



# Garvita

## NEWS BULLETIN

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### From the Desk of Patron



At the onset, I would like to congratulate team IREE for bringing out the 6<sup>th</sup> edition of Magazine "Garvita" on the 7<sup>th</sup> IRSEE day highlighting the achievements of Electrical Department of Indian Railways. Further, it gives me immense pleasure to share that Indian Railways have launched Mission 100% electrification of Indian Railways by 2021

which would make Indian Railways the world leader for being 1st Railways in the world to achieve this milestone. Achieving this mammoth target is a challenge and require an in depth analysis and refinement of all the processes to fasten execution. Also, Green Initiatives and adopting sustainable sources of energy over Indian Railways has been our priority. Improving speed and reducing cost of operation through innovative solutions have been identified as some key focus areas.

On 27<sup>th</sup> & 28<sup>th</sup> Oct.'17, IREE organised an International conference on Green Initiatives & Railway Electrification. The main objective of the two day international conference was to bring green power project developers and other stakeholders on a common platform for making Indian Railways (IR) an efficient and Greener mode of transport.

Theme of the conference aimed at achieving following activities :

- 1) Moving Indian Railways towards 100% Electric traction - Showcase new technologies, mechanisation and innovative solutions for speedy electrification.
- 2) Meeting Indian Railways high speed Locomotive requirements.
- 3) OHE for 200 kmph- Requirements & How to achieve in existing OHE.
- 4) Solutions for Energy Efficiency and increasing use of Renewable Energy on Indian Railways.

This opened an international discussion on various Green initiatives including use of renewable energy, shift towards electric traction, development of new locomotive technology, high speed rail traction system and development in generation of Solar/Wind power as well as use of energy in efficient ways. This conference also gave boost to 'Make in India' and 'Innovative India' campaigns of Hon'ble Prime Minister of India and was a big success.

Lastly, I once again congratulate the organization of IREE which I believe has become a connecting thread for all Electrical Engineers of IR, those serving and also my seniors who pioneered and nurtured this wing of IR and brought it to this level.

**(Ghanshyam Singh)**  
Patron, IREE and  
Member Traction &  
ex-officio Secretary to Govt. of India,  
Railway Board

### Foreword



I am pleased to know that on the occasion of 7<sup>th</sup> Railway Electrical Engineers day, IREE is coming out with 6<sup>th</sup> volume of News Letter 'Garvita' which will bring out its various activities and mission area for which it had been working. IREE's contribution in the growing role of Electrical Engineers in Indian Railways is highly appreciable & this News Letter will be another milestone in the process.

Electrical Engineers today are playing key role in the fields of running trains on electrified routes which are about 38% of total route kms of Indian Railways, maintaining and operating electric rolling stock for all passenger & freight services. We need to appreciate that Electrification on Indian Railways has not only reduced our precious foreign exchange outgo but has also created large number of jobs for fellow Indians in the fields of electricals and related industry besides reducing carbon emissions for a healthy environment.

Towards the end, I once again convey my best wishes to this edition of News Letter. I am quite sure that this will rightly spread the message of progress and growth of Electrical department on Indian Railways.

**(V. K. Aggarwal)**  
President, IREE and  
Addl. Member Electrical, Railway Board

### From the Desk of General Secretary



On the occasion of 7<sup>th</sup> Railway Electrical Engineers Day being celebrated on 3<sup>rd</sup> February, 2018 by IREE, 6<sup>th</sup> Volume of 'Garvita' News bulletin is being brought out as an Endeavour of IREE to disseminate and share the technical knowledge among the railwaymen. Efforts have been made in this edition to highlight the achievements of Electrical Deptt. which has come a long way

due to tireless efforts and commitment by Electrical Engineers of Indian Railways to serve the organization. Electrical Deptt. has a vital role to play in the increased expectations of Indian Railways customers. This year was a glorious year for IREE under the able guidance of the patron of IREE, Sh. Ghanshyam Singh, Member Traction and many technical seminars were organized in collaboration with other technical bodies like IE, IEEE & IET. International Conference on 'Green Initiatives & Railway Electrification' on 27<sup>th</sup> & 28<sup>th</sup> October, 2017 deserves special mention, which was widely appreciated. I look forward towards each and every member of Electrical Deptt. for active support in patronizing this news bulletin to keep each of us updated.

**(Rajesh Tiwari)**  
General Secretary, IREE &  
Pr. Chief Electrical Engineer, Northern Railway

# Achievements of Electrical Department

## Electrical Energy Management & Green Initiatives on IR - Policy directives

- "Vision 2020" document of Indian Railways envisages sourcing at least 10% of energy used from renewable sources such as solar power and wind power and saving up to 15% of energy through improved energy efficient appliances.
- To improve efficiency and to explore alternate sources of energy, Indian Railways have already taken a large number of steps & measures for energy conservation and renewable energy including framing of policy directives specially for level crossing gates, remote railway stations, provision of solar street lights, provision of solar water heaters etc.

## Initiatives of harnessing renewable energy on IR

Indian Railways is committed to contribute towards improvement of environment. As a first step, REMCL, Railway Energy Management Company Limited, a PSU under RITES was formed on 16th August, 2013. The company has been formed to tap the business potential in the energy sector including green energy, power trading etc.

### Solar energy

800, 700, 2005, 1500 KWp Grid connected solar power plants have been installed on PPA basis @ 4.14 per unit at passenger shelters on platforms at Anand Vihar Terminal, Hazrat Nizamuddin, New Delhi & Old Delhi Railway Station respectively during the year 2017 taking total installed capacity of renewable energy on IR to about 66 MW.



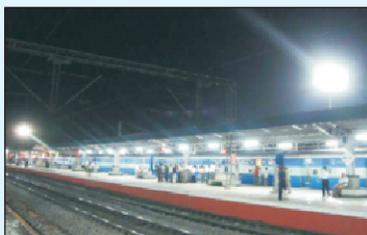
### Wind energy

REMCL has also contributed itself by installing a 26 MW wind based power plant in Jaisalmer & 10.5 MW in Tamil Nadu. Further, locations have been finalized for installation of 157 MW wind power plant.



### LED lights at Stations

4029 no. of stations have been provided with LED lights for illuminating platforms over IR. All stations over IR will be completed with LED lights by March, 2018.



Extensive use energy efficient LED luminaries at stations

## Railway Electrification

More than 1700 RKMs of electrification has been completed during the year upto December'17. Electrification of 30012 RKMs has been completed over IR upto March, 2017.

## Introduction of New Special Rajdhani Train



A new special Express, train no. 04006 was inaugurated on 16.10.2017 from Hazrat Nizamuddin. This train runs tri-weekly between Hazrat Nizamuddin and Bandra Terminus hauled by 2 WAP5 (MU) electric locomotives for faster acceleration and

saves about 2 hours in journey time as compared to 12951/52 Mumbai Rajdhani Express.

## Introduction of Rajdhani Express on Head on Generation

Hon'ble Minister of Railways, Shri Suresh Prabhu flagged off the 1st Rajdhani Express train no. 12952 New Delhi-Mumbai Rajdhani on 30.12.2015 to run with WAP-7 locomotives equipped with Head-On-



Generation (HOG) system. It not only improves energy efficiency in the train haulage but also reduces diesel consumption, noise and air pollution. With this, there is no need of power cars and released space can be commercially utilized. 34 trains have been made HOG compliant and it is planned to convert 30 more trains (cumulative 64 trains) in the remaining period of current fiscal. Presently with the conversion of 34 trains to HOG, there is saving of about Rs. 24.40 lacs per day i.e. Rs. 54 Crore per annum.

## Setting up of captive power plants for reduction in expenditure in electricity bill

To economize the electricity bill by bridging the gap between the cost of generation and current electricity tariff, setting up of captive power plants for Railways' application was identified as one of the key focused area and Railway is setting up following captive power plants:

- 1000 MW capacity at Nabinagar, Bihar in JV with NTPC
- 1320 MW capacity at Adra in West Bengal in JV with NTPC
- 700 MW gas based at Thakurli in Maharashtra.

First unit of Nabinagar Power Plant (3x250MW) has become operational.

## Development of a dedicated transmission line network for IR

To ensure supply of electrical energy at reasonable costs to IR and for improved reliability of power supply, 132 kV transmission line between Dadri-Kanpur was commissioned during 2000-01. In continuation Kanpur - Allahabad, a stretch of approx. 200 Kms, 132 kV transmission line is also commissioned.

As a further initiative and long term perspective for IR, transmission lines project at 132 kV of approx. 10,000 Kms. have been proposed during 2017 in Capital funding through budgetary and extra budgetary support. Four transmission lines MGS-HWH (700 Kms), DLI-Bharuch (1055 Kms), DLI-Chennai (2200 Kms) and Mumbai - HWH (1670 Kms) have also been proposed under PPP mode.

### Procurement of power through open access

IR has been granted the status of Deemed Licensee under third proviso to section 14 of the Electricity Act 2003. It has been corroborated by CERC in its order dated 05.11.2015. This is a major paradigm shift for Railway as IR can now arrange power for its own use as a distribution company instead of taking power from DISCOMs as a consumer. IR's vision of drawing electrical energy as deemed Licensee was realized on 26th November, 2015 when it is started drawing approx. 200MW power on CR from RGPPL in Maharashtra.

The cumulative procurement of power of IR is presently approx. 2000 MW and shall result into annual savings to the tune of about Rs. 2500 Crores in traction energy bills on business as usual mode. The estimated cumulative savings due to such initiatives shall be approx. Rs. 41,000 Crore for electric traction bill in next 10 years i.e. 2015 - 25.

### Conversion of 1500V DC to 25 kV AC Traction system over Mumbai Suburban area of CR & WR

The year 2016 has also witnessed a complete transition of the traction system from 1500 V DC system to 25 KV AC system at Mumbai over Central and Western Railway. A long awaited dream was realized when the section Mumbai CSTM to Panvel on Harbour line was charged on 25 kV AC system during March, 2016.

### Use of Solar Power in passenger coaches (Green Initiative)

Existing train lighting in coaches is catered through SG/EOG system, which envisages generating equipment requiring high maintenance and consumption of fossil fuel.



Keeping in line with aspiration & sensitivity to reduce carbon foot prints, Solar PV units on two BG GS coaches have been installed (one since December, 2014 & another since November, 2016) for technology demonstration. Three coaches on Science Express have also been installed with Solar PV panels on roof top of coaches since October, 2015. Earlier 19 NG coaches of Kangra Valley & KLK-Shimla section were installed with Solar panels during 2011-12. The technical evaluation based on trials proved that it is feasible to meet complete electric power requirement of lighting & fannage of a non AC coach even in summer through 6 kWp capacity Solar PV modules fitted on the roof of the coaches. Efforts are being made to provide solar panels on the roof top of NonAC coaches.

### Manufacturing of high horse power electric and diesel locomotives

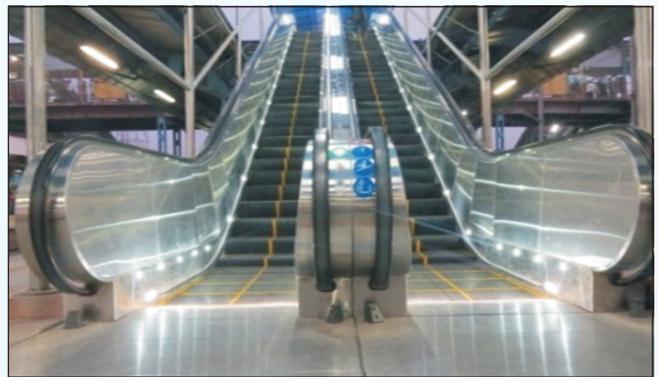
A contract was awarded to M/s Alstom in Nov, 2015 for setting up a factory for manufacturing 12000 hp WAG-12 electric locomotives at Madhepura and supply 800 nos. such locos to IR over a period of 10 years and also maintain them. The first loco is expected to be turned out in last week of Feb., 2018.

Similarly, a contract has been awarded to M/s General Electric for the manufacturing of 4500 & 6000 hp diesel locomotives at Marhaura.

The first electric & diesel locomotive is scheduled to be delivered in early 2018.

### Escalators and Elevators

456 escalators and 297 elevators have so far been installed over IR upto December, 2017.



### Energy efficient 3 phase EMU/MEMU/Kolkata Metro

As a policy matter, it has already been decided to introduce energy efficient three phase propulsion system in EMUs/MEMUs and Kolkata Metro. In Mumbai suburban, 205 energy efficient EMU rakes with 3 Phase IGBT propulsion system have already been introduced in Mumbai Suburban area. With the induction of this technology there is saving of Rs. One Crore per rake per annum.



### First Air conditioned EMU rake

First air conditioned EMU rake manufactured by ICF with indigenous propulsion system has started its commercial services successfully from 25th Dec'17.

Further, as a policy matter, in order to improve safety of 70 lacs Mumbai commuters travelling daily in overcrowded EMU trains, it has been decided to manufacture 565 coaches under MUTP-III with automatic doors & air conditioning system.



## Highlights of International Conference on Green Initiatives & Railway Electrification held on 27<sup>th</sup> & 28<sup>th</sup> October, 2017

Minister for Railways and Coal Shri Piyush Goyal inaugurated the International Conference on Green Initiatives & Railway Electrification organized by Institution of Railway Electrical Engineers (IREE) in partnership with IET, IRCON, Indian Oil Corporation Ltd. & Shakti Sustainable Energy Foundation. Minister of State for Railways & Minister of State for Communications (Independent Charge) Shri Manoj Sinha was specially present to grace the occasion. Shri Ghanshyam Singh, Patron, IREE & Member Traction, Railway Board, other Railway Board Members and senior officials were also present on the occasion.

Speaking on the occasion, Minister for Railways & Coal, Shri Piyush Goyal said, "Indian Railways is working with a renewed attitude and confidence. The mindset of Indian Railways has changed. Indian Railways is working with "will do/can do" spirit. For the Government, Development is a positive agenda. Indian Railways is working in a mission mode and coming up with solutions of the problems. India showed the world a new light in replacement of LED bulbs. Similarly Indian Railways shall lead the world by achieving 100% electrification. Indian Railways by applying economies of scale shall be able to accomplish 100% electrification at lower prices with "an incentive cum penalty framework scheme".

Speaking on the occasion, Minister of State for Railways & Minister of State for Communications (Independent Charge), Shri

Manoj Sinha said, "Indian Railways have set a massive target of 100% electrification. Meeting this huge target is a challenge. This conference will provide an insight how we may achieve this target. Also, Green Initiatives and adopting viable sources of energy over Indian Railways has been our priority in past three years."

Member Traction, Railway Board, Shri Ghanshyam Singh said, "Under the able leadership of Hon'ble Prime Minister and guidance of Hon'ble Minister for Railway, Indian Railway has committed itself to serve the people of this nation by improving its services and thus gradually transforming itself into an efficient and reliable public and goods transporting agency across the country. As announced by Hon'ble MR, to take the pace of Electrification to about 30km per day, we are going for precast foundation, mechanization of construction & are introducing various technologies and systemic changes in our bidding system also by bringing in bigger contract packages. In addition, electrification will also reduce traction energy bill substantially from present energy bill of Rs 26,500 Cr. to Rs 16,000 Cr i.e. by about 40%, thereby will improve operating ratio. Over the last two years, IR has already reduced the electric traction bill of Rs 10,600 Cr in 2014-15 by about Rs 1200 Cr by procuring power under Open access and the same is likely to reduce further, giving Railway an annual saving of about Rs 3000 Cr by end of this financial year."



### IREE GOVERNING BODY

**Patron**  
**Shri Ghanshyam Singh**  
Member Traction &  
ex-officio Secretary to Govt of India,  
Railway Board

**President**  
**Shri V. K. Aggarwal**  
Addl. Member Electrical,  
Railway Board

**General Secretary**  
**Shri Rajesh Tiwari**  
Pr. Chief Electrical Engineer,  
Northern Railway

**Organising Secretary**  
**Shri R.N. Rajpoot,**  
Chief Project Manager,  
RVNL

**Treasurer**  
**Shri Pankaj Sharma,**  
Chief Electrical Engineer/Const.  
Northern Railway

#### Chairmen of Local Centres

Pr. Chief Electrical Engineers/ All Zonal Railways, ICF, RCF, CLW & CORE, Sr. ED TI/RDSO and Director/IRIEEN

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