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ENVIRONMENT MANAGEMENT IN INDIAN RAILWAYS — STATIONS, TRAINS AND TRACKS

MINISTRY OF RAILWAYS

PUBLIC ACCOUNTS COMMITTEE 2014-2015

THIRD REPORT

SIXTEENTH LOK SABHA

सत्यमेव जयते

LOK SABHA SECRETARIAT
NEW DELHI

THIRD REPORT

PUBLIC ACCOUNTS COMMITTEE
(2014-2015)

(SIXTEENTH LOK SABHA)

ENVIRONMENT MANAGEMENT IN INDIAN RAILWAYS—STATIONS, TRAINS AND TRACKS
MINISTRY OF RAILWAY

Presented to Lok Sabha on 25.11. 2014
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LOK SABHA SECRETARIAT
NEW DELHI

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COMPOSITION OF THE PUBLIC ACCOUNTS COMMITTEE
(2014-15)

Prof. K.V. Thomas — *Chairperson*

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3. Shri Sudip Bandyopadhyay
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3. Shri Jayakumar T.	—	*Additional Director*
4. Smt. Anju Kukreja	—	*Under Secretary*

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* Vacant *vice* Shri Rajiv Pratap Rudy who has been appointed as Minister *w.e.f.* 9th November, 2014.

† Vacant *vice* Shri Jayant Sinha who has been appointed as Minister *w.e.f.* 9th November, 2014.

†† Vacant *vice* Dr. M. Thambidurai who has been chosen as Hon'ble Deputy Speaker, Lok Sabha and has since resigned from the membership of the Committee.

COMPOSITION OF THE PUBLIC ACCOUNTS COMMITTEE
(2013-14)

Dr. Murli Manohar Joshi — *Chairman*

MEMBERS

Lok Sabha

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†18. Shri Ashwani Kumar
19. Shri Satish Chandra Misra
††20. Dr. V. Maitreyan
21. Shri N.K. Singh
22. Smt. Ambika Soni

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* Elected *w.e.f.* 14th August, 2013 *vice* Dr. Girija Vyas appointed as Minister of Housing, Urban Development and Poverty Alleviation *w.e.f.* 17th June, 2013.

† Elected *w.e.f.* 3rd September, 2013 *vice* Dr. V. Maitreyan ceased to be a Member upon his retirement as a Member of Rajya Sabha *w.e.f.* 24th July, 2013.

†† Elected *w.e.f.* 3rd September, 2013 *vice* Dr. E.M. Sudarsana Natchiappan appointed as Minister of State for Commerce and Industry *w.e.f.* 17th June, 2013.

COMPOSITION OF THE SUB-COMMITTEE-I (RAILWAYS) OF
THE PUBLIC ACCOUNTS COMMITTEE
(2013-14)

Shri Prakash Javadekar — *Convenor*

MEMBERS

2. Shri Prasanta Chatterjee
3. Dr. V. Maitreyan
4. Shri Ramen Deka
5. Shri Jayaprakash Hegde

INTRODUCTION

I, the Chairperson, Public Accounts Committee (2014-15), having been authorized by the Committee, do present this Third Report (Sixteenth Lok Sabha) on 'Environment Management in Indian Railways — Stations, Trains and Tracks' based on C&AG Report No. 21 of 2012-13 Union Government (Railways) — Performance Audit.

2. The Report of the Comptroller and Auditor General of India was laid on the Table of the House on 20th December, 2012.

3. The predecessor Public Accounts Committee (2013-14) took up the subject for detailed examination and report. A Sub-Committee on Railways under the Convenorship of Shri Prakash Javadekar, MP and a Member of the PAC specifically constituted for the purpose, procured written replies and took evidence of the representatives of the Ministry of Railways (Railway Board) on the subject at their sitting held on 11th October, 2013. The Sub-Committee also undertook on the spot study visits and held discussions with the representatives of the Ministry of Railways. The draft Report on the subject was finalized and approved by the Convenor and subsequently approved by the then Chairperson, PAC. The Sub-Committee of PAC (2013-14) considered and adopted this Report at their sitting held on 14th March, 2014. However, due to dissolution of Fifteenth Lok Sabha, the draft Report could not be considered for adoption by the Public Accounts Committee (2013-14).

4. The subject was subsequently carried forward by the successor Committee (2014-15) for examination. The draft Report which was placed before the main Committee was considered and adopted at their sitting held on 8th October, 2014. The minutes of the Sittings are appended to the Report.

5. For facility of reference and convenience, the Observations and Recommendations of the Committee have been printed in thick type in the body of the Report.

6. The Committee thank their predecessor Public Accounts Committee and their Sub-Committee for taking oral evidence of the Ministry of Railways (Railway Board) and obtaining the requisite information on the subject.

7. The Committee would also like to express their thanks to the representatives of the Ministry of Railways (Railway Board) for tendering evidence before the Sub-Committee and furnishing information in connection with the examination of the subject.

8. The Committee place on record their appreciation of the assistance rendered to them in the matter by the office of the Comptroller and Auditor General of India.

NEW DELHI;
24 *November*, 2014
03 *Agrahayana*, 1936 (*Saka*)

PROF. K.V. THOMAS
Chairperson,
Public Accounts Committee.

REPORT

PART I

I. INTRODUCTORY

Environment in general refers to the surroundings of an object which may be natural or the built environment. Environmental management is essentially the management of interaction by modern human societies and its impact upon the environment. The National Environment Policy, 2006 articulated the idea that environment protection shall form an integral part of the developmental process and cannot be considered in isolation.

2. Indian Railways (IR) is the single largest carrier of freight and passengers in the country. It is a bulk carrier of several pollution intensive commodities like coal, iron ore, cement, fertilizers, petroleum, etc. Being a major consumer of water and energy, policies adopted by the Indian Railways have a substantial impact on our environment and on the conservation of both water and energy in the country. The approach of Indian Railways towards protection of the environment therefore, assumes great importance for tackling environment challenges to the country.

II. AUDIT REVIEW

3. A performance Audit on "Cleanliness and sanitation in IR" was earlier taken up and the results included in the Audit Report No.6 of 2007 (Railways) of the Comptroller & Auditor General of India. The Audit review was conducted to assess whether the Plans and policies framed to maintain cleanliness and management of waste generated in Railway Stations and in trains were adequate. The Audit report, *inter-alia,* had highlighted several deficiencies of IR in maintaining cleanliness at stations and in trains which were further examined by the Public Accounts Committee. In the light of Audit findings and evidence tendered before them, the Public Accounts Committee in their 83rd Report (14th Lok Sabha) had examined various shortcomings/ lapses on Cleanliness and Sanitation on Indian Railways and the Committee had accordingly given their observations/recommendations. Some of the important observations/recommendations made by the Committee in their 83rd Report (14th Lok Sabha) were as under:—

- The Ministry of Railways should strengthen co-ordination efforts and put in place an institutionalized mechanism at the Apex level dedicated towards Cleanliness and Sanitation on Indian Railways.
- The Ministry of Railways should ensure that the Housekeeper should undertake periodic inpsection within the trains several times a day. He should also carry and display a checklist of his inspected items which may be submitted to the concerned authorities at terminal stations.

- The Ministry of Railways should frame a policy on Waste Management and lay down a mechanism whereby the quantum of garbage generated on stations (including garbage collected from trains and disposed off at the nominated stations) can be assessed realistically so that adequate collection, segregation and disposal facilities along with necessary infrastructure can be put in place.
- The Ministry should outlay a dedicated budget exclusively meant for sanitation and cleanliness on Indian Railways with a provision for year-wise increment on the same.
- The Ministry should draw up action plan for provision of setting up adequate infrastructure *viz.,* water supply, washable aprons, drains and sewerage system and machines alongwith conducive platform surfaces for each station duly prioritizing requirements.
- The Ministry should evolve a clear-cut and effective promotional policy for Safaiwalas to boost their morale towards their duty.
- The Ministry should strengthen and modernize the existing mechanism of grievance redressal. The Ministry should also ensure that the existing complaint redressal system is modernized with effective use of technology.
- The Ministry should take steps to reduce the shortcomings of mechanized cleaning in various A and B category stations. The Ministry should also ensure that suitable infrastructure is laid down to carry out mechanized cleaning on all selected stations.

4. These recommendations were substantially accepted by the Government. The action taken by the Ministry on these recommendation are contained in the 21st Report (15th Lok Sabha). Nevertheless, the deficiencies pointed out in the previous Audit Report and the recommendations of the PAC were not addressed completely. Shortcomings in collection and disposal of garbage remained unresolved. The commitment of the Indian Railways to PAC regarding implementation of green toilets in train was not fulfilled and adequate action was not taken by IR to integrate environmental concerns with their operational policies. In this background a comprehensive audit exercise was further undertaken to assess the performance of IR in managing environmental risks. The Audit findings were highlighted in the C&AG's Report No. 21 of 2012-13 (Union Government—Railways) on the 'Environment Management in Indian Railways—Stations, Trains and Tracks'. Which was laid in Parliament on 20.12.2012.

5. In their performance review, Audit examined the commitment of IR towards ensuring environmental protection as an integral part of its development/operational process. They had also examined the entire gamut of interacting IRs with the public through its stations, trains and tracks and its impact on the environment during the period 2006-07 to 2010-11.

6. The Performance review was conducted with the broad objective of forming an opinion on the existence and adequacy of commitment, initiative apparatus put in

place by IR for (i) Prevention and control of air, water and noise pollution; (ii) Management and conservation of natural resources for sustainable development with specific reference to conservation of water, energy and wild life; and (iii) Management of waste generated on IR. Some of the important findings contained in the Audit Report are as under:—

"(i) No comprehensive environmental guidelines have been formulated by the IR for handling and transportation of bulk commodities which are pollution intensive.

(ii) There is no separate directorate or cell at the Railway Board level to co-ordinate various environmental issues involved in their operations.

(iii) As per Air (Prevention and Control of Pollution) Act, 1981, all sidings and goods sheds should obtain Consent for Operation from their respective SPCBs. The Zonal Railway Administrations failed to adhere to the statutory provisions in respect of fifty per cent of the sidings test checked. Guidelines issued by the SPCBs of West Bengal and Jharkhand were also not fully complied within both ER and SER in the goods sheds and sidings test checked.

(iv) In most of the zones coal and iron ore were being carried in open wagons without covering with tarpaulin sheets, thus posing a health hazard to passengers/residents in neighbouring areas.

(v) On an average, one Effluent Treatment Plant (ETP) was installed in each zone leaving most of the major stations without an ETP. In their absence, effluents were being discharged in the nearby low lying areas/water bodies and municipal drainage system resulting in contamination of surrounding surface and groundwater.

(vi) In 12 out of 17 zones no provision of Water Recycling Plants (WRPs) had been made. The WRPs installed in three zones were sub-optimally utilized. Despite Railway Boards' instructions that Automatic Coach Wash Plants (ACWPs) be planned for all coaching Depots; only eight ACWPs had been commissioned over five zones. Similarly, out of 212 stations test checked, rain water harvesting systems were found to be installed at only seven stations in five zones.

(vii) Bio-diesel was used in only five zones and its consumption was insignificant. The initiatives of IR for production of bio-diesel remained largely unsuccessful due to short supply of raw material and slow progress in setting up of new esterification plants.

(viii) Overall achievement in electrification of level crossings with solar panels was far below the targets set for the period 2007-11. IR also failed in making major progress in tapping wind energy. During the period of review, only four wind power plants were sanctioned in three zones.

(ix) 62 elephants died during the review period due to train hits. Despite some initiatives like imposition of permanent speed restrictions, display of signage, regular clearance of vegetation along the track, etc., animal mortality rate due to train hits had not declined.

(x) In 16 out of 23 contracts entered into in four zones for disposal of garbage through outside agencies, no separate clause was incorporated for segregation of wastes. Disposal of garbage by outside agencies was being done either by burning or dumping in Railway premises in 37 stations (all categories) across all zones. At 54 out of 212 stations test checked, the Railway Administration resorted to disposal by burning, dumping into adjacent canal, low lying areas, dumping on Railway land near the track, thereby causing environmental pollution.

(xi) IR is yet to finalise the technology for 'green toilets', despite two decades of experimentation. Open discharge of toilets from running trains led to premature renewal of 47 Kilometers of rail (SER) and resulted in an excess expenditure of ₹35.79 crore during the period 2007-11 alone."

7. Against the above backdrop, the Public Accounts Committee (2013-14) took up the subject for examination and report. For the purpose, a Sub-Committee under the Convenorship of Shri Prakash Javadekar, MP and a Member of the PAC was constituted to examine the subject in detail. In the process, the Sub-committee obtained the Background Note & Advance Replies from the Ministry of Railways (Railway Board). They also took oral evidence of the representatives of the Ministry of Railways besides undertaking an on-the-spot study visit to various places to garner first hand knowledge on the subject matter. Subsequently, the Post-Evidence Replies were also obtained from the Ministry. They also undertook an on-the-spot study visit to Lucknow and held discussion with the representatives of Northern Railways. Based on all these written and oral deposition by the Ministry and the information gathered during the study visit, the Sub-Committee broached upon the subject in detail and identified certain critical issues which are discussed at length in the succeeding paragraphs.

III. PREVENTION AND CONTROL OF POLLUTION

8. IR is a bulk carrier of several pollution intensive commodities like coal, iron ore, cement, fertilizers, petroleum, etc. Extant provisions laid down in the codes and manuals of IR and instructions issued from time to time by the IR though cover various aspects of transportation of different types of commodities, environmental aspects involved in carriage of goods are not specifically and adequately addressed. Audit examination revealed that Railway Board (RB) was yet to issue any comprehensive guidelines specifically for sidings handling and transporting these commodities. Central Pollution Control Board also did not issue any specific guidelines for the transport of pollution intensive commodities by rail. The standards prescribed for control of pollution — water, air and noise were not being followed at a large number of Railway stations.

9. In the above context, the Committee enquired about the specific measures contemplated by the IR to minimize environment pollution resulting from the transport of pollution intensive commodities like coal, cement, fertilizers, POL, etc., In response, the Ministry of Railways (Railways Board) stated as under:—

> **"POL Products —** Red Tariff gives detailed guidelines on the precautions to be taken for transporting of POL tariff. The POL wagons have multiple safety features—like filler pipe cap, top dome cover gasket, master valve, audco valve and bottom flange plates to prevent leakage of any product during transit.
>
> **Cement and Fertilizers —** They are carried in bagged form mainly in closed wagons. Some traffic is carried in open wagons for which necessary instructions are issued *vide* commercial circular 62 of 2009 para 4.0 wherein discount is giving to the traders for incurring the extra cost of covering the consignment with tarpaulin.
>
> **Coal —** Most of the coal transported on IR is loaded and unloaded in sidings. During transit, coal being a dense commodity doesn't require cover during transit. However, the wagons doors are closed to prevent any spillage of material."

10. The Committee then desired to know whether IR had formulated any comprehensive environment policy so far. In response, the Ministry submitted:—

> "Significant proportion of the loading/unloading on IR is done in private sidings where material handling is through hoppers/bottom discharge mechanisms/tipplers and chutes. The private sidings are responsible for taking the necessary steps for environmental protection. For dangerous cargo like POL, the rules for dangerous goods are available in the Red Tariff. IR is committed to alleviate the environment impact of carriage and handling of sensitive cargo."

A. Air Pollution

11. An Indian Railway station is typically overcrowded with large number of visitors, coolies and vendors. The pollution profile of a Railway station is likely to follow that of the neighbourhood as no major pollution source exists at a Railway station. Pollution issues arise mainly while handling and transporting freight such as coal, iron ore, cement, fertilizers, etc. These commodities are mainly handled at Railway/Private sidings and Goods sheds. These materials create serious air pollution when carried by rail in open wagons and during loading/unloading operation. Further, fugitive emission is also caused by these commodities. Such dust, when deposited on the track, impedes drains as it fills the interstices within the track ballast.

12. Audit pointed out that as per section 21 of the Air (Prevention and Control of Pollution) Act, 1981, all sidings and Railway Goods Sheds require Consent for Operation (CFO) from the State Pollution Control Board (SPCB) concerned. RB had stipulated (June 2009) that before issue of Railway Receipt for booking of freight (iron ore, steel and cement), Railway Administration should ensure one time submission of CFO to the Senior Divisional Commercial Manager of the Division in which the loading takes place.

13. Audit test check of 34 sidings over 16 zones handling pollution intensive commodities like coal, coal dust, iron ore, cement, fertilizers, petroleum etc. revealed that CFO was obtained only for nineteen (55 per cent) out of the 34 sidings test checked. 10 out of the remaining 15 sidings (SR-3, ECR-2, SECR-2,SCR-1 and ECoR2) had not obtained CFO on the plea of absence of specific instructions from the RB/ Pollution Control Boards. Audit further observed that no action was taken against the sidings for non adherence to either the instructions of the RB or the statutory provisions. No action was also forthcoming from the Pollution Control Board concerned for ensuring compliance with the statutory guidelines.

14. In the above context, the Committee desired to know about the action taken by the IR to obtain consents under Air (Prevention and Control of Pollution) Act and Water (Prevention and Control of Pollution) Act and also authorization for handling hazardous waste. In reply, the Ministry of Railways (Railway Board) stated as under:—

> "Railway stations do not exist in isolation and as such air pollution levels detected at stations are not just a function of the activities performed within the station premises but are also determined as much by activities that have been taking place outside it or in its vicinity over a period of time. While Railways are cognizant of the fact that pollution related laws of the Central/State Government are applicable even in case of Railway stations situated in its territorial jurisdiction, a formalized system of obtaining consents on *ex-ante* basis is not in existence."

15. When enquired about the reasons for not having a formalized system in Indian Railways, for obtaining consents on *ex-ante* basis, the Ministry of Railways (Railway Board) in their written submission offered the following explanation:—

> "Zonal Railways are not organized on a State basis. In fact, railway stations in a particular State may fall under the jurisdiction of many railway zones and conversely, a railway zone may have railway stations across many States. It will not be possible to prescribe guidelines from the Ministry level. The zonal railways have to ensure that the relevant State laws/rules in this regard are followed."

16. On being asked as to whether the central PCB or State PCBs had ever served notice to the Railways for non-compliance of provisions of law for control of Air and Water pollution, the Ministry stated that there were instances of receipt of Notices from PCOs pertaining to various Railway establishments spread over different Zonal Railway Administration. Asked to furnish details of such Notices including the response of the Ministry of Railways thereon, the Ministry did not reply convincingly.

17. Elaborating the measures taken by the IR to monitor and control Air pollution from running of trains, the Ministry informed as under:—

> "Following are the measures taken/developed for monitoring/control of emissions in respect of diesel motive power on IR:

1. Measurement of Exhaust Gas Temperature (EGT) during load box test in yearly Schedule, which in effect controls exhaust emission, is stipulated for diesel locomotives. Corrective action is taken wherever called for.

2. RDSO has developed mobile Emission Test Car in 2012. This is capable of measuring emissions from diesel locomotives. The test car is mobile which can be stationed at any convenient location of Indian Railways for the purpose of measuring exhaust emissions.

3. RDSO has developed Electronic Fuel Injection (EFI) system and has fitted prototype on a diesel locomotive in Sept. 2011. EFI is capable of bringing reduction of smoke to the extent of 60%. Change notice has been issued to DMW for retrofitting EFI in all conventional diesel locomotives of Indian Railways (IR).

4. Development of dual fuel CNG based DEMU: RDSO has developed prototype DEMU which has shown reduction in smoke emissions by 20%. IR has undertaken such modification in another 10 DEMUs. 40 More are in pipeline.

5. A consultancy project has been completed by RDSO with an international expert to study feasibility of emission reduction. A prototype with the measures identified through consultancy is being developed.

Liquefied Natural Gas locomotive is being developed. This is expected to bring in reduction in exhaust emissions. Tender is under finalization."

18. The Committee then wanted to know the methodology adopted to monitor and control Air pollution at stations, the Ministry in their written reply stated as under:—

> "Besides the fact that individual Railway establishments lack the equipment as well as expertise for measuring and monitoring air pollution levels, it is felt that the task of monitoring and advising Railways on the steps for controlling Air pollution should vest in the concerned law enforcement agency."

19. On being asked to furnish reasons for not having the requisite equipment and expertise in the Railways itself to measure and monitor the air pollution levels and whether any steps had been taken to procure the same, the Ministry submitted as under:—

> "Railway stations are not Industrial Plants where a continuous process of monitoring requirement is necessary. The activity of loading/unloading in a rake is an intermittent process. No transformation of the product happens in the station where the product/cargo is loaded /unloaded. Station is merely a place where the product moves from one mode of transport to the other. However, railways are committed to maintaining the air quality levels in an area.

There are two types of stations where freight loading/unloading is primarily undertaken-sidings and goods sheds. Majority of the loading/unloading on Railways is in the sidings, wherein the responsibility is with the requisite siding owner.

In the goods sheds, where loading/unloading operations are done in railway area, the handling operations are undertaken by the consignor/consignee or his agent as the case may be. The party handling the loading/unloading operations is informed to take necessary precautions at regular intervals."

B. Emission from Diesel Locomotives

20. Diesel is used to power traction in about 70 per cent of the track on IR. Audit scrutiny revealed that IR had neither initiated any measure to fix standards for emissions from the use of diesel for traction purposes nor set up any system to monitor the emissions from diesel locos and assess or compare the extent of emission with the international standard. South Central Railway Administration stated that there were no instructions for regular monitoring of emission levels and there was no such monitoring anywhere in IR.

Bio-Diesel

21. IR had reportedly taken the initiative for using bio-diesel to minimize air pollution and related public health risks as it reduces greenhouse gas emission. After examining the potential applicability of bio-diesel as a fuel for locomotives and conduction trials, Research Design & Standard Organization (RDSO) concluded in December 2003 that bio-diesel could be used without engine modification and could attain full operation power. It was also concluded that a blend of 20 per cent bio-diesel was compatible with the locomotives operating on IR and India's climate condition. The action plan of Mechanical Directorate of RB for Vision 2020 envisaged setting in motion the initiative of IR for achieving 10 per cent blending of bio-diesel. Audit observed that out of 16 zones, bio-diesel was used only in five zones (South Eastern Railway, South East Central Railway, Eastern Railway, Southern Railway and Northern Railway). During the period 2006-11, the production of bio-diesel over these five zones was only 155.123 KI besides procurement of 47.46 KI from outside agencies. The usage of bio-diesel was very insignificant (0.01 per cent) when compared with the total consumption of 109.30 lakh kilo litres of HSD oil.

22. Audit observed that the factors limiting the usage of bio-diesel were (i) Absence of specific instructions for adopting 20 per cent blends for biodiesel (NWR); (ii) The trials conducted for bio-diesel were not encouraging (CR); (iii) There was no production and utilization of bio-diesel as the plantation of Jatropha had not been successful due to high mortality rate (ECR) and (iv) Poor yield of bio-diesel due to poor quality of Jatropha seeds (SER). Again while examining the performance bio-diesel plants, the Audit observed the following:—

- The Bio-diesel Esterification Plant of 2000 litre capacity commissioned in 2006 at Kharagpur at a cost of £ 0.29 crore produced 8803 litre of bio-diesel during 2006-10. No Bio-diesel was produced thereafter, due to non-availability of good quality seeds.

- In Loco Works, Perambur (SR), bio-diesel was being produced using Pungam seeds procured from the open market and used edible oil obtained free of cost from hotels. During the years 2008-11, the capacity utilization of the bio-diesel plant was only in the range of 12 to 16 per cent. The under utilisation was due to short supply of raw material which was not envisaged at the time of setting up of the plant. Besides Southern Railway, various non-governmental organizations resorted to large scale plantations with the aid of Tamil Nadu State Government. Government of India also identified Tamil Nadu for large scale plantations of bio-diesel plant. As a result of non-utilisation of the plants to its full capacity, the objective of development of an alternative fuel could not be effectively achieved.

- During 2006-07, RB sanctioned two projects for use of bio-diesel as an alternative fuel for traction purposes. One project was for the conversion of 100 Diesel Electric Multiple Units (DEMUs) to dual fuel mode using CNG and diesel and the other was for setting up of four bio-diesel esterification plants for the production of bio-diesel. To implement these projects, an organization *viz.,* Indian Railways Organization on Alternate Fuels (IROAF) was set up in 2008 by RB. The aim of the organization was to harness the bio-diesel potential and extend the use of CNG and other alternate fuels /non-conventional sources of energy.

- The contracts were executed in April 2011 and May 2011 for setting up of plants at Tondiarpet (SR) and Raipur (SECR) respectively. While the work of setting up of bio-diesel plant at Raipur was in progress, there was no progress in respect of plant at Tondiarpet as of March 2012 except identification of land.

23. Explaining the reasons for insignificant production and use of bio-diesel, the Ministry in a written submission stated as under:—

> "Indian Railways do not have any Bio-Diesel production facility in house except experimental level plants at Loco Works, (Perambur, Chennai), Shakurbasti Diesel Shed, Delhi and Kharagpur Shed capacity of these plants is very small *i.e.* less than 2000 Ltrs. per month. The plants at Chennai and Shakurbasti have been functional in part capacity. The Kharagpur plant is not working. The main constraint in their continuous operation is non-availability of raw-material for conversion into Bio-Diesel. These plants have been procuring used cooking oil from hotels and restaurants for this purpose, The Bio-Diesel produced in these plants is used in shunting Locomotives or in nominated road vehicles.
>
> Indian Railways are setting up two Bio-Diesel plants of 30 Tonnes Per Day Capacity each. These plants will be ready by December, 2014 after which it will be possible to scale up use of Bio-Diesel to significant levels."

24. As regards introduction of alternate fuels, the Ministry informed that IROAF have taken up projects to introduce LNG based diesel locomotive and Gas

turbine based locomotives on IR. Tenders for these are in advanced stage and these are likely to be introduced by the year 2015.

25. When asked to state the mechanism put in place for monitoring emission from diesel locomotives, the Ministry in their written deposition stated as under:

> "For monitoring emission from diesel locomotives, RDSO has set-up research engine test beds in the Engine Development Directorate at RDSO and projects to reduce in-cylinder production of emissions are being taken up. Project of design and manufacture of emission test car was sanctioned in 2007-08. The emission test car has already been manufactured at ICF, Chennai in 2012 and measurements of regulated emissions are being taken on diesel engines of locomotives and DMUs. Reduction of emission of diesel locomotive engines including the ALCO 16,12,6 cylinder engines has been planned in two phases. Phase I of the project for identifying measures for reduction of emissions on ALCO locomotives has already been completed. Phase II of the project to adopt the measures for emission reduction is on hand."

C. Electrification of Tracks

26. Electric traction is environmental friendly, pollution-free and energy efficient and offers an excellent alternative to fossil fuels as a source of energy. Its use as a motive power is eco friendly for the consumer. As compared to diesel, electric traction is capital intensive and requires higher investment in terms of locomotives, overhead equipment, electric loco sheds and other equipment.

27. Audit review highlighted that IR has progressively electrified 19607 Route Km (RKM) out of 64,460 RKMs till March 2011. During the XI Five Year Plan period (2007-12), IR targeted to achieve electrification of 3500 RKMs at the rate of 700 RKMs per year. During the period 2007—11, 3391 RKMs were electrified.

28. Audit further observed that electrification was being carried out selectively for sections of a route instead of electrifying the whole route. Patch-wise electrification of routes resulted in hauling of diesel engines on electrified route leading to avoidable pollution due to emission from diesel besides higher operational costs on account of higher line haul cost under diesel traction.

29. While providing justification for undertaking patch-wise electrification of routes, the Ministry in their written submission stated as under:

> "Electrification of railway routes is based on economic consideration, operational necessity and availability of resources. The criteria/guidelines being followed in this regard are as under:
>
> (i) Electrifications projects are considered as economically justifiable if rate of return is 14% or more.

(ii) In specific cases, electrification is also considered on grounds of operational flexibility, which would lead to seamless traffic operations and minimizing detentions.

(iii) Short sections, which would otherwise remain isolated in electrified segments, also included in operational interest."

30. Asked to state whether the impact on environment pollution and avoidable expenditure due to movement of diesel locomotives under electrified route was taken into consideration at the time of selection of a section for electrification, the Ministry stated as under:—

"(i) Impact on environmental pollution is not taken while calculating ROR for justifying any electrification project.

(ii) Diesel loco movement, after electrification of a section, is done in limited manner for operational requirements."

31. Further, when asked about the rationale behind not taking into account the impact on environmental pollution, the Ministry apprised the Committee as follows:—

"There is no doubt that electric traction is an environmental friendly mode of transportation because of non emission of smoke, carbon particulates during train running. However, methodology for quantifying these benefits in financial terms has not been evolved so far. As per the existing approved methodology of evaluating Railway Electrification, such projects are approved based on operational considerations and financial viability of any proposal. Railway Electrification projects which offer a rate of return of 14 % or more are considered to be financially viable. Most of the Railway Electrification projects qualify this criteria even without quantifying the benefits which accrue due to reduction in Environmental pollution, after electrification of the Railway Tracks."

D. Noise Pollution

32. As per Rules 3(1) and 4(1) of the Noise Pollution (Regulation and Controls) Rules 2000, different ambient air quality standards in respect of noise levels have been prescribed for different areas such as industrial, commercial, residential and silent zones. The noise levels in those areas should not exceed the standards prescribed. The principal contributors to ambient sound pressure levels at stations are the movement of trains, blowing of horns by trains and announcements.

Noise Pollution at Stations

33. During March 2012, CPCB conducted noise monitoring at different locations of 14 major stations over 12 zones at different points of time in a day. The study revealed that noise levels were in excess of the prescribed limit at all stations and there was no system of monitoring the noise level.

34. Audit also conducted a survey of 2439 passengers at 34 Railway Stations across 17 zones. The survey revealed that 31 per cent of the passengers were of the view that the noise level at stations was unbearable.

35. Further, during the course of trials in two trains between March and June 2010 for measurement of noise in coaches, RDSO observed that the noise level increased from 76.8dB to 80.3 dB as the speed increased from 80 to 110 Kmph and at an identical speed, the noise level in AC coaches increased from 71 to 72 dB.

36. In response to Audit survey questionnaire to 3352 Non-AC passengers and 1295 AC passengers in 80 trains as per sample selection, on an average 26 per cent and 10 per cent of Non AC and AC passengers respectively were of the view that the noise level inside the coaches was unbearable.

37. Audit scrutiny further revealed that in the absence of any specific instructions either from Pollution Control Boards or from Railway Board, the Zones did not initiate any remedial measures to reduce noise pollution. Audit scrutiny of records also revealed that no instruction had been issued at the level of Railway Board regarding noise control measures near habitation/silence zones.

38. Explaining the reasons for not monitoring noise pollution at stations and passenger coaches and measures proposed by Railways to control the same, the Ministry submitted as under:—

> "There are no stipulations for noise pollution inside coaches. For new generation LHB type AC coaches, a certain noise level inside the coaches was specified and same had been validated. Noise pollution arising out of passenger coach running is being addressed at the design stage of various relevant components of coaches. Various additional vibration and noise suppression measures have been taken in new design LHB coaches *e.g.* sound insulation paint, sealed window glass units, sound insulating flooring board, metal bonded rubber components etc.
>
> Noise at stations is due to various factors like running of trains, generator cars, public address system, collective voices of vendors, passengers, staff, etc. Instructions have also been issued for use of standardized equipments for public address system to ensure sound quality and reliable working and for provision of digital announcement system with software based pre recorded messages in standard soothing voice. It would be difficult for the Railways to control other noises at stations that are caused by human element."

E. Water Pollution

39. As per Sections 24, 25 and 26 of the Water (Prevention and Control of Pollution) Act, 1974, no person shall knowingly cause or permit flow of any poisonous, noxious or polluting matter into any stream or well or sewer or land without treating it. IR is a major user of water for cleaning of trains and stations. IR also generates a large quantity of sewage both on trains and stations.

Effluent Treatment

40. Train servicing and maintenance processes generate effluents such as oil, antifreeze and cleaning chemicals which can pollute the environment, if not carefully controlled. IR, therefore, needs to ensure that the effluent from Railway stations/

sidings is discharged after proper treatment into the municipal sewers. RB instructed (June 2009) installation of Effluent Treatment Plants (ETP) at all major stations for treatment of effluents before being discharged into sewers/water bodies.

41. Audit scrutiny revealed that no assessment was made by the RB regarding the requirement of Effluent Treatment Plants (ETP). Out of 17 ETPs sanctioned over five zones (SCR, SECR, WR, NWR and ER), 14 ETPs were installed in three zones (SCR, WR and ER) till March 2012. The sanction of only 17 ETPs at an all India level barely averages one ETP per zone and leaves most of the major stations (Al, A & B category) like Bilaspur/SECR, Jabalpur/WCR, Ahmedabad (WR) and Vadodara (WR), Hubli/SWR, Chennai/SR, Guwahati/NEFR etc. without an ETP. There was little initiative for making provision of ETPs in the remaining 12 zones.

42. Asked to state categorically, whether 17 ETPs be sufficient to cater to the needs of all the Railway Zones, the Ministry replied in the negative.

43. When asked about the measures initiated to ensure that all the Zones and major Railway stations were provided with ETPs so as to effectively dispose of the effluents, the Ministry deposed as under:—

> "Railway provides ETPs at locations wherever required. These works are taken up under works programme based on availability of funds and relative priorities. Ministry of Railways will be reiterating the instructions to zonal railways for formulating the proposals for installation of ETPs at workshops and major stations wherever considered economically desirable."

44. Asked to state the procedure adopted for monitoring and recording the quality and quantity of effluents generated at Stations across the country, the Ministry submitted as under:—

> "Quality and quantity of effluents generated at stations depends upon large number of factors such as number and type of trains being dealt with, number of passengers, type of stations (whether identified in clean station, watering station, if the station is provided with washing lines etc.), watering arrangements available at the station etc. Taking these into account, quantity of effluents is assessed. With regard to the quality, as the effluent of the railway area terminates into municipal systems, local pollution control agencies check and bring any adverse quality to the notice of the railways for corrective action and railways take action accordingly."

F. Measures taken to Monitor the Air/Water Pollution and Treatment of effluents

45. When asked how far the measures taken to monitor the Air Pollution, Noise Pollution and Treatment of effluents generated at stations and passenger coaches have been effective and whether the Ministry were satisfied with the extant initiatives, the Ministry of Railways submitted as follows:—

> **"Air Pollution**
>
> IR has taken the initiative for using bio-diesel to minimize air pollution related health risks as it reduces green house gas emission. After examining the potential applicability of bio-diesel as a fuel of locomotives and conducting

trials, Research Design & Standard Organization (RDSO) concluded (December 2003) that bio-diesel could be used and could attain full operating power. It was also concluded that a blend of 20 per cent bio-diesel was compatible with the locomotives operating on IR and India's climate condition. The action plan of Mechanical Directorate of RB for Vision 2020 envisaged setting in motion the initiative of IR for achieving 10 per cent blending of bio-diesel.

Noise Pollution

There are no stipulations for noise pollution inside coaches. For new generation LHB type AC coaches, a certain noise level inside the coaches was specified and same had been validated. Noise pollution arising out of passenger coach running is being addressed at the design stage of various relevant components of coaches. Various additional vibration & noise suppression measures have been taken in new design LHB coaches *e.g.* sound insulation paint, sealed window glass units, sound insulating flooring board, metal bonded rubber components etc.

Measures have been taken by ICF to control noise pollution in passenger coaches.

1. In AC Coaches

(a) Double sealed glass window in AC coaches.

(b) Automatic door closer for sealed intercommunication door.

(c) Glass wool insulation material provided on the roof, sidewall and under frame.

2. In conventional non-AC coaches

Densified thermal bonded polyester wadding on roof and sidewall.

3. In DEMU coaches

Provision of rock wool insulation around engine room on partition, sidewall and roof. The noise level in driver's cab with doors and windows closed is ensured less than 80 dB and in the passenger carrying area shall not exceed 75dB at maximum output and speed of diesel engine as per RDSO specification. Provision of air spring in secondary suspension of bogies is done to reduce the noise coming from track.

Following measures are being taken to reduce noise level in passenger area of SS coaches, being manufactured by RCF:

1. Sound insulation PU paint is provided on the interior of side wall, roof and floor of the AC coach shells to reduce structural borne sound.

2. Rubber/EPDM based D-coupling elements are provided beneath floor board to isolate the noise and vibrations emanating from rail wheel interactions.

3. Cork sandwiched floor boards are provided to dampen noise and vibrations.
4. Melamine based foam is provided all around AC ducting to reduce sound coming through conditioned air.
5. Non-metallic interiors based upon Fibre Reinforced Plastics provided in the interiors of coach acting as a sound barrier.
6. No direct opening has been provided in the lavatories of the coach to reduce sound propagation in passenger area.
7. Auto closing sealed vestibule doors have been provided to isolate exterior noise.
8. Natural frequency of vibration of shell and bogie is well separated to avoid occurrence of resonance of coach.
9. 09 Nos. of different type of shock absorbers are provided per bogie to dampen the shocks, vibrations and noise.
10. 10 different types of metal bonded rubber components are used as elastic connections in bogie to isolate structural vibration and noise.

Treatment of effluents

There is no provision of sewage treatment on coaches as most of the coaches have open discharge for toilet waste. Indian Railways and DRDO have jointly developed Bio-Toilet. The human excrete is treated in bio-toilets by colony of bacteria that convert human waste into water and small amount of gases (methane and CO_2). In this process human waste is not discharged in the open atmosphere. Till 31.10.2013, 6128 bio-toilets have been fitted on coaches. Such bio-toilets are progressively being inducted in existing as well as new manufactured coaches.

In the interest of environment protection, cleanliness and sanitation and to implement National Programme of eradication of open defecation, Indian Railways have been working towards development of environment-friendly toilet systems.

The first such effort was in the form of controlled discharge type toilet systems which ensured that the waste from the toilets would be discharged on the track after the predetermined speed of the train. This design helps in protecting the station and yard premises and thereby improving the hygiene and sanitation conditions. This design was first adopted in LHB design of coaches acquired through Transfer of Technology between M/s ALSTOM and Indian Railways.

Passengers are requested through notices in train toilets to avoid using toilets at stations. At relatively bigger stations, the discharge from toilets is forced into the nearby drain running parallel to the track by use of water jet machines and other implements etc. Through these drains the discharge is taken to the sewer lines for further treatment/disposal.

Measures taken for monitoring are effective as the effluent of the railway area terminates into municipal systems, local pollution control agencies check and bring any adverse quality to the notice of the Railways for corrective action and railway takes action accordingly.

So far, the system being followed is satisfactory."

IV. MANAGEMENT AND CONSERVATION OF RESOURCES

46. Audit observed that being a major consumer of water and energy, policies adopted by the IR and extent of their implementation assumed significance in the conservation of both water and energy in the country. IR has issued a number of guidelines for the conservation of resources both energy and water. However, their pace of implementation and performance on the ground was far from satisfactory. Steps taken by the IR to protect the flora and fauna were also not adequate as animal mortality due to train hits remained high.

A. Conservation of Water

47. IR is a major user of water—both for drinking and for cleaning purposes. Water is used for cleaning of coaches and in toilets at stations and trains. Due to the presence of large number of passengers, attendants and vendors etc. the demand for water at stations and trains for sanitary purposes is substantial. IR has adopted a number of best practices in the field of conservation of water and has issued a number of instructions for improving the efficiency of water use by installing of automatic coach washing plants and reducing the use of fresh water by way of recycling of water and rain water harvesting.

B. Water Recycling Plant

48. Water recycling refers to reclaiming waste water from industrial, residential, municipal sources, by treating and purifying the wastewater for reuse. Based on the extent of the treatment, the recycled water can be reclaimed and used in the industrial processes, gardening, etc.

49. Audit Scrutiny revealed that RB in July/August 2006 reiterated its instructions that the zones should provide Water Recyling Plants (WRPs) especially at locations like stations and sheds where water is scarce and provision of the same is to be economically justified. The Ministry also emphasized the need for use of fresh water optimally and for use of recycled water for non-domestic purposes at stations. Audit observed that despite there being perennial water shortage; no action has so far been taken (March 2012) for installation of WRP at major stations as directed by the RB. Similarly, none of the major stations in SR, where shortage of water is actually felt in summer months, were identified for provision of WRP, WRPs installed in three zones could not be utilized optimally. Besides, lack of initiatives on the part of Zonal Railways there was no further initiative at the RB level to expedite the provisions of WRP.

50. Asked to state the reasons for non-installation of WRPs at major Railway Stations till March, 2012, despite instructions from the Railway Board, the Ministry stated as under:—

> "As per latest instructions of Railway Board issued in the year 2006, WRPs are to be provided at stations/sheds etc., where there is heavy demand for water for domestic and non-domestic use and which can be justified on economic consideration. In accordance with the instructions, Zonal Railway have been proposing the works in Works Program and the same are being sanctioned keeping in view overall availability of funds and relative priorities."

51. Apprising the Committee about the latest status of installing the WRPs the Ministry stated that 6 Water Recycling Plants have already been completed (one each in SECR, SCR, WCR, SWR and two in CR). Four WRPs are in progress (3 in WCR and one in SECR) out of 5 sanctioned as on July, 2013.

52. Further, with regard to the completion of remaining four WRPs, the Ministry informed that three WRPs in West Central Railway have been completed and were in operation. Another WRP was under construction on South East Central Railway and was likely to be completed by 31.3.2014.

53. The Committee then sought to know about the specific action plan of the Indian Railways for conservation of water. In this regard the Ministry stated that instructions had been issued to all the Zonal Railways, Production Units, Railway PSU and other Railway units stating that rain water harvesting scheme shall be an essential sub-set of all the project estimates relating to construction of assets like offices, service buildings, hospitals, station buildings, quarters, workshops/sheds, yard remodelling etc.

C. Rain Water Harvesting

54. Rain Water Harvesting (RWH) is the accumulation and storage of rain water for reuse before it reaches the aquifer. The rain water so harvested is stored at surface or in sub-surface aquifers. RWH mitigates the effect of drought, improves ground water level and is environment friendly.

55. Audit Review of the status of implementation of RB's directives at 212 selected stations revealed that roof top water harvesting systems were installed at only seven stations in five zones (SER, WCR, SR, SWR and WR). There was no system of monitoring implementation of the instruction of the RB.

56. In May 2003, Ministry of Water Resources requested IR to make provision for Rain Water Harvesting in all future Railway constructions. Accordingly, RB issued (February 2005) instructions to zones for implementation of RWH system.

57. Asked about the measures taken by the Railways to conserve water through Rain Water Harvesting and recharge of ground water, the Ministry submitted as under:—

> "Instructions from Board to all Zonal Railways were issued *vide* letters No. 2000/LMB/09/08 dated 4.6.2001 and No. 2003/LMB/09/01 dated 12.6.2003 in regard to setting up of rain water harvesting system. Most of the Railways

have implemented Rain Water Harvesting System. The work is taken up in phased manner based on availability of funds and relative priorities."

58. On being asked about the monitoring mechanism to ensure implementation of instructions of the Ministry/Railway Board, the Ministry stated that periodic feedback was being obtained by Railway Board from Zonal Railways.

D. Conservation of Energy

59. Audit opined that sustained economic growth of any economy is largely dependent upon availability of adequate energy and its efficient use. An Expert Committee set up by the Planning Commission to formulate an integrated energy policy highlighted the importance of lowering the energy intensity of GDP growth through higher energy efficiency. In the context of the IR, the Expert Committee recommended promotion of the system of urban mass transport, energy efficient vehicles and freight movement by Railways through scheduled freight trains. The Committee also emphasized greater reliance on renewable sources of energy.

60. Audit also observed that in IR, the expenditure on fuel constitutes a major portion of their Working Expenditure. The total expenditure on fuel during 2010-11 was ₹10503 crore and constituted about 15 per cent of their total ordinary working expenses. Thus, fuel being a major cost element, needs greater focus for detection of areas of high energy wastage and adoption of energy saving techniques to realize a cost effective energy system with least environmental impact. In fact, the Energy Conservation Act, 2001 classifies IR as an energy intensive industry. IR had issued various guidelines from time to time and fixed targets/norms for efficient use of fuels/electricity.

61. When enquired about the oversight mechanism evolved by the IR to ensure that the fixed targeted norms, as prescribed for efficient use of fuels/electricity were adhered to, the Ministry deposed as under:—

"The initiatives for Energy Conservation are monitored at different levels through following activities:

(a) Setting up of yearly targets for energy for non-traction application for different Zonal Railways.

(b) Quarterly and yearly collection of energy data for trend analysis.

(c) Celebration of Energy Conservation Week by all Zonal Railways.

(d) Participation by all Zonal Railways for 'National Energy Conservation Award' conducted by Bureau of Energy Efficiency/ Ministry of Power after compilation of energy conservation initiatives on Zonal Railway basis.

Intensified energy conservation measures have resulted in a saving of 1.03% of electricity (356.2 crore units) for non-traction application during 2011-12 as compared to 2010-11 despite increase in connected load.

Further, the project on 'Improving Energy Efficiency in Indian Railway System' through UNDP funding is also being implemented which will facilitate maintaining the energy conservation measures on IT platform."

62. Audit examined the extent of implementation of energy efficient measures by the zones with reference to the target set by the Zonal Railway Administration. IR assessed a saving of ₹860.25 lakh KWh of energy worth ₹70.20 crore in 17 zones as a result of adoption of following energy efficient measures. While admitting the Audit contention regarding slow progress in adopting energy conservation measures in some areas, the Ministry of Railways (MR) stated (October, 2012) that works relating to energy conservation were being planned regularly and progressively by the Railway Administration subject to availability of funds.

63. When the Committee desired to know whether specific funds have been exclusively earmarked towards energy conservation means, the Ministry stated that specific funds were not earmarked for energy conservation works. However, energy conservation efforts were either covered through works sanctioned through Pink Book/Budget like work of provision of capacitor bank at Traction Sub-station etc., whereas day to day Energy Efficiency initiatives like provision of T-5, CFL, 30-70% circuit timers for high mast etc. were covered through revenue grant.

64. On being asked to state the reasons for not earmarking specific funds for energy conservation works, the Ministry in a note stated as under:—

> "Energy conservation is an important thrust area of Railways and an integral part of expenditure management. Parameters like specific fuel consumption and specific energy consumption are the primary tools for monitoring traction fuel/energy expenditure on the system. Energy conservation involves various measures which are in-built in the operating activities carried out on the Railways. Most of these measures form part of Ordinary Working Expenses where adequate funds are provided. For energy conservation works/projects financed through Annual Plan, efforts are made to allocate adequate funds for all priority works, according to need and subject to overall availability of resources."

E. Use of Renewable Energy at Manned Level Crossing Gates

65. The Railway Board issued instructions (March/May, 2007) to provide solar based water heating systems for running rooms, rest houses, hospitals and base kitchens and also for provision of solar panels at Level Crossing (LC) gates. As per instructions (March, 2007), the Zonal Railways were directed to install solar based lighting system at all Manned Level Crossings.

66. But Audit scrutiny revealed that the overall achievement of the IR in electrification of level crossings with solar panel was far below the target set for the period 2007 to 2011. There was no system in place to monitor or document performance of level crossings energized with solar panels or hybrid system. There was also no system of quantification of benefit accrued to Railways as a result of implementation of solar panels/hybrid system in electrification of level crossings.

67. Asked to state the reasons for not achieving the target of electrification of level crossings with solar and hybrid system, the Ministry submitted that *vide* Board's letter dated 26.05.2008, general directives were issued to Zonal Railways to fix-up their internal Action Plan targets for energy conservation for the year 2008-09 without defining any specific target by Railway Board. Such targets, were set up by the Zonal Railways themselves and were achieved partially/fully subject to availability of fund. It was further stated that these works, being small value, were planned and implemented by Zonal Railways either under Revenue grant or under the lump sum grant allocated to Zonal Railways every year. Thus the work related to energy conservation and renewable energy were being planned regularly. However, its progress depended upon the availability of fund.

68. Apprising the Committee about the latest status of electrification of level crossings with solar panel, the Ministry stated that total 3556 nos. of level crossing gates were provided with solar PV modules till 2012. Further, to provide solar panels at LC gates on larger scale works of provision of solar panels at 2000 stations over Indian Railways have been sanctioned which would be provided in a phased manner. The Ministry claimed that this almost would cover the LC gates eligible for provision of solar panels.

69. In this regard, during evidence, the representative of the Railway Board informed the Committee that "Today 4000 plus level crossing gates in the non-traction areas are there, and another 2000 level crossing gates, we are going to take in the next two years".

F. Wind Power Plants

70. Power generation through wind is one of the most rapidly adopted and cost effective renewable energy technologies. Audit scrutiny revealed that IR failed to make a major progress in tapping wind energy. During the period of review (2007-12) only four Wind Power Plants were sanctioned in 3 zones.

71. When asked to state the reasons for lack of adequate initiatives in tapping wind energy, the Ministry in their written submission stated as under:

> "Setting up of windmill requires huge capital investment. The first windmill plant of 10.5 Mega Watt (MW) capacity was commissioned in March, 2009 for Integral Coach Factory (ICF) at a capital investment of ₹67 crore. Procurement process of 10.5 MW windmill plant in Southern Railway through capital investment is underway.
>
> Due to fund constraints, a work of setting up of another 10.5 MW windmill in North Western Railway was sanctioned during 2010-11 through PPP mode. However, as informed by MNRE for non-implementation of any wind project in PPP mode and due to no response from windmill manufacturer/ project proponents for project execution under PPP mode, it was decided to execute the project in JV mode with M/s RITES. Accordingly additional works of setting up of 157.5 MW of windmill plant have been sanctioned

under JV model through Railways Energy Management Corporation (REMC), a JV of IR & M/s. RITES set up for faster execution of such works.

Thus, against the target of harnessing 300 MW of wind energy during XII Five Year Plan, IR has already sanctioned work of 168 MW besides the existing plant of 10.5 MW capacity."

72. When enquired about the future plan of action in exploring cleaner and alternative renewable sources of energy, the Ministry informed as under:—

"Vision 2020 document of Indian Railways envisages sourcing at least 10% of energy used from renewable sources such as solar power and wind power. Accordingly, Indian Railways plan to harness wind energy of 300 MW capacity under XII Five Year Plan, besides harnessing solar power by setting PV modules of 150 MW capacity, subject to availability of fund.

Indian Railways is already harnessing about 4.5 MW of solar energy by setting up of solar photovoltaic plants and solar water heaters across IR, besides harnessing wind power from 10.5 MW of wind plant. Further, works of setting up solar photovoltaic plant of another 7.82 MW and windmills of 168 MW have been sanctioned and will be provided progressively subject to availability of fund."

G. Energy Audit

73. Energy audit encompasses verification, monitoring and analysis of use of energy, including submission of recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption. On the basis of guidelines issued by Bureau of Energy Efficiency (BEE), RB directed (July, 2007/2008) all Zonal Railways to conduct energy audit of areas like major administrative buildings, hospitals, pumping installations, loco sheds, major railway stations and workshops as a onetime exercise and send the reports to them. Subsequently, RB (July, 2008) directed that energy audit of all Traction Sub-Stations and workshops of IR was also to be taken up periodically. All these establishments had been notified by BEE as energy intensive consumers. The progress of energy audit conducted in 17 zones and status of implementation of recommendations of energy auditors revealed the following:—

- No energy audit was conducted in three zones (SER, ECR and SECR).
- In the remaining 14 zones, 30 energy audits were conducted in workshops, traction sub-stations, pump houses, service buildings, etc. of the zones. Energy auditors made 149 recommendations for improving energy efficiency.
- While 48 out of 149 recommendations were not implemented in seven zones, partial implementation was noticed in respect of 18 recommendations. The reasons for non-implementation of recommendations of energy auditors were attributed to constraint of funds, lack of feasibility to implement etc.

- Energy audit of 12 Traction Sub-Stations was conducted. In all cases, recommendations were either partially implemented or no targets were fixed for implementation of the recommendation of the energy auditors.

74. The Committee sought to know the mechanism put in place for ensuring energy audit of all major energy consuming centres and monitor the progress of implementation of recommendations of energy auditors at the Railway Board level. In response, the Ministry in their written note submitted as under:—

> "Indian Railways has over 392 nos. of Traction Sub-Stations and a large numbers of infrastructure assets like administrative buildings, hospitals, pumping installations, loco sheds, major Railway stations and workshops. Due to specific layout, pattern of energy consumption, energy audits of similar assets has revealed almost similar findings. As the cost of energy audit comes about ₹2-4 lakh per installation depending upon loads, location, type of load end uses etc., it is not economical and logical to do energy audit for all installations. The findings of one/two energy audit of similar type of asset are generally sufficient to make action plan for energy conservation. Accordingly, Railways have taken initiatives to get the sample energy audit for one type of assets."

75. The Ministry further stated that sometimes, a few suggestions of energy audits were non-implementable due to operational requirement. Generally such Energy Audit reports did not give details of techno-economical analysis of different options suggested. Therefore, recommendations that were techno commercially viable were taken up for implementation, subject to availability of fund.

76. Apprising the Committee about the future planning in this regard, the Ministry stated that it was planned to monitor and share information on energy efficiency initiatives, energy Audits done and progress of implementation of techno-economical suggestions, across all zonal Railways using web application, for which a website had already been set up and format for data collection was under validation at present. It was planned to get automatic meter reading of major load centers using web application.

H. Railways' Approach for Protection of Wild Animals

77. Animal mortality due to train hits, apart from causing loss of animals can also cause severe loss to the Railways. In certain cases it could lead to derailment of the train, damage to the track, wagons and coaches injury and death of passengers and/or detention of the train. Audit pointed out that during the review period, 2006—11, Sixty- seven animals died which included 62 elephants and one lion. The majority of elephant deaths occurred in NEFR where 43 elephants died followed by SR where 10 elephants died.

78. In March, 2010, the Ministry of Railways and the Ministry of Environment and Forests jointly issued general advisories to prevent train accidents involving elephants. General advisories included measures like clearance of vegetation alongside the tracks sensitizing programmes for train drivers/guards, keeping the

track free from food wastes and engagement of elephant trackers. Audit observed that despite implementation of a number of preventive measures, the animal mortality due to train hits had not declined.

79. In the above context, when the Committee desired to know the action taken to reduce animal mortality due to train hits, the Ministry submitted as under:—

> "Advisories to Zonal Railways have been issued to sensitise Train Crew and Station Masters on a regular basis. A Permanent Co-ordination Committee has also been formed at Zonal Railway level and at Ministry level (Ministry of Railways & Ministry of Environment and Forests) to monitor/review the steps taken on mitigation of such incidence of animal mortality. Ministry of Railways is holding regular meetings with the Ministry of Environment and Forests to take remedial measures for controlling elephant casualties. Elephant corridors have been identified by the Forest Department, and on such corridors, speed restrictions have also been imposed and signage boards provided to pre-warn the train drivers. Instructions have also been issued for need based clearance of vegetation by the sides of the track within railway land.
>
> In consultation with the Ministry of Environment & Forests (MoEF) and Forest Departments of the State Governments, Railways are also attempting to find a more lasting solution in the matter through deposit works consisting of measures such as construction of fencing, ramps, underpasses etc., the cost of which will have to be borne by the Forest Department."

V. WASTE MANAGEMENT

A. Waste Management on Indian Railways

80. IR provides services to about 2.2 million passengers every day. It operates 11842 passenger trains daily and maintains more than 7000 stations all over the country. In the course of its operation, huge wastes both bio-degradable and non-biodegradable nature is generated daily at the Railway stations and trains. Audit scrutiny revealed negligence in adherence to instructions relating to adequate and proper collection, segregation and disposal of plastic wastes. In IR, there is neither any comprehensive waste management policy nor ideally a unified command structure in the organizational hierarchy to monitor the adequacy and effectiveness of the initiatives of IR and ensure accountability. IR has not been able to address the issue of environmental hazards due to open defecation resulting from the delay in implementation of bio-toilets in trains.

81. Audit Report No. 6 of 2007 (Railways) on "Cleanliness and Sanitation of IR also highlighted that there was absence of any mechanism to assess the quantum of waste generated at Railway Stations and Trains. The solid waste generated at trains and stations was not being segregated into bio-degradable and non-biodegradable. categories. The Public Accounts Committee in their 83rd Report (2008-09) also pointed out deficiencies in the management of waste. The Committee observed that while making use of plastic, the Ministry of Railways must not lose

sight of environmental concerns and ensure adherence to the applicable rules. The action taken note of the Ministry was, however, conspicuously silent regarding use of plastics and plastic waste. The action taken by the Ministry of Railways on the recommendations of PAC are indicated below:—

PAC Observations	PAC Recommendations	Action taken by the MR
There was no mechanism to realistically assess the quantum of garbage generated at stations of and segregation of wastes before disposal.	IR must frame a policy on waste management and lay down a mechanism whereby the quantum of garbage generated on stations can be assessed realistically so that adequate collection, segregation and disposal facility along with necessary infrastructure could be put in place by the authorities	Garbage disposal system was already in place on IR. Its quantification was being done before tendering for fixing the appropriate agency for this work.
Several shortcomings in collection and disposal of garbage.	Recommended for adequate provision of VATs and penal provision in the contracts for garbage disposal through outside agencies and regular review of the performance of contractors. The Committee also recommended transportation of garbage to disposal sites by resorting to highest professional standards.	Garbage disposal system was already in place and was being monitored at various levels. IRCTC had been advised to take corrective measures in adherence to the observations of PAC.
Upgradation of toilet standard in trains.	IR should expedite the process of providing Controlled Discharge Toilet System/Zero Discharge Toilet System in as many trains/ coaches as possible.	Field trials were being conducted with different designs/types of environment friendly 'Green Toilets' and based on evaluation of those trials, a final view would be taken.

B. Garbage Disposal

82. Audit examination of the system of garbage disposal in 212 stations over 17 Zones revealed the following shortcomings:

(i) In 64 per cent (135) of the total stations (212) test checked by Audit, centralized dumping yard was not available within the station premises resulting in littering near station premises and along tracks. Further, there were instances when transportation of garbage was not being done hygienically *i.e.* covered by tarpaulin.

(ii) In 105 out of 123 major stations, disposal of garbage from stations to Municipal/Corporation notified areas was done by engaging outside agencies. The quantity of garbage generated was, however, not assessed

and incorporated in the agreements entered into with the outside agencies in 43 out of 105 agreements.

(iii) In the remaining 18 major stations, disposal of garbage was done in house. The quantity of waste generated was not estimated wherever garbage disposal was done departmentally.

(iv) Despite recommendation of PAC to segregate waste into biodegradable and non-biodegradable, a test check revealed that in 16 out of 23 contracts entered into in four zones for disposal of garbage through outside agencies, no separate clause was incorporated for segregation of wastes.

(v) Disposal of garbage by outside agencies was being done either by burning or dumping in Railway premises in 37 stations (all categories) across all zones.

(vi) At 54 out of 212 stations test checked, the Railway Administration resorted to disposal by burning, dumping into adjacent canal, low lying areas, dumping on Railway land near the track, thereby causing environmental pollution.

83. In the above context, when the Committee desired to know whether any policy had been evolved by the Railways on waste management, the Ministry in a written note informed as follows:—

> "As per Catering Policy 2010 in vogue, solid waste management is a priority area. All static and mobile units should liberally provide garbage bins properly lined with garbage bags. Garbage thus collected should be disposed off in the prescribed manner which should be incorporated in all agreements and should adhere to extant pollution control and environmental norms. Zonal railways have been accordingly advised *vide* Commercial Circular No. 45 of 2011 for prompt disposal of waste arising out of catering services at stations and in trains, *inter-alia* advising the procedural order for handling waste and their disposal arising of pantry car services as well as static catering units. It has *inter-alia* been stipulated that "the refuse bins (with three colours) so nominated will be prominently painted in Green (for bio-degradable waste), white (for recyclable waste) and Black (all other waste *i.e.* other than bio-degradable waste and recyclable waste) and will be sufficient in size to ensure all collections. The instruction has been reiterated from time to time for prompt implementation of the policy guidelines."

84. Asked to state specifically whether separate/dedicated waste management cell was setup, the Ministry submitted that there was no separate/dedicated waste management cell. However, for the management of the waste generated through various activities, guidelines have been issued and during the inspections by Inspectors/Officers, implementation thereof was ensured. The Ministry further stated that in case of violation of guidelines, appropriate action was taken against the defaulters.

85. The Committee then desired to know whether there was any proposal in the near future by the Indian Railways to have separate dedicated waste management cell, keeping in view that in the course of its operation, huge wastes, both bio-degradable and non-biodegradable nature was being generated daily at the Railway stations and trains.

86. In response thereto, the Ministry through a written note submitted as under:—

> "At present, there is no proposal for a separate Waste Management Cell. Instructions regarding handling (collection and dumping of garbage arising out of Static/Mobile catering units at nominated stations) of wastes arising out of catering services have been issued. Further, rag picking and garbage disposal contracts are being awarded uninterruptedly at Railway stations to ensure proper cleanliness. Following further arrangements for garbage disposal have been made:
>
> **(i) Clean Train Station**
>
> There is provision for disposal of collected waste from all the coaches and underneath the wash basin from AC coaches in the scope of contract. The contractors' nominated representative/supervisor incharge liaison with the CWS/nominated representative of the Railways for disposal of collected waste at nominated place and disposal is the responsibility of the contractor.
>
> **(ii) On Board Housekeeping Services (OBHS)**
>
> Garbage/litter are collected from the coaches in polybags. These polybags are sealed with a rubber band to avoid spilling of garbage and are handed over to the C&W representative at nominated enroute stations for each train for further disposal."

C. Toilets in Trains

87. IR transports about 14 million passengers on 9000 trains every day. Travelling passengers generates approximately 3980 MT of human waste per day that is dumped through 'open discharge' type toilets of these coaches and directly goes onto the rail tracks across the length and breadth of the country. This pollutes environment at stations as well as in the areas through which the trains pass. Further, this creates problem of hygiene and has resulted in filing of numerous legal cases against the Railways.

88. Audit observed that IR was yet to finalise the technology for 'green toilets', despite two decades of experimentation. Open discharge of toilets from running trains led to premature renewal of 47 Kilometres of rail (SER) and resulted in an excess expenditure of 35.79 crore during the period 2007-11 alone.

89. When the Committee sought the details of the number of coaches that have been equipped with bio-toilets, the Ministry in their written deposition submitted as follows:—

"Till October, 2013, a total of 6128 IR-DRDO bio-toilets have been fitted in 2347 coaches. The coaches are fitted in various trains for the purpose of trials. Now zonal railways have been advised to form complete rakes with bio-toilets fitted coaches. 24 such rakes have been planned. The year-wise progress of fitment of bio-toilets is as given below:—

Year	No. of bio-toilets fitted	No. of coaches on which these bio-toilets are fitted
2010-11	57	31
2011-12	169	67
2012-13	1337	561
2013-14 (upto 31.10.13)	4565	1688
Cumulative	6128	2347"

90. Asked to state the measures taken to extend the facility of bio-toilets to maximum number of coaches, the Ministry made the following submission:—

"IR has adopted following three strategies to extend the facility of bio-toilet in railway coaches:—

(i) Fitment of bio-toilets in new coaches:— All new coaches (ICF type) manufactured at ICF/RCF and BEML are coming out with bio-toilets in them.

(ii) Fitment of bio-toilets during mid-life rehabilitation (MLR) of coaches:— The second strategy adopted by IR is turning out MLR coaches fitted with bio-toilets. Total 56 coaches fitted with 140 bio-toilets have been turned out till October, 2013. Action has been taken to speed up fitment during MLR.

(iii) Fitment of bio-toilets in coaches in which both-side headstock is changed:— Manufacturing facilities have been created in railway workshops to fit bio-toilets in coaches in which both side headstock is replaced."

91. When enquired about the time line prescribed in this regard, the Ministry stated as follows:—

"Provision of Environment Friendly Toilets in passenger coaches is a long gestation project and with a fleet of about 50000 coaches, complete switch-over to bio-toilets will require reasonable time keeping in view the complications, pace of retro-fitment and resource crunch even after earnest efforts by IR to eliminate direct discharge system. IR is envisaging to eliminate production of all types of new passenger coaches with direct

discharge toilet system by 2016-17 and to eliminate direct discharge toilet system from its entire fleet of passenger coaches by end of 13th Five Year Plan *i.e.* by 2021-22 provided no set back is experienced during the development and deployment process of such bio-toilets."

92. However, when the Committee sought to know as to whether the introduction of bio-toilets in all the cases could be completed in next five years, the Chairman, Railway Board, in his deposition before the Committee stated:

"We shall be going to complete by 2021-22. We shall be going to do for all new coaches by 2018."

PART II

OBSERVATIONS/RECOMMENDATIONS

INTRODUCTORY

Indian Railways (IR) are the single largest carrier of freight and passengers in the country. They are the bulk carrier of several pollution intensive commodities like coal, iron ore, cement, fertilizers, petroleum etc. Being a major consumer of water and energy, policies adopted by the IR have a substantial impact on the environment and on the conservation of both water and energy in the country. The approach of IR towards protection of the environment, therefore, assumes greater significance for tackling environment challenges in the country. The Performance Audit of Indian Railways by the C&AG was conducted during the period 2006-07 to 2010-11 with a view to examine the commitment of IR towards ensuring environmental protection as an integral part of its developmental/operational process and to review the entire gamut of interaction of IR with the public through the stations, trains and tracks and its impact on the environment. Audit review revealed several glaring lapses in the performance of IR in managing environmental risks. Test check by Audit revealed that no comprehensive environmental guidelines were formulated for handling and transportation of bulk commodities which are pollution intensive, further there was no separate directorate or cell at the Railway Board level to co-ordinate various environmental issues involved in their operations; on an average one Effluent Treatment Plant (ETP) was installed in each zone leaving most of the major stations without an ETP; in 12 out of 17 zones no provision of Water Recycling Plants (WRPs) had been made; the WRPs installed in three zones were sub-optimally utilized; the initiatives of IR for production of bio-diesel remained largely unsuccessful due to short supply of raw material; slow progress in setting up of new electrification plants; overall achievement in electrification of level crossings with solar panels was far below the targets set for the period 2007-11; 62 elephants died during the review period due to train hits; there was no system of segregation of bio-degradable and non-biodegradable wastes at any station; etc. The Committee's examination of the subject with special emphasis on these lapses and their findings are dealt with at length in the succeeding paragraphs.

Action taken on the Recommendations contained in the 83rd Report (14th LS) of the PAC

2. Various aspects of the cleanliness and sanitation in Indian Railways had been earlier examined by the PAC (2008-09) and rampant deficiencies of IR in maintaining cleanliness at stations and in trains were pointed out. The PAC (2008-09) in their 83rd Report (14th LS) on ''Cleanliness & Sanitation on Indian Railways'' had recommended that the Ministry of Railways should strengthen the co-ordination efforts and put in place an institutionalized mechanism at the Apex level; frame a robust policy on Waste Management; draw up an action plan for provision

of adequate infrastructure for each station, and dedicated budget exclusively meant for sanitation and cleanliness on Indian Railways etc. The Committee find that though these recommendations were substantially accepted by the Government, shortcomings in the collection and disposal of garbage has remained unresolved, implementation of green toilets in trains has not yet been done and no concrete action has been taken by the IR to integrate environmental concerns with their developmental/operational policies. Expressing serious displeasure over the state-of-affairs and non-fulfillment of the commitments made and assurances given, the Committee exhort the Ministry to initiate the requisite and urgent measures so as to effectively address the ever growing menace of environmental pollution.

Air Pollution

3. The Committee are constrained to note that the Railway Board (RB) have not yet issued any comprehensive guidelines specifically for sidings handling and transporting the pollution intensive commodities like coal, iron ore, cement, fertilizers, petroleum etc. The Central Pollution Control Board had also failed to issue any guidelines for the transport of these commodities. This implies that both CPCB and RB are not serious in eliminating or minimizing different forms of pollution arising out of carrying of these commodities. Regarding the measures contemplated by the IR to minimize environment pollution resulting from transportation of these commodities, the Ministry have informed that detailed guidelines have been issued on the precaution to be taken for transportation of POL tariff and instructions are issued for giving discount to the trader for incurring the extra cost of covering the consignment of cement and fertilizers with tarpaulin. The Committee are dismayed to note that all these guidelines/instructions did not yield the desired results for controlling the emission of pollution from transporting the pollution intensive commodities as these are guided by commercial considerations only. Subsequently, as regards formulation of comprehensive environment policy in this regard, the Ministry of Railways have claimed that they are committed to alleviate the environment impact of carriage and handling of sensitive cargo. The Committee find that despite their commitment no substantive action has been taken by the IR to integrate environmental concerns with operational policies. The Committee, therefore, impress upon the Ministry to formulate a comprehensive and more reliable environment policy for controlling air pollution on the stations, yard, work places etc. in coordination with the Central and various State Pollution Control Boards. The Ministry of Railways should also ensure regular and effective monitoring to ensure strict compliance with the Pollution Control laws/guidelines/instructions at all levels so that advance and corrective steps are taken to minimize the air pollution.

Non-compliance with Statutory Regulations

4. The Committee are concerned to observe that while section 21 of the Air (Prevention and Control of Pollution) Act, 1981 clearly stipulates that all sidings and Railway Good sheds require Consent for Operation (CFO) from the SPCB concerned, in majority of cases the Railway Administration have failed to comply with the existing provisions of obtaining consent for operation from the SPCB concerned, before

operating the sidings/good sheds. The CFO was obtained only in 55 percent of the sidings test checked. In some of the cases, there was inconsistent and variable understanding of issues which led some of the Zonal Railways to presume that consent to operate was not required for all sidings/goods sheds. To their dismay, the Committee find that the Ministry of Railways held the Zonal Railways responsible for not having any formalized system of obtaining consents on *ex-ante* basis. According to the Ministry, the Zonal Railways have to ensure that the relevant State laws/rules in this regard are followed while the Ministry themselves have not prescribed any guidelines in this regard. In the absence of any effective guidelines by the Ministry, the Zonal Railways obviously took full advantage of not following the State laws/rules. Thus, by solely relying on the goodwill of the Zonal Railways, the Ministry have treaded on an uncertain path. What irks the Committee more is the fact that the Ministry do not have a record of notices served by the CPCB or SPCB for non compliance of provisions of law for control of Air and Water Pollution. The Committee are further dismayed to find that the Ministry of Railways do not have any mechanism to take action against the sidings for either non adherence to the instructions of RB or compliance with the statutory provisions, which is rather strange and highly deplorable. Deprecating the failure of the Ministry to act sternly against the sidings for violation of laws/provisions, the Committee desire that the matter be vigorously pursued for investigation, fixation of responsibility against the sidings and necessary follow-up action. The Committee also desire that the Ministry instead of leaving things at the mercy of the Zonal Railways, should prescribe concrete guidelines for the operation of sidings/goods sheds which are to be scrupulously adhered to by the Zonal Railways.

5. The Committee are concerned to find that individual Railway establishments lack the equipment as well as expertise for measuring and monitoring air pollution levels at the Stations. According to the Ministry, the Railway Stations are not industrial plants where a continuous monitoring process is necessary. The Committee are not inclined to accept the reasonings given by the Ministry as Indian Railways being the single biggest carrier of freight and passengers and by the very nature of its operations, generates an immense challenge to the overall management of the environment in the country cannot exonerate the responsibility of maintaining national ambient air quality standard within the Station premises. Moreover, the Committee are of the view that in the absence of any equipment as well as expertise, the steps initiated by the Railways towards checking air pollution at the Stations are inadequate and unrealistic. The Committee, therefore, recommend that the requisite equipment for measuring air pollution levels be procured and inducted at all the Stations in a time bound manner so as to obviate air pollution to the desirable level.

Emission from Diesel Locomotives and use of Bio-Diesel

6. The Committee are perturbed to note that Indian Railways have neither initiated any measure to fix standards for emissions from the use of diesel for traction purposes nor any system has been set up to monitor the emissions from diesel locos and assess or compare the extent of emissions with the international standard. Further, there are no instructions to the Zonal Railways for regular monitoring of emission

levels and thus there is no such monitoring anywhere in Indian Railways. The Committee are also concerned to note that although several initiatives are stated to have been taken by the IR for using bio-diesel to help reduce emissions of many air pollutants from diesel locos, no instructions have been issued to the field offices for using blended bio-diesel. Out of 16 zones, bio-diesel was used only in five Zones. Further, during the period 2006-11, the production of bio-diesel over these five Zones was only 155.123 KI besides procurement of 47.46 KI from outside agencies. The Committee find that Indian Railways do not have any in-house bio-diesel production facility except experimental level at some plants. The plants at Chennai and Shakurbasti have been functional in part capacity and the Kharagpur plant is not working. The main constraint in their continuous operation is non-availability of raw-material for conversion into bio-diesel. The Committee also observe that two contracts were executed in April 2011 and May, 2011 for setting up of plants at Tondiarpet (SR) and Raipur (SECR) respectively. While the work of setting up of bio-diesel plant at Raipur is in progress, there has been no progress in respect of the plant at Tondiarpet as of March 2012 except Identification of land. The Committee have been informed that Indian Railways are setting up two bio-diesel plants of 30 Tons per day capacity each which will be ready by December 2014. As the use of bio-diesel in the Diesel locomotives is the critical need of the hour to minimize air pollution and related public health risks, the Committee would like the Ministry to make special efforts for speedier completion of the projects for production of bio-diesel. The Committee would like to be apprised of the present status of setting up of these plants.

7. As regards the system for monitoring emission from diesel locomotives, the Committee find that Phase-I of the project for identifying measures for reduction of emissions on ALCO Locomotives has been completed and Phase-II of the project is on hand. The Committee note that in order to introduce the alternate fuels on the diesel locomotives, Research Development and Standard Organization (RDSO) and Indian Railways Organization for Alternate Fuels (IROAF) have taken up projects to introduce LNG based and Gas Turbine based locomotives on Indian Railways. Tenders for these are in advanced stage and these are likely to be introduced by the year 2015. The Committee desire the Railway Board to periodically monitor the progress of the project undertaken by RDSO and IROAF so as to introduce LNG and Gas Turbine based locomotives by the targeted date which will reduce the emission of harmful pollutants significantly and at the same time reduce the cost of operation due to use of cheaper fuels.

Electrification of Track

8. The Committee are unhappy to note that electrification of railway tracks is being carried out selectively for sections of a particular route instead of electrifying the whole route. Patch-wise electrification of routes has resulted in hauling of diesel engines on electrified route leading to unavoidable pollution due to emission from diesel besides higher operational costs. The Committee are of the opinion that the situation could have been avoided had the Railways resorted to the strategy of route-wise electrification. The Committee further note that the impact on environment

pollution due to movement of diesel locomotives under electrified route was also not taken into consideration at the time of selection of a section for electrification. Such projects are approved, based on operational considerations and financial viability of any proposal. The Committee note that during the 11th Five Year Plan Period (2007—12), IR targeted to achieve electrification of 3500 RKMs at the rate of 700 RKMs per year, out of which during the period 2007-11, 3391 RKMs were electrified. The Committee would also like to be apprised of the status of electrification of remaining 109 RKMs that was targeted to be completed by the year 2012. The Committee recommend that the Ministry, besides making efforts to gauge the impact of environmental pollution due to the movement of diesel locomotives in electrified routes, should also work out the feasibility of making route-wise electrification.

Noise Pollution

9. The study conducted by Central Pollution Control Board (CPCB) during March 2012 has revealed that noise levels were in excess of the prescribed limit at all Stations and no monitoring mechanism has been put in place by the Railways to gauge the noise level. Further, Audit Survey of 2439 passengers at 34 Railway Stations across 17 Zones has also revealed that 31% of the passengers were of the view that the noise level at stations was unbearable. RDSO has also observed that noise level in AC Coaches increased from 71 to 72 dB inside the coaches which is unbearable. The Committee find that in the absence of any specific instructions either from Pollution Control Boards or from the Railway Board, the Zones have not initiated any remedial measure to reduce noise pollution. Further, no instruction has been issued at the level of Railway Board regarding noise control measures near habitation/silence zones. The Committee wonder as to how in the absence of any instructions in this regard, the Zonal Railways have been able to initiate any steps to check noise pollution at Stations. Now that several measures are reportedly being taken by the Ministry to reduce the noise pollution inside the coaches as well as at the Stations, the Committee desire that these measures ought to be implemented earnestly and effectively so as to ensure eliminating/minimizing noise pollution in the coaches and at the Stations.

10. The Committee also desire that the Railway Board, in consultation with the Pollution Control Boards, should constitute a High Powered Body with adequate technical expertise for formulating a comprehensive policy to control environmental and noise pollution in the Trains and Stations and carrying out surprise checks to ensure effective implementation of the measures initiated to that effect.

Effluent Treatment

11. The Committee are constrained to observe that there is no system for monitoring the quality and quantum of waste water generated at Stations. The Railway Board's instructions for installation of Effluent Treatment Plant (ETP) at all major stations have also not been adhered to. On an average, one Effluent Treatment Plant has been installed in each Zone leaving most of the major stations without any ETP. In the absence of ETPs, effluents are being discharged from major stations to the nearby low lying areas/water bodies and municipal drainage systems resulting in

contamination of surrounding surface and ground water. The Committee further note that out of 17 ETPs sanctioned over five Zones, 14 ETPs have been installed in three Zones till March, 2012. The Ministry have admitted that 17 ETPs are not sufficient to cater to the needs of all the Railway Zones. The Ministry have assured that they will be reiterating the instructions to Zonal Railways for formulating the proposals for installation of ETPs at Workshops and major Stations wherever considered economically desirable. Considering the fact that discharging of effluents from the major Stations to the nearby low lying areas/water bodies is harmful for the environment, as well as public health, the Committee recommend that the Ministry should take up installation of ETPs at all the Railway Stations on priority basis by stipulating a deadline for the purpose. Stringent Guidelines are also required to be issued and implementation monitored by the Ministry for scrupulous adherence by the Zonal Railways failing which responsibility be fixed. The Committee would like to be apprised of the outcome of the steps taken in the matter.

Conservation of Water

12. The Committee note that Indian Railways have adopted a number of best practices in the field of conservation of water and have issued a number of instructions for improving the efficiency of water by reducing the use of fresh water and by recycling of water and rain water harvesting. The Committee are however, unhappy to note that despite the RB's instructions issued in July/August, 2006 to zones for providing Water Recycling Plants (WRPs) at locations like Stations and sheds where water is scarce, no action has been taken till March, 2012 for installation of WRPs. Similarly, none of the major stations in SR where shortage of water is actually felt in summer months, has been identified for provision of WRP. Further, WRPs installed in these Zones could not be utilized optimally. Evidently, these instructions have not produced the desired results. Since the installation of WRPs is an essential tool to control water pollution, the Committee hope that the Ministry will intensify their monitoring mechanism to ensure the installation and maintenance of WRPs in a time bound manner. The Committee would also like to be apprised of the details of the construction of WRPs at South East Central Railways and action taken against the defaulting Zones.

13. As regards the action plan of the Indian Railways for conservation of water, the Committee are informed that instructions have been issued to all Zonal Railways, production units, railway PSUs and other railway units. But the Committee find that Rain Water Harvesting (RWH) Systems have been installed at only 70 stations in five Zones. Evidently, in this case also, the Ministry have failed to monitor the implementation of the instructions issued to various Zones in February, 2005. Mindful of the fact that only issue of instructions would not serve the desired purpose unless these are strictly enforced and effectively monitored, the Committee urge the Ministry to impress upon the Zonal Railways in no uncertain terms to unfailingly adhere to the instructions issued for installation of Water Recycling Plants and Rain Water Harvesting Systems at all the Stations.

Use of Renewable Energy at Manned Level Crossing Gates

14. The Committee note that the Zonal Railways were directed in March, 2007 to install solar based lighting system at all manned level crossings. But, the overall achievement of the Indian Railways in the electrification of level crossings with solar panel was far below the target set for the period 2007 to 2011. The Committee find that no system has been put in place to monitor the performance of level crossings energized with solar panels or hybrid system. Further, no system of qualification of benefit accrued to Railways as a result of implementation of solar panels/hybrid system in electrification of level crossings has been set up. The Committee are informed that the RB *vide* their letter dated 26.5.2008 had issued general directives to Zonal Railways to fix their Internal Action Plan Targets for energy conservation for the year 2008-09 without defining any specific target therefor. For which such targets have been earmarked by the Zonal Railways themselves and have been achieved partially/fully subject to availability of funds. Evidently, the system of monitoring of instructions by the RB or Ministry has proved to be deficient and leaves a lot to be desired. The Committee, therefore, recommend that the Ministry of Railways/Railway Board should ensure regular and effective monitoring of the targets set for energy conservation at all levels so that they could be completed within the stipulated time frame. The Ministry should also measure the benefit accrued to the Railways as a result of the electrification of level crossings with solar panels. As the Ministry have assured that solar panels at 2000 stations will be implemented in the next two years, the Committee would like to be apprised of the periodical present progress of the matter.

Wind Power Plants

15. The Committee note that the Indian Railways have failed to make a major progress in tapping wind energy as only four Wind Power Plants have been sanctioned in three zones during the period 2010—12. The Committee are distressed to find that the work of setting up of another 10.5MW Wind Mill in North Western Railways sanctioned during 2010-11 has not been completed so far due to shifting of execution of the same from PPP model to JV model. The Committee are given to understand that an additional work of setting up of 157.5MW of Wind Mill Plant has been sanctioned under JV Model through Railways Energy Management Corporation (REMC), for faster execution of such works. The Committee hope that this joint venture would work out the details of production of wind energy within a fixed timeline to ensure faster execution and completion of all the works so as to achieve the capacity addition targets set for 12th Plan Period. Further, as envisaged in Vision 2020 Document of Indian Railways, they plan to harness wind energy of 300MW capacity under XII Five Year Plan, against which the Indian Railways have already sanctioned work of 168MW besides the existing plant of 10.5MW capacity. The Committee would like to be apprised of the developments made in this regard and desire that the work on all these plants be started in this Plan period itself so as to reap the benefits of the power produced by these projects.

Energy Audit

16. The Committee observe that the progress of energy audit conducted in 17 Zones revealed that no energy audit has been conducted in three Zones, while 48 out of 149 recommendations made by the Energy Auditors have not been implemented in seven Zones and partial implementation has been noticed in respect of 18 recommendations. Further, recommendations given in case of 12 Traction Sub-Stations have either been partially implemented or no targets have been fixed for implementation of the same. The reasons attributed by the Ministry for non-implementation of these recommendations of energy auditors are constraints of funds, lack of feasibility to implement etc. The Ministry of Railways have contended that it is not logical and economical to conduct energy audit of all installations. They have further asserted that some of the suggestions of energy audit were non-implementable due to operational requirement. In that case, the Railway Board themselves should have devised norms and identified the activity centres where energy audit should be conducted. The Committee however, find that no such initiative has been taken at the Railway Board level. There has also been no effective system of monitoring energy audit and implementation of their recommendations at Railway Board level. The Committee deplore the failure of the Ministry on this score and would like to be furnished with a detailed report indicating the recommendations given by the Energy Auditors , implemented/not implemented by the Ministry along with the reasons for non-acceptance and remedial/corrective action taken on the recommendations accepted by them.

Protection of Wild Animals

17. The Committee observe that 62 elephants died during the period 2007—11 due to train hits. The majority of elephant death occurred in NEFR where 43 elephants died followed by SR where 10 elephants died. Despite some initiatives like imposition of permanent speed restrictions, display of signage, regular clearance of vegetation along the track etc., animal mortality rate due to train hits has not declined. Keeping such animal mortality in view, the Ministry of Railways have formed a Permanent Coordination Committee at Zonal Railway level and at Ministerial level(Ministry of Railways & Ministry of Environment & Forests) to monitor the steps taken on mitigation of such incidences. Regular meetings are reportedly being conducted to take remedial measures for controlling elephant casualties. However, the Ministry have remained silent about the number of meetings held so far and the outcome thereof.

18. Opining that the steps initiated are in right direction, the Committee, however, deplore the fact that till 2011 no procedure has been evolved by the Ministry of Railways nor prescribed by the Ministry of Environment & Forests for controlling elephant casualties. The Ministry have apparently taken action only after the matter was examined by the C&AG. Had these steps been initiated earlier, the animal casualties to such a large extent could have been avoided. However, now that measures have been initiated the Committee desire the Ministry of Railways to approach the issue with more seriousness and continue with appropriate corrective action in

coordination with Ministry of Environment and Forests to effectively implement the long-term measures for prevention of animal mortality. The Committee would also like to be apprised of the findings of the Coordination Committee and action taken thereon by the Ministry of Railways.

Waste Management in Indian Railways

19. The Committee find that in Indian Railways there is neither any comprehensive waste management policy nor ideally a unified command structure in the organizational hierarchy to monitor the adequacy and effectiveness of the initiatives and ensure accountability. Indian Railways have also not been able to address the issue of environmental hazards due to open defecation resulting from the delay in implementation of bio-toilets in trains. During the course of examination of the matter, the Committee have found that the system of garbage disposal in 212 Stations over 17 Zones revealed the following shortcomings:—

(i) In 64 per cent (135) of the total stations (212) test checked in audit, centralized dumping yard was not available within the station premises resulting in littering near station premises and along tracks. Further, there were instances when transportation of garbage was not being done hygienically *i.e.* covered by tarpaulin.

(ii) In 105 out of 123 major stations, disposal of garbage from stations to Municipal/Corporation notified areas was done by engaging outside agencies. The quantity of garbage generated was, however, not assessed and incorporated in the agreements entered into with the outside agencies in 43 out of 105 agreements.

(iii) In the remaining 18 major stations, disposal of garbage was done in- house. The quantity of waste generated was not estimated wherever garbage disposal was done departmentally.

(iv) Despite recommendation of PAC to segregate waste into biodegradable and non- biodegradable, a test check revealed that in 16 out of 23 contracts entered into in four zones for disposal of garbage through outside agencies, no separate clause was incorporated for segregation of wastes.

(v) Disposal of garbage by outside agencies was being done either by burning or dumping in Railway premises in 37 stations (all categories) across all zones.

(vi) At 54 out of 212 stations test checked, the Railway Administration resorted to disposal by burning, dumping into adjacent canal, low lying areas, dumping on Railway land near the track, thereby causing environmental pollution.

With regard to framing any policy for waste management in all the Zones and at all the Stations, the Ministry have merely elaborated on the Catering Policy, 2010 in vogue. They have neither elaborated the monitoring aspect of the Policy nor specified the outcome of the steps initiated in this regard. However, instructions are reportedly being reiterated from time to time for prompt implementation of the policy guidelines. Undoubtedly, the above said shortcomings reveal that no sincere efforts

have been taken by the Ministry/Zonal Railways for proper implementation of the policy guidelines. The Committee are also concerned to note that no separate/dedicated waste management cell has been created so far by the Ministry. However, the Ministry have informed that guidelines for management of waste have been issued and during inspections, implementation thereof is ensured. The Committee consider it unfortunate that after issuing guidelines, the Ministry have left the entire system of garbage disposal at the mercy of the Zonal Railways, although the monitoring of the implementation of the guidelines is the responsibility of the Ministry. The Committee, therefore, while urging the Ministry to set up separate Waste Management Cell in all the Zones/Divisions would also like the Ministry to make necessary arrangements for staff in those cells who possess adequate knowledge and skills to deal effectively with waste management in view of the fact that establishing a separate/dedicated Waste Management Cell at each of the Zonal and the Divisional Headquarters would vastly help the Railway authorities in interacting, coordinating and liaisoning with the Zonal Railways on various garbage disposal related issues.

Toilets in Trains

20. The Committee find that Indian Railways are yet to finalize the technology for 'green toilets' despite two decades of experimentation. Further, open discharge of toilets from running trains led to premature renewal of 47 km of Rail (SER) and resulted in an excess expenditure of ₹ 35.79 crore during the period 2007-11 alone. In this regard, the Ministry have submitted that the Indian Railways are taking measures to extend the facility of bio-toilets in new coaches, which include fitment of bio-toilets in new coaches, during Mid-Life Rehabilitation (MLR) of coaches, and also in coaches in which both-side headstock is changed. Apprising the Committee about the time line prescribed for introduction of bio-toilets in all these coaches, the Ministry have informed that Indian Railways are envisaging to eliminate production of all types of new passenger coaches with direct discharge toilet system by 2016-17 and to eliminate it from the entire fleet of passenger coaches by the end of 13th Five Year Plan, *i.e.,* by 2021-22. Considering the crucial importance of implementation of environment friendly toilets, as apart from the issue of hygiene, open defecation has also serious safety and financial implications due to premature corrosion of soils, the Committee impress upon the Ministry to take effective steps for ensuring that prescribed targets for introduction of bio-toilets in all the coaches are achieved within the specified time and any aberration on this score be viewed seriously.

21. The Committee further desire that periodical and realistic assessment of the viability of the bio-toilets, based on the experimentation, be made so that corrective measures, as and when required, can be resorted to while providing foolproof environment friendly toilets.

NEW DELHI;
24, *November*, 2014
03 *Agrahayana,* 1936 (*Saka*)

PROF. K.V. THOMAS,
Chairperson,
Public Accounts Committee

APPENDIX I

MINUTES OF THE SECOND SITTING OF THE SUB-COMMITTEE-I (RAILWAYS) OF THE PUBLIC ACCOUNTS COMMITTEE (2013-14) HELD ON 11TH OCTOBER, 2013

Sub-Committee I (Railways) of the Public Accounts Committee (2013-14) sat on Friday, the 11th October, 2013 from 1100 hrs. to 1300 hrs. in Room No 'G-074', Parliament Library Building, New Delhi.

PRESENT

Shri Prakash Javadekar — *Convenor*

MEMBERS

Lok Sabha

2. Shri Jayaprakash Hegde

Rajya Sabha

3. Shri Prasanta Chatterjee

SECRETARIAT

1. Shri Devender Singh — *Joint Secretary*
2. Shri D. R. Mohanty — *Deputy Secretary*

Representatives of the Office of the Comptroller and Auditor General of India

1. Ms. Divya Malhotra — Director General (Railways)
2. Ms. Ila Singh — Director General (Railway Board)
3. Shri Purushottam Tiwary — Principal Director of Audit (PAC)

Representatives of the Railway Board, Ministry of Railways

1. Shri Arunendra Kumar — Chairman, Railway Board
2. Shri Rajendra Kashyap — Financial Commissioner, Railway Board
3 Shri Subodh Jain — Member Engineering, Railway Board
4 Shri D. P. Pande — Member Traffic, Railway Board
5. Shri Kul Bhushan — Member Electrical, Railway Board
6. Shri Sudhir Mital — Addl. Member (Mech. Engg.), Railway Board
7. Shri Tribhuvan Gupta — Adviser (Bridges), Railway Board
8. Smt. Saroj Rajware — Adviser (Finance), Railway Board

2. At the outset, the Convenor, Sub-Committee I welcomed the representatives of the Office of the C&AG of India and the Ministry of Railways (Railway Board) to the sitting of the Sub-Committee. Observing that the sitting had been convened for taking oral evidence of the representatives of the Ministry of Railways (Railway Board) on the subjects: (i) 'Civil' Engineering Workshops in Indian Railways', (ii) 'Delay in Building the New Rail Bridge Over River Sone', (iii) 'Signal and Telecommunications', (iv) 'Rail Link to Kashmir', and (v) 'Environment Management in Indian Railways—Stations, Trains and Tracks' based on various Audit Paras/ Reports, the Convenor impressed upon the witnesses not to disclose the deliberations of the Sub-Committee to any outsider, especially the Print and Electronic Media. The Convenor then asked the Chairman, Railway Board to give an overview of the subjects under examination, with special reference to the Audit findings and the Ministry's response thereon.

3. The Chairman, Railway Board, accordingly briefed the Sub-Committee on the aforesaid five subjects highlighting the measures taken to upgrade and modernize the Civil Engineering workshops, the status of the Rail Bridge over River Sone; the introduction and expansion of the Anti-Collision Devices; various initiatives undertaken towards Environment Management in Indian Railways and the progress of various stretches in the project Rail Link to Kashmir.

4. The representatives of the Ministry of Railways thereafter responded to various queries raised by the Members. As some queries required detailed and statistical reply, the Convenor asked the Chairman, Railway Board to furnish written reply on the same in due course.

5. The Convenor thanked the representatives of the Ministry for deposing before the Sub-Committee, and furnishing the available information on the subjects. He also thanked the representatives of the Office of the C&AG of India for extending assistance to the Sub-Committee in the examination of the subjects.

The witnesses, then, withdrew.

A copy of the verbatim proceedings of the sitting was kept on record.

The Sub-Committee, then, adjourned.

APPENDIX II

MINUTES OF THE THIRD SITTING OF THE SUB-COMMITTEE -I (RAILWAYS) OF THE PUBLIC ACCOUNTS COMMITTEE (2013-14) HELD ON 14TH MARCH, 2014

The Sub-Committee sat on Friday, the 14th March, 2014 from 1130 hrs. to 1200 hrs. in Room No. 'G-074', Parliament Library Building, New Delhi.

PRESENT

Shri Prakash Javadekar — *Convenor*

MEMBER

Rajya Sabha

2. Dr. V. Maitreyan

SECRETARY

1. Shri D.R. Mohanty — *Deputy Secretary*
2. Shri A.K. Yadav — *Under Secretary*

Representatives of the Office of the Comptroller and Auditor General of India

1. Ms. Divya Malhotra — Director-General (Railways)
2. Shri Purshottam Tiwary — Principal Director (PAC)

2. At the outset, the Convenor, Sub-Committee I (Railways) of PAC (2013-14) welcomed the Members and the representatives of the office of the C&AG of India to the sitting of the Sub-Committee. The Convenor then apprised that the meeting had been convened to consider and adopt three draft Reports of Sub-Committee I (Railways). Thereafter, the Sub-Committee took up the following draft Reports one by one for consideration:

(i) Draft Report on "Civil Engineering Workshops in Indian Railways", "Delay in Building the New Rail Bridge Over River Sone" and "Signal and Telecommunications" based on Paras 3.2 and 3.4 and Chapter V respectively of the C&AG Report No. 32 of 2011-12;

(ii) Draft Report on "Rail Link to Kashmir" based on the C&AG Report No. 19 of 2012-13; and

(iii) Draft Report on "Environment Management in Indian Railways—Stations, Trains and Tracks" based on the C&AG Report No. 21 of 2012-13.

3. After due deliberations, the draft Reports were adopted with some modifications/amendments.

4. The Convenor thanked the Member for his participation in the consideration of the draft Reports and the representatives of the office of C&AG of India for assisting the Sub-Committee in the examination of the subjects.

The Sub-Committee, then, adjourned.

APPENDIX III

MINUTES OF THE SIXTH SITTING OF THE PUBLIC ACCOUNTS COMMITTEE (2014-15) HELD ON 08th OCTOBER, 2014

The Committee sat on Wednesday the 8th October, 2014 from 1545 hrs. to 1645 hrs. in Room No. '62', Parliament House, New Delhi.

PRESENT

Prof. K.V. Thomas — *Chairperson*

MEMBERS

Lok Sabha

2. Shri Nishikant Dubey
3. Shri Bhartruhari Mahtab
4. Shri Janardan Singh Sigriwal

Rajya Sabha

5. Dr. Satyanarayan Jatiya
6. Shri Shantaram Naik
7. Shri Sukhendu Sekhar Roy

SECRETARY

1. Shri A. K. Singh — *Joint Secretary*
2. Shri Jayakumar T. — *Additional Director*

Representatives from the Office of the Comptroller and Auditor General of India

1. Shri A.K. Singh — Dy. CAG (RC/LB)
2. Shri Balvinder Singh — Dy. CAG (CRA)
3. Ms. Subha Kumar — Director General (RC)
4. Shri S. Loomba — DGA
5. Shri T. Theethan — Director General
6. Shri Manish Kumar — Principal Director
7. Shri P. Tiwary — Principal Director

2. * * * * *
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4. * * * * *

5. After the witnesses withdrew, the Committee took up following draft Reports for consideration:—

(i) Draft Report on 'Non-compliance by Ministries/Departments in timely submission of Action Taken Notes on the non-selected Audit Paragraphs of C&AG Reports';

(ii) Draft Report on 'IT Applications in Income Tax Department';

(iii) Draft Report on 'Environment Management in Indian Railways—Stations, Trains and Tracks'; and

(iv) Draft Report on 'Rail Link to Kashmir'.

6. One of the Members suggested that more stringent words should be incorporated in the recommendation portion of the draft Report at (i) The suggestion was accepted by the Committee. The Chairperson desired to invite suggestions/ comments in writing, if any, on the four reports from the members of the Committee so that the same can be included in the Reports. The Committee also authorized the Chairperson to finalise the Reports in light of the suggestions, if any, of the Members and the factual verification received from the Audit and present the Reports to the House on a date convenient to him.

7. The Chairperson thanked the Members for their cooperation. A copy of the verbatim proceedings was kept on record.

The Committee, then, adjourned.

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*Not related to the Report.

GMGIPMRND—4027LS(S3)—17.04.2015.

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