



TRANSPORTATION BUSINESS

OUR STORY

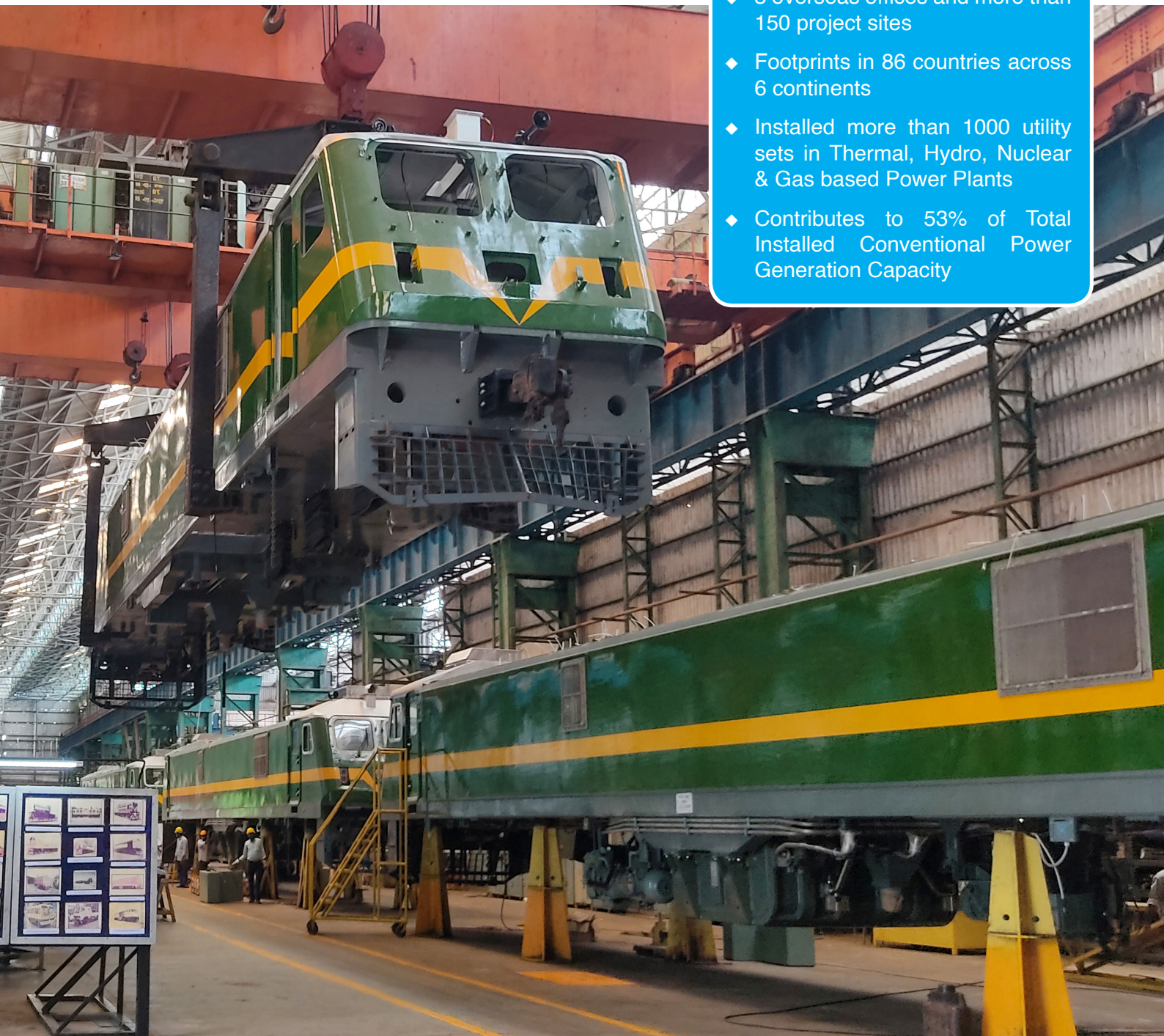
BHEL is India's largest engineering and manufacturing enterprise in the energy and infrastructure sectors. Established in 1964, we are a leading power equipment manufacturer globally and one of the earliest and leading contributors towards building an Aatmanirbhar Bharat. We serve our customers with a comprehensive portfolio of products, systems and services to its customers in the areas of Power-Thermal, Hydro, Gas, Nuclear & Solar PV, Transmission, Transportation, Defence & Aerospace, Oil & Gas and Water.

Right from developing country's power generation capacity to creating multiple capabilities in country's core industrial & strategic sectors, BHEL is deeply aligned to the vision of a self-reliant India.

BHEL is leveraging on its technological capabilities and committed workforce to transform itself. Asserting leadership in core business, diversifying the business mix, cost optimisation, efficiency optimisation & innovative technological solutions are the major enablers driving company's competitiveness in its businesses.

BHEL has a widespread network of:

- ◆ 16 manufacturing plants
- ◆ 2 repair units
- ◆ 4 regional offices
- ◆ 8 service centres
- ◆ 15 regional marketing centres
- ◆ 3 overseas offices and more than 150 project sites
- ◆ Footprints in 86 countries across 6 continents
- ◆ Installed more than 1000 utility sets in Thermal, Hydro, Nuclear & Gas based Power Plants
- ◆ Contributes to 53% of Total Installed Conventional Power Generation Capacity





WAG 7 Electric Locomotive

BHEL IN TRANSPORTATION

Since last 6 decades, BHEL has been a reliable partner of Indian Railways, offering a wide range of products and propulsion systems for various rolling stock. The company has been instrumental in introducing 3-phase technology for locomotives and EMUs in India. BHEL has established dedicated facilities to manufacture Electric locomotives and Diesel Electric Shunting locomotives at Jhansi plant.

Electric Locomotives: Other than Indian Railways, BHEL is the only manufacturer of complete mainline locomotives upto 6000 HP (Type-WAG9H). More than 500 nos. of Electric locomotives and more than 370 nos. of Diesel Electric locomotives were supplied to Indian Railways and Industries respectively.

- BHEL has indigenously developed Propulsion system for 9000 HP Electric Locomotive and the same is running successfully.
- India's first in-house state-of-art WAG-7 locomotive with Regeneration system for DC motors.
- BHEL has developed & supplied Dual Voltage (25 kV AC /1500 V DC) Electric Locomotives to Indian Railways.

Diesel Electric Shunting Locomotives with Air-conditioned cab: BHEL manufactures Diesel Electric Shunting Locomotives in power range of 350-3250 HP, for industrial applications such as Power, Steel, Cement, Fertilizer etc.



1400HP Diesel Shunting Locomotive



Dual Voltage Electric Locomotive



Air Conditioned AC EMU

EMU, MEMU & Trainset:

- India's First IGBT based Air-conditioned EMU train, equipped with BHEL supplied Electrics and controls is running successfully in passenger service in Mumbai.
- BHEL has developed and supplied MEMU with 3-phase electrics to RCF with Ethernet based communication.
- BHEL has the capability to manufacture 3-phase underslung equipment for wide range of rolling stock including India's flagship project-Train-18.



RCF MEMU Rake

PRODUCT MANUFACTURE

BHEL-JHANSI

LOCOMOTIVES

- Electric Locomotives (upto 6000HP)
- WAG-7 Locomotives with Regeneration
- Diesel-Electric Shunting Locomotives (upto 3250 HP)
- Dual Voltage Electric Locomotives
- Battery Powered Locomotive

TRACK MACHINES

- Diesel Electric Tower Car
- Rail-cum-road vehicle
- Battery Powered Road Vehicles
- OHE recording-cum-test car
- Dynamic Track Stabilizers
- Utility Vehicles

TRANSFORMERS: upto 9494 KVA

TRANSFORMER	APPLICATION
9494 KVA	9000 HP Locomotive
7775 KVA	WAP-7 with Hotel load
6531 KVA	WAP-5, WAP7, WAG-9
5400 KVA	WAG-7 & WAG-5
1578 KVA	Air-Conditioned EMU
1278 KVA	EMU & MEMU

OTHER PRODUCTS AT JHANSI

- **Instrument Transformers** - Current Transformer (CT)
- **Wheel & Axle Machining & Assembly**
- **Bogie:** Motorised Bogies for Mainline Locomotives
- **Specialised Wagon :** (Up to 28 Axle, 296 Tonne)

BHEL-RUDRAPUR

- **Aluminium / Stainless Steel Tanks:** For 7775 kVA & 6531 kVA Transformers



Diesel Electric Tower Car



1400 HP Diesel Locomotive



700 HP Twin Power Pack (TPP)



7775 KVA Transformer



6531 KVA Transformer



1578 KVA/1278 KVA Transformer

BHEL-BHOPAL



6FRA6068



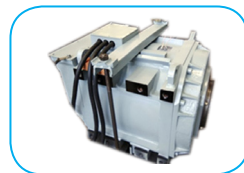
6FXA7059



IM4507AZ



IM3302AZ



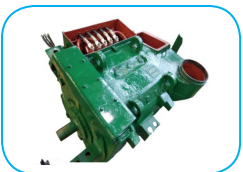
IM4506AZ

AC MOTORS	RATING	APPLICATION
6FRA6068	850 kW	25 kV AC Loco 6000 HP in WAP-7, WAG-9
6FXA7059	1150 kW	25 kV AC 6000 HP Locomotive, WAP5
IM3302AZ	260 kW	MEMU
IM3302BZ	260 kW	EMU
IM4507AZ	425 kW	Broad Gauge Diesel Electric Locomotive type 4000 HP/ 4500 HP WDG4/ WDP4
IM4506AZ	1192 kW	25 kV Electric Locomotive 9000 HP
IM4504AZ	302 kW	3000 HP Cape Gauge Locomotive

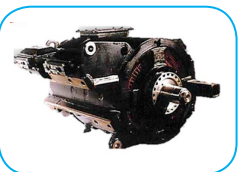
DC MOTORS	RATING	APPLICATION
TM4907BZ	280 kW	BG DE Locomotive WDG3
TM4501AZ	211 kW	WDM1/WDM7, YDM4/ YDM6 BG & MG DE LOCO FOR EXPORT
TM4303BY	233 kW	25kV AC EMU, 1400 HP DEMU & DETC
HS15250A	630 kW	25KV AC Electric Locomotive WAG7 & WAP4
TM3701BY	168 kW	KOLKATA METRO & EMU
TM5002BY	241 kW	BG DE Locomotive
TM4509	288 kW	BG & MG DE Locomotive for export purpose
TM4601BX	167 kW	25kV AC EMU, 700 HP DEMU & DETC
TM4603	136 kW	MG DE Locomotive
TM4605	82 kW	DE SHUNTING Locomotive



TM4907BZ



TM4303BY



HS15250A



TM4509



TM4601BX

ALTERNATOR	RATING	APPLICATION
TA10102EV	3300 HP	AC-DC Diesel Locomotive Type WDM-3
TA10106CY	1200 HP to 2300 HP	AC DC Diesel Locomotive Type WDM-2,WDS-6
TA7003DV	1400 HP	1400HP DEMU
TA5102AZ	1600 HP	1600HP AC-AC DEMU
TA4502AZ	700 HP	700HP DETC (TWIN POWER PACK)
TA9904 AZ & AA 9204AZ	2200 HP	2200 HP 3-Phase Diesel Electric Locomotive
TA9906AZ & AA9206AZ	3000 HP	3000 HP Cape Gauge Locomotive
TA9901AZ & AA9201AZ	4500 HP	4500 HP WDG4/ WDP4 DE Locomotive
TA9902AZ & AA9202AZ	5500 HP	5500 HP WDG4/ WDG5 DE Locomotive



TA10102EV



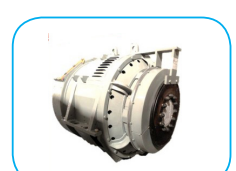
TA7003DV






TA9904 & AA9204AZ



TA9906AZ & AA9206AZ



TA9902AZ & AA9201AZ

GEARS & PINIONS	: Varieties of Gears & Pinions to Indian Railways.	
AUXILIARY/ EXCITER GENERATOR	: AG3101AX & AG2702AX in Diesel Electric Locomotives.	
EDDY CURRENT CLUTCH	: For operating Radiator Cooling Fan in Diesel Electric Locomotives.	
RECTIFIERS & CONTROLS	1. Power Rectifiers for entire range of Diesel Rolling Stock 2. Conventional Controls for DEMUs/DETCs/EMUs / MEMUs	

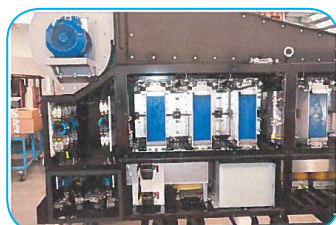
BHEL-BENGALURU

Complete IGBT based Propulsion Systems comprising of:

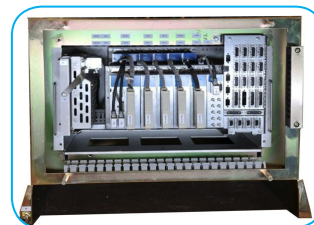
- Traction, Auxiliary Converters & VCU for 6000 HP WAG 9/WAP 7 & WAP 5 Locomotives
- 9000HP propulsion equipment
- Hotel Load Converters
- Traction, Auxiliary Converters & TCMS for EMUs/Air conditioned EMUs/MEMUs/Kolkata Metro/ Train sets
- Composite Converters



Auxiliary Converter



Traction Converter



VCU/TCMS



Hotel Load Converter

CENTRES OF EXCELLENCE

Centre of Excellence at Bhopal

Centre for Electric Transportation (CET) at BHEL Bhopal has been set up with UNDP assistance for testing of complete Rolling Stock

Centre of Excellence at R&D Hyderabad

For Simulators, Surface Engineering, Computational Fluid Dynamics, Permanent Magnet Machines, Intelligent Machines & Robotics and Machine Dynamics.

Centre of Excellence at EDN Bengaluru

Cater to the development needs for transportation electronics including type testing of Traction Converter & Inverter.



PREPARING FOR GROWTH

BHEL has been adept at transforming itself in line with the market requirements throughout its illustrious journey & company is currently focusing on:



Trainset for Semi high speed trains: Supply of complete Trainset including underslung propulsion and Stainless steel/Aluminium coaches.



High Power (9000HP & above) Electric locomotives: High efficiency & high power complete locomotives including complete electrics & mechanicals.



Urban Transportation: Augmentation of facilities to cater to the demand for High Speed Trains, Aluminium/Stainless steel coaches for urban transportation, EMU train sets, Maglev, Metro, Metro-neo, Metro-lite and Monorail.



Dual Mode Shunting Locomotives (DMSL): Working both on battery and Electric power.



Hydrogen fuel cell: For providing environment friendly solution to Indian Railways through Hydrogen fuel cell technology.

Signalling: Development of Train Collision & Avoidance System(TCAS), Kavach to meet the requirement of Indian Railways.



BHARAT HEAVY ELECTRICALS LIMITED

www.bhel.com

For business enquiries, please contact

Transportation Business and Systems Group

Industry Sector, Bharat Heavy Electricals Limited

Integrated Office Complex, Lodhi Road, New Delhi-110003, India

Phone: 91-11-41793243/24369377, Fax: 91-11-41793167

Email: tbsg@bhel.in

Follow us on



BHEOfficial



BHEL_India



BHEL_India



BHEL.India



company/BHEL