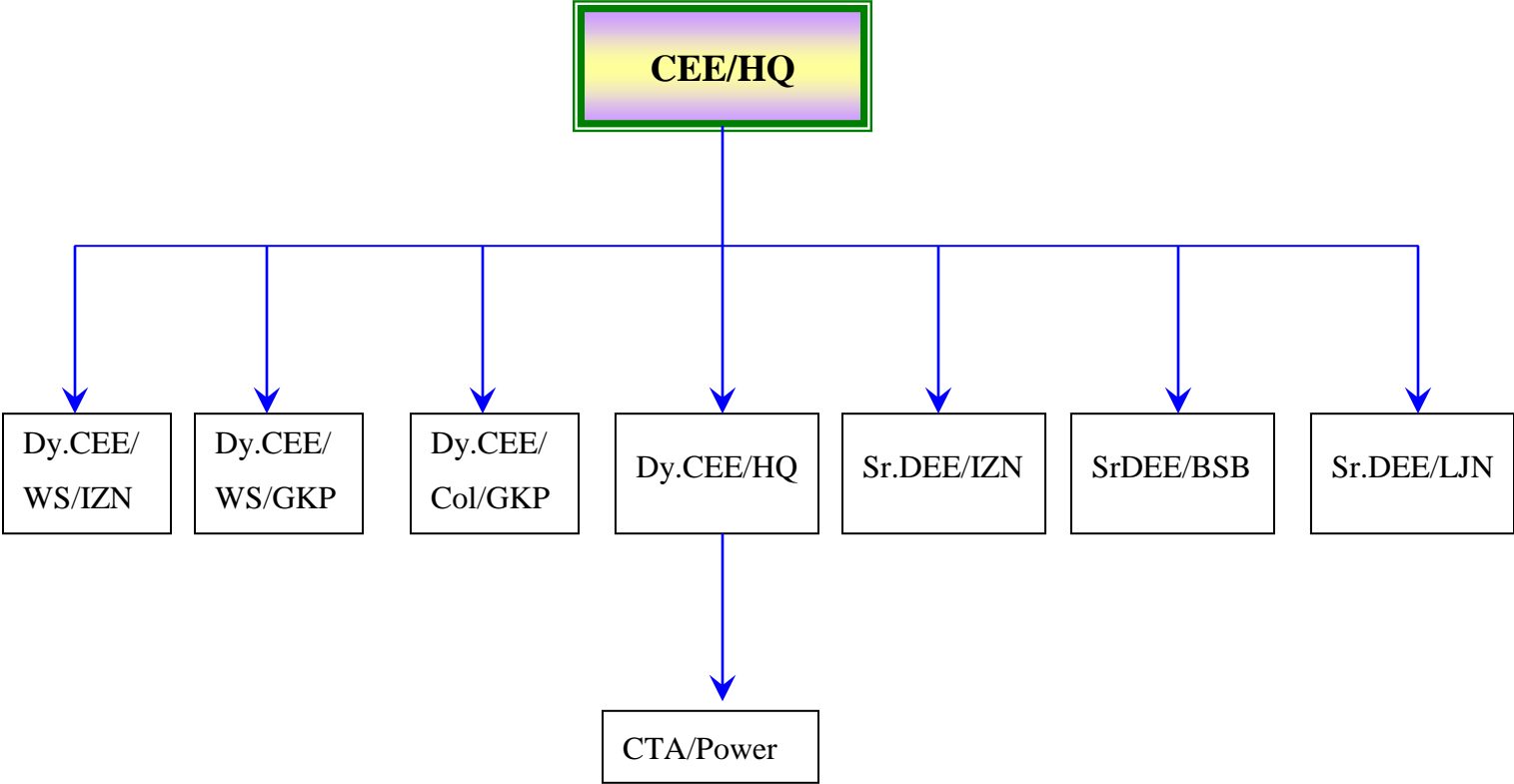
- ❖ To provide reliable and efficient power supply system at optimum cost & use of energy efficient electrical appliances along with use of solar power system.

19.0 Plan to achieve the goal by adopting following Measures :

- ❖ Regular energy auditing, manage efficiently the available energy, upgrade man power. And use of latest & efficient technologies.
- ❖ Carry out regular internal and external energy audit.
- ❖ Enrich our experience on energy conservation by exchange of ideas with similar organization.
- ❖ Promote awareness among all employees by conducting workshops seminars and group discussion.
- ❖ Monitoring the peak load period and feeder wise and Arranging load transfer whenever required.
- ❖ Monitoring Power factor of different circuit load & putting capacitor bank where required.

ENERGY CONSERVATION CELL

Organizational Chart:



Annexure-2**Measures Implemented for Energy Saving :-**

S. No.	Item	Quantity	Saving achieved in units per year	Saving in Lakh Rupees/ year
1.	Energy saving device in Gorakhpur workshop.	16 Machines.	38275	1.49
2.	300 KVAR APFC Panel at four substations of mechanical Workshop Gorakhpur.	04 Nos.	1500256	58.51
3.	260 KVAR APFC Panel at Diesel Shed/IZN, 200 KVAR APFC Panel at DRM office/IZN, 100 KVAR APFC Panel at Railway Hospital/IZN, 150 KVAR APFC Panel at Choupla Colony/IZN.	04 Nos.	34359	1.34
4.	Energy saving Device 99 KW in DRM office Izzatnagar.	01 No.	176880	6.90
5.	Provision of 59 timer switch in street light.	59 Nos.	212400	8.28
6.	Replacement of Incandescent lamp by 3466 nos. CFL.	3466 Nos.	673790	26.28
7.	Replacement of High Wattage Fan with Lower wattage fans 1554 Nos at different offices over NER.	1554 Nos.	50349	1.97
8.	Replacement of 40 W FL fitting with 916 Nos. T-5 fitting.	916 Nos.	47485	1.85
Total			2733794	106.62

Fuel Economy Measures

1. Running of Goods train with Optimum Load.
2. More intensive Foot-plate inspection by loco/fuel inspectors for achieving up gradation in driving technique of drivers followed by educative and counseling programmes.
3. Minimising idling & shutdown of diesel loco if idling is more than 30 minutes.
4. Application of dynamic brake specially on mail /express train.
5. Organising seminars to create awareness of economy measures at all levels with a view to save energy consumption.
6. Keeping maximum locos in good fettle and condemnation of over aged locomotives to prevent excess fuel consumption.
7. Strict control over HSD consumption in various services is exercised and analysis at divisional/headquarter level done for taking corrective action.
8. Checking the fueling points for proper record of fuel accountal to prevent pilferage to control the fuel consumption.
9. Issue of HSD oil for other than locomotive purposes is strictly prohibited.
10. Improvement in maintenance of Rolling to avoid brake binding etc.
11. Watch on actual consumption of HSD oil vis-a-vis trip ration.
12. To check various aspect of fuel issue and consumption, regular inspection of Railway Diesel installation by Loco inspectors and officers.
13. Proper accountal of GTKM.
14. Reducing detension to trains enroot.
15. Increasing average speed of Goods Train.

Energy Audit in DRM Office Building in IZN Division

The following measures were taken after internal energy audit in DRM office building at Izatnagar:-

1. The 11/0.4 KV Sub. Station feeding to DRM building was originally located around 500 meters away from the electrical load center. This was resulting in line losses in LT conductors. The Sub. Station has been shifted near the electrical load centre in DRM office premises. This has resulted in saving of 50 KW load.
2. In lighting circuit an energy saving device has been installed. This device is saving around 15KW load.
3. All the tower rating overhead conductors causing line losses have been converted to underground cables. The circuits have been rationalized in such a way that AC loads and 2/3rd. light in the offices are being switched off after 6 p.m.
4. The entire building have been rewired with HRFR copper conductor and concealed. Earlier the wiring was with aluminum conductor which was having problem of overheating at points and losses. With the above arrangement, not only energy is being saved, but also the system have become more reliable. Each table has been given independent switch for light & fan, which will result in additional power saving once the staff is turned to switch off the fan & light while leaving the place of work.
5. The entire DRM building was provided with 458 high wattage approximately 250 wattage ceiling fans. These fans are being progressively replaced. So far 125 fans have been replaced. Energy efficient fans indent has been sent to HQ for procurement.
6. 1135 nos. 60 watt. Each FL tube were provided in the DRM building. These fittings are progressively being replaced by CFL and energy efficient FL fittings. So far 258 fittings of 28 watt and 143 CFLs have been replaced.
7. All the window air conditioners in the Control office have been replaced by 3 phase motor compressors fitted in ductable air conditioners. Which
8. 17 nos. window type air conditioners have been replaced by energy efficient split Air-conditioners fitted with rotary compressors. The window type Air-conditioner was having approximately 2.2KW load were as the split Air-conditioner is having 1.85 KW load. This has resulted in saving of 5.95 KW.
9. 250 watt sodium HPSV lamps provided in the building circulating area have been replaced by 85 watt. CFL.
10. For winter season, 25nos. conventional heat convector of 2KW have been replaced by 1200 watt. Halogen heaters with step setting of 400,800 & 1200 watt. This has saved approximately 20 KW load.