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**RAILWAY CONVENTION COMMITTEE**

**(2014)**

**(SIXTEENTH LOK SABHA)**

**MINISTRY OF RAILWAYS**

**(RAILWAY BOARD)**

**GREEN ENERGY INITIATIVES IN INDIAN  
RAILWAYS**



**LOK SABHA SECRETARIAT**

**NEW DELHI**

*March, 2017 / Chaitra, 1938-39 (Saka)*

**TWELFTH REPORT**  
**RAILWAY CONVENTION COMMITTEE**

**(2014)**

**(SIXTEENTH LOK SABHA)**

**MINISTRY OF RAILWAYS**  
**(RAILWAY BOARD)**

**GREEN ENERGY INITIATIVES IN INDIAN RAILWAYS**

Presented to Lok Sabha on 31.3.2017

Laid in Rajya Sabha on 31.3.2017



**LOK SABHA SECRETARIAT**

**NEW DELHI**

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**COMPOSITION OF RAILWAY CONVENTION COMMITTEE  
(2014)**

**Shri Bhartruhari Mahtab, MP - Chairperson**

**Members**

**Lok Sabha**

2. Shri Abhishek Banerjee
3. Shri Sanganna Amarappa Karadi
4. Shri K. Ashok Kumar
5. Shri Kamalbhan Singh Marabi
6. **Vacant\***
7. Shri Nana Patole
8. Shri Janak Ram
9. Shri Rahul Ramesh Shewale
10. Shri Bharat Singh
11. Shri Liladharbhai Khodaji Vaghela
12. Shri K.C. Venugopal

**Members**

**Rajya Sabha**

13. Shri Derek O' Brien
14. Shri T.K. Rangarajan
15. Shri Prem Chand Gupta
16. Shri Abdul Wahab
17. Smt. Vandana Chavan
18. Shri Ranvijay Singh Judev

**SECRETARIAT**

- |    |                        |   |                     |
|----|------------------------|---|---------------------|
| 1. | Shri S.C. Chaudhary    | - | Joint Secretary     |
| 2. | Shri M. K. Madhusudhan | - | Director            |
| 3. | Shri D. R. Mohanty     | - | Additional Director |
| 4. | Shri J.S. Patiyal      | - | Committee Officer   |

\*Vacancy occurred w.e.f. 05<sup>th</sup> July, 2016 vice Smt. Anupriya Patel was appointed MOS.

## **INTRODUCTION**

I, the Chairperson, Railway Convention Committee (2014), having been authorized by the Committee, present this Twelfth Report on 'Green Energy Initiatives in Indian Railways'.

2. The Committee obtained background material and written information from the Ministry of Railways (Railway Board) in connection with the examination of the subject. The Committee also took oral evidence of the representatives of the Ministry of Railways (Railway Board) on 21<sup>st</sup> September, 2015 and 02<sup>nd</sup> March, 2017. The Committee express their thanks to the representatives of the Ministry of Railways (Railway Board) for appearing before the Committee and also for furnishing requisite written information in connection with the examination of the subject.

3. The Committee considered and adopted this Report at their sitting held on 29<sup>th</sup> March, 2017. The Minutes of the sitting of the Committee are appended to the Report.

4. For facility of reference and convenience, the Observations/ Recommendations of the Committee have been printed in bold letters in the Report.

New Delhi:  
29 March, 2017  
**08 Chaitra, 1938-39 (SAKA)**

**BHARTRUHARI MAHTAB**  
CHAIRPERSON  
RAILWAY CONVENTION COMMITTEE

# REPORT

## PART - I

### I. INTRODUCTORY

Indian Railways have committed themselves to the cause of reducing carbon emission by adopting renewable energy on priority basis. Efforts are being made to make railway operation environment friendly. In fact, Railways are one of the least polluting modes of transport. In 2014, the erstwhile Planning Commission in their document i.e. 'The Final Report of the Expert Group on Low Carbon Strategies for Inclusive Growth' has brought out the comparison for energy efficiency of various modes of transport as under:

| <b>Passenger</b>   | <b>Railways</b> | <b>Taxis</b> | <b>Bus</b>  | <b>Air</b> |
|--|-----------------|--------------|-------------|------------|
| TJ / BPKM  | 71              | 1338         | 196         | 1266       |
| <b>Freight</b>   | <b>Railways</b> | <b>HCVs</b>  | <b>LCVs</b> | <b>Air</b> |
| TJ/ BTKM   | 91              | 1125         | 1143        | 8925       |
| Note: TJ – Terra Joules, BPKM - Billion Pass kM, BTKM – Billion Tonne kM |                 |              |             |            |

2. The above comparative data shows that Indian Railways are 2.8 times energy efficient for passenger Traffic and 12.4 times efficient for Freight movement as compared to Road vehicles. In pursuance of Railway's commitment towards environment improvement, the Indian Railways are taking a number of measures like Solar Power Plants, Wind Energy, use of alternate fuels viz. Bio-diesel, CNG and LNG, Green Buildings, installation of energy efficient equipment, Tree plantation, water conservation etc.

3. With a view to assessing the effective implementation and achievements of the Green Energy initiatives by the Indian Railways, the Committee took up the subject for examination and report. In the process, the Committee obtained background note, written replies

and other requisite documents from the Ministry of Railways. The Committee also took evidence of the representatives of the Ministry of Railways (Railway Board) on two occasions. The Committee undertook on-the-spot Study Visits to various Zonal/Divisional Railways to obtain first-hand knowledge on the subject matter. Based on the written and oral depositions of the Ministry of Railways as well as the inputs gathered during the field visits, the Committee have deliberated on the issues concerning the subject matter in the succeeding paragraphs.

## **II. Solar Energy**

4. The emphasis of Indian Railways is towards development of solar power mainly through PPP model i.e. Railways will provide its space to the developer who in turn will provide all solar plants to the Railways. So far, Indian Railways have harnessed about 14 MWp of solar energy at about 4,761 LC gates, 650 way side Railway stations, 69 office buildings which includes 1 MW on Katra, 500 KW each at Varanasi, Jaipur, Secunderabad, Kolkata Metro & Bhsawal stations, Rail Coach Factory Rai Bareli, 1,500 solar based street lights, 1,502, solar water heaters at training institutes/running-rooms/hospitals/rest-houses/canteens/base kitchens etc.

5. In response to the Committee's query regarding the latest status of installation of solar run equipment like Solar Plants, Solar Voltaic Modules, Solar lanterns/solar lighting systems, Solar water heaters, Energy efficient luminaries, Solar panels and net savings per unit from the solar energy generated by Indian Railways (zone-wise), the Ministry submitted the following information in a tabular form:-

| <b>Status of Installed Solar Power over Indian Railways</b>     |              |  |  |  |   |
|---|--------------|--|--|--|---|
| S.No  | Railway      | Solar installed Capacity (including solar plants & solar lighting) | Net Saving from Solar plants, Solar lighting(Rs./year) | Solar Water Heater capacity installed (in Litres Per Day)* | Stations provided with 100%/no. of LED fittings** |
| 1   | CR           | 0.766  | 9421065  | 59550  | 73  |
| 2   | ER           | 0.028  | 310482   | 33900  | 189   |
| 3   | ECR          | 0.354  | 2982084  | 10500  | 27  |
| 4   | ECoR         | 0.140  | 1189085  | 1000   | 17  |
| 5   | NR           | 2.720  | 21785887   | 125900   | 61  |
| 6   | NCR          | 5.140  | 53829061   | 2000   | 36  |
| 7   | NER          | 0.338  | 3535291  | 20300  | 21  |
| 8   | NWR          | 0.954  | 8712214  | 96700  | 43  |
| 9   | NFR          | 0.307  | 3150538  | 47900  | 6   |
| 10  | SCR          | 1.809  | 19253911   | 196200   | 190   |
| 11  | SECR         | 0.218  | 2417655  | 59200  | 30  |
| 12  | SER          | 0.071  | 598275   | 26100  | 20  |
| 13  | SR           | 0.073  | 698769   | 41160  | 84  |
| 14  | SWR          | 0.317  | 2653347  | 68250  | 24  |
| 15  | WR           | 0.462  | 4075965  | 62975  | 34  |
| 16  | WCR          | 0.272  | 2587634  | 15400  | 41  |
| 17  | Metro        | 0.530  | 4847083  | 300  | 2   |
| 18  | RWF          | 0.001  | 9159   | 31400  | 0   |
| 19  | RCF/KXZ      | 0.101  | 887423   | 11500  | 61000 no. of LED fittings                         |
|   | <b>Total</b> | <b>14.601</b>  | <b>142944926</b>                                       | <b>910235</b>  | <b>898</b>  |
| * Saving depends upon the usage                                 |              |  |  |  |   |
| ** Savings Figures are being collected & will be provided later |              |  |  |  |   |

6. Asked to state the total energy units generated from solar run equipments during 2015-16 and 2016-17, the Ministry apprised that the Units generated in 2015-16 were about 12 Million Units (MU) and in 2016-17 it was about 18 MU.

7. The Committee were then informed that Indian Railways are contemplating setting up of grid connected solar power installations of about 1000 MW by providing solar PV modules as a part of green energy initiatives by 2020. Indian Railways have also envisaged harnessing solar energy by utilizing roof top spaces of Railway



stations and other Railway buildings and land, including through PPP mode for which guidelines & Model Bid Documents have been issued for this tender for above 50 MW capacity have already been issued.

8. In the above context, when the Committee desired to know the latest status of the ambitious plan of setting up of 1000 megawatt of solar power by the year 2020, the Chairman, Railway Board submitted in evidence:

“...We have already done 14 megawatt. Another 250 megawatt we are going to install in another one and a half years and then, balance in another two years.”

9. Asked to state whether the Ministry would be able to set up around 986 megawatt of solar power in the remaining three years, the Chairman, Railway Board, exuding confidence, replied in the affirmative.

10. The Committee then asked about the investment required for the purpose and the proposal of the Railways to generate it. In reply, the Ministry in their written deposition submitted as under:

“Most of the capacity will be generated on PPA basis wherein the investment will be made by developer & based on PPA, Railways will procure power from the developer. Only at stations of D, E, F and other places where the capacity is low, Railway will invest money”

11. The Committee then desired to be apprised of the efforts of the Railways towards roof top solar power installations. In response, the Chairman, Railway Board submitted in evidence as under :-

“That is one of our priority areas. Out of total 1000 MW, 250 MW is planned from solar roof top. In all our major installations, we have directed our Zonal Managers to go in for roof top solar power installations. Like for example, the Katra station, we already have one on the roof top of the station as well as on the

platform cover. It is a one MW system. We have railway coach factory at Rae Bareli where we have a plant of 2 MW. That is on roof as well as on ground. At Jaipur station also we have this roof top system. Even at our Railway Bhawan building we have a 30 KW roof top station. My colleague who was General Manager of Secunderabad, is saying that at Secunderabad, there is some 500 KW station. At all our major installations, space is available. We are going in for it and the total target is around 250 MW.”

12. As regards solar power trains, the Chairman, Railway Board apprised the Committee as follows:

“...Sir, this has been done only on experimental basis on very few coaches. One is on the narrow gauge system of Kangra Valley where on some coaches we have done it and we have done it on some other coaches. We still have to come to a conclusion whether it is really a viable thing based on the results that we get. We will take a further proliferation of this...”

13. The Committee then enquired about the cost of installing a solar plant and the gain that would accrue to the Railways. In response, the Chairman, Railway Board deposed:

“On a very rough estimate basis, the cost of installation of a solar plant is around Rs. 7 crore per megawatt. Now, it has come down to Rs. 5 crore per mega watt. The thermal plant is also established almost at the same cost. So, while we are establishing some of the plants ourselves through our subsidiaries, that is, REMCL, RITES, and only some we are installing ourselves under a Viability Gap Funding arrangement of Ministry of Power. Bulk of the solar power that we intend to source out of this 1000 MW will be through a PPA arrangement where a private individual establishes a plant and we source the power from him at a fixed rate over a period of say 25 years. This type of an arrangement is being done by various State Governments and we are also going in for that and the power rate which initially used to be little high has over a period of time come down. You must also have observed in some of the newspaper reports that the lowest rate that has been received some time in the past was even less than Rs. 4 per unit..”

14. Asked to state categorically the adverse impact on the Thermal Plants in terms of employment generation and waste of investment in case of Railways switching over to solar energy to a greater extent, the Chairman, Railway Board responded as under:

“It is not that whatever installation that we are going to do by solar power in our system we are going to be surplus in electricity generation, that is not really the case. Over all, the requirement of electricity as far as whole of India is concerned, we are still short. So, solar power, thermal power, hydro-electric power, nuclear power everything can survive. We have a commitment in the Paris Agreement on Climate Control that we have to reduce the carbon footprint and heat intensity by almost 30 per cent. All that is possible provided we go in for non-conventional sources of energy for incremental power that we need. So, it is a policy of the Government of India and that is how they are also supporting it by Viable Gap Funding. So, it is not that any thermal power plant which will be available will become redundant but of course they will be under pressure to improve their performance, improve their efficiency so that the rate at which they produce the electricity is comparable with other modes of energy those are available with us.”

15. The Committee then queried about the financial benefit of the Railways from the energy saving measures. In reply, the Chairman, Railway Board submitted:

“...Sir, I will not be able to give a straight answer to that but what we have planned is that whatever is the energy bill that is with us, we save almost 10 per cent on that. So, we have made a plan that we will be saving around Rs. 40000 crore over ten years as far as energy bill is concerned. That is by various means, by mix of various power sources, by energy efficiency, by way of procurement that we do of energy, by open access at lower rate than what is the normal rate, by using energy efficient devices. So, all the measures together should result in saving of Rs. 40000 crore as far as energy bill is concerned over a period of ten years. That is the target.”

16. The Committee desired to be apprised of the carbon credits earning by the Railways from the solar energy and their monetary value. In their written submission, the Ministry stated that earlier Indian Railways had obtained carbon credits, but due to non-monetization of the same, no further carbon credits had been processed.

17. Asked to state the reasons for non-monetization of the carbon credits and measures taken to further process them, the Ministry responded as under:

“The Current price of Carbon Credit is € 0.32 (<http://carbonplace.eu/info-commodities-CER>). Ministry of Railways has earned 9,462 Carbon Credits from the CDM projects and is at present lying in the MoR’s Permanent Account No. 2829 at CDM Registry. The present cost of CER CERs will continue to accrue till the year 2018. Sale of these CERs will be taken at appropriate time with the approval of associate finance.”

### **III. Wind Energy**

18. The Committee were informed that Indian Railways had planned to set up about 200 MW of wind mill power plants. Asked to state the number of wind energy plants already installed, the Ministry submitted that total capacity of about 36.5 MW wind energy plants had already been installed and about 10.5 MW of wind energy plants were under completion/proposed to be commenced.

19. The Chairman, Railway Board submitted in evidence:

“As far as wind is concerned, we have a plan of 150 megawatt by 2020 and we have already installed 30 megawatt and we are going ahead in this direction.”

20. As regards feasibility study made for setting up of wind power plants in the country, the Chairman, Railway Board apprised the Committee as under:

“The first plant in Tamil Nadu is in Thirunelveli. There are wind corridors. There are a lot of wind corridors in Karnataka also. Chitradurga district is one of the districts which has been identified in respect of the wind power corridor where the plants can come up. Some areas in Maharashtra are also there. So based on the feasibility where wind power can be tapped, we are also establishing them. These plants will be in the corresponding corridors of wind power.”

21. In response to the Committee’s query regarding total units of energy generated by wind plants during 2015-16 and 2016-17, the Ministry stated that for wind plants the units generated in 2015-16 were about 23 Million Units (MU) and in 2016-17 (upto Dec.16) it was about 39 MU.

22. In response to a specific query of the Committee regarding the percentage of total green energy contributed by wind energy, the Ministry stated that about 72 percent of total green energy was being contributed by wind energy on Indian Railways. Highlighting the basic difference between solar energy and wind energy, the Ministry submitted that while solar power was available only during the day time, wind power was available even at night.

23. As regards revenue earned through wind energy, the Ministry stated that the savings from wind energy were practically not much but it was replacing the coal based power as part of Indian Railways Green Energy initiatives.

24. The Committee then enquired whether any State Governments/PSU had entered into Energy Purchase Agreements (EPAs) with Indian Railways. In response, the Ministry submitted as under:

“As of now, there are no State Governments/PSUs which have entered into Energy Purchase Agreements (EPAs) with the Indian Railways.”

25. Asked to state the reasons for no EPAs with the State Governments/PSUs and measures taken to do the needful, the Ministry submitted that EPAs were being signed based on the

requirement and the process for EPAs was in progress with some State Governments.

26. The Committee then desired to know about the investment partners in the PPP model for development of wind farms. In reply, the Ministry stated that there were no investment partners in the PPP model for development of wind farms. However, wind plants were being set up through Railways Energy Management Company Limited (REMCL).

27. Asked to state the steps taken to attract private investment for wind plants, the Ministry submitted that tenders for PPP model for processing wind power from the developers were in process.

#### **IV. Water Conservation**

28. The Committee were informed that the Indian Railways were taking a number of measures for water conservation which inter-alia included effluent treatment, waste disposal, installation of bio-toilets, plantation of trees, rain water harvesting, water recycling plant etc.

29. Asked to furnish the latest status of each of the above water conservation measures, the Ministry in their written submission stated as under:

“a) Effluent treatment of discharge safe liquid waste to sewage systems.

At present 28 number of waste water treatment plants are operational treating around 1.26 crore litres of water every day.

b) PCB approved hazardous waste disposal system in workshops.

There are 47 Rolling Stock Workshops in Indian Railways out of which 37 are IMS/ISO 1001 certified. This includes compliance with PCB.

c) Progress of installation of bio-toilets in coaches till December, 2016.

The actual fitment of bio-toilets till 31st Jan, 2017 is 23,000.

d) Plantation of trees on vacant Railway land to prevent soil erosion and pollution from runoff waste water.

About 43.12 thousand hectares of Railway land are under plantation as on 31.3.2016. A total of 118.47 lakh trees has been planted up to January, 2017 (in 2016-17).

e) Rain water harvesting and water recycling plants.

Rain Water Harvesting (RWH)

So far 2294 Rain Water Harvesting Systems have been provided in Railways upto March 2016.

Water Recycling plants (WRP)

At present 39 WRPs have been commissioned upto Jan 2017.”

30. The Chairman, Railway Board supplemented in evidence as follows:

“...we are having around 2300 rain water harvesting systems. We are having at major coaching depots and stations, water recycling plants and presently we have 39 of them. We have plans to further raise it...”

31. The Committee then desired to know whether any water audits had been carried out. Replying in the affirmative, the Ministry furnished a list of 157 stations/centres under various Zonal Railways where water audits had already been carried out.

32. A perusal of the above said list of stations revealed that water audits had not been carried out in any station/centre under the jurisdiction of Southern Railway. On being asked to explain the position, the Ministry submitted that Southern Railway had identified 25 main water consumption centres for water audit out of which at 11 locations the same had already been completed and at the remaining locations it was being done.

33. Asked to state the improvements observed in water conservation subsequent to water audits at different locations, the Ministry apprised as under:

“Water audit helped in finding out misuse/wastage of water at many places and thus administration took action to reduce or eliminate wastage of water at many points such as fitting of floating valves in overhead tanks, replacing corroded pipelines to

avoid leakage etc. Remedial actions taken reduced water consumption on an average by 10%-15%.”

34. As regards the latest status of installation of bio-toilets in coaches, the Ministry apprised as under:

“Bio-toilets were fitted in 16817 coaches till 31.01.2017. The target for this year (2016-17) is 30,000 Bio-toilets. Target for 2017-18 is 40000 Bio-toilets and the work is scheduled to be completed in 2019.”

35. Asked about the manufacture of bio-toilets, the Chairman, Railway Board submitted in evidence as under:

“Sir, basically bio-toilet is a fabrication of a tank and some systems. Then we put bacteria inside that. There are many manufacturers of this tank and this system of bio-toilets. They are fitted in our Railway workshops. All new coaches which are manufactured come out with bio-toilets. Retro-fitment is done as far as old coaches are concerned in our Railway workshops mostly during POH cycle or mid-life refurbishing.”

36. On tree plantation, the Chairman, Railway Board apprised the Committee as under:

“We have also gone in for tree plantation in a big way. This year, we have planted around 1.2 crore trees up to January. We are very much concerned about saving energy and green initiatives so as to save energy and environment.”

37. Asked to furnish the details of tree plantation, the Ministry submitted as follows:

“In pursuance of Railway’s commitment towards environmental improvement through afforestation and also with a view to safeguard the precious railway land against unauthorized occupation/encroachment, tree plantation is being done on Railways land on regular basis. At present 39542 hectares of Railway land is under afforestation. To enhance afforestation, Ministry of Railways has finalized a model agreement to be



entered by the Zonal Railways with the State Forest Department in consultation with Ministry of Environment, Forest and climate change. Northern Railway has entered into an agreement with Forest Department of Punjab and Haryana States and Northeast Frontier Railway with Forest Department of Assam for planting trees along the track side in a big way. Other Zonal Railways are also making sincere efforts for agreement with Forest Department of the State Governments. During the year 2016-17, about 1.18 crore saplings have been planted by January, 2017.”

## **V. Use of Alternate Fuels**

38. As regards the use of alternate fuels viz. Bio-diesel, CNG & LNG by Indian Railways and its overall cost impact on the fuel bill, the Ministry stated as under:

“(a) Hon’ble MR in his Budget speech on 08-08-14 has stated that “Indian Railways (IR) will start using Bio Diesel up to 5% of the total fuel consumption in diesel locomotives. This will save precious foreign exchange substantially.

(b) After resolving regulatory barriers to the purchase of biodiesel, with the Ministry of Petroleum and Natural Gas, Indian Railways has started using Bio Diesel on various Railway Consumer depots (RCDs).

(c) IR has already started running CNG based DEMUs on Northern Railway and is converting a total of 100 DEMUs to run on dual fuel i.e. CNG and diesel. So far 10 no. DPCs (Diesel Power Cars) have been converted.

(d) IR is working to develop locomotives which can run on LNG fuel.

Tentative overall cost savings on the fuel bill of Indian Railways due to use of 5 % Bio Diesel will be Rs. 56.45 cr as per the estimate given below;

| S.No                       | Location          | Price of Bio diesel (Rs/Litre) | Date of PO/LOA | Price of HSD on PO date (Rs//Litre) | Diff (Rs.)  |
|----------------------------|-------------------|--------------------------------|----------------|-------------------------------------|-------------|
| 1                          | Andal (ER)        | 50.0                           | 09.06.15       | 54.99                               | 4.99        |
| 2                          | Sanathnagar (SCR) | 52.16                          | 03.06.15       | 57.71                               | 5.55        |
| 3                          | Raipur (SECR)     | 53.5                           | 29.05.15       | 55.89                               | 2.39        |
| 4                          | Tuglakabad (NR)   | 47.5                           | 12.06.15       | 50.7                                | 3.2         |
| Average Diff per Ltr       |                   |                                |                |                                     | 4.0325      |
| Current HSD price/ Ltr     |                   |                                |                |                                     | 50.0        |
| Difference in price        |                   |                                |                |                                     | 8.07%       |
| Implementation expected B5 |                   |                                |                |                                     | 5%          |
| Savings = 8.07%*5%         |                   |                                |                |                                     | 0.4%        |
| Total Fuel consumption     |                   |                                |                |                                     | 2800000 KLS |
| 5% of Total consumption    |                   |                                |                |                                     | 140000 KLS  |
| Savings = 140000 x 40325   |                   |                                |                |                                     |             |
| Savings in crores          |                   |                                |                |                                     | 56.45 cr    |

39. In response to a specific query regarding blending facility of bio-diesel in various Rail Consumer Depots (RCDs), the Chairman, Railway Board submitted in evidence:

“...We are blending five per cent bio-diesel with the conventional normal high speed diesel which was the decision taken in 2015. We are doing it in various RCDs that we have. We have almost 300 RCDs (Rail Consumer Depots) where diesel is stored and is dispensed on the various diesel locomotives. We have already provided 48 RCDs with blending facility of bio-diesel and 80 RCDs will be further added in the coming year, i.e., 2017-18.”

40. Underlying the impediments faced in the blending of bio-diesel, the Chairman, Railway Board further deposed:

“In fact, we wanted to take bio-diesel forward at a very fast rate but somehow the speed of blending five per cent all over could not progress very fast because of limited availability of bio-diesel because bio-diesel is not being marketed by main oil marketing companies and the prices of the bio-diesel is also highly volatile. No supplier of bio-diesel presently is prepared to offer us at fixed rate for over three months. So, those have been some of the constraints. We are also planning to set up our own bio-diesel plant at two places – one is Tondiarpet near Chennai in Southern Railway and other is Raipur, Chhattisgarh and South-East Central Railway.”

41. Asked to state the overall savings in the energy bill from use of bio-diesel the Chairman, Railway Board responded:

“As far as bio-diesel is concerned, there is a problem. Earlier the thinking was that by blending bio-diesel, the overall cost of energy or fuel will go down. That has not really happened. The price of bio-diesel and that of diesel is almost the same and at some places we have found it to be even higher than the price of diesel. It is not that by mixing diesel with bio-diesel I will be saving on the energy bill; it is from the environment point of view and saving the fossil fuel that I am going for blending of 5 per cent as per the policy of the Government of India.”

42. As regards use of CNG & LNG fuels, the Committee were apprised that Indian Railways had already started running four CNG based power cars on 2 DEMUs on Northern Railway and proposed to convert a total of 100 DEMUs to run on dual fuel i.e. CNG and diesel. Indian Railways were also working to develop locomotives which could run on LNG fuel.

43. When the Committee desired to be apprised of the latest status, the Ministry stated as under:

“Driving Power Cars (DPCs) of 17 DEMUs have been converted in dual fuel mode using CNG mixed with Diesel. The use of LNG for Diesel locomotives is yet to be developed.”

44. Asked to state the reasons for non-development of use of LNG for Diesel locomotives, the Ministry submitted as under:

"No suitable technology for use of Liquefied Natural Gas (LNG) on diesel locomotives on Indian Railways system is available. Indian Railways Organization for Alternate Fuels (IROAF) has floated a tender for conversion of 1400HP engines of Diesel Electric Multiple Unit (DEMU) into Dual Fuel Engine with LNG."

45. In response to another specific query regarding adequate Bio-diesel depots and CNG/LNG pump stations to cater to the needs of operations on longer routes, the Ministry apprised as follows:

"Regular supply of Bio-diesel by the oil companies is yet to start, in the meantime Railways have started procuring 100% Bio-Diesel (B-100) directly from manufactureers and are using in selected Depots where facilities for blending have been developed. So far, one CNG pump station has been developed at Shakur basti depot of Delhi division of Northern Railway for regular fittings of CNG in dual fuel DPCs. Use of LNG for traction purpose has not commenced in Indian Railways so far."

46. As regards efforts made to overcome the constraints, the Ministry further stated as under:

"Railways are setting up 02 bio-diesel manufacturing plants of 30 Tonne per day, capacity each at Tondiarpet, Chennai and Raipur, Chhattisgarh.

Tondiarpet plant is expected to commence production in the financial year 2017-18. The Raipur plant contract is under finalization.

Supply of CNG/LNG is also being planned at Vijaywada depot of South Central Railway and Sabarmati depot of Western Railway for use in DEMU trains based at these depots."

## **VI. Installation of Energy Efficient Equipment**

47. Regarding the progress of energy efficient fittings in Railway Stations, Coaches etc., the Committee were apprised as under:

“(a) So far, 898 nos. of Railway stations have already been fitted with 100% LED luminaire. These works are taken up by Railways progressively.

Further, instructions have already been issued for use of energy efficient LED lightings in all newly manufactured coaches in Production Units including EMU/MEMUs and Kolkata Metro coaches. Besides above, instructions have also been issued to replace all conventional FL/CFL used in IR coaches with energy efficient LED light during POH. FL/CFL released from coaches be utilized as spares by Zonal Railways during maintenance. This will result in energy saving of about 700 units of electricity per annum per coach. Keeping in view huge fleet size of rolling stock, the savings in terms of energy bill will be substantial in future.

b) Regular cleaning of air filters/air conditioners

Regular cleaning of air filters/air conditioners is being carried out during schedules specified for maintenance of AC Coaches.

c) Energy savers (VVVF) drivers in lifts and escalators

New procurement of Lifts and escalators includes provision of energy saving VVVF drive.

d) Automatic switching systems

Some stations have the Manual/automatic systems linked with train running for switching off part lights during night on need basis as a part of energy conservation initiative. In this system, the lighting at the platform is reduced to about 30% when there is no train at the platform.

e) Occupancy sensors

These systems will be provided as part of the Building Management System (BMS) by Railways progressively.”

48. The Committee desired to be apprised of the plan of action on the part of Railways to cover all the stations with 100 percent LED luminaire. In reply, the Ministry *inter-alia* submitted as under:

“As on date, out of 8500 stations about 1050 have already been provided with 100% LED luminaire. For remaining stations, works have been sanctioned and in next two years all stations will be covered either through Railway own funding or through Energy Services Company (ESCO) Model.”

49. As regards monitoring mechanism evolved for the purpose, the Ministry apprised as follows:

“Instructions have been issued for use of energy efficient LED lighting in all newly manufactured coaches in various production units including EMU/MEMUs and Kolkata Metro coaches. Instructions have also been issued to replace all conventional FL/CFL with energy efficient LED lights during POH, which shall be done in a progressive manner. A work for provision of LED lights in 10000 TL/EMU/MEMU coaches (Rs. 19 Crore) has been proposed to include in Railway Board Bulk RSP 2017-18 under DRF.”

## **VII. Green Buildings**

50. As regards policy decision taken by the Railway Board to convert different types of establishment into Green Buildings, the Ministry apprised the Committee as under:

“Railway Board has issued “Policy instructions” for undertaking Green Rating Certification for different types of Railway establishments. The certification would mainly cover the assessment of parameters having direct relations to environment improvement, such as Energy conservation measures, Use of renewable, Water recycling/ rain water harvesting, waste management (Solid & Liquids) and its disposal, Tree Plantation / Green cover, etc.

Under the policy, following would be covered:-

- (i) Green Rating certification & Energy Star Rating for Railway office building.
- (ii) Green Rating for Industrial Units (PUs and Workshops)
- (iii) Green Rating system for major railway stations.
- (iv) Green & Energy star Rating for major hospitals.
- (v) Green Rating for Railway Schools & Training Centres.

The above certification would not only provide for a substantial savings in energy, fuel and water and other benefits of environment conservation, apart from establishing image of IR as a “Green Organisation”.

51. During their Study Visit to Pune in February, 2016 the Committee visited the new administrative block/building of IRICEN (Indian Railways Institute of Civil Engineering), which is declared as a Green Building. There the Committee were informed that Offices/buildings at some more places viz. IRIAT, Nagpur, G.M. Office, Malegaon, N.F. Railway, G.M. Office, East Central Railway, Bilaspur, Dedicated Freight Corridor, Malegaon (Goa) and IRMEE, Jamalpur, etc. were also being converted into Green Buildings.

52. In the above context, the Committee desired to be apprised of the progress made so far. In reply, the Ministry submitted as under:

“A new building, extension to GM Office building is being constructed at Maligaon, Northeast Frontier Railway which has planned as Green Building. South East Central Railway GM Office building at Bilaspur, and East Central Railway GM Office building at Hajipur, construction have already been completed and Railways are processing for getting the Green Building Certificate. IRMEE, Jamalpur building is very old and the same is not feasible to be converted into a Green Building. IRIAET, Nagpur is planned as a new institute for which new building is to be constructed. A consultant has been engaged for architectural and structural design of the building. The building is to be designed as a “Green Building”.

## **VIII. Energy Audit**

53. As regards energy/environmental audit by the Indian Railways, the Ministry stated as under:

“(a) Indian Railways carries out electric energy audits as a regular exercise. In the current year (upto June 2015), 40 energy audits have been done. However, at present, no carbon footprint calculation is done.

(b) (i) DFCCIL has taken up Environment Impact Assessment (EIA) study for the Dedicated Freight Corridor Projects (EDFC and WDFC). As per the study most of the impacts during pre-construction and construction stages are localised, insignificant and temporary in nature. The scale of impact in post-construction stage ranges between no impact to insignificant impact in all parameters. There will be positive impact in respect of Global Warming & air pollution due to shift of freight from road to rail.

(ii) The EIA study has also been done in case of Udhampur-Baramulla-Srinagar Rail Link Project which has a substantial length of tunnelling length of tunnelling requiring dumping sites for muck disposal.”

54. Asked to state the periodicity prescribed in conducting energy audits, the Ministry responded that energy audit of all buildings having more than 100 KW was carried out regularly.

55. In response to a specific query, the Ministry replied that so far, 643 number of energy audits has been carried out across Indian Railways at different places/installations.

56. When asked about the main/major findings of the energy audits already conducted, the Ministry submitted as under:  
“Following are the main/major findings of the energy audits already conducted:



- (i) Replacement of all T-12, T-5 fittings, CFL & conventional lights with recommended LED fittings.
- (ii) Provision of Automatic Power Factor Correction (APFC) panel for better power factor and replacement of defective APFC panel.
- (iii) Provision of high efficiency pumps with automatic system and replacement of oversized pumps.
- (iv) Provision of capacitors at pumps.
- (v) Replacement of old air compressors and installation of separate compressor for high pressure application.
- (vi) Replacement of high wattage fans by low wattage fans.
- (vii) Replacement of conventional geezers by solar water heater.
- (viii) Use of BEE Star rated appliances.
- (ix) Using 30/70 switching for platform lighting and timer lighting in high mast light.”

57. Asked to state the mechanics evolved to enforce implementation of the energy audit observations the Ministry submitted that the officials of the Zonal Railways monitored the progress of the implementation of such recommendations.

58. The Committee asked whether all the workshops, depots etc. had been environmentally certified. In reply, the Ministry stated as under:

“08 Production Units, 37 Workshops, 25 diesel loco sheds, 04 major coaching depots and 02 major Freight depots are certified with Integrated Management System (IMS)/Environment Management System (EMS-ISO 14001).”

59. Asked to spell out the plan of action for environmentally certifying all the workshops, loco sheds etc., the Ministry apprised as under:

“10 more workshops, 21 more diesel loco sheds, 28 more major coaching depots and 10 more major freight depots are planned to be certified in next year, up to march 2018.”

60. As regards proposals to carry out performance audit of the Green Energy initiatives, the Ministry submitted as follows:

“The Technical Directorates in Railway Board regularly monitor the progress of respective Green Initiatives, which includes Energy Audits on periodic basis. No separate performance audit is taken up so far.”

61. When the Committee desired to be apprised of the reasons for not carrying out a separate performance audit of the Green Energy initiatives, the Ministry deposed as under:

“No such policy directives exist at present from Railway Board. Notwithstanding, monitoring of performance of initiatives is a regular administrative responsibility. The Hon’ble Committee’s valuable suggestion has been noted.”

#### **IX. Budgetary Provision for Green Energy Initiatives**

62. As regards budget allocation for Green Energy initiatives, the Ministry apprised the Committee as under:

“Although, there is no budget allocation exclusively for green energy initiatives, there are a number of on-going projects/works worth Rs. 77.76 Cr at RDSO, under this plan-head, which directly or indirectly contribute towards improving environment through development of alternative energy resources, modification in rolling stock designs, etc. The funds provided for these works are considered to be adequate.”

63. The Ministry further stated:

“Respective Directorates / departments are allocated Budget provisions as per the projected requirement of funds for their Programmes & Schemes, which include schemes for Green Initiatives. No separate budget is allocated or maintained for Green Initiatives exclusively.”

64. Asked to state whether a separate and exclusive budget allocation for Green Energy was not required, the Ministry submitted as under:

“Business wise the field of Green Energy is still evolving. Even on the Railways initially Solar PV was installed by the Department whereas this is now being restored to increasingly on PPA/PPP basis. Hence, the need for creating a separate and exclusive budget allotment head has not been felt.”

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## **PART-II**

### **OBSERVATIONS/RECOMMENDATIONS**

- 1. The Committee note that Indian Railways are 2.8 times energy efficient for passenger traffic and 12.4 times efficient for freight movement, implying thereby Railways are one of the least polluting modes of transport. In their efforts to reduce carbon emission and make railway operation environment friendly, the Indian Railways are embarking upon a number of measures like Solar Energy, Wind Energy, Water Conservation, Use of Alternate Fuels like Bio-diesel, CNG and LNG, installation of Energy Efficient Equipment, Green Buildings, Tree Plantation etc. The Committee appreciate the commitment of the Railways towards Green Energy initiatives and would like to encourage them to keep up the good work besides exploring more such measures for environment improvement.**
- 2. The Committee note that Indian Railways are contemplating to set up grid connected solar power installations of about 1000 MW by the year 2020 by providing solar PV modules as a part of Green Energy initiatives. In this context, the Committee are concerned to find that so far only 14 MW solar power has been installed, leaving 986 MW to be set up in the remaining**

**three years. However, taking note of the assurance of the Chairman, Railway Board in evidence, the Committee trust that the Ministry would take recourse to all requisite and effective measures to ensure that the projected 1000 MW solar power is set up by 2020.**

**3. The Committee note that out of the total 1000 MW of solar power, 250 MW is planned from roof top solar power installations for which instructions have been issued to all the Zonal Managers. Roof top solar systems have already been installed at Katra, Jaipur and Secunderabad stations and also on the roof top of the Rail Coach Factory at Rae Bareilly besides the Rail Bhavan Headquarters at Delhi. Since adequate space is available at all the major installations of Indian Railways, as submitted by the Chairman, Railway Board, the Committee urge the Ministry to monitor the instructions issued to the Zonal Managers so as to ensure that the projected 250 MW of solar power is obtained from the roof top arrangements by 2020.**

**4. The Committee note that the cost of installations of a solar plant has come down to Rs. 5 crore per MW, at par with the establishment of a Thermal Plant. The Committee further note that bulk of the solar power that the Ministry intend to source out of the projected 1000 MW will be**

through a Power Purchase Agreement (PPA) where a private individual establishes a plant and the Railway will source the power from him at a fixed rate over a period of say 25 years. As various State Governments are adopting such arrangements which has resulted in cost effectiveness of power tariff, the Committee endorse the decision of the Railways and believe that the projected solar plants would be installed by the deadline.

5. The Committee find that the Railways have a commitment in the Paris Agreement on Climate Control that they have to reduce the carbon footprint and heat intensity by almost 30 percent. That is possible provided the Railways go in for non-conventional sources of energy for incremental power that they need. In view of the fact that the Government of India, as a policy matter, are supporting it by Viable Gap Funding and Railways have a plan to save around Rs. 40,000 crore over a period of ten years in energy bill through various energy saving measures, the Committee recommend that the initiatives for non-conventional sources of energy should be intensified by the Indian Railways.

6. The Committee note that due to non-monetisation of carbon credits, the Railways have not been processing the same, as they used to do earlier. However, taking note of

**the Ministry's submission that sale of 9,462 carbon credits earned from the CDM projects will be made at an appropriate time with the approval of associate finance, the Committee trust that requisite action will soon be taken by the Railways in this regard.**

**7. The Committee note that the Railways have a plan to set up 150 MW of wind mill power plants by 2020 and they have already installed about 36 MW power plants so far. In view of the fact that about 72 percent of total green energy is being contributed by wind energy which is replacing the coal based power and available even at night, the Committee exhort the Ministry to accord top priority to wind energy and take requisite and effective measures to set up the remaining wind mill power plants by 2020.**

**8. The Committee are concerned to find that as of now no State Governments/PSUs have entered into Energy Purchase Agreements (EPAs) with the Indian Railways. It is a matter of equal concern that there are no investment partners in the PPP model for installation/development of wind farms. However, taking into consideration the Ministry's submission that the process for EPAs with some State Governments and tenders for PPP model is in progress, the Committee desire the Railway Board to**

**accelerate the process so that more wind farms are set up and the energy sourced from them is gainfully utilised.**

- 9. The Committee appreciate that for water conservation, the Railways are taking a number of measures which *inter-alia* include waste water treatment plants, waste disposal system in workshops, rain water harvesting, water recycling plants, bio-toilets and tree plantation. In this context, the Committee find that at present 28 Waste Water treatment plants are operational treating around 1.26 crore liters of water every day. Similarly, out of the 47 Rolling Stock Workshops, 37 are in compliance with the Pollution Control Board (PCB) approved hazardous waste disposal system. Moreover, 2294 Rain Water Harvesting Systems and 39 Water Recycling Plants have been provided/commissioned. While taking note of the commendable measures of the Indian Railways towards water conservation, the Committee desire that efforts be made to install more waste water treatment plants, rain water harvesting systems and water recycling plants across the Zones so as to ensure conservation of more water. The Committee also recommend that requisite measures be taken to make the remaining 10 Rolling Stock Workshops conform to the PCB approved hazardous waste disposal system.**



**10. The Committee note that water audits have been carried out in 157 stations/centres under various Zonal Railways, except Southern Railway. The Ministry have subsequently clarified that at 11 locations in Southern Railway water audit has been completed and in 14 more locations it is being done. Since water audits help in detecting misuse/wastage of water enabling the Zonal/Divisional Railways to take remedial/corrective action, the Committee urge that water audits be carried out in more stations/centres including the remaining 14 locations at Southern Railway.**

**11. The Committee note that the target for fitment of bio-toilets in coaches has been 30,000 during 2016-17 out of which 23,000 bio-toilets have already been installed. The target for 2017-18 is 40,000 bio-toilets. Since all new coaches which are being manufactured will come out with bio-toilets, the Committee impress upon the Railways to accelerate the process of retro fitment of bio-toilets in all the old coaches so that the mission is accomplished as per target.**

**12. The Committee are pleased to note that during the year 2016-17 (as on 31 January, 2017), as many as 1.18 crore saplings have been planted in 39542 hectares of railway land, as a part of Railway's commitment towards**

**environmental improvement. In this context, the Committee observe that with a view to enhancing afforestation, the Ministry have finalised a model agreement to be entered by the Zonal Railways with the State Forest Departments in consultation with the Ministry of Environment and Forests. The Committee are of the considered view that it is a step in right direction and should be persisted with so that afforestation is enhanced for environmental improvement as well as to safeguard the precious Railway land against unauthorized occupation/encroachment.**

- 13. As per a decision taken in the year 2015, the Railways are blending five per cent bio-diesel with the conventional normal high speed diesel in their Rail Consumer Depots (RCDs) with a view to saving fossil fuel and precious foreign exchange substantially. In this context, the Committee find that out of the total number of 300 RCDs, blending facility has been provided in 48 RCDs and such facility is proposed to be provided in 80 more RCDs during 2017-18. According to the Chairman, Railway Board, earlier the thinking was that by blending bio-diesel, the overall cost of energy or fuel will go down which has not really happened. But as per the policy of the Government of India, the Railways are blending five per cent bio-diesel from the environmental point of view**

and to save the fossil fuel, which according to the Committee is a prudent action. The Committee, therefore, recommend that blending of bio-diesel in the remaining 252 RCDs be initiated at an early date from the environmental point of view, quantum of savings on energy bill notwithstanding.

14. The Committee note that because of limited availability of bio-diesel and highly volatile nature of its prices, the speed of blending bio-diesel has suffered a setback. In order to overcome the impediments, the Railways are proposing to set up two bio-diesel manufacturing plants at Tondiarpet (Chennai) and Raipur (Chhattisgarh). While the Tondiarpet Plant is expected to commence production in 2017-18, the Raipur Plant contract is under finalisation. The Committee impress upon the Ministry to expedite the finalisation of the Raipur Plant contract besides exploring the feasibility of setting up of similar plants at other places so that the basic constraints are tackled and blending of bio-diesel progresses as per planning.

15. The Committee note that Indian Railways have already started running four CNG based cars on two DEMUs on Northern Railway and proposed to convert a total of 100 DEMUs to run on dual fuel i.e. CNG and

**Diesel. Out of these 100 DEMUs, 17 DEMUs have been converted to dual fuel mode. In view of the CNG's environment friendly character and cost effectiveness, the Committee call upon the Ministry to make efforts for converting the remaining targeted 87 DEMUs to dual fuel mode in a time bound manner. The Committee also desire that requisite measures be taken in unison with other appropriate Departments to develop suitable technology for use of LNG on Diesel Locomotives.**

**16. Energy efficient fittings in Stations/Coaches is another important Green Energy initiative undertaken by the Indian Railways. In this context, the Committee find that out of a total number of 8500 stations, about 1050 stations have already been provided with 100 percent LED luminaire. Further, instructions have been issued for use of LED lightings in all newly manufactured coaches in various production units including EMU/MEMUs and Kolkata Metro Coaches. The Committee recommend that the Railway Board should monitor the effective implementation of their instructions so as to ensure that the remaining 7450 stations and all the newly manufactured coaches are fitted with energy efficient LED lightings within a definite time line.**

**17. The Committee appreciate that the Railway Board have issued 'Policy instructions' for undertaking Green Rating Certification for different types of Railway establishments. As a result, efforts have been initiated to construct/convert some establishments under North East Frontier Railway, South East Central Railway, East Central Railway etc. into Green Buildings. As the Green Rating Certification endorses various parameters having direct relation to environment improvement, the Committee impress upon the Railways to intensify their efforts for converting maximum possible establishments into Green Buildings which would provide for a substantial savings in energy, fuel and water besides establishing the image of Indian Railways as a 'Green Organization'.**

**18. The Committee note that so far, 643 energy audits have been carried out across Indian Railways at different places/installations subsequent to which the findings/recommendations are being implemented. The Technical Directorates in Railway Board regularly monitor the progress of various Green Energy initiatives including Energy Audits on periodic basis. In view of the import of energy audits to suggest corrective measures towards energy saving, the Committee exhort the Railways to conduct more such audits periodically. The Committee further desire the Railway Board to issue policy directives**

**for a separate performance audit of the Green Energy initiatives to have an objective assessment.**

**19. The Committee note that so far 8 Production Units, 37 Workshops, 25 Diesel Loco Sheds, 4 major Coaching Depots and 2 major Freight Depots have been certified with Integrated Management System/Environment Management System. The Railways are planning to get some more workshops, Diesel Loco sheds, Coaching Depots and Freight Depots certified environmentally by March, 2018. The Committee desire that steps be taken to environmentally certify all the major Railway Workshops, Sheds etc. in a progressive and time-bound manner.**

**20. The Committee note that there is no exclusive budget allocation for the Green energy initiatives. According to the Ministry the need for creating a separate and exclusive budget allotment head is not felt as business wise the fields of Green Energy is still evolving and some measures are resorted to increasingly through PPA/PPP basis. The Committee would, however, like the Ministry to consider a separate Budget allocation for the Green Energy initiatives so as to ensure that no Green Energy initiative is stuck due to want of funds.**

New Delhi:  
**29 March, 2017**  
08 Chaitra, 1938-39 (SAKA)

**BHARTRUHARI MAHTAB**  
CHAIRPERSON  
RAILWAY CONVENTION COMMITTEE

**RAILWAY CONVENTION COMMITTEE (2014-2019)**

**MINUTES OF THE SEVENTH SITTING OF THE COMMITTEE**

The Committee sat on Monday, the 21<sup>st</sup> September, 2015 from 1100 hrs. to 1300 hrs. in Committee Room-G-074, Ground Floor, Parliament Library Building, New Delhi.

**PRESENT**

**Shri Bhartruhari Mahtab - Chairperson**

**Members**

**Lok Sabha**

2. Shri K. Ashok Kumar
3. Smt. Anupriya Patel
4. Shri Nana Patole
5. Shri Rahul Ramesh Shewale
6. Shri K.C. Venugopal

**Rajya Sabha**

7. Shri Avinash Rai Khanna
8. Dr. Vijaylaxmi Sadho
9. Shri Arvind Kumar Singh
10. Shri K.C. Tyagi

**Secretariat**

1. Sh. K. Vijaykrishnan - Addl. Secretary

- |    |                       |   |                |
|----|-----------------------|---|----------------|
| 2. | Sh. M. K. Madhusudhan | - | Director       |
| 3. | Sh. D.R. Mohanty      | - | Addl. Director |

### Witnesses

#### Representatives of the Ministry of Railways (Railway Board)

- |    |                      |                           |
|----|----------------------|---------------------------|
| 1. | Sh. A. K. Mittal     | Chairman, Railway Board   |
| 2. | Sh. S. Subrahmanyam  | Addl. Member (Budget)     |
| 3. | Sh. Navin Tondon     | Member (Electrical)       |
| 4. | Sh. V. K. Gupta      | Member (Engineering)      |
| 5. | Sh. Hemant Kumar     | Member (Mechanical)       |
| 6. | Sh. R. P. Nibariya   | Addl. Member (Electrical) |
| 7. | Sh. S. Vijayraghavan | Addl. Member (Finance)    |
| 8. | Sh. K. Swaminathan   | Advisor (Environment)     |

2. At the outset, the Chairperson welcomed the Members and the representatives of the Ministry of Railways (Railway Board) to the sitting of the Committee, convened to have a briefing on the subject **“Green Energy Initiatives in Indian Railways”**. Impressing upon the witnesses to keep the proceedings of the Committee **“Confidential”**, the Chairperson requested the Chairman, Railway Board, to brief the Committee on various Green Energy Initiatives undertaken by the Indian Railways.

3. The Chairman, Railway Board, accordingly gave a brief overview of the various measures taken/proposed by the Ministry towards Green Energy. Thereafter, the Advisor (Environment) gave a PowerPoint presentation and briefed the Committee about the measures taken for improvement in energy efficiency in Railway systems such as the use of alternative sources of energy, harnessing green energy through Solar and Windmill power plants, use of renewable energy and also the promotion of green initiatives to curb pollution. Thereafter, the Members raised several issues on harnessing of Solar and Wind energy at a much wider scale to meet the ever increasing demand of Indian Railways, blending of Bio-diesel in the HSD, Installation of LED's and other energy efficient technologies, the progress of installing Bio-toilets in the coaches and improving the sanitation standards, efficient use and conservation of water in trains, etc. The representatives of the Ministry of Railways responded to the queries raised by the Members. As some queries required detailed and statistical reply, the Chairperson asked the Chairman (Railway Board) to furnish written reply thereon within 3 weeks. The Chairman (Railway Board) assured to comply.

4. The Chairperson thanked the witnesses for appearing before the Committee and for furnishing the available information that the Committee desired in connection with the examination of the subject.

The witnesses then withdrew.



A verbatim copy of the proceedings was kept on record.

**The Committee then adjourned.**

**RAILWAY CONVENTION COMMITTEE (2014)**

**MINUTES OF THE 30<sup>th</sup> SITTING OF THE COMMITTEE**

The Committee sat on Wednesday, the 02<sup>nd</sup> March, 2017 from 1100 hrs. to 1245 hrs. in Committee Room-G074, Parliament Library Building, New Delhi.

**PRESENT**

Shri Bhartruhari Mahtab - Chairperson

**Members**

**Lok Sabha**

2. Shri Sanganna Amarappa Karadi
3. Shri K.C. Venugopal
4. Shri K. Ashok Kumar
5. Shri Janak Ram
6. Shri Rahul Ramesh Shewale

**Rajya Sabha**

7. Shri Prem Chand Gupta
8. Shri Ranvijay Singh Judev
9. Shri T.K. Rangarajan

**Secretariat**

1. Sh. M.K. Madhusudhan - Director
2. Sh. D.R. Mohanty - Addl. Director

## Witnesses

### Representatives of the Ministry of Railways (Railway Board)

1. Shri A.K. Mital - Chairman, Railway Board & Ex-officio Principal Secretary to the Government of India.
2. Shri Ravindra Gupta - Member Rolling Stock & Ex- officio Secretary to the Government of India.
3. Shri Pradeep Kumar - Member Staff & Ex- officio Secretary to the Government of India.
4. Shri S.C.Jethi - Additional Member (Commercial)
5. Shri A.K. Tiwari - Adviser(EnHM)
6. Shri Achal Khare - Adviser (Infra)
7. Sh. Rajiv Chaudhary - Adviser/SDE

2. At the outset, the Chairperson welcomed the Members and the representatives of the Ministry of Railways (Railway Board) to the sitting of the Committee, convened to take oral evidence on the subjects **“Green Energy Initiatives in Indian Railways”** and **“Exploring PPP avenues in Railway Infrastructure”**. Impressing upon the witnesses to keep the proceedings of the Committee **“Confidential”**, the Chairperson asked the Chairman, Railway Board, to first update the Committee on further developments on the Green Energy initiatives taken by Indian Railways highlighting *inter-alia* the status of the ongoing and future schemes/projects on solar energy, bio-diesel, wind energy, water conservation etc.

3. Accordingly, the Chairman, Railway Board apprised the Committee of the ambitious plan of the Railways towards green energy initiatives like solar power

generation, wind power plants, blending of bio-diesel, water harvesting, transmission of energy to overhead railway traction system, LED fittings in coaches and stations, bio-toilets, tree plantation etc.

4. The Chairperson then asked the Chairman, Railway Board to apprise the Committee of the various schemes/projects envisaged under PPP like Port Connectivity Projects, Private Freight Terminal Scheme, Private Containers Operation, Wagon Leasing Scheme, Special Freight Train Operator Scheme, Redevelopment of Stations etc.

5. The Chairman, Railway Board, accordingly made a brief power-point presentation *inter-alia* highlighting the need for PPP in Indian Railways, commencement of PPP in 2012, participative policy, projects under PPP policy 2012, customer funded projects, summary of investments in Railway connectivity projects, other private investment initiatives etc. The representatives of the Ministry of Railways thereafter responded to the queries raised by the Members. As some queries required further clarifications and detailed reply, the Chairperson asked the Chairman, Railway Board, to furnish written replies on the same, within a week. The Chairman, Railway Board, assured to comply.

6. The Chairperson thanked the witnesses for appearing before the Committee and furnishing the available information that the Committee desired in connection with the examination of the subject.

The witnesses then withdrew.

A verbatim copy of the proceedings has been on record.

**The Committee then adjourned.**

**RAILWAY CONVENTION COMMITTEE (2014)**

**MINUTES OF THE THIRTY FIRST SITTING OF THE COMMITTEE**

The Committee sat on Wednesday, the 29<sup>th</sup> March, 2017, from 1500 hrs. to 1545 hrs. in Room No. 215, Chairperson's Chamber, Parliament House Annexe Extension, New Delhi.

**PRESENT**

**Shri Bhartruhari Mahtab** - **Chairperson**

**Members**

**Lok Sabha**

2. Shri Kamalbhan Singh Marabi
3. Shri Nana Patole
4. Shri L.K Vaghela
5. Shri K.C. Venugopal

**Rajya Sabha**

6. Shri Abdul Wahab
7. Shri Ranvijay Singh Judev

**Secretariat**

1. Sh. Sukhi Chand Chaudhary - Joint Secretary
2. Sh. M. K. Madhusudhan - Director
3. Sh. D. R. Mohanty - Additional Director

2. At the outset, the Chairperson welcomed the Members to the sitting of the Committee, convened to consider and adopt the draft Reports on the subjects (i) Exploring PPP avenues in Railway Infrastructure (ii) Green Energy Initiatives in Indian Railways (iii) Action Taken by the Government on the Observations/Recommendations of the Committee contained in their Fourth Report on Role of IRFC and use of SPV methodology in financing development needs of Indian Railways and (iv) Action Taken

by the Government on the Observations/Recommendations of the Committee contained in their Fifth Report on Share of Railway Traffic vis-a-vis Air and Road Transport-An Evaluation. Giving an overview of the important Recommendations contained in the Draft Reports, the Chairperson solicited the views/suggestions of the Members.

3. The Committee then took up for consideration the said Draft Reports and adopted them after some discussions.

4. The Chairperson thanked the Members for their valuable suggestions and active participation in the deliberations of the Committee. The Chairperson also appreciated the performance of the Officers of the Secretariat attached to the Committee.

5. The Committee, then, authorized the Chairperson to finalize the Reports in the light of consequential changes that might arise out of factual verification of the Draft Reports and present the same to both the Houses.

**The Committee then adjourned.**