2

BHARAT HEAVY ELECTRICALS LIMITED

MINISTRY OF HEAVY INDUSTRIES

COMMITTEE ON PUBLIC UNDERTAKINGS

(2024-25)

SECOND REPORT

EIGHTEENTH LOK SABHA

LOK SABHA SECRETARIAT

NEW DELHI

SECOND REPORT

COMMITTEE ON PUBLIC UNDERTAKINGS

(2024-25)

(EIGHTEENTH LOK SABHA)

BHARAT HEAVY ELECTRICALS LIMITED

MINISTRY OF HEAVY INDUSTRIES

Presented to Lok Sabha on 18.12. 2024
Laid in Rajya Sabha on 18.12. 2024

LOK SABHA SECRETARIAT

NEW DELHI

……., 2024/ ……., 1946 (Saka)

CPU No. 1055

Published under Rule 382 of the Rules of Procedure and Conduct of Business in Lok Sabha (……. Edition) and Printed by Lok Sabha Secretariat, New Delhi- 110001.

CONTENTS

REPORT

PART I

PART II

COMPOSITION OF THE COMMITTEE ON PUBLIC UNDERTAKINGS (2024-25)

Shri Baijayant Panda - Chairperson

Members

LOK SABHA

2. Shri Tariq Anwar
3. Shri Sudip Bandyopadhyay
4. Shri R.K. Chaudhary
5. Shri Chandra Prakash Joshi
6. Smt. Kanimozhi Karunanidhi
7. Shri Kaushalendra Kumar
8. Shri Shankar Lalwani
9. Smt. Poonamben Hematbhai Maadam
10. Shri B.Y. Raghavendra
11. Shri Mukesh Rajput
12. Shri Sukhjinder Singh Randhawa
13. Shri Pratap Chandra Sarangi
14. Shri Kodikunnil Suresh
15. Shri Prabhakar Reddy Vemireddy

RAJYA SABHA

16. Shri Neeraj Dangi
17. Shri Milind Murli Deora
18. Shri Narain Dass Gupta
19. Dr. Bhagwat Karad
20. Shri Surendra Singh Nagar
21. Shri Debashish Samantaray
22. Shri Arun Singh

SECRETARIAT

1. Shri Neeraj Semwal - Joint Secretary
2. Smt. Jyochanamayi Sinha - Director
3. Shri Dhruv - Under Secretary
4. Shri Chandan Kumar - Assistant Executive Officer

COMPOSITION OF COMMITTEE ON PUBLIC UNDERTAKINGS (2023-24)

Shri Santosh Kumar Gangwar - Chairperson

Members

LOK SABHA

2. Shri Sudip Banyopadhyay
3. Shri Anil Firojiya*
4. Dr. Heena Vijaykumar Gavit
5. Shri Chandra Prakash Joshi
6. Smt. K. Kanimozhi
7. Shri Lavu Sri Krishna Devarayalu
8. Smt. Poonamben Hematbhai Maadam
9. Shri Arjunlal Meena
10. Shri Janardan Mishra
11. Shri Nama Nageswara Rao
12. Dr. Arvind Kumar Sharma
13. Shri Ravneet Singh Bittu
14. Shri Sushil Kumar Singh
15. Shri Ramdas Chandrabhanji Tadas

RAJYA SABHA

16. Dr. Radha Mohan Das Agrawal
17. Shri Syed Nasir Hussain
18. Dr. Anil Jain
19. Shri Prakash Javadekar
20. Dr. Amar Patnaik
21. Shri V. Vijayasai Reddy
22. Shri Binoy Viswam

---

* Elected w.e.f. 19.12.2023 *vice* Shri Uday Pratap Singh resigned as Member of Lok Sabha w.e.f. 06.12.2023.

COMPOSITION OF COMMITTEE ON PUBLIC UNDERTAKINGS (2022-23)

Shri Santosh Kumar Gangwar - Chairperson

Members

LOK SABHA

2. Shri Sudip Banyopadhyay
3. Dr. Heena Vijaykumar Gavit
4. Shri Chandra Prakash Joshi
5. Smt. K. Kanimozhi
6. Shri Lavu Sri Krishna Devarayalu
7. Smt. Poonamben Hematbhai Maadam
8. Shri Arjunlal Meena
9. Shri Janardan Mishra
10. Shri Kinjarapu Ram Mohan Naidu
11. Dr. Arvind Kumar Sharma
12. Shri Ravneet Singh Bittu
13. Shri Sushil Kumar Singh
14. Shri Uday Pratap Singh
15. Shri Ramdas Chandrabhanji Tadas

RAJYA SABHA

16. Shri Anil Desai
17. Ms. Indu Bala Goswami
18. Shri Syed Nasir Hussain
19. Dr. Anil Jain
20. Shri Prakash Javadekar
21. Dr. Amar Patnaik
22. Shri M. Shanmugam

COMPOSITION OF THE COMMITTEE ON PUBLIC UNDERTAKINGS (2021-22)

Shri Santosh Kumar Gangwar - Chairperson*

Member

LOK SABHA

2. Shri Lavu Sri Krishna Devarayalu
3. Dr.Heena Vijaykumar Gavit
4. Shri Chandra Prakash Joshi
5. Smt. Kanimozhi Karunanidhi
6. Smt. Poonamben Hematbhai Maadam
7. Shri Arjunlal Meena
8. Shri Janardan Mishra
9. Shri Ram Mohan Naidu Kinjarapu
10. Shri Nama Nageswara Rao
11. Shri Arvind Kumar Sharma
12. Shri Ravneet Singh Bittu
13. Shri Sushil Kumar Singh
14. Shri Uday Pratap Singh
15. Shri Ramdas Chandrabhanji Tadas

RAJYA SABHA

16. Shri Birendra Prasad Baishya
17. Shri Anil Desai
18. Shri Syed Nasir Hussain
19. Shri Om Prakash Mathur
20. Shri Surendra Singh Nagar
21. Shri K.C. Ramamurthy
22. Shri M. Shanmugam

***Shri Santosh Kumar Gangwar appointed as Chairperson, COPU w.e.f. 13 August, 2021 *vice* Smt. Meenakshi Lekhi appointed as Minister on 07 July, 2021**

INTRODUCTION

I, the Chairperson, Committee on Public Undertakings (2024-25) having been authorized by the Committee to submit the Report on their behalf, present this Second Report on 'Bharat Heavy Electricals Limited (BHEL)'.

2. The Committee on Public Undertakings (2021-22) had selected the said subject for detailed examination. As the examination of the subject remained inconclusive during the previous Committee terms, the present Committee on Public Undertakings (2024-25) decided to carry forward the subject so as to complete the unfinished task.

3. The Committee on Public Undertakings (2022-23) was briefed about the subject by the representatives of the Bharat Heavy Electricals Limited (BHEL) on 7th November, 2022 and thereafter took their evidence on 14th March, 2023. The Committee also took oral evidence of the representatives of Ministry of Heavy Industries on 6th July, 2023.

4. The Committee (2024-25) considered and adopted the draft Report at their sitting held on 25th September, 2024.

5. The Committee wish to express their thanks to the representatives of Bharat Heavy Electricals Limited (BHEL) and Ministry of Heavy Industries for tendering evidence before the Committee and furnishing the requisite information to them in connection with examination of the subject.

6. The Committee wish to express their sincere thanks to the predecessor Committee for their valuable contribution in examination of the subject.

7. For facility of reference and convenience, the Observations and Recommendations of the Committee have been printed in bold letters in Part-II of the Report.

New Delhi:
11 December, 2024
20 Agrahayana, 1946 (S)

BAIJAYANT PANDA
Chairperson,
Committee on Public Undertakings

ACRONYMS

AEI	-	Associated Electrical Industries
AMA	-	Advanced Manufacturing Action
AMCA	-	Advanced Medium Combat Aircraft
AMRCD	-	Administrative Mechanism for Resolution of CPSEs Disputes
ASSCP	-	Amorphous Silicon Solar Cell Plant
AUSC	-	Advanced Ultra Super Critical
BEL	-	Bharat Electronics Limited
BESS	-	Battery Energy Storage System
BHEL	-	Bharat Heavy Electricals Limited
BIDCO	-	Bajaj Infrastructure Development Company Ltd.
BIFPCL	-	Bangladesh India Friendship Power Company Ltd
BOP	-	Balance of Plant
BSE	-	Bombay Stock Exchange
CEA	-	Central Electricity Authority
CEEMS	-	Civil & Erection Execution Monitoring System
CET	-	Centre for Electric Transportation
CFBC	-	Circulating Fluidized Bed Combustion
CIL	-	Coal India Limited
CPPP	-	Captive Power & Process Plant
CSR	-	Corporate Social Responsibility
CTI	-	Ceramic Technological Institute
CVC	-	Central Vigilance Commission
CVO	-	Chief Vigilance Officer
DIPAM	-	Department of Investment and Public Asset Management
DJU	-	Deed of Joint Undertaking
DPE	-	Department of Public Enterprises
DPIIT	-	Department for Promotion of Industry and Internal Trade
DRDO	-	Defence Research and Development Organisation
DSOG	-	Downstream Oil And Gas
DTC	-	Design to Cost
DVC	-	Damodar Valley Corporation
EPC	-	Engineering, Procurement and Construction
ESP	-	Electrostatic precipitator
FAME	-	Faster Adoption and Manufacturing of Hybrid and Electric Vehicles
FI	-	Financial Institution
FGD	-	Flue Gas Desulfurization
FO	-	Furnace Oil
GEDCOL	-	Green Energy Development Corporation of Odisha Ltd
GeM	-	Government e-Marketplace
GIPCL	-	Gujarat Industries Power Company Ltd
GIS	-	Gas Insulated Switchgear
GNFC	-	Gujarat Narmada Valley Fertilizers & Chemicals Ltd.
GSECL	-	Gujarat State Electricity Corporation Limited
GSFC	-	Gujarat State Fertilizers & Chemicals Ltd.
GST	-	Goods and Services Tax
GTE	-	Global Tender Enquiry
HAL	-	Hindustan Aeronautics Limited
HEIL	-	Heavy Electricals (India) Ltd.
HEPL	-	Heavy Electricals Private Ltd.
HM	-	Hydro Mechanical
HP	-	Horse Power

HPBP	-	High Pressure Boiler Plant
HSD	-	High-Speed Diesel
ICF	-	Integral Coach Factory
IDEAS	-	Indian Development and Economic Assistance Scheme
IGBT	-	Insulated Gate Bipolar Transitor
IGCAR	-	Indira Gandhi Centre for Atomic Research
IOCL	-	Indian Oil Corporation Limited
IPMS	-	Integrated Project Management System
IPR	-	Intellectual property rights
ISRO	-	Indian Space Research Organisation
JPMA	-	J.P. Mukherji & Associates
KPCL	-	Karnataka Power Corporation Limited
LDO	-	Light Diesel Oil
LIS	-	Lift Irrigation Scheme
LPG	-	Liquified Petroleum Gas
LTSA	-	LongTerm Service Agreement
LTSSA	-	Long Term Spares Supply Agreement
MAHAGENCO	-	Maharashtra State Power Generation Company
MEIL	-	Megha Engineering & Infrastructures Ltd
MPL	-	Mitsubishi Power Limited
MSME	-	Micro, Small & Medium Enterprises
MSPGCL	-	*Maharashtra State Power Generation Co. Ltd*
MT	-	Metric Tonne
MVA	-	Mega Volt Ampere
MW	-	Mega watt
NAPS	-	National Apprenticeship Promotion Scheme
NATS	-	National Apprenticeship Training Scheme
NGT	-	National Green Tribunal
NHPC	-	National Hydroelectric Power Corporation
NLCIL	-	Neyveli Lignite Corporation India Limited
NREDCAP	-	New & Renewable Energy Development Corporation of AP Ltd.
NSE	-	National Stock Exchange
NTPC	-	National Thermal Power Corporation
OHSAS	-	Occupational Health & Safety Management Systems
OIA	-	Overseas Infrastructure Alliance Limited
OPTCL	-	Odisha Power Transmission Corporation Limited
PCRI	-	Pollution Control Research Institute
PEDM	-	Project Engineering Documentation Manager
PFBG	-	Pressurized Fluidized Bed Gasification
PLI	-	Production Linked Incentives
PMA	-	Permanent Machinery of Arbitration
PNG	-	Piped Natural Gas
PPE	-	Property, Plant & Equipment
PSB	-	Public Sector Bank
PSE	-	Public Sector enterprises
PVC	-	Price Variation Clause
R&D	-	Research And Development
RLNG	-	Regasified Liquefied Natural Gas
RPCL	-	Raichur Power Corporation Limited
RVUNL	-	Rajasthan Rajya Vidyut Utpadan Nigam Limited
S&D	-	Sales & Distribution
SCADA	-	Supervisory Control and Data Acquisition
SCCL	-	Singareni Collieries Company Limited

SCR	-	Selective Catalytic Reduction
SDD	-	Site Data Digitization
SEBI	-	*Securities and Exchange Board of India*
SMHPCL	-	Shree Maheshwar Hydel Power Corporation Limited
SPMS	-	Smart Project Management System
SPV	-	Solar Photovoltaic
SRGM	-	Super Rapid Gun Mount
STP	-	Steam Turbine Plant
TANGEDCO	-	Tamil Nadu Generation and Distribution Corporation
TCA	-	Technical Collaboration Agreement
TDP	-	Technology Demonstration Plant
THDCIL	-	Tehri Hydro Development Corporation India Limited
TPD	-	Tons per day
TSGENCO	-	Telangana State Power Generation Corporation Limited
UNFCCC	-	United Nations Framework Convention on Climate Change
UPPTCL	-	Uttar Pradesh Power Transmission Corporation Limited
UPRUVNL	-	Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited
WAPCOS	-	Water and Power Consultancy Services (India) Limited
WBPDCL	-	West Bengal Power Development Corporation Limited
WBSEDCL	-	West Bengal State Electricity Distribution Company Limited
WRI	-	Welding Research Institute

REPORT

PART I

CHAPTER - 1

INTRODUCTION

A. BACKGROUND

1.1 Bharat Heavy Electricals Limited (BHEL) established in 1964 is one of the leading contributors towards building of Atma Nirbhar Bharat. The Company is India's largest engineering and manufacturing enterprise in the energy and infrastructure sector. The Company provides a comprehensive portfolio of products, systems and services in the areas of Power (thermal, hydro, gas, nuclear and solar photo-voltaic), Power Transmission, Transportation, Defence & Aerospace, Industry including Oil & Gas, e-mobility, energy storage, etc.

1.2 After independence, the country needed adequate electric power as a precondition for longterm industrial growth. Towards this, the need for having a strong domestic power equipment industry was also realized. Accordingly, the Government of India signed an agreement in 1955 with Associated Electrical Industries (AEI) of United Kingdom, for the establishment of a factory for the manufacture of heavy electrical equipment in India. The setting up of this factory at Bhopal was taken up under the aegis of a Company registered in 1956 as Heavy Electricals Private Ltd. (HEPL). This factory was dedicated to the nation on 6th November 1960. During the decade of sixties, HEPL was renamed as “Heavy Electricals (India) Ltd.” (HEIL).

1.3 Substantial increase in the demand for power generating capacity was projected in the Five Year Plans of the 1960s. Then, the Government of India decided to set up three more plants for the manufacture of heavy electrical power generation equipment. The first one of these was taken up at Tiruchirappalli (Tamil Nadu) for High Pressure Boilers, the second for Steam Turbo-Generators, High Pressure Pumps and Compressors at Hyderabad (Telangana), and the third plant at Haridwar (Uttrakhand) for Large Steam Turbo generating sets, Motors and Hydro generating sets. A new Company, namely, Bharat Heavy Electricals Limited (BHEL) was incorporated on 13th November 1964 under the Companies Act, 1956 for setting-up and managing these three new Units. After due deliberations, Government of India decided to merge the operations of HEIL with BHEL in 1972. The operations of all the four plants were integrated in July 1972, and in January 1974, HEIL was formally merged with BHEL.

Subsequently, BHEL received 'Navratna' status in the year 1997 and "Maharatna" status in February 2013.

B. CURRENT STATUS

1.4 The Revenue from Operation of the Company is Rs.23,365 Crore and profit after tax is Rs. 448 Crore for the year ended 31 March, 2023. Currently BHEL has more than 150 project sites across India and abroad. The worldwide installed base of power generating equipment supplied by BHEL exceeds 1,96,000 MW. With an extensive network of 16 manufacturing units, 2 repair units, 4 regional offices, 8 service centres, 15 regional marketing centres and a team of more than 29000 employees, BHEL commands 55% share in India's total installed capacity of utility power segment excluding renewables, which stands as testimony to its valuable contribution towards nation building. BHEL has also established references in 89 countries in all 6 inhabited continents, with equipment supplied for about 12,000 MW of power generating capacity in overseas markets.

Shareholding pattern of BHEL as on 31 March, 2022 :

Category	**2022 (in per cent)**
President of India (POI)	63.17
Banks, Financial Institutions, Insurance Companies, Qualified Institutional Buyers, Alternative Investment Fund	11.09
Foreign Institutional Investors (including Qualified Foreign Investor)	4.00
Mutual Funds and UTI	1.57
Individuals, HUF, Employees	18.36
Bodies Corporate	0.83
NRIs & Foreign National/ Entity	0.64
Trust	0.02
Clearing Members	0.31
IEPF	0.01

C. VISION

1.5 In the backdrop of India's commitments in COP26 for attaining Net Zero by 2070, power sector in India is in midst of energy transition as the Government is poised to meet the country's energy needs through a balanced fuel mix consisting of clean coal, hydro, nuclear, solar and wind energy. Though, imminent increase in renewable sources of energy is expected, dependence on coal based power plants as base load is set to remain in India for a few more decades. However, focus will be on meeting

cleaner and greener utilization of coal for meeting such coal based energy requirements. Declaration of exit from coal based power by the global giants' viz. GE, Siemens and Toshiba leaves BHEL among few others to cater to this domain in the domestic market. Further, there is market for spares & services for the entire fleet (BHEL & non-OEM) to ensure smooth running of the base load plants besides having a strong focus on Nuclear and Hydropower sector. BHEL is taking all necessary steps to ensure that it continues with its market leadership in power equipment business by defending its core business.

BHEL is focusing on building and maintaining profitable growth, maintaining leadership in the core business, and diversifying by harnessing long term opportunities emerging out of Government's focus on infrastructure development and indigenization. Giving top priority to strengthen technology base in existing and new areas, the Company is exploring and pursuing range of opportunities in Rail transportation, Defence & Aerospace and Oil & Gas segments. Efforts are being made by the Company to enter into strategic partnerships with global OEMs, to leverage upcoming opportunities.

1.6 During the evidence the representative of the Ministry of Heavy Industries stated as under:

"…बीएचईएल वर्ष 1964 से काम कर रही है। इसका मूल उद्देश्य, जब से इसकी स्थापना हुई थी, तब से लेकर आज तक यह विचारधारा है कि हम एक कोल पावर बेस्ड कंपनी हैं। उसमें हमको राष्ट्रीय स्तर पर एक पहचान मिली हुई है। लेकिन क्लाइमेट चेंज की वजह से जो डायरेक्शनल चेंजेज आ रही हैं, इसलिए बीएचईएल के बोर्ड ने एक नई स्ट्रैटिजी बनाई है कि कैसे हम बदलते हुए परिवेश में अपने आप को स्थापित कर पाएं। वर्तमान में करीब 75 परसेंट हमारा रेवेन्यु कोल बेस्ड पावर प्लांट से आता है। इनके लिए विजन रखा गया है कि अगले पांच सालों में इसको घटाते हुए 50 परसेंट बिजनेस कहीं और से लाना है। इस दिशा में इन्होंने कुछ अच्छे काम किए हैं। वंदे भारत ट्रेन सेट में इनको बड़ा काम मिला है। डिफेंस के बारे में भी बताया है कि डिफेंस क्षेत्र में हमको आगे बढ़ना है। न्यूक्लियर पावर में आगे बढ़ना है और जो एक नया क्षेत्र हाइड्रोजन का खुला है।…"

CHAPTER - 2

CORPORATE GOVERNANCE

ORGANIZATIONAL STRUCTURE

A. BOARD OF DIRECTORS (BOD)

2.1 The composition of the Board of Directors of BHEL is as follows:

Position(s)	Sanctioned strength (Nos.)	Actual strength as on 06.07.2023 (Nos.)
Chairman & Managing Director	1	1
Whole-time Executive (Functional) Directors	5	4 @
Part-time Official Directors (Government Nominees) representing the Government of India	2	2
Part-time Non-official (Independent) Directors	8	3 #
Total	**16**	**10**

@ The post of Director (Human Resources) which was lying vacant since 01.02.2022 and Director (Power) was holding additional charge of the post of Director (Human Resources) was reported to be filled in as imtimated during the sitting held on 6.7.2023.

The matter of filling up vacancies is under process with Government of India.

2.2 When asked by the Committee about the number and amount of penalties have been imposed by NSE, BSE and SEBI on BHEL for vacancies in BoD BHEL submitted the following written reply to the Committee:

> "As on November 15, 2022, there exists four (4) vacancies of part-time Non-official (Independent) Directors and one (1) vacancy of whole-time Functional Director i.e. Director (HR)*, on the Board of BHEL. Steps taken by BHEL for filling up of vacancies on its Board include:
>
> - BHEL has been regularly pursuing with the Ministry of Heavy Industries for appointment of requisite number of Independent Directors, including woman Independent Director, for ensuring compliance with Corporate Governance norms enunciated under SEBI

(Listing Obligations & Disclosure Requirements) Regulations and the Companies Act.

- The copies of correspondences between BHEL and the stock exchanges (NSE/BSE) regarding imposing fine, non-compliances of SEBI regulations, LODR pertaining to board composition etc. are also forwarded to the administrative Ministry for their appraisal and appointment of Independent Directors against vacant positions on the Board.

- The status of Board level vacancies and current Board of Directors is uploaded online on the website of Department of Public Enterprises (DPE).

* [Interviews were held for filling the vacant post of Director (HR) on 10th November' 2022 wherein Public Enterprises Selection Board (PESB) / DoPT made recommendations for the post of Director (HR)].

"Prior to September' 2018, no fines / penalties were imposed on BHEL by BSE and/or NSE for non-compliance of SEBI Regulations. Due to reduction of strength of independent directors to less than 50% of the actual strength of Board composition (including no independent woman director), NSE and BSE started imposing fines every quarter from September' 2018 onwards, for non-compliance of Regulation 17(1) of SEBI (LODR) Regulations. However, subsequent to the induction of independent directors including woman independent director, BHEL became compliant to the SEBI regulations w.e.f. 09.11.2021. An amount to the tune of Rs. 72 lakhs was levied as fine by the stock exchanges (NSE / BSE) separately w.e.f. quarter ending September 2018 to December, 2021. However, on submissions made by the Company as the matter is completely under purview of the Government of India and requests for waivers, BSE and NSE have waived the fine levied on BHEL till December 2020 and December, 2021 respectively."

However, as a result of resignation of one Independent director, BHEL has again become non-compliant with Regulation 17 (1) of SEBI Regulations, 2015 w.e.f. 30.05.2022. Subsequently, one more Independent Director has resigned from Board of BHEL on 12.09.2022."

A statement of fine levied by BSE and NSE on BHEL w.e.f. September 2018 till March, 2023, is given as under: -

Fine levied by Stock Exchanges (Rs.)

(w.e.f. Sep, 2018)

Period	BSE (Rs.)	NSE (Rs)
Jun,18	-	-
Sep, 18	542800	542800
Dec, 18	542800	542800
Mar, 19	531000	531000
2018-19 (A)	**1616600**	**1616600**
Jun, 19	536900	536900
Sep, 19	542800	542800
Dec, 19	542800	542800
Mar, 20	536900	536900
2019-20 (B)	**2159400**	**2159400**
Jun, 20	536900	536900
Sep, 20	542800	542800
Dec, 20	542800	542800
Mar, 21	531000	531000
2020-21 (C)	**2153500**	**2153500**
Jun, 21	536900	536900
Sep, 21	542800	542800
Dec, 21	230100	230100
2021-22 (D)	**1309800**	**1309800**
Sep, 22	188800	188800
Dec, 22	542800	542800
Mar,23	531000	531000
2022-23 (E)	**1262600**	**1262600**
Total * (A+B+C+D+E)	**8501900**	**8501900**
Total Fine imposed by SEs from Sep, 18 to Mar,23* Rs. 17003800/-		

* BSE has waived off the fine imposed from Sep, 18 to Dec, 21 amounting to Rs. 7239300/-

* NSE has waived off the fine imposed from Sep, 18 to Dec, 21 amounting to Rs. 7239300/-

B. HUMAN RESOURCES

2.3 As on 31.03.2023, total manpower strength of BHEL is 29,536 and break-up of employees is as in table below:

BHEL Workforce (Last 5 Years - as on 31 March each year)								
	Executive		Supervisor		Worker		Grand Total	
Year	Total Strength	Female Strength	Total Strength	Female Strength	Total Strength	Female Strength	Total Strength	Female Strength
2019	10420	1054	6861	486	18190	513	35471	2053
2020	10209	1057	6312	451	17231	479	33752	1987
2021	10140	1019	5577	429	16406	445	32123	1893
2022	10280	1019	4758	399	15720	415	30758	1833
2023	10187	1010	4363	356	14986	380	29536	1746

2.4 On being asked about the impact of declining workforce on performance and production of the Company, BHEL, in a written reply, submitted as under:

> "The Manpower requirement in the Company is analyzed regularly taking into account factors like business environment new opportunities / future business outlook, new projects, market conditions, attritions, superannuation etc. Due to subdued business environment, the available outstanding order book of the Company has gone down gradually over the years. However, during last decade, the Company has undertaken several initiatives including induction of high technology production facilities, continuous training of employees etc. to boost the productivity apart from induction of domain experts to bridge the technology gaps wherever found desirable. In case of need for any specific skill-set, manpower requirements are first attempted to be met through redeployment of existing manpower, and fresh recruitment (at entry level / higher grades) from outside is resorted to thereafter, if required.
>
> Thus, as such, the Company has not witnessed any adverse impact on performance & production on account of declining work force."

2.5 On being asked about the steps/initiatives taken by BHEL to enhance the representation of women in the Company, BHEL, in a written reply, submitted as under:

"Nonetheless, enhancing the representation of women in the company is a continuous focus area for which various steps / initiatives are taken mentioned as below:

- Women are recruited at Executives, Supervisors and Workers positions available in the Company-both at induction as well as lateral levels.
- BHEL also has well-defined induction trainings at all the three entry levels – Engineer/ Executive Trainees (Dakshata), Supervisor Trainees (Nipun) & Workmen Trainees (Praveen). Women employees are nominated without prejudice in training programmes conducted by the training centers. Many women employees are also nominated for external programmes.
- Special programmes are organized exclusively for women employees in various manufacturing units of BHEL essentially in the areas of Leadership, Empowerment, Financial Management and Health Management.
- Apart from training, women are also provided with various opportunities for growth and development like challenging assignments/ projects/ postings within the company and experiential learning through collaborator site visits.
- Women employees are encouraged to apply for various awards instituted by Govt. of India, prominent being Vishwakarma Award, ShramBhushan, ShramVeerangana and Shram Devi. This gives them confidence to participate & contribute better to the organization.
- It is worth mentioning that BHEL is currently having its 1st women functional directorin the board of the company. Also, for the 1st time in the history of organization, a woman Executive Director is heading a BHEL's manufacturing unit (EDN Bengaluru).
- BHEL Excel Awards which are given in recognition of all-round excellence displayed by employees including women professionals, outstanding contribution made by the employees towards growth & profitability, and technology development."

2.6 When asked whether the Company has any skill development/training programme for fresher, BHEL, in a written reply, submitted as under:

"For the fresh inductees at BHEL, there are one-year comprehensive development/training modules available, viz. Dakshata for Engineer Trainees, Nipun for Supervisor trainees and Praveen for Artisan trainees.

These are structured training programmes for fresh inductees helping them understand their role and responsibilities in the organization.

BHEL is also providing skill development training to Trade apprentices under National Apprenticeship Promotion Scheme (NAPS) and Graduate, Diploma & vocational Apprentices National Apprenticeship Training Scheme (NATS). BHEL provides training to apprentices and after successful completion of training the apprentices are awarded completion certificate.

Recruitment to various posts in BHEL is generally made at the induction levels viz. Executive Cadre including Executive / Engineer Trainees, Non-Executive Cadre including Supervisor Trainees and (Artisans) which done through advertisement in the Press (National and/or Regional Dailies, Employment News) & Careers Website)"

2.7 When asked the Ministry about their role in providing various facilities and social securities to BHEL's workforce including contract workers according to Government Norms, the Ministry of Heavy Industries, in a written reply, submitted that the Ministry of Heavy Industries ensures compliance of statutory guidelines for applicable laws including, deployment of contract workers. Further, for Contract workers deployed in BHEL, it is ensured (through the Contractors) that various statutory benefits like minimum wages, PF, ESI and Gratuity are paid to them. Moreover, other facilities like housing to the extent available in BHEL townships, canteen and education are also provided to contract labour."

CHAPTER - 3

PHYSICAL PERFORMANCE

A. OVERVIEW OF THE BUSINESS

3.1 BHEL has two business segments i.e. Power & Industry. These segments are driven by the three business sectors i.e. Power Sector, Industry Sector, International Operations. The Power segment comprises thermal, gas, hydro and nuclear power plant businesses, spares & services business. The Industry segment caters to major equipment supplies and Engineering, Procurement and Construction (EPC) works for a variety of sectors including transportation, transmission, defence & aerospace, captive power, renewables, downstream oil & gas, energy storage, and electric mobility, among others.

Sr No	Power Sector Segment	Industry Sector Segment
1.	Thermal Sector	**Transportation**
2.	Gas and Oil Sector	**Defence & Aerospace**
3.	Hydro Sector	**Transmission**
4.	Nuclear Power Plant Sector	**Captive Power & Process Plant**
5.	Spares & Services Business Sector	**Renewables and other Industrial Products**

B. POWER SECTOR

3.2 As on March 31 2022, the installed energy capacity of India is as under:

S. No.	Product	Capacity (in GW)	Percentage
1.	Coal	211	53
2.	Renewable Energy Sources	110	27
3	Hydro	47	12
4.	Gas & Oil	25	6
5.	Nuclear	7	2

Source: Central Electricity Authority (CEA) Ministry of Power.

3.3 BHEL contributes supply of Coal & Lignite based utility sets which generate 59.4% of the country's total generation of 1,078.5 BUs. Since its inception in 1964, BHEL has added 461 coal based utility sets, 422 hydro utility sets, 103 gas based utility sets and 12 nuclear based utility sets in India upto financial year 2021-22.

3.4 The Committee have been informed that BHEL has been able to maintain its market leadership in the conventional thermal power equipment manufacturing business over the years and the main reasons for loss of orders in case of Flue Gas Desulfurization's (FGD) (*Fleu gas is the gas that is emitted as a result of the combustion of fuels, typically in industrial processes or in heating systems*) mainly is on account of procurement restrictions in line with Government of India's Guidelines and lack of level playing field vis-à-vis private players.

3.5 When enquired about the quantum and performance of the Company in supplying spare parts and the current status of long-term spares supply contracts from companies including NHPC and IOCL, BHEL, in a written reply, submitted as under:

> "As regards, performance of the Company in supplying spare parts, turnover for last 5 years till second quarter of current financial year Spares & Services Business is as below:

Spares & Services	(values incl. taxes) (Rs/Cr)
Financial Year	Turnover Value
18-19	2501
19-20	2072
20-21	2170
21-22	2275
22-23 (upto Q2)	1029

> In order to ensure improved service to customers as well as for improving its market share in the business, BHEL has been focussing on entering into long term services and spares agreements with major customers in the past few years."

3.6 BHEL has submitted to the Committee that the Compnay is one of the few companies in the world having the capability to manufacture the equipment for entire range of power plants thermal, gas, hydro and nuclear and submitted the following written information to the Committee in this regard:

Major Products	Unit of Measurement	2018-19	2019-20	2020-21	2021-22	2022-23
Boiler	Metric Tonne (MT)	352405	183437	100866	94098	148200
Thermal Sets including Gas & Hydro	Mega watt (MW)	3898	2965	5408	7175	7576
Power Transformer	Mega Volt Ampere (MVA)	32269	30084	18475	26979	29287
Traction Machine	Number	2663	2757	2288	1919	1650
Electrical Machine	Number	750	697	590	596	906
Control Panel and Equipment	Cubicles	4785	4342	3108	3699	4059

3.7 When asked for the reasons for declining physical performance of the Company during the period 2019-20 to 2020-21, BHEL, in a written reply, submitted as under:

> "The overall shop production of major products *viz.* Boilers, Turbines, Generators at BHEL was impacted during the financial year 2019-20 and financial year 2020-21 owing to supply chain disruptions from both within and outside the country and manpower shortage (at BHEL as well as ancillaries/ vendor works operations) due to spread of COVID-19 pandemic.
>
> There was a complete loss of manufacturing capacity during the initial period of nationwide lockdown. Even after lifting of full lockdown during Q-1 financial year 2020-21, the manufacturing capacity was reduced substantially due to reduced manpower availability owing to local state lockdowns, night curfews, reduced shift timings, stringent quarantine norms and other similar measures which were put in place to maintain social distancing norms to curb the spread of COVID-19.
>
> All these resulted in slowing down the BHEL's operation in manufacturing facilities and hence the general declining trend of physical performance during the Fiscal financial year 2020-21 as compared to financial year 2019-20.

Production is linked to a number of factors which inter-alia include orders on hand, anticipated orders with shorter delivery cycles, order liquidation programme/ cycle, customer commitments and their readiness to accept the deliverable equipment, progress at sites etc. In this regard, the decline/ slowdown in production of BHEL is mainly due to low orders inflow for execution, resulting from orders not fructifying in the market in general. It is worthwhile to mention that orders in the export market are sporadic in nature, with the last major export order for Maitree project in Bangladesh, received in the year 2017."

Aging of Plants

3.8 Ministry regarding the aging fleet of thermal power plants in the Country, have submitted to the Committee that the Power Sector's current thermal fleet has a significant proportion of older plants, with ~13% of coal-based plants (~28 GW) aged more than 30 years, out of which ~5 GW of plants are aged more than 40 years. Further, ~18 GW plants are expected to cross 30 years of age in the next decade and >130 GW of plants will cross this age by 2047. Notably, most of these plants are subcritical in nature, which have lesser efficiencies (~10% lower) and higher carbon emissions (10-20% higher) than the newer supercritical power plants and efficiency (-20% lower) than AUSC power plants.

3.9 Ministry have further added that the Government of India have initiated the project of developing an advanced technology in the form of Advanced Ultra Super Critical (AUSC) Technology offering higher efficiency and reduced emissions. The project was funded by the Ministry of Heavy Industries, BHEL, IGCAR, Department of Science & Technology and NTPC. Against the total outlay of Rs. ~900 crore for this project, MHI contributed a major share of Rs. ~ 470 crore. The R&D phase of design and manufacturing technology has been successfully completed in December' 2020 by the consortium of BHEL, IGCAR & NTPC. A Technology Demonstration Plant (TDP) of capacity 1X800 MW based on AUSC technology is envisaged under the aegis of the Ministry of Power after the approval from the Government of India.

3.10 During the briefing the representative of the Ministry of Heavy Industries regarding the Tranmission business submitted to the Committee as under:

"…हमारी आर्थिक स्थिति की बात हुई कि हमारा टर्न ओवर गिरा है, प्रोफिटेबिलिटी भी गिरी है, अभी थर्मल पॉवर और कोल पर बात हो रही थी, primarily, we have been a thermal power company over the last five decades. अब पिछले वर्षों में कोल की ऑर्डरिंग NIL पर आ गई, क्योंकि कोयले के प्लांट लगे ही नहीं और हम रिन्यूएबल एनर्जी

की ओर जा रहे हैं। तीन साल में कोई ऑर्डरिंग नहीं हुई, अब तीन साल के बाद पहला ऑर्डरिंग हुई है।, टोटल ऑर्डरिंग और हमारा को-रिलेशन के ऊपर एक ग्राफ दिखाया था, एक और ग्राफ दिखाया था, एवलेबल आर्डर के अगेंस्ट हम कितना टर्न ओवर जनरेट कर रहे हैं। हमारी स्थिति खराब हुई क्योंकि थर्मल खत्म होने लगा, जबकि सच्चाई यह है कि अगर हमें 5 ट्रिलियन डॉलर की इकोनॉमी बनना है तो बेस लोड के लिए थर्मल पॉवर चाहिए। अब फिर से छह से आठ महीने में रूस-यूक्रेन युद्ध के बाद जब गैस प्राइस बढ़ी और इंटरनेशनल सिच्यूएशन चेंज हुई तो फिर से हमें Realise हुआ कि हमें थर्मल पर जाना है। हमने एक फीगर दिखाया कि 16 हजार मेगावाट का अभी ऑर्डरिंग होना जरूरी है जिसे जल्दी करना पड़ेगा। अगर देश को 5 ट्रिलियन डॉलर इकोनॉमी बनने का सपना साकार करना है तो ऑर्डरिंग जल्दी करनी पड़ेगी। कोयला रहेगा, लेकिन कोयले के साथ-साथ एक रिअलिटी भी सामने आ गई कि हमारे देश में हाईड्रोकार्बन नहीं है, ऑयल गैस नहीं है। हमारे पास हाई ऐश कन्टेंट कोयला है, उसको कैसे इस्तेमाल करना है। इस स्थिति के बैकग्राउंड में हमारे दो-तीन प्रयास चल रहे हैं। हमें डाएवर्सिफिकेशन करना है, हम मेनकोल बेसेज से कैसे आगे बढ़ें, रेलवे की बात हुई, डिफेंस में बहुत से इनिशिएटिव लिए गए हैं, डिफेंस में अपग्रेडेड एसआरजीएम के बारे में बताया गया, इसके साथ-साथ कई एरियाज में हम काम कर रहे हैं। पहले कुछ चीजें इम्पोर्ट हो रही थीं, पर अब डिफेंस में मरीन गैस टरबाइन और सर्विसेज के एरिया में हम डिफेंस मिनिस्ट्री और डीआरडीओ के साथ काम कर रहे हैं कि हम और क्या-क्या support कर सकते हैं। कहां-कहां हमारे लिए काम आ सकता है, कोयले के एरिया में कोल गैसिफिकेशन पर हमारा काम 30 साल से ज्यादा समय से चल रहा है। हमने त्रिची में आईजीजीसी प्लांट भी सेट-अप किया, पिछले साल कोल टू मेथेनॉल का एक Pilot प्लांट सेट-अप किया है, कोल गैसिफिकेशन का हमें अनुभव है, इंडियन कोल जो हाई ऐशकन्टेंट वाला कोल होता है। उसकी गैसिफिकेशन की proven टेक्नोलॉजी केवल हमारे पास है, हमारे करने के बाद और लोग भी आ रहे हैं। पीओसी करने के बाद कमर्शियल स्केल पर करने के लिए हमने मिशन मोड पर एक टीम सेट-अप की, वह काम बड़ी तेजी से हो रहा है। कमर्शियल प्लांट का इंजीनियरिंग, डिजाइन और उसके बाद ऑप्टिमाइजेशन किया है ताकि उस की प्रोडक्शन कॉस्टरिड्यूस हो और इफिशिएंसी इन्क्रीज हो, वह काम हमारा चल रहा है। आगे हम बड़ा मेजर एरिया देख रहे हैं। जब हम कोल यूज करेंगे तो Carbon capture is another major element अब यह समझ आ गया है कि हमें कोयला तो यूज करना ही पड़ेगा, हमें कार्बन कैप्चर में भी जाना पड़ेगा। उसमें भी हम काम कर रहे हैं, कोल

गैसिफिकेशन में फायदा होता है कि नार्मली कार्बन कैप्चर की कॉस्ट काफी ज्यादा आती है, कोल गैसिफिकेशन में कार्बनडाईऑक्साइड की अलग stream निकलती है, उसकी कार्बन कैप्चर की कॉस्ट बहुत कम हो जाती है। मेजर एफर्ट हमारा इस डायरेक्शन में भी चल रहा है। एयूएससी के बारे में बताया गया कि 46 परसेंट एफिशिएंसी की टेक्नालॉजी डेवलप की है। आईजीकार, एनटीपीसी और मिनिस्ट्री ऑफ हैवी इंडस्ट्री के साथ मिलकर किया है।

इसके ऊपर लगभग 900 से 1000 करोड़ रुपये का खर्च आया है। उसका एक टेक्नोलॉजी डेवलपमेंट प्लांट बनना था। उसके लिए तीन साल पहले एमओयू भी साइन हो गया था, लेकिन अभी तक उसका अप्रूवल नहीं हुआ है। वह एक बड़ा मेजर चीज है, क्योंकि जो पुराने प्लांट्स हैं, सब-क्रिटिकल प्लांट्स हैं, उनकी एफिशिएंसी करीब 36 परसेंट होती है। हम जो एडवांस अल्ट्रा सुपर क्रिटिकल (एयूएससी) बना रहे हैं, उसकी efficiency 46 परसेंट है। उससे कोयले का इस्तेमाल और पॉल्यूशन कम हो जाएगा। जो पुराने प्लांट्स रिप्लेस होने हैं, वे सारे लेटेस्टटेक्नोलॉजी से रिप्लेस होने चाहिए, क्योंकि कोयला को तो आगे चलाना पड़ेगा।…''

3.11 When asked about the role of Ministry of Heavy Industries and progress in replacement of older power plant machinery with newly developed Advanced Ultra Supercritical (AUSC) Technologies in a written reply, the Minstry of Heavy Industries submitted as under:

"The Power Sector's current thermal fleet has a significant proportion of older plants, with ~13% of coal-based plants (~28 GW) aged more than 30 years, out of which ~5 GW of plants are aged more than 40 years. Further, ~18 GW plants are expected to cross 30 years of age by 2032 and >130 GW of plants will cross this age by 2047. Notably, most of these plants are subcritical in nature, which have lesser efficiencies (~10% lower) than the newer supercritical power plants and (~20% lower) than AUSC power plants.

With the development and commercialization of the most efficient thermal technologies like AUSC, replacement of older power plants by plants based on Supercritical and AUSC technologies can lead to significant reductions in emission levels (of even up to 10-20% from subcritical levels). Phase-I, i.e. the R&D Phase, for development of this technology has been completed successfully. Now with support of MHI, BHEL is pursuing for commercialization ofAUSC technology. Hence, a policy driven

mechanism for retirement of these older plants is imperative for reducing the carbon footprint of the Indian Power sector.

Given the future demand for energy, requirement for thermal power plants and the ageing of fleet, the need for policy driven mechanism for retirement of older plants and expeditious ordering of efficient technology-based plants as their replacement assumes criticality and is being advocated by MHI through various agencies like CEA and MoP, etc."

C. INDUSTRY SECTOR

3.12 Industry Sector offers a broad range of industrial systems and products for the major sectors of the Indian economy. With focus on growth of non-coal based businesses of the company, Industry Sector comprising of market-focused groups, is offering comprehensive solutions for transportation, defence & aerospace, transmission, renewables, oil & gas, captive power plants, industrial products, energy storage, e-Mobility, and new business areas. During FY 2021-22, Industry Sector* secured orders worth `5,660 Crore as compared to `4,283 Crore in the previous year, in a challenging business environment.

Transportation

BHEL has been a key player in the growth journey of India's rail transportation segment for the last six decades and has been meeting Indian Railways' rolling stock requirements by offering innovative solutions and supplying 'Made in India' systems & equipment. Significant numbers of locomotives & EMUs of Indian Railways carry traction equipment manufactured by BHEL.

Indian Railways has embarked on an ambitious modernization plan, which is creating several opportunities in the sector. As a part of this, Indian Railways is projecting a requirement of around 62,000 coaches of various types including MEMU, EMU and Trainsets, 11,000 locos and signaling for approx. 17,000km track length. The total associated expenditure expected in the next 10 years is of the order of `2.8 Lakh Crore. In the urban mobility segment, states are pursuing mass rapid transit projects in cities having a population of over two million and light rail/ monorail solutions are being explored for smaller cities. All these along with metro/ metrolite announcements in 50 cities are expected to offer multiple opportunities in the transportation segment in the years to come.

Range of offerings

- Rolling Stock
  - » Complete Electric locomotives up to 6000 HP (electrics upto 9000 HP)
  - » Diesel-Electric locomotives up to 3000 HP
  - » Diesel Electric Tower Cars (DETCs)
- Traction Machines
  - » Traction Motors and Alternators
- Traction Drive System & Controls
  - » Insulated-Gate Bipolar Transistor (IGBT) based propulsion systems for rolling stock
  - » Train control management system & vehicle control unit
  - » Hotel load converter and composite converter
  - » Control gear equipment for conventional rolling stock
  - » Regenerative braking system for conventional rolling stock
- Traction Transformers
- Conventional Traction Electrics for Rolling Stock

Achievements of BHEL during the year 2021-22

• Mainline Electric Multiple Unit (MEMU) equipped with BHEL manufactured IGBT based electrics has rolled out from RCF Kapurthala. For the first time in India, Ethernet based communication system was developed and installed in this train which enables deployment of futuristic technologies requiring high bandwidth connectivity throughout the train.

• Maiden order received for propulsion electrics of Vande Bharat Express (Trainsets) from ICF, Chennai; marking BHEL's entry into Indian semi high-speed mobility segment.

• BHEL manufactured & supplied environment friendly 1350 HP Diesel Electric Shunting Locomotive (DESL) meeting US EPA Tier-II standards to M/s JSW, Dolvi.

• Order received for six 6000 HP Electric Locomotives from NTPC for material handling operations replacing the Diesel Electric Locomotives.

Future perspective of BHEL

As per National Rail Plan, Railways plans to increase the share in freight transportation from 30% to 45% by year 2030, while also focusing on increasing average speed of goods trains by 50% through introduction of high HP locos. For passenger traffic, it is introducing semi high-speed trainsets to reduce travel time and improve passenger comfort. Indian Railways has already released orders for train electrics for 44 semi high speed trainsets and is going ahead with big-ticket procurement using novel business models for state-of-theart Vande Bharat trainsets for passenger operations and high HP electric locomotives of 9000 HP/ 12000 HP power capacity for freight duties. Leveraging

its manufacturing experience, technological competence and pan India presence, BHEL is working to develop technology self-sufficiency and strengthen inhouse capability for design & manufacturing of advanced mechanical and electric systems for all types of rolling stock. Your company is also working with OEM's/ collaborators to address upcoming businesses, especially of high HP locos, Metro/Metrolite, Monorail, Maglev, Battery and Alternate Fuel Powered Locomotives, High Speed Rail and Signaling.

3.13 BHEL further informed that the Company is getting regular orders for propulsion equipment for Locos and EMUs from Railways. The five year average order booking has increased from Rs.932 crore (financial year 2012-17) to Rs.2,003 crore (financial year 2017-22)

3.14 BHEL has submitted the following information about the major steps taken by the Company for improving its portfolio and to address emerging opportunities in Railway segment:

- 'Successful secured business for 127 nos. of WAG9 locomotives from Indian Railways.

- One of the major contributors of BHEL's order booking in the Transportation Segment has been on account of the complete locomotive supply orders received from Indian Railways for which there is a dedicated facility at BHEL Jhansi with capacity of 75 nos. of WAG9H locos per annum. BHEL has been receiving supply orders for utilization of this facility from Railway Board, Ministry of Railways on single tender basis. Last such major order was issued by Railway in year 2019-20 for 75 nos. WAG9H electric locos valued at Rs. 850 crore which was received by BHEL. However, in current financial year Railway Board has placed an order for 22 nos. WAG9H locos under 30% option quantity condition.

- BHEL has also approached Railway Board for allowing BHEL along with an International Technology Partner to qualify for the upcoming 12000HP High Horse Power Locomotive tender under manufacturing cum maintenance scheme. As of now BHEL does not qualify to participate in the tender despite being the only locomotive manufacturer in the country apart from Indian Railways' Production Units/ JV.

- Supplied upgraded kit for 9000 HP locomotive to Indian Railways which has completed testing at site and is under service trials.

- Progress is being made in conversion of 6000HP locomotives to 9000HP.

- In-house development to manufacture WAG7 locomotive with regenerative capabilities. BHEL is the first organization in the world to successfully develop, manufacture & demonstrate Regeneration System to increase the energy efficiency of Indian Railways fleet of conventional electric locomotives. Subsequent to this development, BHEL obtained commercial order for supply of 25 nos. of 5000 HP Electric Locomotive (WAG-7) with Regenerative Braking which is currently under execution.

- Secured order from NTPC Limited, an Industrial Customer in India, for Electric Locomotives for their material handling operations replacing the Diesel Electric Locomotives for industrial application.

- Technical Collaboration Agreement (TCA) with M/s Kawasaki, Japan for manufacture of metro coaches.

- MOU with M/s Kawasaki, Japan for indigenization of High Speed Trains for Mumbai Ahmedabad High Speed Train Project

- BHEL marked its foray into the semi high speed and metro propulsion equipment segment by securing first time orders for i) propulsion system for Vande Bharat Trains and ii) metro propulsion for Kolkata metro project respectively during the last one year.

- Attempting to address Indian Railways mega project for Complete Vande Bharat Trains in collaboration with the qualified consortium partner.

- BHEL has also successfully supplied the 9000HP propulsion upgradation kit to Indian Railways, which is currently under field trials. This will enable Indian Railways to manufacture 9000HP Locomotives on the existing 6000HP mechanical platform.

- Successfully secured first time order in Metro market for 16 sets of 3 phase Propulsion System for Kolkata Metro from M/s ICF, Chennai.

- Secured developmental order for propulsion equipment for Vande Bharat Express Trainsets from ICF, Chennai.

- Focusing on developing complete range of IGBT propulsion through in-house efforts. In-house development of electric propulsion for rolling stock, locomotives & MEMUs for Indian railways at BHEL, EDN, Bengaluru is in progress for indigenization of transportation technology thereby strengthening the vision of "Make in India" and "Atmanirbhar Bharat".

- Attempts are being made to secure business of Coaches for Rail & Metro in domestic market through collaborations with external technology resources.

- Forayed into semi-high speed rail segment by booking the maiden order for propulsion electrics of 'Vande Bharat Express' last year. Counter offer / LOA received for supply & maintenance of 80 nos. 'Vande Bharat Express' in March'23"

3.15 During the evidence the representative of the Ministry of Heavy Industries regarding the Tranmission business submitted to the Committee as under:

"…जो नया बिजनेस ग्रो करना है, जो कि एक बड़ा बिजनेस है, उसको हम ट्रांसमिशन बिजनेस कहते हैं। ट्रांसमिशन बिजनेस चाहें कोल फायर्ड हो, सोलर हो या विंड हो, सबको ट्रांसमिशन बिजनेस चाहिए है। अत: बीएचईएल ने यह तय किया है कि ट्रांसमिशन बिजनेस के लिए हमारे पास ऑलरेडी क्षमताएं हैं। हम इन क्षमताओं में विकास करेंगे और इन क्षमताओं के अनुसार स्टेट्स की ट्रांसमिशन कंपनीज हैं, उनकी जो बिड्स निकलती हैं या सेंट्रल लेवल पर जो बिड्स निकलती हैं, उनमें हम लोग प्रतिभाग करके ट्रांसमिशन बिजनेस में अपने आप को बढ़ाएंगे, क्योंकि ट्रांसमिशन एक एवरग्रीन बिजनेस है।"

D. INTERNATIONAL OPERATIONS

3.16 BHEL has over the years established its references in 89 countries of the world and spanning countries like Afghanistan, Bangladesh, Bhutan & Nepal, and others such as Belarus, Ethiopia, Indonesia, Iraq, Libya, Nigeria, Oman, Rwanda, Senegal, Sudan and Spain.

The available details of export orders bagged by BHEL during the last 6 years are as under:

BHEL : Export market	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Number of contracts secured (including spares & services)	70	50	57	37	47	62

3.17 BHEL has submitted the following information about the steps taken by the company to expand its business outreach in the international market against global competitors.

> "BHEL has over the years established references in 88 countries of the world spanning all 6 inhabited continents including neighboring countries like Afghanistan, Bangladesh, Bhutan & Nepal, and others such as Belarus, Ethiopia, Indonesia, Iraq, Libya, Nigeria, Oman, Rwanda, and Sudan. These references encompass almost the entire range of BHEL products and services inter-alia covering turnkey thermal and gas-based power projects, electro-mechanical package for Hydro Power plants, transmission sub-station projects, rehabilitation projects for boilers & power stations etc., besides a wide variety of products like Transformers, Reactors, Compressors, Valves and Oil field equipment, Electrostatic Precipitators, Photo Voltaic equipment, Insulators, Switchgears, Heat Exchangers, Castings & Forgings, etc.
>
> Recognizing its core strength as a manufacturing company, BHEL has taken up efforts to focus on products as the core of its international business. BHEL's products such as motors, transformers, Compressors, and valves have a demand in the international market and over the years, orders in this segment have grown. Further, BHEL has strategized a multipronged approach focused towards expanding its business in international market through creation of product desk to increase its outreach in the target markets in a focused manner to strive for quantum jump in product exports, besides the following initiatives:
>
> - Improving technical/ EPC capabilities through strategic / pre-bid/ pre-award tie-ups with vendors/ OEMs/ Civil/ Erection and Commissioning contractors, so as to submit comprehensive and competitive bids to prospective customers
> - Enhanced focus on opportunities in markets such as of Africa, neighbouring countries and South East Asia.
> - Close engagement with other PSEs such as SJVN, NTPC, RVNL, WAPCOS and EIL for overseas opportunities.
> - Pursuing new funding schemes through Govt. of India / funding institutions like EXIM Bank of India/ other financial institutions.

- Market intelligence through Indian Embassies, Embassies in India, local contacts, websites of utilities in target countries, various databases etc.
- Leveraging Hydro business experience to establish dominance on in the Hydro power segment in African region besides neighbouring and other countries.
- Concentrating on enhancing our footprints in the renewable businesses

As regards, current status and future business prospects in the countries of Nepal, Bhutan and Afghanistan, brief details are as mentioned below:

Projects presently under execution: Nepal & Bhutan

- 2 x 20 MW Rahughat Hydro Project, Nepal
- 4 x 225 MW Arun – III Hydro Project, Nepal
- 6 x 200 MW Punatsangchhu-I HEP, Bhutan
- 6 x 170 MW Punatsangchhu-II HEP, Bhutan

Projects being targeted in near future: Nepal & Bhutan

- Lower Arun Hydro, Nepal,
- Upper Karnali Hydro, Nepal
- Betan Karnali Hydro, Nepal
- Dudhkoshi Hydro, Nepal
- Arun -IV Hydro, Nepal
- Sankosh Hydro, Bhutan
- Kholongchhu Hydro, Bhutan"

3.18 BHEL has informed the Committee, about the current status of the projects in Bhutan (for Hydro projects) and Afghanistan (esp. Salma Dam project), as under:

Current status of Hydro projects: Bhutan & Afghanistan	
Project	**Current Status**
6 x 200 MW Punatsangchhu-I HEP, Bhutan:	• 99% of its contractual supplies - Completed by BHEL. • Box-up of 4 Units – Completed by BHEL • Balance 2 units - Targeted by Sep '23* **Water is not expected for another 3-4 years as the dam (customer scope) is not ready.*
6 x 170 MW	• 95% of its contractual supplies – Completed by BHEL

Punatsangchhu-II HEP, Bhutan:	• Balance supplies - Progressively by Dec '23[#] *# Project is delayed due to delays in civil work execution which is in customer's scope. However, customer is trying to commission Unit #1 in Dec '23 for which BHEL is providing all necessary support.*
3 x 14 MW Salma HEP , Afghanistan	• Machines were commissioned in Jun'16 • BHEL has completed all its contractual obligation in the project.

E. PRODUCTION CAPACITY

3.19 When asked about the under utilization of production capacity of the Company and the reasons therefor, BHEL, in a written reply, submitted as under:

> "Capacity utilization is linked to a number of factors which broadly include orders in hand, anticipated orders coming during the course of year, project cycle, customer commitments and their readiness to accept the deliverable equipment, progress at sites etc. In this regard, the decline / slowdown in utilized capacity of BHEL is mainly due to low orders inflow for execution, resulting from orders not fructifying in the market in general.
>
> As regards power sector, which constitutes the major chunk of BHEL's business portfolio, the utility power segment witnessed a sharp decline in orders fructifying in the domestic market, i.e. from a total market level of over 25,000 MW per year during 2007-10, to an average of around 9,400 MW from 2011-12 to 2014-15, which got further reduced to around 5,000 MW in 2016-17 and 2017-18, 660 MW in 2018-19, and 2,640 MW in 2019-20. It is worth mentioning that no major thermal utility power project order was finalized during the years 2020-21 and 2021-22 thereby creating a situation of declining utilization of Company's manufacturing capacity. It is pertinent to note that for 2x660 MW Talcher thermal power plant project where BHEL emerged as successful bidder in March' 2018, the ordering for the project was delayed due to various reasons inclusive of non-availability of necessary approvals from Odisha Government. Eventually, the tender was annulled in Oct '21, retendered and finally was secured by BHEL again in Sep' 2022 (after a delay of over 50 months).
>
> BHEL has also been witnessing lower capacity utilization in respect of major products (allocated across various manufacturing units) due to incessant transition in energy sector directly impacting the nature of the

product mix of the Company. This capacity to deliver the existing products was built over decades on strength of available resources including machinery, manpower and technology etc. ....the shop production of BHEL was impacted during the financial year 2019-20 and financial year 2020-21 owing to supply chain disruptions from both within and outside the country and manpower shortage due to spread of COVID-19 pandemic."

CHAPTER - 4

FINANCIAL PERFORMANCE

A. OVERVIEW

4.1 The Committee have been informed that Bharat Heavy Electricals Limited (BHEL) is trying to come out from its financial crisis where the Company faced negative progress during the period 2019-20 to 2020-21. During the period of 2019-20 Loss after tax were Rs.1,473 crore and it were Rs.2717 crore in the period of 2020-21. Since last two years BHEL started getting profit after tax, now it are Rs.448 crore. In the year 2022-23, total assets of the Company were Rs.59,804 crore and the total liabilities are Rs. 32542 crore. The revenue from operations of the Company are Rs. 23365 crore.

4.2 BHEL has provided the details of the financial performance of the Company during the period from 2017-18 to 2022-23 in Table as under:

(Rs. in crore)

Financial Year	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**
Total Assets	63764	64431	60236	55701	56708	59804
Total Liabilities	31124	32999	31055	29217	29737	32542
Revenue from operations	28813	30423	21459	17308	21211	23365
Profit/(Loss) Before Tax	1585	2048	- 662	-3612	437	450
Profit/(Loss) After Tax	807	1209	-1473	-2717	410	448
Trade Receivables in number of Days of Revenue from Operations (Nos.)	192	190	198	152	107	102
Liquidation (%) of Trade Receivables out of Current Year(CY) Net Billing	56%	59%	73%	82%	86%	86%
Liquidation (%) of Trade Receivables out of Total Potential (OP Net Trade Receivables+CY Net Billing)	56%	62%	67%	74%	75%	75%

B. ASSETS AND LIABILITIES

4.3 When asked about the reasons for declining trend of total value of assets, BHEL, in a written reply, submitted as under:

> "The decline in total assets of the Company from Rs.63,764 crore (as on 31.03.2018) to Rs.56,708 crore (as on 31.03.2022) is pertinently on account of parameters viz. Cash & Bank balance, Receivables and Property, Plant & Equipment (PPE). Reasons specific to these parameters are as below:
>
> Cash & Bank balance:
>
> - In case of major ongoing projects currently under execution, customers have given undue weightage to payment towards completion of intermediate and final milestones. Such extremely stringent and skewed payment terms is one of the biggest reason that have severely impacted BHEL cash inflows.
> - Lower advances and back loaded payment terms without any relief on account of deferred payment terms for outflows (Large amount of purchases are made from MSMEs/through GeM/through LCs where the payments are to be made in time bound manner) has resulted in cash flow imbalances and reduction in BHEL Cash and Bank Balance.
> - There has been marked increase in material cost of the Company, which has been more pronounced during last few years. So while the realization from the market has come down (due to cut-throat competition with thermal ordering in the range of only ~1.7 GW average during the period 2017-2022 Vs manufacturing capacity of 30 GW in the market), profit margins got further squeezed.
> - The higher share of imported bought outs due to conditions stipulated under DJU (Deed of Joint Undertaking) has also affected the profitability of the Company. Global prices of various commodities (particularly in Steel, Copper, Aluminum, Nickel, and so on) had been steadily rising. In fact, material cost was at an all-time high of 72% for the Company during financial year 21-22. The recent disturbances in Global front also further pushed the prices of various commodities and also had a significant impact on Power & Fuel cost of the Company. The cost of civil construction, structural fabrication and erection activities have also witnessed an upswing.
> - The impact on the Company's financials is accentuated, as part of the current orders under execution are on firm price basis, i.e. without any price variation clause to absorb such unprecedented increase in the prices of various commodities.
> - The present share of existing business has a far higher proportion of EPC work (Civil being in BHEL scope which has significantly

higher material percentage). Furthermore, certain projects under construction, such as FGDs, and others, have extremely high material costs due to lower realizations and large quantum of Bought out material.

- Due to recent guidelines issued (by DPIIT and Department of Expenditure regulating import of materials), competition has got restricted adversely affecting the material cost, due to new indigenous vendors being in development stage. Consequently, procurement timelines also got affected.
- Further, the cash & bank balance was also impacted by buy back of shares as per DIPAM guidelines, Wage revision arrears payment to employees and also higher incidence of GST payments (some customers not fully reimbursing / delaying reimbursement of GST).

Receivables:

- The reduction is on account of higher cash collection efficiency (% liquidation out of total potential has increased to 75% in financial year 2021-22 from a meagre level of 56% in financial year 2017-18) due to concerted efforts incl. sequential management of supplies in line with project site requirements and also due to lower level of operations. (Revenues in financial year 2017-18: Rs.27,850 Cr., in financial year 2021-22: Rs.20,153 Cr.)

Property, Plant & Equipment (PPE):

- The reduction is primarily due to periodical depreciation in line with accounting policy of the Company. ”

4.4 Similarly, when the Committee asked about the reasons for increase in total liabilities of the Company, BHEL, furnished the following written information to the Committee:

> “The total liabilities of the Company of Rs.32,542 (2022-23) crore comprise of trade payables, short term borrowings, contract liabilities and other provisions/ liabilities. These liabilities are commensurate with the scale and nature of operations of the Company. In fact, through effective working capital management, these liabilities are well under control and over the last 5 years & have gone down from Rs.31,124 Cr. in financial year 2017-18 to Rs. 29,737 Cr. in financial year 2021-22. Since these liabilities are operational in nature and part of the working capital cycle, as such, there is no impact on the performance / viability of the Company.”

4.5 Contrary to the claim of BHEL that the liabilities of the Company is well under control during the last 5 years and have gone down to Rs.29,737 crores in financial year

2021-22, it is clear that the liabilities of BHEL has further increased to Rs.32,542 crore which is higher than that of the level of financial year 2017-18.

C. PROFITABLILITY

4.6 As is seen in table at para 4.2 above, profit/loss after tax of BHEL were Rs.807 crore in financial year 2017-18, Rs.1209 crore in financial year 2018-19, Rs.-1473 crore in financial year 2019-20, Rs.-2717 in financial year 2020-21, Rs.410 crore in financial year 2021-22 and now it is Rs.448 crore in financial year 2022-23. The Company suffered loss of Rs.1473 crore in financial year 2019-20 and Rs. 2717 crore in 2020-21.

4.7 BHEL submitted the following reasons for decline in profitability of the Company:

> "The decline in profits of the Company has been primarily due to lower order inflow, unexecutable orders, reduced volume of operations, project execution being impacted by COVID-19 and higher input cost. These are explained in detail as under:
>
> **Lower Order Inflow & Unexecutable Orders**
> The Indian Power Sector has witnessed significantly lower ordering activities in recent years, with *thermal ordering in the range of only ~1.7 GW average during the period 2017-2022* The concerns on climate change and consequent shift in focus toward renewable energy resources caused significant reduction in fresh orders for conventional coal-based thermal power stations. Earlier, Indian power sector also faced issues like fuel supplies, land acquisition, environment clearance etc. Notably, no new main plant equipment order for any thermal power plant has been finalized in 2020-21 and 2021-22 and only now in September'22, one single order has been placed in the country (Talcher 2x660 MW Stage-III) which BHEL won under competitive bidding. As a result, the order book of the Company, especially in terms of executable orders, has been declining markedly. The Order receipt of the Company was merely Rs.13,472 Cr for the year 2020-21, the lowest level since 2003-04.Further, there have been significant delays and cancellation in ordering, with tender for Talcher TPP (whose Price Bid was opened in 2018) getting annulled in 2021 and subsequently retendered (BHEL secured the retendered order successfully) and the tenders for Lara & Singrauli TPPs annulled as well.
>
> In addition, various orders of BHEL have become unexecutable, due to varied reasons, further creating a stress on BHEL operations. These include orders for DVC's Raghunathpur TG Pkg, TANGEDCO's Uppur project and RVUNL's Ramgarh among others.

Lower Volume of operations

In financial year 2019-20 and financial year 2020-21, the outbreak of COVID-19 pandemic worldwide resulted in unprecedented challenges and further added to the uncertainties present in the business environment. The nation-wide lockdown undertaken as a measure to contain the spread of COVID-19 pandemic caused disturbance and slowdown of the economic activity. Civil & Erection execution was particularly impacted due to labour migration issues. Also, the geo-political and economic circumstances across the globe restricted the supplies with cascading effect being felt even now (Semiconductor chip shortage is an important example of the same). These supply chain disruptions had an impact on the items being produced and business activities in the economy. Operations of the Company were severely affected with the Company achieving revenue level of only Rs.16,296 Cr in the year 2020-21.

The Procurement Policy witnessed a paradigm shift in June, 2020, with the issuance of the revised procurement guidelines and its subsequent amendments and clarifications. BHEL needed to comply with these, which created a requirement of retendering various sub-contracts and accordingly, delayed the project execution.

The COVID-19 pandemic created severe financial constraints for various BHEL vendors and subcontractors, and hence, to tide this situation, BHEL had to short-close its various contracts, even without invoking risk & cost (as per the extant Company policies), to reduce the impact on project execution. These issues not only impacted BHEL's operations but also had an impact on BHEL's finances.

Though the operations of the Company were restricted during these two years, the Company continued to bear fixed expenses over lockdown period, also impacting the profitability of the Company.

Higher Input / Material Cost

Over the years, there has been marked increase in material cost of the Company, which has been more pronounced during last few years. So while the realisation from the market has come down (*due to cut-throat competition with thermal ordering in the range of only ~1.7 GW average during the period 2017-2022 Vs manufacturing capacity of 30 GW in the market*), profit margins got further squeezed. The situation was further exacerbated in the aftermath of the pandemic and the geo-political developments, which resulted in steep rise in global prices of various

commodities (particularly in Steel, Copper, Aluminium, Nickel, and so on) . As a result, material cost was at an all-time high of 72% for the Company during financial year 21-22. The impact on the Company's financials is accentuated, as part of the current orders under execution are on firm price basis, i.e. without any price variation clause to absorb such unprecedented increase in the prices of various commodities.

The recent global disturbances also pushed the prices of various commodities further and posed a significant impact on Power & Fuel cost of the Company. The cost of civil construction, structural fabrication and erection activities have also witnessed an upswing.

Certain business verticals of the Company such as FGD, Solar etc. are intensely competitive with multiple players, thereby resulting into significant pressure on the margins front. The mix of projects under construction is also impacting the material costs, with various FGD projects being executed by BHEL, which have high material costs due to large quantum of Bought out material. Further, revised procurement guidelines (notified by DPIIT and Department of Expenditure regulating import of materials) have impacted the level of competition, which has adversely affected the material cost, due to new indigenous vendors being in development stage. This also impacted procurement timelines and hence the project execution activities.

In view of the major business disruptions explained above, impacting the volume of operations as well as input costs, for financial year 19-20, the Company recorded a loss after tax of Rs.1473 Cr (Revenue at Rs.20491 Cr. were down by 30% as compared to the previous year coupled with huge increase in material cost from 61% in 18-19 to 67% in 19-20). For financial year 20-21, the Company incurred a loss after tax of Rs.2717 Crs as against a loss of Rs.1473 Crs in financial year 19-20, mainly due to lower volume of operations, higher material cost and also additional provisioning. Consistently rising receivables and quantum of Trade Receivables in terms of no. of days of revenue had been a matter of concern for institutional investors, DPE, bankers and other stakeholders."

4.8 BHEL has informed the Committee about the steps taken by the Company to regain profitability, as mentioned below:

"The Company achieved breakeven in financial year 2021-22 and the Company is already strategizing and working towards the long term sustainable turnaround of the Company, though it is pertinent to mention

that Material cost has been a challenge, not only for BHEL but also across the industry spectrum, domestically as well as globally. Furthermore, inflation in general is also putting persistent pressures on maintaining operational budgets which are being dealt through stringent budgetary controls measures. Higher fuel prices have also played a major role in negatively impacting the bottom-line. Some of the key highlights and efforts in attaining back the profitability in financial year 21-22 are enumerated below:

- During financial year 2021-22, despite deadliest COVID19 wave in 1st quarter of financial year 2021-22, supply chain disruptions and increase in the prices of key commodities, the Company was able to achieve a 23% increase in revenue from operations vis-à-vis previous year by adopting multi-pronged process improvements.

- However, cost reduction initiatives and stringent budgetary control measures have contributed to make up the loss to some extent. The multi-pronged process improvements in the Company led to increase in Other Operational Income (highest in last 8 years at Rs.1013 cr. for financial year 20-21) as well as cost reduction in the areas of miscellaneous & administrative expenditure (including Power & Fuel, Consumables) to the extent of ~ Rs.700 Crores (saving in financial year 2020-21 vis-à-vis 2019-20) partly also attributable to lower volume of operations.

- …owing to a significant cost reduction drive within the Company the manufacturing, administrative and Sales & Distribution (S&D) expenses as % of revenues have come down to less than 7% in financial year 2021-22 from a level of more than 9% previous fiscal. This has helped in protecting margin position by more than 200 basis points.
- …over the last couple of years, the Company is also working with the objective of improving its quality of assets (specifically, receivables) in the balance sheet which has not only resulted in lowering of provision cost for financial year 2021-22 but also contributed to preservation of bottom-line of the Company. Further, in this direction, focussed efforts are being made to settle pending issues with the Customer like time extension, closure of punch points etc. so as to arrest further creation of provisions as also leading to withdrawal of already created provisions.

- The Company carried out detailed review of each and every major contract with the objective of improving the realization. Wherever realization was not probable in the near future, appropriate action was taken based on merits of the case i.e. provisioning, disclosure as contingent liability or maintaining status quo. Based on the above management assessment in line with the applicable Ind AS, additional provision against such receivables amounting to about Rs.1800 Crs. has been created during financial year 20-21.

- Despite the challenging business environment, several initiatives have been taken in the past couple of years towards reorientation of Company's operational ideology from being 'Revenue Centric' to 'Project Centric'. Some of the major initiatives include implementation of Integrated Project Management System (IPMS) for real time project progress monitoring, ongoing work for Site Data Digitization, sequential supplies to project sites, amongst others, resulting in the highest erection tonnage at project sites in the past five years, highest ever project closures and lowest number of outstanding punch points in the year 2021-22.

- The Company took a call to conservatively provide these Receivables as a matter of utmost financial prudence, so as to strengthen the receivable management process and better reflect the Receivables position in the Balance Sheet. In case such provisioning had not been done, the Net Loss for financial year 20-21 would have been much lower at the level of around Rs.1350 Crs, as against Rs.1473 Crs in financial year 2019-20.

- Company's paradigm shift in its operating philosophy to 'Project Centric Approach' helped in improving customer satisfaction, reducing trade receivables to lowest levels which is also evidenced by 86% liquidation of current year billing during financial year 2021-22, highest in last ten years. Further, this also helped in restricting unavoidable expenditures at sites and ensured best possible working capital management.

- Company's Cash & bank balance improved by 29% to Rs. 2409 Cr., at the end of financial year 2021-22 as against Rs. 1868 Cr. at the end of previous year. This was also majorly aided by resolving old pending income tax disputes and realising refunds.

- In the backdrop of prevailing challenges of receding topline, shrinking margins & rising material cost, a dedicated Cost Optimisation Cell has been formed to strategically focus on cost reduction through efforts like Design Optimisation, Design to Cost etc.

Focussed efforts to improve upon Other Operational Income are being done especially w.r.t. Scrap Income. Unused material lying at Site / Surplus material is being targeted for alternative usage/ disposal of scrap. The overall other operational income reached its pinnacle in financial year 2021-22 at Rs.1058 Cr., directly contributing to the bottomline of the Company.

Apart from the above, the Board has recently approved the Strategic Plan 2022-27 of the Company, in which several new growth areas have been identified, also aligning the same with national priorities *viz.,* Coal gasification, Rail transportation, Defence etc. These new growth areas are expected to play an anchor role in ensuring sustainable business growth for the Company."

4.9 During the evidence, the representative of the Ministry of Heavy Industries have submitted the following regarding the declining profitability of the Company:

"...बीएचईएल आज एक नाजुक मोड़ पर है। इसमें कोई दो राय नहीं है कि अगर हम 25 हजार करोड़ रुपये का बिजनेस कर रहे हैं और हमारा मुनाफा सिर्फ 400 करोड़ रुपये है तो यह दिखाता है कि बिल्कुल टच एंड गो टाइप की सिचुएशन है। नॉर्मली अगर देखें तो अगर 20 हजार करोड़ रुपये का बिजनेस है तो 10 परसेंट मुनाफा मानें तो 2 हजार करोड़ रुपये का हमारा मुनाफा होना चाहिए।..."

D. RECEIVABLES AND PAYABLES

4.10 BHEL provided the details of trade receivables as mentioned below:

Trade Receivables & Contract Assets (Rs. in crore)					
	2018-19	2019-20	2020-21	2021-22	2022-23
Trade Receivable	15796	11641	7213	6229	6544
Contract Assets	22819	23794	24079	26940	29740
Total (Net of Provision)	38615	35435	31292	33168	36284

4.11 Similarly, the details of trade payables for the period were also provided as under:

	2018-19	2019-20	2020-21	2021-22	2022-23 Upto Dec'22
Trade Payables (Rs. Crore)	12078	9900	8559	9882	10404

4.12 Regarding the details of top 10 customers of BHEL (State-wise) who account for high value of receivables, were provided as below:

Net Debtors as on 30th Sep'22				
Customer	**Trade Receivable**	**Contract Assets**	**Total Debtors**	**%**
NTPC	1076	7779	8855	26%
TANGEDCO	519	4951	5470	16%
TSGENCO	875	1375	2250	7%
BIFPCL MAITREE	23	1355	1378	4%
RVUNL	402	747	1149	3%
MSPGCL	129	856	985	3%
MEGHA ENG	26	900	926	3%
UPRVUNL	199	666	865	3%
JAYPEE	475	373	848	3%
BAJAJ	360	419	779	2%
Subtotal	**4084**	**19421**	**23505**	**70%**
Others	2540	7673	10213	30%
Total	**6624**	**27094**	**33718**	**100%**

4.13 The Customers' Category-wise details of Total Receivables (in Rs. Crore) were submitted as under:

Customer Category	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**
Central PSU's incl Railways and Govt. Deptt	12684	11709	11351	12125	14150
State Electricity Boards	19172	16764	13373	13816	14777
Private Customers	4558	4079	4135	4733	5039
Exports	2202	2884	2434	2494	2318
TOTAL	**38615**	**35435**	**31292**	**33168**	**36284**

4.14 When asked about the steps taken by the Company to recover the payments pending for long time, BHEL, submitted the following written information to the Committee:

"BHEL has made excessive efforts in the recent years to contain the level of Receivables and reduce the outstanding Trade Receivables from customers, which include:

- The Company carried out detailed review of major contracts with the objective of improving realization. Wherever realization was not probable in the near future, appropriate action was taken based on merits of the case i.e. provisioning, disclosure as contingent liability or maintaining status quo.
- Formulation of Trade Receivable Policy in 2018: A uniform guiding policy to have continuous monitoring of Receivables was introduced in the Company with the approval of Board.
- Focus on realizing old debts through closure of long pending punch points, resolving technical issues, completion of performance guarantee tests as well as settlement of long pending time extension cases are helping garner cash from commissioned projects.
- The reorientation of the Company's operational ideology, from being Revenue Centric to Project Centric has resulted in improving the quality of the trade receivables of the Company.
- For Government customers including State utilities, support from the MHI (Ministry of Heavy Industries) is also taken for expediting realization of dues. Matter is taken up with the Ministry from time to time during various review meetings and their intervention is sought to the extent considered necessary.

➢ TANGEDCO projects (1x800 MW North Chennai, 2x660 MW Ennore, 2x660 MW Udangudi, and 2x800 MW Uppur) : In addition to making efforts at TANGEDCO level, CMD (BHEL) also met Chief Secretary (Tamil Nadu) and Hon'ble Minister of Power (Tamil Nadu) in this regard. Thereafter, matter was further escalated to Ministry level and help was sought. Secretary (HI) took up the matter with Govt. of Tamil Nadu, besides BHEL pursuing the matter continuously. This led to improvement in realization of receivables from TANGEDCO, mainly for the three projects, viz, North Chennai, Ennore and Udangudi. However, substantial dues for Uppur project is still stuck up as the project has been put on hold by NGT since March 2021. BHEL has been taking up the issue of revival of Uppur project with TANGEDCO at the apex level and is also seeking intervention from the Ministry.

➢ TSGENCO Yadadri project: Subsequent to taking up for expediting the fund release by PFC and REC to TSGENCO through nodal Ministry, positive movement in the realization of dues could be achieved.

- WAPCOS Salma Dam project: Administrative Mechanism for Resolution of CPSEs Disputes (AMRCD) was also approached and consequently, the entire outstanding dues were received.
- HEL Haldia (erstwhile IPCL Haldia) project: Arbitration proceedings were invoked, which was awarded in favour of BHEL.

- Even for non-Government customers, regular follow ups are being made with the customers at the highest level for recovery of payments especially those pending for long time. However, in chronic/serious cases, project execution activities like erection and commissioning are also put on hold till clearance of existing dues and/or securing further dues.
- In case of a private sector project, outstanding dues were realized only after the project was on hold.
- Recently, the execution activities of some Lift Irrigation Scheme projects were put on hold due to delays in opening of LC by the customers and consequently, the holds were lifted on opening of the LCs

4.15 On the same query, Ministry of Heavy Industries, submitted as under:

"During various review meetings conducted from time to time, the matter of pending payments has been brought to the notice of the MHI. Based on the merits of the cases, the concerns have been taken up with the relevant agencies wherever found appropriate. BHEL, with support from MHI, has made all efforts in the recent years to contain the level of Receivables and reduce the outstanding Trade Receivables from customers.

As a result of the efforts there is a sustainable improvement in cash collection from dispatches by 6.41% in 2022-23 over previous year and liquidation of Current Year billing also sustained at 86% in financial year 2022-23. Net trade receivables reduced from a level of 107 days of Revenue from Operations (Gross) in 2021-22 to 102 days in 2022-23. "

4.16 During the evidence, the representative of the Ministry, regarding the issue of pending payments, deposed before the Committee as under:

"….सर, कुछ केसेज़ आते हैं, जिनमें मंत्रालय का बहुत बड़ा रोल होता है। जहां पर स्पेशली राज्य सरकार की ईकाइयों के साथ में बहुत बड़ा रोल होता है। उनकी कुछ तकनीकी परेशानियों की वजह से जहां पर पैसा समय से नहीं मिल पा रहा है, उस केस में भी मंत्री महोदय के स्तर पर हमने इन विषयों को कन्संर्ड एजेंसीज़ के साथ में लिया है। उसका एक

उदाहरण में देना चाहता हूँ कि हमारे सचिव महोदय ने रिसेंट्ली तमिलनाडू के एडीश्नल चीफ सेक्रेटरी महोदय के साथ चर्चा की है। बी.एच.ई.एल. के 2000 करोड़ रुपए फंसे हुए थे। उसके लिए एक प्लान तैयार किया गया है कि वे किस तरह से हमारे उस फंड का भुगतान भी करेंगे।.."

"...TSGENCO के साथ Yadadri project था या WAPCOS के साथ AMRCD के माध्यम से भी मंत्रालय ने बी.एच.ई.एल. के आउटस्टैंडिंग ड्यूज को दिलाने में मदद की है। इसका एक बहुत अच्छा रिजल्ट आपको स्क्रीन पर दिखेगा। बी.एच.ई.एल. एक साल में जितनी भी फंड की बिलिंग करता है, उसका लगभग 86 प्रतिशत उसी वर्ष में ले पाने में भी सक्षम रहा है। Net Trade Receivable का स्तर 107 दिनों से घट कर 102 दिनों तक आ गया है।..."

E. COST OPTIMIZATION

4.17 BHEL has informed the Committee about the cost cutting measures undertaken by the Company:

> "Company is taking various steps towards cost optimization and reducing its expenses which are as follows:
>
> - A dedicated Cost Optimisation Cell has been formed in February' 2021 to strategically focus on cost reduction through efforts like Design Optimisation, Design to Cost etc. The group focusses on optimization of design of various projects & products, review of system/ civil designs to reduce cost during execution, amongst other initiatives.
> - Design to Cost (DTC) exercise has been initiated in identified products as a step to cut down its expenses without compromising the quality.
> - Focus on extensive use of latest design techniques as well as use of advanced softwares such as advanced 3D Structural analysis for offering optimum designs to our valued customers.
> - '*Make or Buy*' decision, utilization of surplus materials, digitization of various processes for improving monitoring and efficiencies, Real time project monitoring through IPMS, site digitalization initiatives, timely closure of project sites and efficient energy management &

assets utilization are some other focus areas which are expected to bring long term sustained cost benefits.

- Company has put necessary provisions in place to address contracts where material costs are liable to wide fluctuations, wherein price variation clause are made part of tenders.
- Miscellaneous administrative expenditure have been sharply curtailed through effective budgetary control as well as creating a culture of cost consciousness. A significant cost reduction drive within the Company led to reduction in the manufacturing, administrative and sales & distribution (S&D) expenses to less than 7% of revenues in financial year 2021-22 from a level of more than 9% in financial year 2020-21.
- Supplementing above, major steps taken towards ensuring that Quality is not compromised while implementing any of the cost optimization initiatives and across all aspects / operations in BHEL include:
- BHEL is implementing "*Quality First*" initiative in mission mode which was launched in 2019 to put in place state-of-the-art processes, and making Quality a hallmark of the Company's products and services.
- Company's manufacturing units and other entities have been accredited to Quality Management Systems (ISO 9001:2015), Environmental Management Systems (ISO 14001:2004) and Occupational Health & Safety Management Systems (OHSAS 18001:2007)."

4.18 On being enquired about the role of Ministtry in supporting cost optimization measures, in a written reply, submitted as under:

"As a part of the Make-in-India vision of Government of India, and to strengthen the cause of a Self-Reliant India thereby reducing dependency on imports, MHI has launched schemes in various sectors, including Production Linked Incentives (PLI) schemes for Automobiles & Auto components, Advanced chemistry cell and electronic products; Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) Scheme- where the incentives are given to the beneficiaries on the domestic production & sales; Enhancement of Competitiveness of the Capital Goods Sector I & II – provided facilitation for indigenous development of latest cutting edge technology."

F. LAND BORDER SHARING AND GLOBAL TENDER ENQUIRY (GTE) RESTRICTIONS

4.19 On the impact of land border sharing and GTE restrictions in smooth operation of Company's business, BHEL, in a written reply, submitted as under:

> "The impact of these restrictions is multi-faceted and not just limited to monetary cost to BHEL. Owing to the GTE restrictions, the timelines of projects have been delayed by 5-6 months and even upto 9 months in some cases. This leads to loss to the Company in terms of prospective business, delayed deliveries/ project delays and levy of LD's for delay, etc. Furthermore, due to the restrictions on procurement from countries sharing land borders with India, BHEL had to incur substantial additional procurement cost for major items. BHEL had also conducted a series of workshops under the name BHEL SAMVAAD since Dec 2020 with the domestic Industry, to develop local suppliers."

4.20 When enquired whether the Company taken up these issues with the Ministry of Heavy Industries, BHEL, in a written reply, submitted as under:

"BHEL has requested for following dispensations with respect to the restrictive regulatory guidelines on Global Tender Enquiry for orders below 200 crore and restrictions on bidders from countries which share a land border with India:

a) The powers for GTE approvals be sub-delegated to the Board of Directors of BHEL, which comprises Government Nominees & Independent Directors appointed by Government of India.
b) All future public tenders should specify that no bidder (including the private entities) can procure material for the project from countries sharing land borders with India, which will ensure level playing field between public and private sector and also address national security concerns.
   In case, the same is not possible, level playing field is to be ensured for CPSEs like BHEL by suitably factoring the extent of cost of the materials being sourced from such countries by the private entities.
c) As relaxations were provided by DoE to educational and research institutes (OM dated 08.01.2021), as well as DAE for carrying out research activities (OM dated 01.04.2022), similar dispensation may be provided to BHEL as well, since it is engaged in industrial research for building AatmaNirbhar Bharat, since its inception.

d) As BHEL needs to invest heavily in the CAPEX for the country, it is expediting investments in CAPEX for which there would be need for GTE approvals at times. GTE approvals may be exempted in such cases.

Further, vide letter ref. AA/CMD/23/45 dated 16.11.2022, BHEL has taken up with MHI requesting intervention from Hon'ble Minister of Heavy Industries for suitably taking up with Hon'ble Minister of Finance."

4.21 Regarding the action taken by the Ministry on the issue of restrictions on CPSUs denying level playing fields to them, the Ministry of Heavy Industries, in a written reply, submitted as under:

"BHEL has been constantly representing with Government of India regarding the restrictions which are impacting the operations and profitability of BHEL. The last communication was vide letter ref. AA/CMD/23/45 dated 16.11.2022 of CMD/ BHEL, wherein intervention from Hon'ble Minister of Heavy Industries was requested for suitably taking up with Hon'ble Minister of Finance.

The proposal was appropriately taken up by MHI at the level of Hon'ble Minister with Ministry of Finance. However, no favourable response has been found citing national security."

4.22 In the same context, during the evidence, the representative of the Ministry of Heavy Industries stated as under:

"...ग्लोबल टेंडर इंक्वायरी एक विषय है, जिसमें बीएचईएल को मंत्रालय पूरी तरह से सहयोग देता है। उनके जितने भी इम्पोर्ट केसेस होते हैं, उन केसेस को हम सेक्रेटरी कॉर्डिनेशन के पास लेकर जाते हैं तथा उनके उस संबंध में जो भी प्रश्न होते हैं, उनका जवाब देकर क्लीयरेंस दिया जाता है। इस प्रोसेस को सबसे अच्छे तरीके से निभाने के लिए बीएचईएल की सेक्रेटरी कॉर्डिनेशन और कैबिनेट सेक्रेटेरीएट द्वारा समय-समय पर प्रशंसा भी की गई है। सर, इसके साथ में मैं यह भी बताना चाहूंगा कि इस विषय को बीएचईएल ने उठाया है, क्योंकि ये सिर्फ सरकार के तहत जो पब्लिक सेक्टर्स होते हैं, उन्हीं के ऊपर लागू होता है और प्राइवेट सेक्टर्स के ऊपर लागू नहीं होता है। बीएचईएल का यह मानना है कि उसकी वजह से उनको लेवल प्लेइंग फील्ड नहीं मिल रहा है। भारत सरकार की यह नीति है और उसका पालन करना हमारा और बीएचईएल का कर्त्तव्य है। इसलिए उसका पूर्ण रूप से पालन किया जाता है।..."

G. EXPORTS

4.23 The physical exports by BHEL during the last 5 years are as follows:

Year	Physical Exports (Rs. Crore)	Major Countries of Exports
2018-19	3,282	Bangladesh, Brunei, Bhutan, Comoros, Nepal, Nigeria, Oman, Senegal and Syria
2019-20	3,821	
2020-21	1,855	
2021-22	1518	
2022-23	1075	

4.24 Having noted the decline in export turnover and prospects of profitability in overseas projects of the Company, when asked the reasons for this trend of declining export, BHEL, in a written reply, submitted as under:

> "The overall shop production of major products viz. Boilers, Turbines, Generators at BHEL was impacted during the financial year 2019-20 and financial year 2020-21 owing to supply chain disruptions from both within and outside the country and manpower shortage (at BHEL as well as ancillaries/ vendor works operations) due to spread of COVID-19 pandemic.
>
> There was a complete loss of manufacturing capacity during the initial period of nationwide lockdown. Even after lifting of full lockdown during Q-1 financial year 2020-21, the manufacturing capacity was reduced substantially due to reduced manpower availability owing to local state lockdowns, night curfews, reduced shift timings, stringent quarantine norms and other similar measures which were put in place to maintain social distancing norms to curb the spread of COVID-19.
>
> All these resulted in slowing down the BHEL's operation in manufacturing facilities and hence the general declining trend of physical performance during the Fiscal financial year 20-21 as compared to financial year 19-20.
>
> Production is linked to a number of factors which inter-alia include orders on hand, anticipated orders with shorter delivery cycles, order liquidation programme/ cycle, customer commitments and their readiness to accept the deliverable equipment, progress at sites etc. In this regard, the decline /slowdown in production of BHEL is mainly due to low orders inflow for execution, resulting from orders not fructifying in the market in general. It is worthwhile to mention that orders in the export market are sporadic in

nature, with the last major export order for Maitree project in Bangladesh, received in the year 2017."

4.25 BHEL has submitted the following written information regarding it's expansion globally:

"BHEL has over the years established references in 89 countries of the world spanning all 6 inhabited continents including neighboring countries like Afghanistan, Bangladesh, Bhutan & Nepal, and others such as Belarus, Ethiopia, Indonesia, Iraq, Libya, Nigeria, Oman, Rwanda, and Sudan. These references encompass almost the entire range of BHEL products and services inter-alia covering turnkey thermal and gas-based power projects, electro-mechanical package for Hydro Power plants, transmission sub-station projects, rehabilitation projects for boilers & power stations etc., besides a wide variety of products like Transformers, Reactors, Compressors, Valves and Oil field equipment, Electrostatic Precipitators, Photo Voltaic equipment, Insulators, Switchgears, Heat Exchangers, Castings & Forgings, etc.

- The cumulative portfolio of BHEL's overseas power projects stands at 17 GW out of which over 11 GW has already been commissioned.
- More than 90% of Power generated in Bhutan is from BHEL equipment.
- BHEL has successfully commissioned 3x14 MW Salma hydropower project in Afghanistan. The project (renamed as Afghan-India friendship Dam) was jointly inaugurated by the Hon'ble Prime Minister of India, Shri Narendra Modi and Dr. Mohammad Ashraf Ghani, Hon'ble President of Afghanistan.
- Currently, executing several major projects, including 2x660 MW Maitree thermal power project in Bangladesh, 6x200 MW Punatsangchhu-I and 6x170 MW Punatsangchhu-II hydro projects in Bhutan, 26 MW Calabar Gas based power project and 1.3 MW Kaduna Solar Mini grid projects in Nigeria, 4x225 MW Arun-3 hydro project and 40 MW Rahughat hydro project in Nepal, the Government of India LoC funded 8 MWacHeneritta Solar Project in Mauritius and 2 x 200 MW Tishreen Thermal in Syria. These Projects of national importance will enable strengthening of bilateral relations."

4.26 When enquired about the kind of support provided by Ministry to BHEL, the MHI submitted the following information to the Committee:

“MHI has been extending support to BHEL wherever required. Recently, MHI had confirmed BHEL’s capabilities to execute large-scale project in overseas market to MEA (GoI) in the context of the Boulapha Thermal project, Laos which BHEL is trying to secure.”

CHAPTER - 5

ORDER BOOK

A. OVERVIEW

5.1 In 2021-22, BHEL secured orders for 4,700 MW, aggregating to Rs.17,931 crore, amidst intense competition and a limited pipeline of orders. This includes orders for Rs. 2,942 crore from the Spares and Services Business [*For* financial year *2021-22,* BHEL-GE Gas Turbine Services Private Ltd. (BGGTS) *orders considered in Industry Sector*].

BHEL placed the following picture of data on Orders booked by the Company in Power Sector, Industry Sector and by its International Operations Division during the period between 2015-16 and 2021-22, before the Committee:

Details : Power Sector *(incl. Spares)*					
Financial Year	**Number of Orders booked**	**Value (in Rs. Crs.)**	**Number of Orders completed**	**Balance***	**Remarks**
	(A)	(B)	-(C)	(A)-(C)	
2015-16	2574	38401	2565	9	*Under Execution (1 project (i.e., Uppur) is presently on hold)
2016-17	2588	6771	2581	7	*Under Execution
2017-18	2700	33187	2682	18	
2018-19	2962	12506	2918	44	
2019-20	2775	10756	2634	141	
2020-21	2631	8435	2352	279	
2021-22	2713	16523	1912	801	

Note: Small value services (~5 Crs. or less) has not been considered in Balance in the table above.

Details : Industry Sector					
Financial Year	**Number of Orders booked**	**Value (In Crs)**	**Number of Orders completed**	**Balance***	**Remarks**
2015-16	354	5125	353	1	*Orders under execution
2016-17	358	6181	354	4	
2017-18	405	7514	396	9	
2018-19	608	6860	590	18	
2019-20	580	7853	565	15	
2020-21	562	4283	512	50	
2021-22	617	5660	461	156	

Details : International Operations Division					
Financial Year	**Number of Orders booked**	**Value (Rs. in crore)**	**Number of Orders completed**	**Balance***	**Remarks**
2015-16	56	73	56	0	
2016-17	59	10047	58	1	*Orders under execution
2017-18	70	75	70	0	
2018-19	50	716	47	3	
2019-20	57	739	54	3	
2020-21	37	35	37	0	
2021-22	47	124	44	3	

5.2 When asked about the reasons for declining order book of the Company and the steps taken by Company to improve it's order book, BHEL, submitted as under:

"Power Sector - The Indian Power Sector has witnessed significantly lower ordering activities in recent years. The utility power segment, which constitutes the major chunk of BHEL's business portfolio, witnessed a sharp decline in orders fructifying in the domestic market, i.e. from a total market level of over 25 GW per year during 2007-11, to an average of around 9.3 GW from 2011-12 to 2015-16, which got further reduced to an average of around 5 GW from 2016-17 to 2021-22.

Further in utility segment, thermal ordering remained in the range of only ~1.2 GW during the period 2016-2022. It is also worth mentioning that no major thermal utility power project order was finalized during the years 2020-21 and 2021-22, thereby creating a situation of declining order book of the Company from 2015-16 to 2021-22. The concerns on climate change and consequent shift in focus toward renewable energy resources caused significant reduction in fresh orders for conventional coal-based thermal power plants. Earlier, Indian power sector also faced issues like fuel supplies, land acquisition, environment clearance, retendering of orders etc. It is pertinent to note that for 2x660 MW Talcher thermal power plant project where BHEL emerged as successful bidder in March' 2018, the ordering for the project was delayed due to various reasons including non-availability of necessary approvals from Odisha Government.

Eventually, the tender was annulled in Oct ’21, retendered and finally was secured by BHEL again in Sep’ 2022 (after a delay of over 50 months).

As an uptick is observed in ordering levels with award of NTPC Talcher (2x660 MW Stage-III) to BHEL, the Company is taking concerted steps to increase the order book in this shrinking market, which majorly include:

(i) Improving cost competitiveness:

- Offering better guarantee parameters through Design optimization.
- Reduction in import content.

(ii) Expanding its product offerings:

- Participation in stand-alone BOP packages, leading to orders like WBPDCL Sagardighi #5 (Chimney Pkg.) and THDCIL Khurja (CW System Civil works Pkg.)
- Strategic tie ups with technology collaborators like recent long term technology transfer agreement of BHEL with SHI-FW for 'Circulating Fluidized Bed Combustion (CFBC)' Boilers.

(iii) Approaching project developers for equity participation with BHEL to leverage equipment sale.

(iv) Policy advocacy with Government and policy makers for amendments in policies/ guidelines to effect level playing field with other industry players to overcome the disadvantages faced by BHEL.

(v) MoUs signed with CIL and NLCIL for Coal gasification projects, based on BHEL’s indigenous PFBG technology.

(vi) Long Term Spares Supply Agreement (LTSSAs) and Long Term Service Agreement (LTSAs) with major customers viz. NTPC, IOCL, DVC, NLC, SCCL, UPRUVNL, NPCIL etc. for assured spares business revenue.

(vii) Advanced Manufacturing Action (AMA)/ Stocking of Spares are being done to ensure quick turnaround of high margin spare orders.

(viii) Spares promotion being pitched to customer(s) during services/ overhauling jobs to attain better plant availability.

Industry Sector - As regards, Industry Sector order book witnessed a transient dip majorly due to less order finalization owing to COVID pandemic in financial year 2019-20 to financial year 2020-21. Furthermore, some of the orders were lost by BHEL due to large number of players vying for limited opportunities, and quoting of low / undercutting prices by the competitors. Industry segment at BHEL is making focused efforts for enhancing the order booking, which majorly include:

Defence and Aerospace:

- Upgradation of facility to manufacture & supply Upgraded Super Rapid Gun Mount to Indian Navy
- Upgradation of facility to manufacture Compact Heat Exchangers for TEJAS aircraft
- Long term capability building through development orders for strategic equipment from MoD/ Indian Navy.
- Cost Optimization to meet market level price for competitive bidding.
- Attempting new areas for diversification – Marine Gas Turbine, Li Ion Battery System, Heat Exchangers for Fighter Aircrafts & Helicopters.
- Formation of Water Front Support Team at Naval Dockyards to provide at site support for Super Rapid Gun Mount.

Transportation:

- Development of propulsion electrics for Vande Bharat Trains targeting future business.
- In recent tender of 200 Vande Bharat Train by Indian Railway, BHEL consortium is eligible for orders for 80 Trains.
- Upgradation of Propulsion System of Electric Locos from 6000 HP to 9000 HP.
- In-house development of Regenerative System (for savings in energy consumption) in conventional WAG-7 Locos of Indian Railways.
- Attempts are being made to secure business of Coaches for Rail & Metro in domestic market through technology collaborations
- Addition of new customers for Electric Locomotives.

Other business areas – Industry Segment

- Successfully concluded Technology collaboration agreement with Sumitomo Heavy Industries Foster wheeler for CFBC Boiler technology. Business for CFBC Boilers is approximately 400-450 Crore p.a. in industrial segment.

- Diversification into downstream oil and gas (DSOG) segment by securing its maiden order for Sulphur Recovery Unit (SRU) for IOCL Paradip refinery.

- Pursuing Utilities for relaxation of QR for GIS EPC tenders enabling BHEL to participate based on EPC experience in GIS switchyard - Success in POWERGRID, IOCL, OPTCL, UPPTCL for GIS EPC projects up to 400kV. Secured two major orders from M/s UPPTCL (400kV GIS substations at Ballia & Shamli) and one order from M/s OPTCL for 400/220kV GIS Substation at Ersama (Paradip).

- Addressing GIS project tenders through Pre bid Tie up with GIS OEM.

- Addressing Battery Energy Storage System (BESS) business - exploring to manufacture grid scale batteries & participate in PLI scheme expected to be issued by GoI shortly.

- Continued cost optimization efforts in the areas of design, engineering and procurement, to reduce cost of in-house products, bought out items and civil execution.

- Enhancing vendor base and entering into Rate contract with vendors to become more competitive.

International Operations - Major reasons for declining order book include:

- The energy sector is undergoing one of its most significant transformation as worldwide countries and companies are recasting their energy goals into its cleaner & greener forms.

- The Paris Agreement 2015 (COP 21) under the United Nations Framework Convention on Climate Change (UNFCCC) had inclined the entire world towards renewable energy wherein most of the participants agreed to gradually discontinue electricity production from thermal (coal / oil / gas fired) power plants. This led to several

upcoming thermal power projects being shelved and difficult to arrange financing for coal fired power plants which were still being pursued.

- The onset of COVID-19 pandemic induced disruptions and brought the economic activities to a near standstill the world over. Emerging market and developing economies target markets were experiencing unfavourable financial conditions amid mounting debt. New projects were also getting deferred or delayed with major resources being diverted towards healthcare infrastructure.

- Subsequently, the COP 26 agreements seconded the climate goals of the Paris Agreement (COP 21) further reducing the prospects of thermal power plants.

- The revision in Government of India's IDEAS (GoI LoC) guidelines in 2015 has also impacted the exports prospects as earlier BHEL could work with potential buyers in developing a project but now even if BHEL is involved in project development, the ordering will only be done on tendered basis leaving no incentive to BHEL (or other similar companies) to get involved in project development.

5.3 During the evidence the representative of the Ministry of Heavy Industries submitted as under:

"…एक इश्यू बीएचईएल के ओवरऑल परफॉरमेंस का आया है, उसके बारे में बात हो रही है कि यह पिछले सालों में गिरा है। इसमें मैं यह बताना चाहूँगा, एक तो जो हमारा मेन, जैसे बात हुई कि बीएचईएल का मेन बिजनेस थर्मल पॉवर का है। बीच में एक समय ऐसा आया, जब माना गया कि कोई भी थर्मल प्लांट नहीं लगाया जाएगा। वर्ष 2018-19, वर्ष 2019-20 में भी बहुत कम ऑर्डर्स हुए, अगस्त 2019 के बाद तीन साल तक कोई भी थर्मल प्लांट का ऑर्डर इस देश में प्लेस नहीं हुआ। उसके बाद जो पहला ऑर्डर प्लेस हुआ तालचेर का, वह बीएचईएल ने लिया। उसके बाद अभी कुछ ऑर्डर्स पाइपलाइन में हैं, जैसे कि सिंगरेनी की बात हुई, अभी मार्च एंड में उसका RA हुआ था, 26 मार्च के करीब उसका रिवर्स ऑक्शन हुआ था, जिसमें हम L-1 आए हैं, उसको आगे फाइनलाइज कराने की तरफ डिस्कशन आदि चल रहा है। एक तो इसके कारण भी हमारा टर्नओवर गिरा है, क्योंकि हमारी ऑर्डर बुक कम होती गई।…"

B. PROJECTS 'ON HOLD'

5.4 As on 01.12.2022, 13,771 MW Power Sector projects, Rs. 292 crore Industry Sector projects and 3 International projects were put 'On-Hold' category. These projects were kept 'On-Hold' due to the issues like environmental clearance, fuel unavailability, coal linkages, financial constraints with customers, change in customer requirements, etc. Most of these 'On-Hold' projects are under arbitration/ legal proceedings at present. The details of such projects 'On-Hold category are given as under:

Projects Under Hold - Power Sector			
S. No.	**Project**	**Reasons for Hold**	**Total MW**
AA)	**Projects under 'HOLD':**		
1	9x145 MW MEIL / PalamaruRangareddy Stg 2	A. 5 sets - Financial constraints. Manufacturing, Procurement of material & Bought-out items put ON HOLD vide letter dtd 19.07.2022 due to delay in opening of LC by MEIL and to avoid further financial exposure. Project now Revived, under execution B. 4 sets - Pending Clearance from I&CAD, expected in financial year 23-24	A. 725 (hold lifted) B. 580
2	9x145 MW MEIL / PalamaruRangareddy Stg 3	A. 5 sets - Financial constraints. Manufacturing, Procurement of material & Bought-out items put ON HOLD vide letter dtd 19.07.2022 due to delay in opening of LC by MEIL and to avoid further financial exposure. Project now Revived, under execution B. 4 sets - Pending Clearance from I&CAD, expected in financial year 23-24	A. 725 (hold lifted) B. 580
3	8x145 MW MEIL/ PalamuruRangareddy LIS Stg-1 (Pkg.1)	A. 4 sets - Financial constraints. Manufacturing, Procurement of material & Bought-out items put ON HOLD vide letter dtd 19.07.2022 due to delay in opening of LC by MEIL and to avoid further financial exposure. Hold now lifted, under execution B. 4 sets - Pending Manufacturing clearance from MEIL, expected in financial year 23-24	A. 580 (hold lifted) B. 580
4	5x145 MW MEIL/ PalamuruRangareddy LIS Stg-4 (Pkg.16)	3 sets –Hold lifted, under execution 2 sets - Pending manufacturing clearance from MEIL, expected in financial year 23-24	A. 435 (hold lifted) B. 290
5	3x57 MW NTPC / Lata Tapovan HEP	Supreme court has placed hold on project. NTPC terminated the contract on 28.07.2021.	171
6	10x40 MW SMHPCL / Maheshwar HEP # 1-10	Financial constraints. Revival Uncertain	400
7	2x800 MW TANGEDCO Uppur	TANGEDCO decision regardingproject revival expected in Q4 of financial year 22-23. (The project was put on hold due to NGT issue)	1,600
8	160 MW RRVUNL / Ramgarh CCPP Stg IV	RRVUNL has requested BHEL to defer supplies due to Gas availability issues Project revival expected in Q2 of financial year 23-24	160

9	2x660 MW DVC / Raghunathpur TG Pkg	• Project was put on hold by DVC due to financial constraints. In-Principle approval received by DVC from MoP towards "go ahead clearance" for revival of project. • Project revival under discussion with DVC, expected in Q4 of financial year 22-23.	1,320
10	2x525 MW Monnet Power / Malibrahmani, Angul	Project put on hold due to Financial constraints. Pending before Supreme court.	1,050
11	2x210 Surana Power Ltd. / Raichur #1&2	Project put on hold due to Financial constraints. Pending before Supreme court.	420
12	2x270 MW GVK / Goindwal	Financial constraints. Under Arbitration.	540
13	2x270 MW Abhijeet / Chandwa Ph. I	Financial constraints. Under Litigation.	540
14	2x270 MW Abhijeet / Chandwa Ph. II	Financial constraints. Under Litigation	540
15	1x300 MW Abhijeet / Vizag	Land acquisition constraints. Fund constraints. Environmental Clearance not available. Project Under Litigation	300
16	2x600 MW Visa Power / Raigarh Unit # 1&2	Unit #1: Financial constraints, Unit #2: Coal linkage not available with the customer Project now pending before Supreme court.	1,200
17	5x270 MW Nasik Ph 2 #1-5	Financial constraints. Under Arbitration.	1,350
18	5x270 MW Amravati Ph 2 #1-5	Financial constraints. Under Arbitration.	1,350
		Sub-Total	12,971
BB)	Projects awaiting commencement of Zero date:		
19	1x800 MW RPCL / Edlapur	Environmental Clearance awaited. Likely to be cancelled	800
		Sub-Total	800
GRAND TOTAL			**13,771**

Orders Under Hold - Industry Sector			
Sl. No	**Customer / Project**	**Reason for hold**	**Order Book Outstanding (excl. taxes) (In Crs)**
1	Kohinoor Power 66MW BTG	Funds constraint with customer	66.3
2	Concast Steel and Power Ltd. (Formerly SPS Steel) 40 MW STG	Funds constraint with customer	11.1
3	Lokmangal Agro, 1x30 MW STG	Project scrapped by customer.	19.1
4	Sintex Infra 2X150MW BTG	Arbitration invoking notice - 15.02.2021	21.6
5	GAMMON India Kalwakurthy Stg 3-E&M	Fund constraint	4.4
6	Ankur Udyog Gorakhpur 1X60 MW STG	Rating changed by customer	0.5
7	Lalitha Cements 1X15MW STG	Under arbitration	2.6
8	Nagarjuna Oil Corporation Ltd. (NOCL) Cuddalore Recycle Gas Compressor	Under NCLT.	25.9

9	Jhabua Power Ltd. Korba West (Avantha) 3x245MVA 400KV Gen. Trfr	Company is under Liquidation. Project didn't take off.	15.4
10	Indiabulls (Nasik/Amravati) 20x20MVA 21KV UT and 4x63MVA 132KV PTRF	Project didn't take off.	53.0
11	VBC Ferro Alloys 2x90MVA and 2x15MVA Transformers	Project did'nt take off.	10.0
12	Easun MR (CSPTCL) 1x160MVA 220KV Auto and 2x63MVA 132KV PTRF	Under Litigation	8.5
13	BIDCO 2x110MVAr 765KV Reactors	Under Arbitration.	12.0
14	IP Bus duct for 3 x 40 MW Rangit IV thru M/s- Siemens for Jal Power Corp Ltd.	Project has been shelved.	2.9
15	Setting up of 360 KWp Roof Top Solar at VTU Belagavi thru VTU	Project has been shelved.	1.7
16	BPCL Naini for IOCL-HBPL	Company closed.	1.0
17	Reliance Naval and Engineering Limited (RNEL) 5 SRGM for NOPV (P-21)	Funds constraint with customer.	1.0
18	EESL Supply of 48 MWp SPV Modules	Part quantity on hold by customer	35.0
			292

Projects Under Hold – International Operations Division		
S. No.	**Name of Project**	**Reason for hold**
1	4 x 100 MW Marib Gas Turbine Project, Yemen	The project is on hold due to Force Majeure conditions (Civil war in Yemen since Mar '15 - continuing till date).
2	4×16 MW Grand Katende Hydro Electric Project, D.R.Congo	The project was terminated by Government of Democratic Republic of Congo on advice of MEA (Govt. of India) due to concerns regarding Civil+ Hydro-Mechanical (HM) executing agency (Angelique International Ltd.). However, customer also conveyed that BHEL would remain in the project. MEA (Govt. of India) are looking for an agency for Civil and HM works of the project.
3	2 x 40 MW Tendaho-II Thermal Power Project	Government of India had put hold on the project in Oct'16 due to non-availability of sugarcane at present site. MOM dated 29th August, 2019 of meeting between Ethiopian Sugar Corporation (ESC), JPMA (consultant), MEA, EXIM Bank, Oversease Infrastructure Alliance Limited (OIA), BHEL and other sub-contractors, states that due to socio-economic reasons, Tendaho Phase-II will not be implemented at Tendaho Site.

5.5 The Ministry of Heavy Industries, in a written reply, informed the Committee about the steps taken by the Company to revive 'On-Hold' projects, as mentioned below:

"BHEL is taking following steps, for resolving issues related to 'On Hold 'projects.

Power Sector: Some projects of BHEL were put 'On-Hold' majorly due to the extrinsic issues which were beyond the control of BHEL like environmental clearance issues, fuel unavailability, coal linkages, and financial constraints of customer etc. Majority of these 'On-Hold' projects are under arbitration/ legal proceedings at present. However, BHEL is making all efforts for early revival of such projects, some of which are as below:

- Apart from regular follow-ups with customer at highest level, letters from Secretarial level (MHI)/ CMD level also sent to customers for revival of the project.

- High level meetings held with customers for arriving at mutual solutions to revive the projects. As a result of these efforts, revival of DVC Raghunathpur TG pkg. is expected in financial year 2023-24.

- Concerns regarding early revival and un-executable order book of hold projects are regularly highlighted at Board level/ Nodal Ministry level and intervention is sought to the extent considered necessary.

- For Government customers including State utilities, support from the MHI (Ministry of Heavy Industries) is also taken for early revival of projects.

- Arbitration/ legal action is being taken against customer(s) to realize long pending dues held up in stressed projects

- In chronic cases of long outstanding payments from non-government customers, project execution activities like erection and commissioning are restricted till clearance of existing dues. In case of MEIL Tuticorin project, such efforts had resulted in realization of our long outstanding dues.

Industry Sector: Industry Sector secures orders of systems and products in the areas of transportation, defence & aerospace, transmission,

renewables, oil & gas, Captive Power plant, Industrial Products, etc. from customers in Government and private sector.

Over the years some of the projects/supplies could not be executed due to various reasons like projects shelved, fund constraints with customers, change in customer requirements, customer being under liquidation and arbitrations. As such chances of revival of these projects are remote. However, BHEL's interest is being protected through legal and other suitable actions.

International Operations:

Sl.	Name of Project	Reason for hold & Present Status	Steps taken for revival
1	4 x 100 MW Marib Gas Turbine Project, Yemen	The project is on hold due to Force Majeure conditions. Civil war which started in Yemen since Mar '15 is continuing till date.	Revival of project is possible only after restoration of normalcy in the Yemen. BHEL is in continuous touch with MEA (Govt. of India) for updates on situation in Yemen.
2	4×16 MW Grand Katende Hydro Electric Project, D.R.Congo	The project was terminated by Government. of Democratic Republic of Congo on advice of MEA (Govt. of India) due to concerns regarding Civil+ HM executing agency (Angelique International Ltd.). However, customer also conveyed that BHEL would remain in the project. MEA (Govt. of India) are looking for an agency to take care of the Civil and HM works of the project.	A team comprising members from Indian Mission in DRC, WAPCOS, EXIM Bank of India, Customer and BHEL were sent to site during Dec '21 and Mar '22. Based on their report, Govt. of India is trying to resuscitate the project. BHEL is in continuous touch with MEA (Govt. of India) and keeping a track of the developments.
3	2 x 40 MW Tendaho-II Thermal Power Project, Ethiopia	Government of India has halted the project in Oct'16 due to non-availability of sugarcane at present site. MOM dated 29th August, 2019 of meeting between Ethiopian Sugar Corporation (ESC), JPMA (consultant), MEA, EXIM Bank, OIA , BHEL and other sub-contractor's states that due to socio-economic reasons, Tendaho Phase-II will not be implemented at Tendaho Site.	Project activities will commence upon identifying the new location of project site and clearance from MEA (Govt. of India), EXIM and client. BHEL is in continuous touch with MEA (Govt. of India) and keeping a track of the developments.

5.6 During the course of oral evidence, the representative of the Ministry of Heavy Industries deposed before the Committee as under:

"...कुछ प्रोजेक्ट्स, जो किसी एन्वायर्नमेंटल कारणों से या सफिशिएंट फंड न होने की वजह से या किसी भी और कारण की वजह से होल्ड पर आ जाते हैं और जिसमें बीएचईएल का कुछ पैसा इन्वेस्ट हो चुका होता है, उन प्रोजेक्ट्स को उनकी रिक्वायरमेंट के हिसाब से दोबारा से मैन स्ट्रीम में लाने के लिए मंत्रालय समय-समय पर उन कन्संर्ड एजेंसीज़ के साथ टेकअप करता है। यह विषय सबसे ज्यादा राज्य सरकार की ईकाइयों के पास आते हैं तो हमने ऐसे कुछ उदाहरण भी पेश किए हैं, जहां पर मंत्रालय के इंटरवेंशन के बाद उन प्रोजेक्ट्स को दोबारा से मैनस्ट्रीम प्रोजेक्ट्स में ला पाए हैं और उन प्रोजेक्ट्स को बीएचईएल ने सक्सेसफुली बनाया है।..."

C. DELAYED PROJECTS

5.7 From financial year 2015-16, there are several projects of Power (Thermal, Hydro, and Nuclear), Industry and International sectors of more than Rs. 100 crore are delay in execution.

5.8 Regarding reasons for delay in execution of projects, BHEL submitted the following information:

> "Delay in execution of projects were majorly because of external reasons, which were beyond BHEL's control like delays on account of customer in providing required inputs, impact of COVID-19 and changing Geopolitical situations (like Russia Ukraine War), unprecedented hike in steel and commodity prices and procurement restrictions from countries sharing land borders with India along with Global Tender Enquiry (GTE) restriction in procurement etc.
>
> The nation-wide lockdown undertaken in financial year 2019-20 and financial year 2020-21 as a measure to contain the spread of COVID-19 pandemic was the prime reason of delay in execution of the BHEL projects. As a result, civil & erection execution was impacted due to labor migration and related issues. Also, the changing geo-political scenario as well as paradigm shift in procurement philosophy by Government in 2020 restricted the procurement cycles of raw materials and items. In addition, various orders of BHEL slowed down, majorly due to long pending receivables, further causing BHEL to take tough steps and restrict the supplies in such projects."

5.9 On the aspect of considerable delays in execution of several projects, being asked about the steps taken by the Company to fast track execution and completion of these projects, BHEL, in a written reply, submitted as under:

> "To address these external issues, BHEL is highlighting the issues in appropriate forums to Customer, Ministries and regulatory bodies for their intervention. Along with this, various steps including policy initiatives have been taken internally in BHEL to address the hurdles in project execution. Such internal initiatives taken by BHEL for expediting project execution are given below:
>
> - Project Centric Operations
>   - Shift in company's ideology from being 'Revenue Centric' to Project Centric', thereby bringing enhanced focus on project execution, with Project Centric reviews by top management.
> - Empowerment
>   - Appointment of Project Directors, as key planner, driver and monitor for all project deliverables for faster decision making to ensure timely execution of Projects.
> - Policy support to contractors / vendors
>   - Bonus clause implemented for sub-contractors for early completion of site execution for Khurja TG package & Sagardighi Boiler package, to encourage and incentivize contractor's performance.
>   - Amendments made in Work Policy & Purchase Policy to empower the project sites and expedite project execution.
>   - New clause introduced in work's policy to make "Payment of Idling wages" to sub-contractors
>   - Change in Price Variation Clause (PVC) with contractors – Applicability of PVC changed from "Scheduled contract completion date" to "Bid submission date".
>   - Guidelines for "short closure of contracts without invoking risk & cost" based on merits of case issued.
> - Digitization Initiatives
>   - Implementation of online real time project monitoring through 'Integrated Project Management system (IPMS)'.
>   - Implementation of Site Data Digitization (SDD) for monitoring physical site progress.
>   - Implementation of Civil & Erection Execution Monitoring System (CEEMS) to monitor month wise vendor progress.

- Transactions related to drawing approvals through online web based system named 'Project Engineering Documentation Manager (PEDM) system'.

➢ Other Initiatives

- Identification of import content in the project at bidding stage itself to facilitate advance actions for seeking GTE approvals/ relaxation.
- Optimize capacity utilization through debottlenecking and Upgradation of facilities for faster manufacturing process.
- Establishing rate contract for the major standard items (like structures, hardware, foundation bolts, conductor etc.).
- Advance action regarding procurement of raw materials and items upto purchase order (PO) readiness stage without incurring any financial expenses.
- Advance action regarding sub-contractor finalization upto purchase order (PO) readiness stage without incurring any financial expenses.
- Targeting completion of utmost activities during pre-shutdown stage of concerned Units."

5.10 BHEL clarified the impact of changing it's operational ideology from 'Revenue Centric to Project Centric', as under:

"Revenue Centric Approach, which till recent years had been the traditional approach of the Company, was primarily focused towards revenue maximization. This approached to issues like non-sequential supplies to project sites, resulting in project execution delays. While project execution delays adversely affected payments from customers, it also led to GST outflow on account of material procured, expiry of warranty against bought out items and increased cost on account of rework/rejection of material lying at project sites. The resultant delays in execution and decline in quality led to serious damage to customer confidence, acute liquidity situation and poor employee morale.

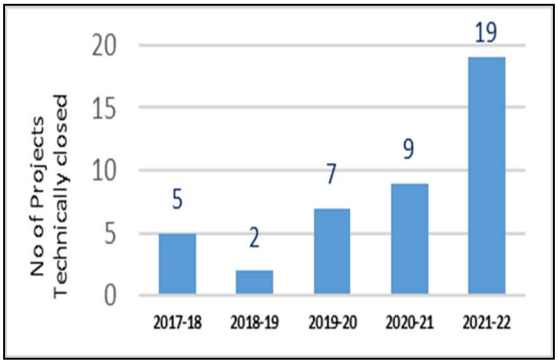
However, sustained efforts were made by the company over the past two years towards reorientation of the Company's operational ideology; from 'Revenue Centric' to 'Project Centric', business diversification, and prudent financial management which have started bearing fruit towards achieving operational excellence, which majorly include:

- The paradigm shift in ideology has resulted in the highest erection tonnage at project sites in the past five years; highest ever project

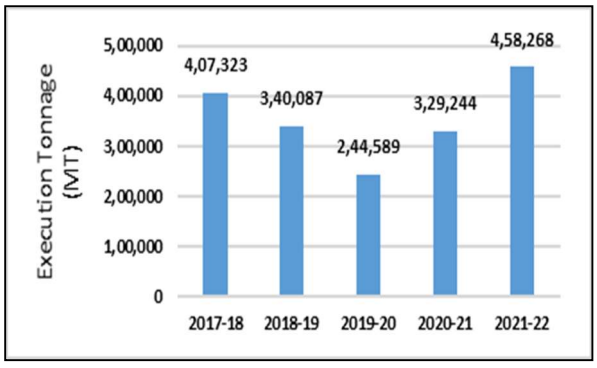
closures; lowest number of outstanding punch points as well as reduction in other expenses to decadal lows.

- This supported the company's efforts to realize old dues and improve the position with regard to sundry debtors.
- Execution of more than 4.5 lakh MT tonnage (highest in last 5 years) and technical closure of 19 projects (highest ever).
- Steps taken for sequential supplies as per contractual requirements through focused project review and monitoring using Integrated Project Management System (IPMS)
- Reduction in losses due to damages/deterioration in equipment lying at sites for long.
- Taking strong position against slow/non-paying customers etc., which has impacted revenue but helped in reducing trade receivables.

Furthermore, the benefits may also be observed in the trends as shown in the graphs below:



Highest Ever Project Closures



Increase in execution tonnage

5.11 Besides above, during the evidence the representatives of the Ministry of Heavy Industries further highlighted the advantages of adopting the Project Centric Approach as under:

"…हमने फोकस किया प्रोजेक्ट एग्जीक्यूशन पर कि जो मैटेरियल जाए, सीक्वेंशियली जाए, जिस प्रोजेक्ट की रिक्वायरमेंट है, उसे कंपलीट करें और पुराने प्रोजेक्ट्स को कंपलीट किया जाए, मैं बताना चाहूँगा कि पिछले चार वर्ष में अगर हम इरेक्शन टनेज लें, जो कि एक मेजर Indicator है कि किस प्रोजेक्ट में काम कितना हुआ, तो पिछले चार सालों में वह टनेज हमारी लगभग दोगुना हो गई है। जो हमारे पुराने प्रोजेक्ट्स थे, जिसमें कि कुछ

टेक्निकल इश्यूज बचे थे, कुछ काम कंपलीट करने के लिए बचे थे, वह कंपलीट करने के लिए हमने बहुत प्रयास किए उससे, जो पुराना पैसा बचा था, उसको हमने निकाला। एक और आंकड़ा है, कलेक्शन अगेंस्ट करंट इयर्स बिलिंग है, इस साल में जो हमने काम किया, जितने हमने बिल रेज किए, उसके अगेंस्ट कितना पैसा हमें एक्चुअली कैश मिला। यह चार साल पहले 59 परसेंट पर था, यह अब 86 परसेंट पर आ गया है।..."

"…एक विषय project centric versus revenue centric approach का है, उसके माध्यम से बी.एच.ई.एल. को काफी फायदा हुआ है, उसकी कंस्ट्रक्शन टनेज बढ़ी है। जिससे सिक्वेंशियल सप्लाई हुई है। इससे क्लाइंट्स को बहुत सुविधा हुई है। यह एक अच्छा विषय है, जो मंत्रालय के सहयोग से बी.एच.ई.एल. ने अचीव किया है।"

CHAPTER- 6

R&D AND DIVERSIFICATION

A. RESEARCH AND DEVELOPMENT

6.1 Bharat Heavy Electricals Limited has achieved over 21 percent of the Company's revenues from in-house developed products, systems and services in Financial Year 2021-22. BHEL spends over 2.5 percent of its revenue on R&D. BHEL's IPR Capital stands at 5163 nos. as on 30.09.2022. BHEL has been registered 5163 IPRs till 30.09.2022. BHEL has submitted the following information about R&D of the Company:

BHEL : Particulars	2017-18	2018-19	2019-20	2020-21	2021-22
R&D Expenditure (Rs. Crores)	752.6	820	766	726	700
Expenditure (percentage of Total Turnover)	2.7	2.8	3.7	4.5	3.5
Turnover from in-house developed products (Rs. Crores)	5247	5761	4792	3945	4352
IPRs Filed (in Nos)	530	558	549	526	516
IPRs Granted/ Registered (in Nos)	561	651	404	538	528

6.2 BHEL has elaborated on the R&D initiatives of the Company vide a written reply submitted to the Committee:

> "BHEL's products & services are technology intensive in nature, and hence, Engineering & Technology are of strategic importance to the organization. Accordingly, technology development/R&D has been a continuous thrust area in BHEL right from the Company's inception. BHEL has been enhancing its offerings through continuous in-house development efforts as well as through acquisition of new technologies from leading engineering organizations of the world.
>
> Corporate R&D Division at Hyderabad leads BHEL's research efforts in a number of areas important to its product offerings. It has a number of laboratories in areas related to electrical, mechanical, electronics & controls, metallurgy & chemical sciences, and new & renewable energy systems. Research and Product Development (RPD) centers at

manufacturing divisions play a complementary role to the Corporate R&D Division for their respective products.

As part of BHEL's efforts to build its Engineering and R&D capabilities, the Company has set up 14 Centers of Excellence in various fields at (a) Corporate R&D Hyderabad (for Intelligent Machines and Robotics, Machine Dynamics, UHV Laboratory, Computational Fluid Dynamics, Permanent Magnet Machines, etc.) (b) HPBP Tiruchirapalli (for Coal Research Centre); and (c) EDN Bengaluru (for Power Electronics, IGBT & controller Technology). BHEL also has five specialized research institutes viz. Pollution Control & Research Institute (PCRI), Haridwar, Welding Research Institute (WRI), Trichy, Ceramic Technological Institute (CTI), Bengaluru, Centre for Electric Transportation (CET), Bhopal and Amorphous Silicon Solar Cell Plant (ASSCP).

BHEL's R&D activities have grown manifold since its first Corporate Plan in 1975 and today the Company's R&D expenditure, at around 2.5% of turnover, is among the highest in the country. BHEL is also one of the leaders in IPR registrations in India.

6.3 Company further elaborated on the long term implications of it's R&D activities and furnished the following written information to the Committee in this context:

"BHEL is working in various areas / segments wherein initiatives have been formulated for Research and Development in view of long term gains. Some of these areas where BHEL is working extensively are:

- Coal to Chemicals- BHEL has successfully designed, installed and demonstrated indigenous 0.25 TPD coal to methanol technology demonstration plant, based on PFBG technology using high ash Indian Coal at Hyderabad. To commercialize this technology BHEL has indigenously done the design for upscaling the 0.25 TPD to over 2000 TPD gasifier, which is a unique achievement. The design of PFBG gasifiers for high ash Indian coal (with 30 bar operating pressure), for 2000 TPD Coal to Ammonium Nitrate Plant has been validated by national & international experts, thereby ensuring BHEL's technical readiness for commercialisation of this technology.
- Advanced Ultra Super Critical (AUSC) Technology– Indigenously development of AUSC technology successfully completed by BHEL along with NTPC and IGCAR, providing best-in-class efficiency in

coal-based power generation by reducing CO2 emissions by 11% as compared to super-critical technology-based power plants.

- Gas Insulated Switchgear -Indigenously designed and developed high voltage Gas Insulated switchgear (GIS) modules (ranging from 33 kV to 400 kV) besides designing hybrid gas insulated switchgear (HGIS) bay which is designed for 400 kV voltage class. Furthermore, work is in progress for development of environment friendly green gas composition based gas insulated switchgear as an alternative to sulphur hexafluoride (SF6) gas based switchgear.
- Hydrogen Economy – Products & systems for Hydrogen value chain and fuel cell applications being explored. BHEL's Fuel Cell Research lab is fully equipped for development of fuel cell system upto 5kW and has developed a compact fuel cell system integrated in an electric Golf Cart thereby demonstrating the technology. Furthermore, BHEL's R&D is currently developing a modular 25 kW fuel cell system for various stationary and mobility applications.
- Remote Monitoring and Diagnostics Services and Reliability Centric Maintenance–BHEL R&D aims to develop complete in-house capability by building the requisite AI & ML based diagnostic software internally, as well as by developing the key features of RCM functionality
- Smart Project Management System (SPMS) - tool for end-to-end monitoring of Material, Man & Machinery using state of art technologies like Radio Frequency Identification (RFID), Bluetooth Low Energy (BLE), Long Range WAN (LoRa WAN) and Industrial Internet of Things (IIoT). Implementation of SPMS during project execution leads to effective utilization of resources helping in reduction of overall project cost and time."
- Hardware In Loop and Software In Loop Test facility
- Solution for E-Mobility ecosystem
- Defence and Aerospace
- Indigenization of industrial products (Top pressure recovery turbine, Sucker rod pump, Axial Blower, Low & Medium Voltage Industrial Drives, Brushless Exciter of Turbo Generator)
- Flue Gas Desulfurization (FGD)
- Marine Gas Turbines
- Nuclear Power Segment (Primary cooling pump motor, Boiler feed pump)

6.4 When asked whether the Company has taken any steps for import substitution through indigenization, BHEL, in a written reply, submitted as under:

> "BHEL has completed the following major indigenization activities through R&D Besides the above, various R&D initiatives for areas related to new product development, steam turbines, traction motors, etc. are ongoing which are targeted for completion in near future."

6.5 When asked about the steps taken to reduce dependency the Ministry of Heavy Industries, submitted as under:

> "As a part of the Make-in-India and "Atamanirbhar Bharat" initiatives to provide purchase preference to domestically manufactured goods, Public Procurement (Preference to Make in India) Order have been issued in respect of Electrical Equipment used in Power Sector (issued by M/o Power), Renewable energy (issued by MNRE), Industrial Boilers, Process Plant Machinery, Electric Vehicles, etc.
>
> As result of MHI's efforts to encourage domestic production, concessional BCD rates extended to project imports are being phased out gradually (Notification No. 02/2022-Customs dated 1st February, 2022)."

1. **….**"Make in India initiatives by Government of India to promote domestic manufacturing.

2. The foreign players / bidders from the countries sharing land border with India have to register themselves in order to participate in domestic tenders."

B. DIVERSIFICATION INITIATIVES

6.6 BHEL has informed the Committee that it is on the way to transform itself from a Thermal Power Equipment & Engineering, Procurement, and Construction (EPC) Company to an 'Engineering Company' covering a wide spectrum of products & services for various sectors of the economy. BHEL have submitted the following details regarding the diversification initiatives the Company has taken:

(a) Solar:

BHEL, submitted the following information about the diversification initiatives in Solar energy segment and steps to reduce imports:

> "BHEL manufactures major equipment being used in a solar power plant viz. Solar PV cells, Modules, PCUs (Power Conditioning Units), Power

Transformers, SCADA (Supervisory Control and Data Acquisition), HT panels etc".

"For the purpose, some of the items are imported for manufacturing of Solar cells, SPV Modules, PCUs and SCADA (Supervisory Control and Data Acquisition) systems which mainly include Multi Solar Silicon Wafers and texturing additives, Silicon /Aluminium pastes, types of capacitors & connectors, semiconductor fuses, diodes, fiber optics etc."

"BHEL is one of the very few domestic manufacturers having both Solar PV cell and Module (Panel) Manufacturing capacity of 105 MW /annum and 226 MW/annum respectively. To meet any customer specific requirements which cannot be met through in-house production at BHEL, the procurement is done majorly from domestic sources. BHEL is exploring opportunities to associate with other PSUs/Govt. Entities/Industry to support them for large scale manufacturing of solar PV modules."

(b) Defence & Aerospace

6.7 BHEL submitted following written information regarding stpes taken by the Company towards development of defence equipment in the country:

"BHEL presence in Defence business is over three decades with proven track record of providing competitive and high quality supplies along with life time product support. With a sturdy focus on innovation & technology, BHEL's Research & Development wing is taking imperative steps to leverage organizational capabilities for enhancing offerings in Defence & Aerospace equipment / systems which are:

- Super Rapid Gun Mount (SRGM) and Upgraded SRGM - Existing BHEL SRGM manufacturing infrastructure is being augmented to manufacture & supply Upgraded SRGM to MOD/ Indian Navy.

- Integrated Platform Management System (IPMS) - India's first indigenous aircraft carrier INS Vikrant (commissioned by Hon'ble Prime Minister), is equipped with BHEL-GE Avio supplied IPMS system.

- Compact Heat Exchangers for Light Combat Aircraft - Recently received prestigious order for supply of Compact Heat Exchanger sets for 83 LCA (light combat aircraft) Tejas MK1A aircrafts from Hindustan Aeronautics Limited (HAL). In-house design and

manufacturing. Modernisation & augmentation of existing facility undertaken to enhance productivity.

- Strategic Equipment for Indian Navy – Order received for In-house design & development of Steam Turbine Plant (STP) compartment layout for strategic application from Indian Navy. Being indigenously developed for the first time in the country. BHEL is working with DRDO/ Armed Forces for achieving self-reliance in strategic programme of Indian Navy.

- Space Grade Solar Panels and Li Ion batteries – In-house manufacturing of space grade solar panels for satellites & launch vehicles. BHEL has also setup a dedicated facility for manufacturing Lithium Ion Cells (Nickel Cobalt Aluminium chemistry) with ToT from ISRO.

- Hot forming of spacecraft propellant tank, forming of Titanium Shell/ Domes, welding & machining of Titanium sheet and tubes – In-house manufacturing/ machining of Ti (Titanium) components.

- BHEL contributed through its manufactured items [Li-ion Batteries for Lander & Propulsion Module, Ti-Alloy based propellant Tank parts and Friction welded Bi-metallic adaptors for cryogenic Stage of Launch Vehicle Mark-III (LVM-3 M4) flight] in Chandrayaan-3 which was landed on Moon on 23rd August, 2023.

6.8 About the steps taken by BHEL to compete with existing players in manufacturing of defence equipment to getting orders, BHEL, in a written reply, submitted as under:

"To capitalize on the opportunities in sectors of Defence & Aerospace, BHEL has enhanced its offerings in the form of comprehensive solutions along with taking extensive R&D initiatives / steps towards enhancing capabilities to compete with existing players.

In the Defence sector, BHEL is making concerted efforts to expand its footprint, while facing intense competition from existing players:

- BHEL has acquired certification such as Approval of a Firm and Quality Management System (AFQMS), quality certifications AS9100D & CEMILAC as a part of its aerospace portfolio, in a bid to expand its presence in aerospace segment.

- Augmentation of manufacturing facilities at its manufacturing units, in order to develop them as reliable suppliers to the defence sector. Dedicated manufacturing facilities for Li-ion cells has been established under Transfer of Techonology (ToT) from ISRO at Bengaluru. Manufacturing of cells has commenced and under qualification with ISRO.

- Extensive in-house R&D. As a result of these efforts, Compact Heat exchangers have been developed and are being supplied for LCA "Tejas" and are under development for Advanced Light Helicopter, Sukhoi 30-Mki & AMCA.

- Successfully demonstrating in-house capabilities to secure developmental orders for strategic equipment. This has resulted in securing first ever order for Design of STP layout development.

- For space application, BHEL is regular supplier of Li-ion Batteries and Space Grade Solar Panels for Satellite Application as well as Hardware for Titanium Propellant Tanks (including for Chandrayaan-1, 2, & 3 & Mangalyaan missions).

- Being the exclusive supplier of SRGM since the last three decades (main gun on Indian warships), tie-up with global OEMS for upgraded technology/versions, has led to receipt of first order for two upgraded Super Rapid Gun Mounts (SRGM). TCA & Supply Contract Agreement signed for upgraded SRGM in Dec'21 and order for 2 Nos. Guns received from M/s GSL.

Process & Quality Improvement for established products to avoid rework & rejections and Pre-bid Tie-ups/ MoUs / Business Partnership Agreements on case to case basis to address business opportunity."

6.9 During the evidence, the representative of the Ministry of Heavy Industries stated as under:

"...डिफेंस में मेक इन इंडिया जो मेक इन इंडिया एफर्ट है, उस दिशा में रक्षा मंत्रालय के साथ हम लोगों की बातचीत चल रही है कि ऐसी कौन सी चीजें हैं, जिनमें हमें एक सस्टेंड ऑर्डर, कई वर्षों के लिए एक लंबा ऑर्डर मिल जाए, ताकि हम उसके लिए मशीन्स खरीदकर, इनवेस्टमेंट करके उसे अपने पास इस्टैब्लिश कर लें और हमको उसके लिए एश्योर्ड रिटर्न्स और रेवेन्यु मिल जाए।..."

(c) E-Mobility and Battery Energy Storage Systems (BESS)

6.10 BHEL has informed the Committee that it is contributing in supply of EV Chargers and associated electrical system. The Company is also providing EPC solution for setting up of EV Charging Stations with upstream electrical system.

6.11 BHEL furnished the following written information to the Committee about BESS:

> "BHEL has setup a dedicated group under its Industry sector vertical for Battery Energy Storage System. The group tracks the business environment besides taking steps towards addressing relevant opportunities in the market. Following are the initiatives completed / orders won in BESS:-
>
> - BHEL has setup 1MWh Battery Energy Storage System at the premises of BHEL Hyderabad Corp R&D with three different battery technology.
>
> - Amidst stiff competition, BHEL has secured its first commercial order for setting up of cumulative 410 kWh Battery Energy Storage Systems (BESS) in National Capital Region (NCT) of Delhi."

(d) Captive Power & Process Plant (CPPP) and Industrial Products for Oil & Gas Sector

6.12 BHEL in its Annual Report has stated that Indian refineries have expansion plans calling for substantial investments. Besides CPP business, the successful execution of IOCL Paradip SRU project (maiden order in DSOG segment) shall open up avenues for BHEL to address various other downstream Oil & Gas EPC packages in future. BHEL has further added that it is working towards indigenisation of various imported items required for centrifugal compressor packages as a contribution towards "Aatmanirbhar Bharat Abhiyan". Next five years will witness increased CAPEX in key core sectors of the country and BHEL is well prepared to address opportunities emerging out of these investments.

(g) Hydrogen Mission

6.13 With regards to the details of R&D expenditure on Hydrogen value chain, Coal Gasification and Transportation for the last 5 years of the Company, BHEL, submitted the following details:

Area	R&D exp. on completed projects in last 5 years (in Rs. crore)	R&D exp. on ongoing projects (in Rs. crore)
Coal Gasification	15.49	4.22*
Hydrogen Value Chain	1.31	7.68*
Transportation	25.56	2.22*

* Further development projects are also envisaged in these areas.

6.14 The representative of the Ministry of Heavy Industries, during the evidence deposed before the Committee, as under:

"...जब से एमएनआरई ने नेशनल ग्रीन हाइड्रोजन मिशन का एलान किया है, उसके बाद बी.एच.ई.एल. ने इस पर बहुत तेजी से प्रगति की है। हिंदुस्तान की किसी कंपनी के पास हाइड्रोजन बनाने का संयंत्र, जो कि इलेक्ट्रोलाइजर कहलाता है, किसी के पास इंडीजिनस नहीं है। हमने यह आइडेंटिफाई किया है कि इलेक्ट्रोलाइजर और टाइप-IV सिलेंडर्स, हाइड्रोजन के लिए बनाने के लिए बी.एच.ई.एल. सक्षम है। इस पर प्रयास चल रहा है। जो सीएसआईआर की लैब्स हैं, उन्होंने इसके कुछ मॉडल्स बनाए हैं और बीएचईएल ने उनके साथ एमओयू कर लिया है। इसका विकास करने के लिए आरएंडडी जारी है, इसके लिए बी.एच.ई.एल. ने आई.जी.एल और Volvo Eicher Commercial Vehicles Limited के साथ समझौता कर लिया है। बी.एच.ई.एल. ने कमिन्स के साथ एक अम्ब्रेला एमओयू किया है, जिससे हम देश में ही इलेक्ट्रोलाइजर बना पाएं। लेकिन इसमें वक्त लगेगा। हाइड्रोजन में एक और खास बात है। इसके सिलेंडर्स के बारे में प्रश्न उठे थे कि इसके सिलेंडर्स बनाए जा रहे हैं। हमको पता है कि हाइड्रोजन दुनिया का सबसे हल्का पदार्थ है। हाइड्रोजन गैस को बहुत ही कम्प्रेस करके रखना है। घरों में गैस का जो सिलेंडर होता है और जिस सिलेंडर में हाइड्रोजन स्टोर की जाएगी, उसमें बहुत बड़ा अंतर है। इसको बहुत ही भारी प्रेशर पर, बहुत ही कंट्रोल्ड एनवायर्नमेंट में इसमें गैस भरी जाती है। इसका सिलेंडर ऐसा है कि इसको हिंदुस्तान में अभी कोई नहीं बना रहा है। इसका सिलेंडर इम्पोर्ट हो रहा है। भेल इसके लिए वाराणसी में संयंत्र लगाने की प्लानिंग कर रहा है, जिससे इस सिलेंडर का बिजनेस इस्टैब्लिश होगा और दो लोगों से इनका टाईअप हो गया है कि जितने सिलेंडर ये बनाएंगे, उतना खरीद लेंगे। दिल्ली में इंद्रप्रस्थ गैस एजेंसी है। आपने देखा होगा कि सीएनजी की गाड़ियों में सिलेंडर लगता है और सीएनजी ट्रांसपोर्ट होकर आती है। भारी प्रेशर वाले सिलेंडर्स बनाकर इंद्रप्रस्थ गैस एजेंसी को दिए जाएंगे और दूसरा, वॉल्वो आयशर, जो भारत की एक बड़ी बस और ट्रक कंपनी है। इनकी जो हाइड्रोजन पावर्ड बसें बनेंगी या ट्रक्स बनेंगे,

उनके लिए हम लोग ये सिलेंडर्स इनको देंगे। अत: हाइड्रोजन का विषय ऐसा है कि इसमें अभी बहुत काम बाकी है, लेकिन हम लोग इसके प्रति सजग हैं। बीएचईएल का प्रयास रहेगा कि हम काफी बिजनेस जेनरेट करेंगे। हाइड्रोजन का भविष्य में भारत में और विश्व में आने वाला जो बिजनेस है, उसमें हम लोग काम करेंगे। "…

(h) Coal to Gasification and Chemical

6.15 When asked about the amount of Indian Coal which is targeted to be used in BHEL's Pressurized Fluidized Bed Gasification (PFBG) technology and its market scenario with regard to business potential and competitors in this area, BHEL, in a written reply, submitted as under:

> "The USP of BHEL's indigenously developed Pressurized Fluidized Bed Gasification (PFBG) technology is that it is the only proven technology for gasification of high ash Indian coal. The technology comprises of unique features like improved carbon conversion efficiency, operating temperature below ash fusion temperature, no slag & tar formation, self-sustainable steam production, etc.
>
> Aiming to harness opportunities emerging out of the Government of India's National Coal Gasification Mission which targets 100 Million Metric Tons (MMT) of coal gasification by 2030, BHEL has signed MoU with Coal India Limited (CIL) and NLC India Limited (NLCIL) for commercial coal gasification projects. Advanced discussions are now in progress with CIL for jointly setting up of 2000 Tons per day (TPD) Ammonium Nitrate Project.
>
> As regards market scenario, currently the companies in this sector are limited besides an Indian Company known to be in process of developing fluidized bed coal gasification technology. However, a foreign technology based coal gasification project to produce chemicals is under implementation in India."

CHAPTER - 7

JOINT VENTURES

7.1 Bharat Heavy Electricals Limited has 4 (four) Joint Venture Companies (JVCs) as mentioned below:

S. No.	Name of the Joint Venture Company (JVC)	JV Partner	Date of Incorporation	Broad Objective	Status (as on 18.11.22)
1.	BHEL- GE Gas Turbine Services Private Ltd. (BGGTS)	GE, USA	05.05.1997	Repair & servicing of GE designed Gas Turbines	Operational
2.	Raichur Power Corporation Ltd. (RPCL)	KPCL	15.04.2009	To set up 2×800 MW Supercritical Thermal Power Plant (TPP) at Yeramarus and 1×800 MW Supercritical TPP at Edlapur, Raichur, Karnataka on build, own and operate basis.	Operational
3.	NTPC- BHEL Power Projects Private Ltd. (NBPPL)	NTPC Ltd.	28.04.2008	To carry out EPC contracts for power plants and manufacture of power plant equipment	Operational*
4.	Powerplant Performance Improvement Pvt. Ltd. (PPIL)	Siemens AG, Germany	06.05.1997	Performance improvement of old fossil fuel power plants	Under Liquidation

*Board in its meeting held on February 8, 2018 is accorded in principle approval for pursuing winding up of NBPPL.

7.2 **BHEL-GE Gas Turbine Services Private Limited (BGGTS):** BHEL-GE Gas Turbine Services Private Limited (BGGTS) is a Joint Venture Company of BHEL and GE, USA formed to take up repair & servicing of GE designed gas turbines.

7.3 **Raichur Power Corporation Limited (RPCL):** Raichur Power Corporation Limited (RPCL) is a Joint Venture Company of BHEL and Karnataka Power Corporation Limited (KPCL) promoted for setting up of 2x800 MW supercritical thermal power plant at Yeramarus, Raichur, Karnataka and 1x800 MW supercritical thermal power plant at Edlapur, Raichur, Karnataka on build, own and operate basis.

7.4 **NTPC BHEL Power Projects Private Limited (NBPPL):** NTPC BHEL Power Projects Private Limited (NBPPL) is a Joint Venture Company of BHEL and NTPC Limited promoted to execute EPC contracts for Power Plants and manufacture power

plant equipment. The JVC has a manufacturing facility for Balance of Plant (BoP) equipment at Mannavaram in Andhra Pradesh.

7.5 **Power plant Performance Improvement Private Limited (PPIL):** Power Plant Performance Improvement Private Limited (PPIL) is a Joint Venture Company of BHEL and Siemens AG, Germany promoted for performance improvement of old fossil fuel power plants. Since sufficient business to ensure viability of the Company was not forthcoming, the promoter partners mutually agreed to gradually wind up the Company. All the pending contracts of the JVC were closed and the process of winding up was initiated during financial year 2018-19. The JVC is under liquidation. Investment in PPIL is `Rs.2 crore which has been fully provided for.

Financial Status of JVCs of BHEL (Rs. in crore)

Sl. No	Name of the Company	BHEL's investment in Equity		Revenue from Operations		Profit/(Loss)	
		2021-22	2020-21	2021-22	2020-21	2021-22	2020-21
1.	BGGTS	2.38	2.38	801.18	791.76	100.84	88.29
2.	RPCL	664.04	664.04	3027.00#	2029.79	(565.00)	(1431.84)
3.	NBPPL*	50.00	50.00	24.06#	42.93	(40.52)	(12.61)
4.	PPIL	Promoter partners mutually agreed to gradually wind up the Company. JVC is under liquidation.					

*Board in its meeting held on February 8, 2018 is accorded in principle approval for pursuing winding up of NBPPL.
Based on provisional unaudited figures.

7.6 With regards to the JV Companies steps taken by the Company to support NBPPL and RPCL which are running in losses and PPIL which is under liquidation, BHEL, in a written reply, submitted as under:

> "One of the JVCs (i.e., BGGTS) has been earning profits consistently while two are into losses and remaining one is under liquidation. From the above mentioned, it is visible that three JVCs viz. RPCL, NBPPL and PPIL were formed with diverse objectives to cater business potential in thermal power segment. However, the focused shift of Government from non-renewables to renewable sources of energy resulted in subdued business environment for thermal power sector. Consequently, the performance of these companies got adversely impacted resulting into losses due to rising expenses, fixed costs, etc."

CHAPTER - 8

ENVIORNMENTAL MATTERS

A. CARBON EMISSION CONTROL

8.1 BHEL has the informed the Committee that the Company is primarily not a carbon intensive Company and furnished the following details of Carbon Intensity (Scope 1&2 emissions):

Company	2020-21	2021-22
IOCL	40	29.57
NTPC	2549	2000
SAIL	557.24	416.14
BHEL	19.9	16.1

Unit of Measurement of Values: "*Metric tonne CO_2-e per Rs. Crore of revenue***"**

Source: Business Responsibility & Sustainability Report, Annual Report, Sustainablility Report for year 2021-22 of NTPC, SAIL, IOCL and BHEL

8.2 BHEL has informed the Committee about the steps taken by the Company to reduce its carbon footprints as under:

"Yet, BHEL is tracking its Scope-1 (direct) and Scope-2 (indirect) emissions and maintaining its inventory of carbon footprints and making relentless efforts towards decarbonization through various initiatives, including some major initiatives like:

- BHEL has been working towards a greener environment through development of environment friendly technologies, reduction of emissions and improvement in efficiency of its equipment in addition to improvements made towards reducing Carbon footprints in BHEL's operation.
- BHEL has successfully demonstrated its indigenous solution for Carbon Capture through a 1.4 TPD Carbon Capture unit, integrated with its 0.25 TPD Coal-to-Methanol demonstration plant. The amine-based CO_2 absorption method used by BHEL is the most mature technology used globally at commercial level for post combustion carbon capture.

- Advanced Ultra Supercritical (AUSC) Technology, indigenously developed by BHEL along with NTPC and IGCAR, provides best-in-class efficiency in coal-based power generation by reducing CO_2 emissions by about 11% as compared to Super Critical power plants and about 20% as copared to Subcritical power plants.
- In our operations, decarbonisation is being achieved through energy conservation / efficiency improvement projects, transition to cleaner fuels like Regasified Liquefied Natural Gas (RLNG) and use of renewable energy which is generated at our premises for captive use.
- BHEL has installed several Solar power plants at its manufacturing units, spread across the country, totaling to around 33 MW.
- Usage of LED lighting in place of conventional lighting systems
- Switching to greener fuel such as LPG/PNG/RLNG in place of LDO/HSD/FO for operational use
- BHEL is also actively contributing to the “Decarbonization mission” of its clients viz. NTPC, Indian Railways, GSECL, GIPCL, GNFC, GSFC, SCCL, BEL, WBPDCL, WBSEDCL, MAHAGENCO, KPCL, GEDCOL, NREDCAP, etc., through Installation of more than 1100 MW Solar PV Power plants, comprising of more than 50 Grid connected Ground Mounted, Rooftop, Floating Solar, Canal Top solar power plants.”

8.3 Regarding approach of the Company towards new business opportunities emanating from the revised emission norms in term of environmental requirement, BHEL, in a written reply, submitted as under:

> “To capitalize on the opportunities arising out of emission norms and their revisions in term of environmental requirement, BHEL has enhanced its offerings in the form of comprehensive solutions for emission control for both upcoming and existing plants, through high efficiency ESPs (Electrostatic precipitators), SOx control through Flue Gas Desulphurization (FGD) systems, NOx control through boiler modifications and installation of SCR (Selective Catalytic Reduction) systems. Offerings and various initiatives include:
>
> - BHEL supplies state-of-the-art Selective Catalytic Reduction (SCRs) for higher reduction in NOx emission and also possess in-house capabilities for boiler modifications towards reduced NOx emission levels.

- Technology collaboration with NANO Co. Ltd., Republic of Korea, for developing capabilities for in-house manufacturing of SCR Catalysts and with Babcock Power Environmental Inc., USA for Selective Catalytic Reduction (SCR) Systems for De-NOx application in coal fired power plants.
- As a retrofit solution for the existing unit of 250 MW and above, BHEL offers furnace modification to bring down NOx value below 450 mg/Nm3.
- For controlling Particulate Matter (PM) emissions, BHEL's credentials as one of the leading suppliers of Electrostatic Precipitators to power plants are well established as the Company has already been supplying ESP equipment capable of meeting the most stringent levels, as per customer requirements.
- BHEL has been a major player in emission control equipment business segment as well and has garnered sizeable orders so far, including FGD packages for ~33.5 GW projects (inclMaitree, Bangladesh). In addition, BHEL has secured orders for SCR installation for ~8.4 GW of projects.
- For rapid technology assimilation & indigenization for offering state-of-the-art technology, BHEL has an ongoing technology collaboration with Mitsubishi Power Limited (MPL), Japan, for FGD systems.

In addition to above, BHEL in conjunction with NTPC and Indira Gandhi Centre for Atomic Research (IGCAR) has successfully completed the R&D phase (Technology Development) forAdvanced Ultra Supercritical (AUSC) technology for thermal power plants which offers highest (46%) efficiency with 11% reduced emission levels as compared to super-critical power plants.

Further, the technology developed by BHEL for gasification of high ash Indian coal and resultant higher concentration of CO2 in flue gas when coupled with CCUS (Carbon, Capture, Usage and Storage) technology, will further support country's environmental efforts.

8.4 Ministry has submitted the following about Net-Zero carbon emission targets by 2070:

"BHEL through its product and offerings endeavors towards achieving the net zero carbon emission set by Government of India. Some of the key initiatives taken by BHEL in consultation with MHI are as under:

- **AUSC technology**: BHEL has developed the Advanced Ultra Supercritical (AUSC) technology for thermal power plants which will yield plant efficiency of 46% against ~38% efficiency of subcritical and ~41- 42% of supercritical sets besides reducing coal consumption / CO2 emissions by about 11% as compared to super-critical plants. BHEL plans to put up a technology demonstration plant and would like to offer it for all new coal-based power plants.
- **High efficiency LRSC**: BHEL has developed low-rating supercritical sets (LRSC) with higher efficiency and lower CO2 emissions w.r.t. comparable subcritical sets. These are very apt for replacement of old and inefficient lower rating sub-critical sets with high-carbon footprint.
- **Nuclear opportunities:** To attain the country's net zero targets, nuclear power is expected to gain prominence in the near future. To leverage the opportunity, BHEL is striving to strengthen and expand its position in design, development and manufacture of nuclear equipment meeting a range of national requirements."

B. WASTE MANAGEMENT

8.5 The Company submitted the details of Waste recycled and scrap disposed off by the Company, as under: -

Waste recycled/reused data vis-à-vis Waste Generated (Values in Metric Tonnes)

Waste Type	2017-18		2018-19		2019-20		2020-21		2021-22	
	Generated	Recycled / Reused	Generated	Recycled /Reused	Generated	Recycled /Reused	Generated	Recycled /Reused	Generated	Recycled/ Reused
Non-Hazardous	36261	36261	51548	51548	38571	38571	52696	52696	25722	26466 (Includes waste carried forward from previous years)
Hazardous	3312	1194	1692	1170	965	714	1528	1225		

Details of Scrap disposed

Financial Year	2017-18	2018-19	2019-20	2020-21	2021-22
Scrap Sales (Amount in Rs./Cr)	147	206	142	142	274

8.6 To a query regarding the Waste Management System/mechanism of the Company, BHEL, in a written reply, submitted as under:

> "The Company has a Waste Management System in place which is based on "3R" approach viz. Reduce, Reuse, Recycle. Resource conservation and waste reduction is an integral objective of activities / processes of designing, planning, production and operations for optimizing raw material consumption. The mechanism for different types of waste disposal is as under:
>
> *Metallic scrap* generated during the manufacturing processes are segregated, stored, and reused to the extent feasible, while the remaining quantity is sent to store for selling to authorized agencies. A major chunk of ferrous scrap is sent to our own foundries for use as input material for casting and forgings.
>
> *Building and demolition wastes* are reused in construction work to the extent feasible and remaining quantity, if any, is used for filling & leveling of low-lying areas in our own project premises.
>
> *Biomedical wastes* from our hospitals and dispensaries are collected, stored in safe and secure manner and then disposed of as per the extant Bio-Medical Waste Management Rules.
>
> *Biodegradable wastes* generated are used for making compost or generation of biogas to the extend feasible. Remaining quantity including non-hazardous, non-saleable and inert waste is used for filling low lying areas in our own premises.
>
> *All other kind of waste such a paper, wood, plastics, insulation materials, batteries, e-wastes*and other items having resale value are stored for selling to authorized agencies or disposed as per applicable regulatory requirements."

CHAPTER - 9

CORPORATE SOCIAL RESPONSIBILITY (CSR)

9.1 BHEL has funished the following details to the Committee regarding CSR budget allocation and expenditure:

(In Rs. Lakhs)

Financial Year	Carry forward balance of previous year (if any)	Budget Allocation of current year	Total CSR allocation (Amount available for spending)	Percentage of allocation of the average of PAT of last 3 years (Calculated as per CSR Rules)	Total expenditure during the current year	Balance
2015-16	6294	11010	17304	2%	8406	8898
2016-17	8898	3750	12648	2%	7258	5390
2017-18	5390	1040	6430	2%	3316.08	3113.92
2018-19	3113.92	670	3783.92	2%	1601.45	2182.47
2019-20	2182.47	2880	5062.47	2%	3511.53	1550.94
2020-21	1550.94	2018	3568.94	2%	1441.99	2126.95
2021-22	2126.95	00	2126.95	2%	911.08	1215.87

9.2 The Company further provided Area-wise CSR amount spent during the period from 2017-18 to 2021-22, as below:

(In Rs. Lakhs)

Areas of fund utilization	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**
Clean India	94.96	139.49	23.05	57.40	58.44
Educated India	1799.5	207.05	2349.35	779.89	0.0
Green India	84.11	3.22	0	41.05	2.35
Healthy India	553.1	840.39	139.44	437.07	734.84
Heritage India	1.73	1.42	0	0	0
Inclusive India	345.21	226.46	99.75	33.29	68.73
Responsible India	271.67	103.36	724.37	21.20	2.75
Capacity Building/Admin Expenses	165.8	80.07	175.58	72.10	43.98
Total	**3316.08**	**1601.45**	**3511.53**	**1441.99**	**911.08**

9.3 When enquired about the criteria for allocation of CSR budget of the Company, BHEL submitted to the Committee as under:

"BHEL has been actively engaged in carrying out its CSR activities in identified areas specified in Schedule VII of the Companies Act, 2013, The Companies (CSR Policy) Rules, 2014, various other guidelines/ directions issued by the Department of Public Enterprises (DPE) on the matter, and their amendments thereof from time to time which include:

- The CSR budget is computed in the manner prescribed in section 198 of the Companies Act, 2013 i.e. "at least 2% of the average net profit of the Company during the three immediately preceding financial years".
- BHEL's CSR policy is formed and approved by Company's Board in line with Companies Act, 2013 and Companies (CSR Policy) Rules, 2014. Further the policy is also hosted on the Internet website of the Company viz. www.bhel.com.
- CSR Committee is constituted as per the Companies Act, 2013 and its functions are defined in CSR policy.
- CSR activities undertaken by the Company are the activities which fall within the purview of Schedule VII of the Companies Act, 2013 and in line with Companies (CSR Policy) Rules, 2014.
- CSR activities are reported in Company's annual report in the formats specified in Companies (CSR Policy) Rules, 2014

9.4 During the course of evidence, the representative of the BHEL stated as under:

"…Regarding CSR, for 2021-22, there is a figure of Rs. 22.16 crore. That figure was a part of the carry forward also. जब हम कोई प्रोजेक्ट लेते हैं, जो कि बड़ा प्रोजेक्ट है, जो दो-तीन साल चलेगा, तो उसमें fund कैरी फॉरवर्ड होगा या जो छ: महीने का प्रोजेक्ट है, वह दिसम्बर-जनवरी में फाइनलाइज/अवार्ड हुआ है, तो उसमें कैरी फॉरवर्ड होगा। That way, some carry forward happens. Sometimes, पुराने प्रोजेक्ट में फंडिंग किया गया, लेकिन वह फंड यूज नहीं हुआ, तो वहां भी कैरी फॉरवर्ड हो जाता है। But in 2022-23, we had a zero budget because of the losses in the previous two years. हमारी तीन साल की एवरेज निगेटिव थी। That is why, no new projects were taken up in 2022-23…."

9.5 BHEL furnished following details regarding the unspent CSR budget in the allocated time frame:

> "In line with The Companies (CSR Policy) Rules, 2014 and BHEL CSR Policy, the CSR fund in BHEL is non-lapsable. Any unspent or unallocated amount is carried forward to subsequent years till it is spent. However, spill over for CSR funds in last three financial years is owing to diverse reasons, which majorly include:
>
> - The spill over amount mostly pertains to the long term CSR projects like providing free Anti Haemophilic Factor (AHF) to persons & children, installation of community Bio-digester toilet clusters, Motivating Agrarian communities of Kandhamal (Odisha) for their Economic Transformation (PRADAN), etc. which involve multiple stakeholders/agencies responsible for clearances/permissions for project execution and stretch beyond any one financial year.
> - In addition, some of the projects like construction, operation and maintenance of Sulabh Toilet Complex at 12 Places, etc, which started towards end of the financial year, thereby spilling over of the funds to subsequent fiscal.
> - However, execution / completion of these projects have to be carried out from the funds already allocated / budgeted during the start of the project.
> - Implementation of projects got interrupted due to imposition of lockdowns and other restrictions on movement of manpower due to COVID 19 pandemic during year 2020 and 2021.

9.6 MHI further elaborated about unspent CSR budget by the BHEL:

> "In line with the Companies (CSR Policy) Rules, 2014 and BHEL CSR Policy, the CSR fund in BHEL is non-lapsable. Any unspent or unallocated amount is carried forward to subsequent years till it is spent."

CHAPTER - 10

CASES UNDER ARBITRATION, AMRCD AND CVC

A. CASES UNDER ARBITRATION

10.1 BHEL has informed the Committee that there were around 118 cases pending pending in Arbitration (as 31.12.2022 withfinancial implications > Rs.10 crores). The details of number of arbitration cases during the last five years:

Year	Pending as on 1st Jan.,	Arbitration matters added during the year	Arbitration matters disposed off / deleted during the year	Matters pending as on 31st Dec.
Jan 2018- Dec 2018	122	34	42	114
Jan 2019- Dec 2019	114	29	30	113
Jan 2020- Dec 2020	113	22	10	125
Jan 2021- Dec 2021	125	17	30	112
Jan 2022- Dec 2022	112	31	25	118

10.2 When the Committee enquired about the details of the cases wherein the arbitration or dispute is attributable to execution delays / slow progress on the Company's end, BHEL in written reply, submitted as under:

> "... there are no arbitrations or disputes invoked by Customer against BHEL attributable to execution delays/ slow progress on BHEL's end. However, in cases where BHEL has invoked arbitrations against Customers, counter claims have been filed alleging delays in BHEL's part. The said allegations are being defended suitably...."

10.3 When the Committee wanted the information about the status of amount under arbitration, the Ministry of Heavy Industries in written reply, submitted as under:

> "Ministry of Heavy Industries & Public Enterprises, Department of Public Enterprises (now in Ministry of Finance), vide its O.M. No. 4(1)/2007-PMA dated 14th May 2008 directed in para 3 of the said O.M. that all the CPSEs should report progress in arbitration cases every three months to their respective Boards. This was followed by Ministry of Heavy Industries & Public Enterprises, Department of Heavy Industry's (now Ministry of

Heavy Industries) letter No. 7(1)/2008-Coord dated 22nd/24th May 2008 requesting that the guidelines contained in the O.M. of DPE be taken note of for strict compliance.

In view of the said directions from MHI, Board of the BHEL is getting apprised of the arbitration matters every quarter and Major Legal Disputes of the company pending before the Courts (excluding Appellate Tribunals) and having financial implications of more than Rs. 10 (Ten) Crores at half-yearly intervals. Further, in the 470th meeting of the Board of Directors held on 26th May 2015, the Board has also constituted a Board Level Committee for detailed review of Arbitration cases as well as Major Legal Disputes and then apprising the Board accordingly in this regard.

Accordingly, the details and status of arbitration cases and major legal disputes pending at the end of each quarter are presented before the Board Level Committee on Arbitration & Major Legal Disputes and Alternative Dispute Resolution for detailed review.

The total amount under arbitration as on 31.03.2023 is given below: -

Claims against BHEL	Rs. 3843.89 Crores
Counter Claims by BHEL	Rs. 2622 Crores

Claims by BHEL	Rs. 12944.29 Crores
Counter Claims against BHEL	Rs. 24721.18 Crores

The Company further informed the Committee that the number of arbitration cases during the last 5 years have not varied substantially since during the year 2020 the number of cases disposed had come down due to the pandemic. The details of amount received of the cases awarded in favour of BHEL, have been given at Annexure – A and Annexure – B respectively.

B. CASES UNDER AMRCD

10.4 BHEL, in a written reply, submitted the details of the disputes for settlement through AMRCD as under:

S.No.	Dispute between	Issue related to	Remarks
1	BHEL vs. New India Assurance	M/s. New India Assurance Company Ltd. (NIACL) did not comply the PMA (Permanent Machinery of Arbitration) Award dated 17.07.2013, awarding a sum of Rs. 25,94,701 with interest in favour of the BHEL. Since NIACL did not refund the advance premium paid by BHEL, PMA passed Award in favour of BHEL, which has become final.	Amount involved - Rs.0.26 Crores
2	BHEL vs. National Insurance	The dispute is for non-payment of compensation by the Insurance Company against the loss suffered by BHEL in the accident. Claim of BHEL is for Rs. 23.58 Crores.	Amount involved – Rs.23.58 Crores
3	BHEL vs. WAPCOS	Despite the completion of the Project by BHEL, M/s WAPCOS (Water and Power Consultancy Services (India) Limited) had not settled the dues of BHEL. The total amount payable by M/s WAPCOS to BHEL was a sum of Rs. 48.55 Crores. AMRCD mechanism was invoked by BHEL and thereafter Rs. 32.11 Crs was released by WAPCOS. Interest portion of Rs. 16.44 Crs is still to be paid by WAPCOS.	Amount involved – Rs.16.44 Crores
4	BHEL vs. NTPC	The dispute with NTPC pertains to the interpretation of two contract clauses viz., Price Adjustment and Change in Law clauses, as to which of the aforesaid clauses would be applicable for claiming compensation towards abnormal increase in Statutory minimum wages. Claim of BHEL is for Rs. 169.51 Crores.	Amount involved – Rs.169.51 Crores
5	BHEL vs. Hindustan Steelworks Construction Limited	Contract awarded to HSCL was not performed and hence Contract was terminated at risk and cost of HSCL. Risk and cost amount, liquidated damages and other recoveries were claimed from HSCL, but not paid. Claim of BHEL is for Rs. 73.61 Crores.	Amount involved – Rs.73.61 Crores

10.5 The Committee asked whether BHEL contacted the Ministry for an early disposal of such pending cases with a timeline, the Ministry of Heavy Industries, in a written reply, submitted as under:

> "Ministry of Heavy Industries & Public Enterprises, Department of Public Enterprises (now in Ministry of Finance), vide its O.M. No. 4(1)/2007-PMA dated 14th May 2008 directed in para 3 of the said O.M. that all the CPSEs should report progress in arbitration cases every three months to their respective Boards. This was followed by Ministry of Heavy Industries & Public Enterprises, Department of Heavy Industry's (now Ministry of

Heavy Industries) letter No. 7(1)/2008-Coord dated 22nd/24th May 2008 requesting that the guidelines contained in the O.M. of DPE be taken note of for strict compliance.

In view of the said directions from MHI, the Board is being apprised of the arbitration matters every quarter and Major Legal Disputes of the Company pending before the Courts (excluding Appellate Tribunals) and having financial implications of more than Rs. 10 (Ten) Crores at half-yearly intervals. Further, in the 470th meeting of the Board of Directors held on 26th May 2015, the Board has also constituted a Board Level Committee for detailed review of Arbitration cases as well as Major Legal Disputes and then apprising the Board accordingly in this regard.

Accordingly, the details and status of arbitration cases and major legal disputes pending at the end of each quarter are presented before the Board Level Committee on Arbitration & Major Legal Disputes and Alternative Dispute Resolution for detailed review.

The cases falling under the ambit of AMRCD are brought to the notice of MHI for constitution of AMRCD and suitable resolution."

C. CASES UNDER CVC

10.6 BHEL has submitted the following written information regarding the cases under CVC:

i. CVC vide OM dated 23rd May, 2022 rendered the first stage advice for initiation of major penalty proceedings against Shri R. Anbarasu, GM (Retd.), BHEL, PS-SR, Uppur Site. Inquiry has been completed on 22.10.2022 and Vigilance comments on the same submitted to Disciplinary Authority on 22.11.2022. Further action on the report is under progress.

ii. CVC conducted Intensive Examination of BHEL Tower, Sector-16A, NOIDA wherein they have raised 19 paras out of which 14 paras have been settled based on the inputs provided by BHEL. CVC has also advised system improvement / investigation on 05 paras, which is currently under progress.

10.7 When asked whether the Ministry have any role to play in vigilance cases in CBI/CVC, the Ministry of Heavy Industries, in a written reply, submitted as under:

“The Vigilance Manual 2021 issued by Central Vigilance Commission (CVC) prescribes the process for dealing with complaints against the officials of CPSEs. The para 3.7 of the manual specifies the process to be followed in respect of complaints against the board level appointees. The relevant parts of the para are reproduced as below:

As per clause 3.7 of Vigilance Manual 2021:
“(a) A complaint involving a Board-level appointee, whether figuring alone or in association with others, may be forwarded by the CVO of the PSE or PSB or FI to the CVO of the administrative Ministry. Under no circumstances should he initiate action against the Board-level appointee on his own initiative. The CVO of the administrative Ministry would initiate action on such complaints in accordance with the instructions given in para 3.5.

In cases where the Commission calls for investigation and report against a Board-level appointee, the CVO of the Ministry shall initiate inquiries and furnish report in the prescribed format….”

In light of the above, CVO of the Nodal Ministry exercises the jurisdiction of inquiry or investigation into the complaint against Board Level Appointees.”

CHAPTER - 11

PENDENCY OF C&AG AUDIT PARAGRAPHS

11.1 The details regarding the pendency of Audit Paras as submitted by BHEL to the Committee is reproduced below:

Sr. No.	Gist of the Audit Para pending	Date of Receiving	Action Taken by the Company to expedite the para	Present Status
Chapter V of Report No. 14 of 2021 **Para No. 5.1 (Year : 2020-21)**				
1	Avoidable loss due to laxities in supply of Alternate Current Electrical Multiple Units. Bharat Heavy Electricals Limited suffered a loss of Rs. 13.69 Crore due to laxity in supply of complete sets of Alternate Current Electrical Multiple Unit.	Received on 01.10.2021	Reply by BHEL submitted to the Ministry of Heavy Industries (MHI) on 02.12.2021. Further comment from C&AG received on 12.05.2022 and in this regard reply/ ATN was submitted to MHI on 17.05.2022 citing that the matter is sub-judice before the Hon'ble High Court of Kolkata. Further, Reply/ ATN submitted on 31.08.2022 with respect to MHI letter dated 10.08.2022.	Under consideration with MAB-Delhi. [MAB : Member Audit Board]
Chapter V of Report No. 14 of 2021 **Para No. 5.2 (Year : 2020-21)**				
2	Non- safeguarding of financial interest resulted in additional burden towards payment of Safeguard Duty. Electronics Division, Bengaluru unit of Bharat Heavy Electricals Limited did not take cognisance of the proposed changes in tax structure and the delivery schedules, resulting in additional liability of Rs. 11.58	Received on 10.06.2021	Reply/ATN by BHEL submitted to the Ministry of Heavy Industries (MHI) on 02.12.2021, in consideration whereof para has been retained on watch by MAB-Hyderabad, as informed vide MHI letter dated 10.03.2022. Further, Reply/ ATN has been submitted on 31.08.2022 with respect to MHI letter dated 24.08.2022.	Under consideration with MAB-Hyderabad.

	Crore towards payment of Safeguard Duty for clearing of imports.			
Chapter VI of Report No. 18 of 2020 **Para No. 6.1 (Year : 2019-20)**				
3	Loss due to non-performance under a contract (Keban-BG encashment Rs. 28.35 Crore) BHEL suffered a loss of Euro 3.83 million (Rs. 28.35 crore) due to failure to deliver performance as per the contractual provisions and resultant invocation of Bank Guarantee by the client (Keban).	Received on 21.05.2021	Reply/ATN submitted to the Ministry of Heavy Industries (MHI) on 03.03.2022.	Under consideration with MAB-Delhi.
Chapter IV of Report No. 13 of 2019 **Para 4.1 (Year : 2018-19)**				
4	Undue benefit to employees towards Late Night Snacks Allowance. Bharat Heavy Electricals Limited, Hyderabad extended undue benefit to its employees towards payment of Late Night Snacks Allowance to the tune of Rs. 16.69 Crore, in violation of the guidelines of DPE as well as its own Personnel Policy.	Received on 10.10.2018	ATN was sent to C&AG on 11.08.2021 by the Ministry of Heavy Industries (MHI). Also, the concern raised in the Audit observation has been suitably addressed by BHEL, and its Action Taken Note (ATN) submitted to the MHI on 24.11.2021. In response to MHI communication, reply/ ATN has been submitted on 22.04.2022. Vide letter dated 10.06.2022, CAG requested MHI to forward the matter to COPU. Comments of	Under consideration with MAB-Hyderabad.

			BHEL submitted to MHI on 06.07.2022. Further, reply has been submitted on 31.08.2022 with respect to MHI letter dated 26.07.2022.	
Chapter VI of Report No. 11 of 2018 **Para 6.1 (Year : 2017-18)**				
5	Avoidable payment of customs duty and safeguard duty. Bharat Heavy Electricals Limited, Trichy unit did not obtain the amendments to the advance authorization for import of seamless carbon steel tubes in time and consequently made avoidable payment of customs duty (including safeguard duty) amounting to Rs. 5.71 Crore.	Received on 12.01.2018	Reply/ATN submitted on 27.04.2018 and 04.06.2020 to the Ministry of Heavy Industries (MHI). Fresh ATNs submitted on 14.07.2022 and 09.08.2022 with respect to MHI letters dated 17.06.2022 and 18.07.2022 respectively.	
Chapter XIII of Report No. 13 of 2014 **Para 13.1 (Year : 2014-15)**				
6	Irregular payment towards encashment of Half Pay Leave (HPL)/ Sick Leave (SL)/ Earned Leave (EL) as well as employer's share of EPF (Employees' Provident Fund) contribution on leave encashment. Audit observed that BHEL deviated from the DPE (Department of Public Enterprises) guidelines and made irregular payment of Rs. 36.86 Crore to their employees towards HPL/ SL/ EL	Received on 03.09.2014	Replies/ATNs to the para and subsequent rejoinders submitted from time to time. Last reply/ATN submitted to the Ministry of Heavy Industries (MHI) on 01.09.2021, with respect to MHI letter dated 25.08.2021.	

	encashment on superannuation over and above the ceiling of 300 days.			
Chapter XIII of Report No. 13 of 2014 Para 13.2 (Year : 2014-15)				
7	Irregular payment towards Performance Related Pay (PRP). Due to non-adherence to the DPE guidelines with respect to payment of performance related pay, the BHEL has made payment of Rs. 15 Crore.	Received on 03.09.2014	Replies/ATNs to the para and subsequent rejoinders submitted from time to time. Last reply/ATN submitted to the Ministry of Heavy Industries (MHI) on 24.12.2021.	Under consideration with MAB-Delhi.
Chapter XIV of Report No. 3 of 2011 Para 14.3 (Year : 2010-11)				
8	Compliance of DPE Guidelines on Perquisites and allowances. DPE while issuing guidelines of pay revision stipulated therein a ceiling of 50% of basic pay on payments made to employee towards perquisites and allowances. Audit observed that BHEL incurred an excess expenditure of Rs. 359.55 Crore.	Received on 28.03.2011	ATNs clarifying correctness of payment and conformance to the DPE Guidelines submitted from time to time. Last reply submitted to the Ministry of Heavy Industries (MHI) on 21.12.2020.	

PART II

OBSERVATIONS/RECOMMENDATIONS

BHEL-OVERVIEW

The Committee note that Bharat Heavy Electricals Limited (BHEL) is a 'Maharatna' public sector undertaking which was established in 1964. It is one of the leading contributors towards building of Atmnirbhar Bharat. During the long and ardous journey, BHEL has been serving in the areas of Power (thermal, hydro, gas, nuclear and solar), Power Transmission, Transportation, Defence, Aerospace including Oil & Gas, e-mobility, energy storage, etc. The 53% share of India's total installed capacity of utility power segment excluding renewables is commanded by BHEL. The worldwide installed base of power generating equipment supplied by BHEL exceeds 1,96,000 MW. The Committee further note that BHEL is primarily involved with coal-based power sector companies and it executes the engineering and manufacturing segment of this sector. The Company earns 75 percent of the revenue from this sector. The Company has set its long- term aspirational targets of 50% of order-book from Non-fossil sector for period financial year 2023-27. The organization has turned its focus towards increasing market share majorly in Transportation and Systems Business, Defence and Aerospace business, Renewable Energy (RE) and Nuclear segment. BHEL has secured the order for supply and maintenance of Vande Bharat express trains. BHEL has been involved in international projects and collaborations in various countries and had executed projects in around 89 countries. The Committee are happy to know that BHEL has played an important role in nation building and serve the nation around six decades.

2. The Committee observe that the total assets of the Company are Rs. 59,804 crore and the total liabilities are Rs. 32,542 crore in the year 2022-23. The revenue from operations of the Company are Rs. 23,365 crore for the period. At present Government of India hold the share of 63.17 percent of the Company and rest of the shares are held by others including Banks, Foreign Institutional Investors and

Individuals. In 2021-22, BHEL secured orders for 4,700 MW, aggregating to Rs.17,931 crore, amidst intense competition and a limited pipeline of orders.

3. The Committee have made a comprehensive examination of the BHEL as an organization and touched upon many issues such as physical performance, financial performance, order book status, subsidiaries, etc. The Committee, after examination of various aspects of the functioning of BHEL, have made observations and recommendations in succeeding paragraphs and are hopeful that these will be implemented by the BHEL and the Government in right perspective so as to bring about needed improvement in the functioning and growth of the Company.

Vision of BHEL

4. The Committee note that BHEL is committed to the requirement of changing market dynamics by focusing on profitable growth and diversification of the Company. In this regard, BHEL is emphasizing on strengthening its technology base and exploring opportunities in Rail transportation, Defence & Aerospace, and Oil & Gas sectors demonstrates a proactive approach to leverage emerging trends and Government initiatives. BHEL is also recognizing the need to reduce reliance on coal-based power generation and invest in cleaner energy sources aligns with the global imperative of addressing climate change. The intent of BHEL to form strategic partnerships with global Original Equipment Manufacturers (OEMs) shows its willingness to tap the external expertise and resources.

5. The Committee also appreciate the Ministry's assertion that BHEL needs to redefine its strategy in light of environmental shifts and reduce coal-based power business while expanding into new areas. This paradigm shift will be critical for BHEL's relevance and competitiveness, not only in India but also on a global scale. The aspiration for order for Vande Bharat Train Set and efforts in defence, nuclear, and hydrogen sectors reflect a forward-looking vision. The Committee, therefore, desire that the Company should promptly adapt to Industry's trend,

make strategic collaborations with due diligence and effectively execute the projects in a time bound manner for sustainability of the Company.

Board of Directors of BHEL

6. The Committee note that the vacancies in various posts in the Board of Directors (BoD) of BHEL is a matter of concern. As of July 6, 2023, the actual strength of the BoD stands at 10 out of a sanctioned strength of 16. Notably, there are significant gaps in the representation of Part-time Non-official (Independent) Directors, which is critical for ensuring corporate governance and independent decision-making. The Committee note that the post of Director `Human Resources' was laying vacant since 1.2.2022. For this post the interview was held on 10.11.2022. The Director joined the Board of Directors on July 2023. During the vacant period for this post the Director was holding additional charge of the post of Director Human Resources. The inordinate delay in filling of the vacancies is a matter of concern. This under-representation of independent directors is a regulatory compliance of SEBI, BSE and NSC. Non-compliance of such regulatories leads to imposition of substantial fines by stock exchanges (BSE and NSE) and SEBI from September 2018 to March 2023. Although the fines have been partially waived by the stock exchanges, they raise questions about adherence to regulatory norms and governance practices. BHEL faced financial penalties amounting to Rs. 17,003,800 over this period due to these violations. The Committee observe that the Company has taken steps to address this issue by inducting independent directors, however, the Committee wish to recommend that BHEL should ensure timely action for the compliances and should give top priority for maintaining governance standards.

7. The Committee are well aware of the fact that vacant positions in the Board can adversely impact the effective functioning of any Company. Therefore, the Committee strongly recommend that the administrative Ministry should take up the matter with DPE for seriously looking into the issue of abnormal delay in appointment of Directors on the Board. The Committee further recommend that the controlling Ministry and DPE should anticipate the future vacancies for

various posts in the Board of Directors and initiate the required actions and complete the process of the filling up the vacancies well before the end of the term of the outgoing Directors.

Human Resources

8. The Committee observe that the composition and changes in BHEL's workforce over the last five years reveal a noticeable decline in total manpower strength. The total workforce has decreased from 35,471 in the year 2019 to 29,536, in the year 2023.The Committee are aware that the Manpower requirement in the Company is analyzed regularly taking into account factors like business environment new opportunities / future business outlook, new projects, market conditions, attritions, superannuation etc. Due to subdued business environment, the available outstanding order book of the Company has gone down gradually over the years. The Committee further note that BHEL has taken various steps, including induction of high technology production facilities, induction of domain experts and providing skill development and training programs for fresh inductees, aiming to bridge technology gaps and enhance employee capabilities. However, the Committee feel that there is a need of taking further initiatives to improve productivity and increase business through technology adoption and employees training for which adequate number of dedicated employees are required. Further, keeping in mind the business environment, new opportunities and diversifications the Committee hope and desire that the shortage may be fulfilled promptly.

9. The Committee note that the strength of female employees of BHEL has declined from 2053 in the year 2019 to 1746 in the year 2023. The Committee note that to enhance the representation of women in the Company us a continuous focus area for which various steps/ initiatives are being taken. The Committee hope that these steps will yield desired results in the coming years and BHEL should will be able to achieve a certain percentage increase in the number of female employees each year and increase the percentage of women in leadership

roles, too. The Committee, therefore, strongly recommend that BHEL should set goals, aiming to increase the representation of women within the workforce. This will not only align with global best practices but also enhances creativity and innovation within the organization, contributing the long-term success of Company.

Physical Performance of the Company

10. The Committee observe that BHEL operates in two primary business segments: Power and Industry and these segments are fueled by three business sectors: Power Sector, Industry Sector, and International Operations. The Power segment encompasses a wide range of power plant businesses, including thermal, gas, hydro, and nuclear, as well as the spares and services business. The Industry segment focuses on supplying major equipment and providing Engineering, Procurement, and Construction (EPC) services for various sectors, such as transportation, transmission, defence, renewables and more. The Committee further note that the power sector in India is characterized by diverse energy sources, including coal, renewable, hydro, gas, and nuclear. BHEL significantly contributes to the generation of electricity in India, particularly through coal and lignite-based utility sets, accounting for 59.4% of the country's total electricity generation. Despite its historical market leadership in thermal power equipment manufacturing, an additional challenge for BHEL is the aging of thermal power plant fleet in India, where a substantial proportion of coal-based plants, approximately 13% (28 GW), are over 30 years old. These older plants have lower efficiencies and higher carbon emissions compared to newer supercritical power plants. Higher Carbon emission are having climatic concern. Besides, there are other factors, like disruption of supply chain from both within and outside the country, low orders inflow for execution, sporadic export market rate manpower shortage and COVID- 19 pandemic contributed to decline in orders to BHEL. The utility power segment witnessed a sharp decline in orders fructifying in the domestic market. BHEL has also been witnessing lower capacity utilization in respect of major products (allocated across various manufacturing

units) due to incessant transition in energy sector directly impacting the nature of the product mix of the Company. BHEL is making concerted efforts for enhancing capacity utilization which majorly include:

- **In light of ageing of facilities and changes in the product mix, the company is reviewing the production capacity of various equipment at its manufacturing units**
- **Initiatives are being taken for addressing new opportunities across wide spectrum of products & services viz. Nuclear Power, Defence and Aerospace, Coal Gasification, developing new systems / solutions for Railways, Hydro power, Downstream Oil & Gas, Energy storage, etc.**
- **Focus on technology leadership and strengthening diversification initiatives.**

The Committee trust and hope that these remedial steps will reflect rise in the production graphs of BHEL in the coming years and they may be apprised of the Action Taken Replies. The Committee feel that investing in renewable energy projects may be viable strategies for which BHEL needs to promote research and development (R&D) to produce state-of-the-art equipment for conventional and renewable energy sectors like solar and wind. The Committee desire utmost priorities to R&D which can help address the changing dynamics in the power sector.

The Committee have been informed that our country is not having hydrocarbon and oil gas. India is having coal with high ash content. The Ministry of Heavy Industries is working on 2-3 Projects to deal with the challenges. The Ministry has acknowledged that in order to increase the turn over and increase the economy to 5 trillion US dollar, there is a need to resort to diversifications. In this regard steps have been taken for Shifting from a coal based initiatives to Railways and defence etc. The Ministry of Heavy Industries has developed a proven technology on coal gasification. Therefore, the Committee wish to recommend the Ministry to take necessary steps for its wider operationalisation and commercialization.

11. The Committee note that BHEL has been able to maintain its market leadership in the conventional Thermal Power Equipment manufacturing business over the years. One of the reasons attributed for loss of orders in case of few gas desulfurizations (FGP) is on account of procurement restrictions in line with Government of India's Guidelines and lack of level playing filled vis-à-vis private players. Analysing Companies performance in supplying spare parts turn over for last five years from the period 2018-2019 till the second quarter of 2022-2023, the Committee observe that the turnover value has been reduced. The production of Boiler, Power Transformer and Traction Machines have been reduced. The Committee are also informed that the overall shop production of major products viz. Boilers, Turbines and Generators was impacted during the Financial Year 2019-2020 and 2020-2021 due to supply chain disruptions. Further the productions were affected by Covid-19 pandemic and low orders inflow for execution resulting from orders not fortifying in the market in general. The Committee further recommend that BHEL should continue expanding its presence on Government e-Marketplace (GeM) for long-term and bulk quantity supplies. BHEL should thoroughly analyze its bidding strategy to identify weaknesses and focus on developing a more competitive strategy that aligns with evolving market dynamics and client expectations. To overcome the inconsistency in orders, BHEL should consider diversifying its product portfolio. Exploring opportunities in emerging technologies like energy storage and electric mobility can be advantageous. BHEL should conduct an in-depth analysis to identify the root causes of the decline in contract success. Following the analysis, BHEL should revamp its bidding and proposal strategies, focusing on improving competitiveness and aligning more closely with market dynamics. Finally, BHEL should establish a system for continuous monitoring of contract success and revise strategies as needed to ensure improved contract acquisition rates.

12. The Committee have been apprised that the Power Sectors Current Thermal Fleet has a significant proportion of older plants. with ~13% of coal-based plants (~28 GW) aged more than 30 years, out of which ~5 GW of plants are aged more than 40 years. Further, ~18 GW plants are expected to cross 30 years of age in the next decade and >130 GW of plants will cross this age by 2047. Notably, most of these plants are subcritical in nature, which have lesser efficiencies (~10% lower) and higher carbon emitter (10-20% higher) than the newer supercritical power plants. The representative of BHEL have acknowledged that it is imperative to have a Policy Driven Mechanism for retirement of these older plants. The Committee applaud the fact that to address the issue of aging power plants, BHEL has initiated the development of Advanced Ultra Super Critical (AUSC) technology, aiming to enhance efficiency and reduce emissions. The Ministry of Heavy Industries, along with other stakeholders, such as BHEL, IGCAR has provided funding and technical support for this project. A Technology Demonstration Plant (TDP) of 1X800 MW capacity based on AUSC technology is planned under the Ministry of Power. A budgetary provision of Rs. 900 crore has been envisioned. A MoU was signed 3 years back but till date the approval is pending. The Committee recommend that BHEL should collaborate with the Government to expedite approvals and render adequate financial support for the development of Advanced Ultra Super Critical (AUSC) Technology which will improve the efficiency and environmental performance of India's thermal power plants. This will boost the orders of BHEL for replacing older thermal power plants with AUSC technology. The Committee may be apprised of the action taken in this direction.

13. The Committee acknowledge the pivotal role played by BHEL in rail transportation sector for the past six decades consistently in fulfilling Indian Railways' rolling stock requirements by delivering 'Made in India' systems. A substantial number of locomotives and EMUs within the Indian Railways fleet feature traction equipment manufactured by BHEL. It is estimated that an expenditure of around Rs. 2.8 Lakh crore will be incurred over the next ten years

in meeting the evolving needs of Indian Railways, including approximately 62,000 coaches of various types (such as MEMU, EMU, and Trainsets), 11,000 locomotives, and signalling for roughly 17,000 km of track. Notably, there has been a positive trend in the five-year average order booking for Traction and Signalling Group (TBSG), increasing from Rs. 932 crore during the financial years 2012-17 to Rs. 2,003 crore during the financial years 2017-22. Furthermore, in the semi-high-speed rail segment, BHEL secured its first order for propulsion electrics for the 'Vande Bharat Express' last year, and it has received a Letter of Acceptance (LOA) for the supply and maintenance of 80 units of 'Vande Bharat Express' in March 2023. The Committee appreciate these developments on the part of BHEL and recommends that BHEL should make efforts for having maximum number of orders from Railways and others. Considering their expertise and contributions to the rail transportation sector, BHEL should also make effort for enhancing their collaboration with Railways and others. Collaborative efforts can lead to the development of cutting-edge solutions and equipment aligning the evolving needs of the sector. This will further boost the domestic manufacturing sector and reduce dependence on imports.

14. The Committee acknowledge BHEL's extensive global footprint, with a presence in 89 countries worldwide, including countries like Afghanistan, Bangladesh, Bhutan, Nepal, as well as others such as Belarus, Ethiopia, Indonesia, Iraq, Libya, Nigeria, Oman, Rwanda, Senegal, Sudan, and Spain. BHEL has been consistently providing post-sales support to its international clientele through the provision of spare parts and services. Notably, BHEL secured 70 contracts in 2017-18, encompassing various aspects, including spares and services. However, there has been a decrease in contract acquisition, with 37 contracts in 2020-21, and a recent uptick to 62 contracts in 2022-23. The Committee are happy to note that recognizing its core strength as a manufacturing company, BHEL has taken out efforts to focus on products as the core of its international business. Further BHEL has strategies a multi pronged approach focus towards expanding its business in International Market through creation of Product Desk to increase its outreach in the target markets in a

focused manner to stripe for quantum jump in product exports. The Committee hope and trust that these steps will yield desires in the coming years. The Committee may be apprised about the achievement made in this regard in the action taken replies.

Financial Performance

15. The Committee observe a fluctuating financial performance for BHEL over the last few years. There was a negative trend with losses of Rs. 1,473 crore in 2019-20 and Rs. 2,717 crore in 2020-21. However, there has been a positive turnaround in the last two years, with a profit after tax of Rs. 448 crore in the recent fiscal year (2022-23). BHEL's financial position in 2022-23 is characterized by total assets of Rs. 59,804 crore and total liabilities of Rs. 32,542 crore, with revenue from operations reaching Rs. 23,365 crore. The Committee further note that BHEL's total assets have shown a declining trend over the years, decreasing from Rs. 63,764 crore in 2017-18 to Rs. 56,708 crore in 2021-22. The Committee are happy to note that BHEL has made a remarkable turnaround from losses in 2019-20 and 2020-21 to a profit after tax of Rs. 448 crore in 2022-23. This recovery is commendable, but Committee are still wary of the fact that profit margin remains relatively modest when compared to total revenue. The Committee, therefore, suggest that BHEL should prioritize strategic sourcing, establish vendor partnerships, explore cost-effective alternatives, collaborate with local suppliers, negotiate bulk discounts, assess its pricing strategy, explore options to improve profit margins, enhance operational efficiency, control overhead costs, adopt lean practices, diversify into higher-margin products/services, explore international markets etc. to mitigate the impact of rising material costs and increasing profit. To improve its financial stability, BHEL should also actively engage with customers to negotiate more balanced payment terms for ensuring a consistent cash flow.

16. The Committee note a decrease in total liabilities from Rs. 31,124 crore in 2017-18 to Rs. 29,737 crore in 2021-22, and thereafter, an increase in total

liabilities to Rs. 32,542 crore in 2022-23. Further, financial performance from 2017-18 to 2022-23 shows a fluctuating trend in profit. In 2017-18, BHEL reported a profit of Rs. 807 crore which increased to Rs. 1,209 crore in 2018-19 and thereafter, there was significant losses in 2019-20 and 2020-21, amounting to Rs. 1,473 crore and Rs. 2,717 crore, respectively. However, there is an improvement in reducing the number of days in liquidating trade receivables, from 192 days in 2019-20 to 102 days in 2022-23. The percentage of trade receivables liquidated out of net billing has also improved from 73% to 86% during the same period which demonstrates better collection efficiency. From the information furnished to the Committee, the decline in profitability has been attributed to several factors, including lower order inflow due to a shift towards renewable energy sources, unexecutable orders, disruptions caused by the COVID-19 pandemic, and rising input/material costs. To recover profitability, BHEL has undertaken various initiatives such as cost reduction, lower operational expenses and improved customer satisfaction following which the Company achieved 23% increase in revenue in 2021-22. The Committee feel that Company can further improve its profitability through automation, stricter credit policies, and proactive follow-up on overdue payments, enhancing cash flow and reducing financial stress besides concentrating on new areas such as coal gasification, rail transportation, and defence etc. The Committee, therefore, recommend that in addition to their existing expertise, BHEL should implement robust financial management practices and explore new areas to reduce its liabilities and increase profitability for overall financial stability.

17. The Committee are happy to note that BHEL established a Cost Optimization Cell for the purpose of reducing costs through initiatives like design optimization and design-to-cost. With a view to improve profitability of the Company, the Committee strongly believe that BHEL should maintain a strong focus on cost control and optimization to improve profit margins by meticulously following effective cost control, diversification in sectors beyond thermal power, efficiency improvement by measures that could help in reducing trade

receivables besides closely monitoring of market dynamics and plan its business strategy accordingly to meet the requirement of changing industry trends and customer demands. The Committee would like to be apprised of the steps taken by the Company and progress made in implementing these suggestions. The Committee also like to be apprised of the achievements made by the Cost Optimization Cell so far.

Receivables and Payables

18. The Committee note that the trade receivables of BHEL have exhibited a fluctuating pattern over the years. In FY 2018-19, the trade receivables amounted to Rs. 15,796 crore, which decreased to Rs. 11,641 crore in FY 2019-20. However, they saw a significant drop in FY 2020-21, with trade receivables amounting to only Rs. 7,213 crore, followed by a slight increase to Rs. 6,229 crore in FY 2021-22 and Rs. 6,544 crore in FY 2022-23. The Committee have been informed that trade receivables in terms of the number of days of revenue from operations reduced from a level of 192 days in 2017-18 to 107 days in 2021-22 and the number of days was further reduced to 102 days in 2022-23. As regards contract assets, the Committee note that contract assets were on an increasing trend over the years i.e. in FY 2018-19, they were at Rs. 22,819 crore, which further increased to Rs. 23,794 crore in FY 2019-20 and continued to rise to Rs. 26,940 crore in FY 2021-22 and then, as of March 2023, contract assets were reached Rs. 29,740 crore. Similarly, the total debtors (net of provision) also showed fluctuations as in FY 2018-19, the total debtors were Rs. 38,615 crore, which decreased to Rs. 35,435 crore in FY 2019-20, and then further dropped to Rs. 31,292 crore in FY 2020-21. In FY 2021-22, they increased to Rs. 33,168 crore, and as of March 2023, they stand at Rs. 36,284 crore. As far as payables of BHEL, it shows a relatively stable trend such as in FY 2018-19, trade payables were Rs. 12,078 crore, which decreased to Rs. 9,900 crore in FY 2019-20, they increased slightly from Rs. 8,559 crore in FY 2020-21, Rs. 9,882 crore in FY 2021-22, and further increased to Rs. 10,404 crore as of December 2022.

19. When analyzed the customer-wise receivable figures, the Committee find that BHEL's top 10 customers account for a significant portion of its receivables, with these customers representing 70% of the total debtors as of September 2022. NTPC is the largest debtor, accounting for 26% of the total, followed by TANGEDCO at 16%. The Committee also found that the majority of BHEL's receivables were historically from State Electricity Boards (SEBs), which accounted for 45% of total receivables in FY 2018-19, 47% in FY 2019-20, 43% in FY 2020-21, 42% in FY 2021-22, and 41% in FY 2022-23. Central PSUs, including Railways and Government departments, also constitute a significant portion of the receivables.

20. With a view to minimize the risk of bad debts and overdue receivables, the Committee recommend BHEL to enforce stringent credit policies to assess the credit worthiness of its customers before entering into contracts and develop a robust system for monitoring of the recoverability of outstanding receivables with regular follow-ups, periodic reconciliations, and identifying accounts that are at risk of becoming overdue besides monitoring payment history and patterns of its customers regularly. Wherever realization is not probable in the near future, appropriate provisions should be made in accordance with accounting standards.

21. The Committee also recommend that in cases where payments are pending from Government entities including State Electricity Boards, BHEL should escalate its efforts to seek intervention and support from relevant Ministries/Departments/State Governments to expedite outstanding payments, as demonstrated in the case of TANGEDCO which certainly can be effective and, in the cases of chronic non-payment from private sector clients, BHEL should consider taking timely legal actions, such as arbitration proceedings, to recover dues. The Committee also feel that over reliance on a few major customers can pose significant risks to the Company and, therefore, BHEL should explore opportunities to diversify its customer base and reduce dependence on a small number of clients.

Cost Cutting

22. The Committee observe an upward trend in the material costs of various commodities, notably Steel, Copper, Aluminium, Nickel, and others over the past few years. This rise in material costs has occurred simultaneously with a decline in the market, exerting additional pressure on profit margins. Recent global disruptions have further exacerbated the pricing challenges of these commodities. The costs associated with civil construction, structural fabrication, and erection activities have also experienced an increase. The Committee find that BHEL is actively implementing a range of measures aimed at optimizing costs and reducing expenses. These measures include Design Optimization, Design to Cost, 3D Structural analysis to provide optimal designs to our valued customers, the utilization of surplus materials, the digitization of various processes, real-time project monitoring through IPMS, and a Project-Centric approach, among others. In the light of the rising material costs and market challenges, the Committee advise BHEL to focus on developing a robust system for forecasting cost fluctuations in key commodities, especially Steel, Copper, Aluminum, and Nickel through the price discovery mechanism of Commodity exchanges and others. By analyzing various scenarios and their potential impact on costs of materials, BHEL can proactively adjust its strategies ensuring greater resilience to market fluctuations and enhancing its competitive edge.

Land Border Sharing and Global Tender Enquiry (GTE) Restrictions

23. The Committee find that BHEL is grappling with challenges related to Land Border Sharing and Global Tender Enquiry (GTE) restrictions. These challenges have had a cascading effect on project timelines, causing delays of 5-6 months and, in certain instances, up to 9 months. These delays result in adverse consequences for the Company, including missed business opportunities, postponed deliveries, project setbacks, and the imposition of liquidated damages (LDs) for tardiness. Moreover, due to the constraints on procuring from nations sharing land borders with India, BHEL has incurred significant additional costs

for the acquisition of crucial components. BHEL has made multiple appeals to the administrative ministry regarding these concerns who have taken the matter with M/o Finance to have a level playing field for BHEL. However, the Ministry has done nothing substantial yet. Besides, BHEL has organized a series of workshops called BHEL SAMVAAD since December 2020, engaging with the domestic industry to cultivate to mitigate the challenges posed by Land Border Sharing and Global Tender Enquiry (GTE) restrictions. The Committee, therefore desire that MHI should vigorously take up the matter with M/o Finance for removal of restrictions and providing level playing field to BHEL. Further, BHEL should also develop a network of local suppliers which will reduce delays, minimize additional procurement costs, and enhance supply chain resilience.

24. The Committee are surprised to know that these restrictions are applicable only to public sector entities, not the private sector, however, nothing else has been divulge in support of this condition except national security. Therefore, the Committee urge that both the Ministry of Heavy Industries and BHEL should continue with their efforts to advocate for removal or modification of GTE and land border sharing restrictions that adversely affect its operations. The Committee expect that the Ministry of Heavy Industries would take up vigorously the issue with the concerned Government authorities and Ministries which is crucial to address these challenges effectively for providing a level playing field to CPSUs particularly BHEL. Simultaneously, BHEL should keep maintaining open lines of communication and collaboration with the Ministry of Heavy Industries and other relevant Government bodies for the sake of facilitating a better understanding of BHEL's needs and concerns.

Export

25. BHEL has set export performance targets as a percentage of Revenue from Operations (Net) in its Memorandum of Understanding (MoU) with the Ministry of Heavy Industries for the financial years 2018-19, 2019-20, 2020-21, and 2021-22. The Company has consistently achieved these targets as in FY 2018-19, the target was 6%, and BHEL achieved 10.4%, in FY 2019-20, the target was 10%, and BHEL

achieved 17.8%, in FY 2020-21, the target was 10%, and BHEL achieved 10.72%, in FY 2021-22, the target was 8%, and BHEL achieved 7.16%. BHEL's physical exports over the last six years have shown variations as in FY 2017-18, BHEL recorded exports worth Rs. 687 crore to countries such as Bangladesh, Brunei, Bhutan, Comoros, Nepal, Nigeria, Oman, Senegal, and Syria, exports increased significantly in FY 2018-19 to Rs. 3,282 crore, FY 2019-20 saw further growth, with exports reaching Rs.3,821 crore. However, in FY 2020-21, exports decreased to Rs.1,855 crore and this declining trend continued in FY 2021-22, with exports at Rs.1,518 crore and as of FY 2022-23, exports stood at Rs. 1,075 crore. BHEL attributes the declining trend in export turnover and profitability in overseas projects to several factors such as a significant impact of COVID-19 pandemic on BHEL's operations, both in terms of supply chain disruptions and manpower shortages, and slowdown in BHEL production mainly due to low orders inflow for execution,

26. Given the sporadic nature of export orders and the impact of external factors like the COVID-19 pandemic, the Committee recommend that BHEL should explore diversification of export markets to reduce dependence on specific regions or countries with a view to mitigate risks associated with market fluctuations. BHEL should further enhance the resilience of its supply chain to cope with disruptions like pandemics or geopolitical challenges by developing alternate sourcing strategies, strategic stockpiling, or contingency plans.

Order Book of the Company

27. BHEL provided data on orders booked in the Power Sector, Industry Sector, and by its International Operations Division for the period between 2015-16 and 2021-22. The data shows a varying trend in the number of orders booked and completed. The Committee note that BHEL's order book for the financial year 2021-22 stood at 4,700 MW, amounting to Rs.17,931 crore which the Company achieved in a competitive environment with a limited pipeline of orders. To enumerate, in the Power Sector, the number of orders booked and completed has

fluctuated over the years, with a decline in the number of orders in recent years. Industry Sector has also experienced fluctuations in the number of orders, with a dip during the financial year 2019-20 to 2020-21 attributed to the impact of the COVID-19 pandemic. The Committee observe the reasons for the decline in the order book is primarily attributed to the sharp reduction in orders in the utility power segment, which constitutes a significant portion of BHEL's business. This reduction is notable as (i) orders reduced from over 25 GW per year during 2007-11 to an average of around 5 GW from 2016-17 to 2021-22; (ii) thermal power ordering remained low, around 1.2 GW during the period 2016-2022; and (iii) no major thermal utility power project orders were finalized during 2020-21 and 2021-22. The Committee also observed that the decline is also linked to a global shift towards cleaner and greener energy sources, driven by concerns about climate change and this has led to a decrease in orders for conventional coal-based thermal power plants. Besides, impact of COVID-19 pandemic on the Industry Sector's order book due to disruptions in the economy, the Committee are of the views that delays in project ordering are also a major contributing factor as in the case of ordering for the 2x660 MW Talcher thermal power plant project.

28. The Committee have taken note of the various steps taken by BHEL to enhance order book such as (i) focusing on improving cost competitiveness through design optimization, reducing import content, and strategic collaborations with technology partners; (ii) participating in stand-alone Balance of Plant (BOP) packages, forming strategic tie-ups with technology collaborators, and exploring new product areas such as marine gas turbines and heat exchangers; (iii) BHEL is approaching project developers for equity participation to leverage equipment sales; (iv) engagement with the Government and policymakers to advocate for policy amendments that level the playing field with other industry players; (v) long-term spares supply agreements and service agreements with major customers are being pursued by BHEL to ensure a stable source of revenue; (vi) implementing advanced manufacturing actions and stocking spares to ensure quick turnaround of spare orders; (vii) diversifying into

other business areas, such as the defense and aerospace sector, transportation, and downstream oil and gas segments aiming at expanding its order book beyond traditional sectors; and (viii) enhancing its vendor base and entering into rate contracts with vendors to become more competitive in the market. The Committee are of the view that BHEL can work towards stabilizing and expanding its order book, ensuring sustainable growth in a rapidly evolving energy sector, only with continuation of its efforts and proactively adjust business strategies accordingly.

29. The Committee observe that as of December 1, 2022, a total of 13,771 MW of Power Sector projects, Rs. 292 crore worth of Industry Sector projects, and 3 International projects have been categorized as 'On-Hold.' These projects are currently in a state of suspension due to various reasons, including challenges related to environmental clearance, fuel availability, coal linkages, financial constraints faced by customers, alterations in customer requirements, and ongoing arbitration or legal proceedings. The Committee, therefore, recommend that the Ministry of Heavy Industries should take a proactive role in resolving the above challenges obstructing the progress of these projects. Their pivotal role will reinvigorate these 'On-Hold' projects, which, in turn, can contribute to the revitalization of the power and industrial sectors. On the aspect of International Projects on hold, the Committee would recommend BHEL to stay informed about the evolving situations in international projects and work closely with the Ministry of External Affairs (MEA) to assess the feasibility of revival in unstable regions.

30. The Committee acknowledge that the timely completion of projects is vital for the industry's growth. Project delays have been primarily attributed to various factors, including delays in the provision of necessary inputs, the impact of events such as the COVID-19 pandemic and changing geopolitical situations (e.g., the Russia-Ukraine conflict), unprecedented increases in steel and commodity prices, procurement restrictions from neighboring countries, and limitations associated with Global Tender Enquiries (GTE) for procurement. In response to these challenges, BHEL has initiated several measures to ensure that

projects are completed as per schedule. These measures include shifting from a revenue-centric approach to a project-centric one, revising work and purchase policies, implementing real-time project monitoring through the Integrated Project Management System (IPMS), and introducing bonus clauses for subcontractors to incentivize early completion. The Committee note that BHEL successfully closed 19 projects in the fiscal year 2021-22, indicating an improvement in its project execution tonnage, which increased from 4,07,323 MT in 2017-18 to 4,58,263 MT in 2021-22. In light of these facts and figures, the Committee strongly recommend to evolve a system for addressing the obstacles hindering the project completion. A system that rewards companies for completing projects on time while imposing penalties for delays may be implemented. This approach will serve to foster a culture of timely project delivery and enhance the efficiency and competitiveness of the industry.

Research and Development

31. The Committee observe that the value of imports consumed by BHEL varied over the last five years, with the highest being in 2018-19 at Rs.4603.07 crore and the lowest in 2021-22 at Rs.2016.33 crore. To address this issue, the Committee note that BHEL has consistently invested in research and development (R&D), with R&D expenditure as a percentage of total turnover varying between 2.5% to 4.5% over the last five years. As of September 30, 2022, BHEL has registered 5163 Intellectual Property Rights (IPRs) or patents. This signifies that the Company has a strong commitment to innovation and technological advancement. The Committee also note that BHEL's R&D efforts are extensive and encompass various domains, including:

- **Coal gasification technology for coal-to-chemicals production.**
- **Advanced Ultra Supercritical (AUSC) technology for coal-based power generation with reduced CO2 emissions.**

- **Development of gas-insulated switchgear (GIS) and alternative environmentally friendly gas compositions.**

- **Research in the hydrogen value chain and fuel cell applications.**

- **Remote monitoring, diagnostics services, and reliability-centric maintenance.**

- **Development of a Smart Project Management System (SPMS) for project execution efficiency.**

- **Hardware In Loop and Software In Loop Test facility.**

- **Solutions for the e-mobility ecosystem.**

- **Indigenization of industrial products and components.**

- **Research in flue gas desulfurization, marine gas turbines, and nuclear power segments.**

32. The Committee further note that BHEL has been taking initiatives to reduce dependency on imports by indigenizing critical components and materials, and the Company has completed several major indigenization activities through R&D, contributing to import substitution. Besides supporting domestic manufacturing and reduce dependency on imports, including Make-in-India, Public Procurement (Preference to Make in India) Orders, Production Linked Incentives (PLI) schemes, and the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) Scheme, the Ministry of Heavy Industries are also supporting BHEL and also facilitate to get foreign players registered to participate in domestic tenders, ensuring better monitoring and regulation.

33. The Committee, having been satisfied with the combined endeavour of the Company and the Ministry of Heavy Industries in R&D, expect that BHEL would continue to allocate a significant portion of the budget for R&D to drive innovation, technology development, and product improvement with maintaining an R&D expenditure of around 2.5% to 4.5% of total turnover is commendable and

should be sustained. While stressing upon focusing on areas such as coal gasification and power generation, the Committee urge BHEL to consider diversifying R&D efforts into emerging technologies like hydrogen-based energy systems, advanced materials, and renewable energy solutions to align with changing market trends; to collaborate with leading research institutions, universities, and other industry players to enhance R&D capabilities and leverage external expertise; to focus on commercializing successful R&D projects and technologies, especially those with the potential for significant market impact, such as coal gasification and AUSC technology; to reduce import dependency by indigenizing critical components and materials by identifying key components that can be indigenized and develop strategies for their local production; and on the same time to explore opportunities to export indigenously developed products and technologies to international markets, as the Committee opine, diversifying the customer base can reduce dependence on the domestic market. The Committee, therefore, suggest for a regular performance assessment on the impact and effectiveness of R&D investments, ensuring that they align with the Company's long-term goals and objectives and to see whether the R&D efforts being taken by the Company are also aligned with environmental sustainability goals, especially in renewable energy and clean technologies, to stay competitive in a rapidly evolving market.

Diversification in Manufacturing Segment

34. The Committee observe that Bharat Heavy Electricals Limited (BHEL) is undergoing a transformation from being primarily focused on thermal power equipment and engineering services to becoming a versatile "Engineering Company" that offers a broad range of products and services across various sectors of the economy. In pursuit of this transformation, BHEL has taken diversification initiatives in several key areas. These are: -

Solar Energy: BHEL is actively involved in solar energy by manufacturing essential equipment like solar PV cells, modules, power conditioning units, transformers, and supervisory control and data acquisition (SCADA)

systems. While some items are imported, BHEL is one of the few domestic manufacturers with production capabilities for solar PV cells and modules and is exploring collaborations with other public sector units and industry partners to expand manufacturing.

Defence & Aerospace: BHEL has a strong presence in the defence sector, with a focus on innovation and technology. It is working on projects such as Super Rapid Gun Mount (SRGM), Integrated Platform Management System (IPMS), Compact Heat Exchangers, strategic equipment for the Indian Navy, space-grade solar panels, and lithium-ion batteries. BHEL's enhanced offerings, certifications, and extensive research and development efforts enable it to compete with existing players in the defence industry.

E-Mobility and Battery Energy Storage Systems (BESS): BHEL is actively involved in the supply of electric vehicle (EV) chargers and associated electrical systems. The Company offers engineering, procurement, and construction (EPC) solutions for EV charging stations. BHEL has set up a dedicated group for Battery Energy Storage Systems (BESS) and has secured orders for the installation of BESS units.

Captive Power & Process Plant (CPPP) and Industrial Products for Oil & Gas Sector: BHEL's successful execution of projects like the IOCL Paradip Sulphur Recovery Unit (SRU) positions it to address various other downstream oil and gas engineering, procurement, and construction (EPC) packages. The Company is also working on the indigenization of items required for centrifugal compressor packages.

Hydrogen Mission: BHEL is actively participating in India's National Green Hydrogen Mission, with a focus on electrolyzer and type-IV cylinders. The Company has initiated partnerships with research organizations and is working on developing technology for hydrogen generation, storage, and transportation.

Coal Gasification and Chemical: BHEL has developed Pressurized Fluidized Bed Gasification (PFBG) technology, which is unique for

gasifying high ash Indian coal. This technology has significant potential in the National Coal Gasification Mission of India, which aims to gasify 100 million metric tons of coal by 2030.

35. The Committee recognize that BHEL is actively engaged in various critical sectors such as Hydro Power, Nuclear Power, Defence, Space, Renewable Energy, and International Operations. BHEL plays a significant role in supporting the value chain of these vital sectors within the country. The Committee feel that as India steadily asserts its position as a global leader, towards which safeguarding its strategic interests becomes imperative and BHEL has the potential to make substantial contributions under these circumstances. Therefore, the Committee strongly recommend that the Government should consider bestowing upon BHEL the status of a 'Strategic' Public Sector Undertaking (PSU).

Joint Ventures

36. The Committee note that BHEL has four Joint Venture Companies (JVCs), namely BHEL-GE Gas Turbine Services Private Ltd. (BGGTS), Raichur Power Corporation Ltd. (RPCL), NTPC-BHEL Power Projects Private Ltd. (NBPPL), and Powerplant Performance Improvement Pvt. Ltd. (PPIL). Among these, BGGTS is the sole profitable venture, reporting a profit of Rs. 100.84 crore in the fiscal year 2021-22, while both RPCL and NBPPL have incurred significant losses of Rs. 565.00 crore and Rs. 40.52 crore in the same period respectively. The Committee also note that PPIL is already under liquidation and the Board in its meeting held on 8 February, 2018 had accorded in principle approval for pursuing winding up of NBPPL also. Notably, the Government's increasing emphasis on renewable energy sources has led to a challenging environment for the thermal power sector, resulting in adverse effects on these JVCs due to escalating expenses and fixed costs. The Committee, therefore, recommend that unprofitable joint ventures should either be wound up expeditously or adapt their business models to align with the current market dynamics.

Enviornmental Matters

37. The Committee note that BHEL is inherently a low carbon-emitting Company, with its carbon emission intensity reducing from 19.9 metric tonnes in 2020-21 to 16.1 metric tonnes in 2021-22. The Committee observe that BHEL is diligently monitoring its Scope-1 and Scope-2 emissions and maintaining a comprehensive record of its carbon footprint. The Company is unwavering in its commitment to decarbonization, demonstrated through a new initiative called "Harit BHEL," aimed at transitioning into an environmentally responsible corporation. The Committee further note that BHEL's commitment to achieving net-zero carbon emissions aligns with the Government's environmental objectives. The Committee are of the opinion that BHEL should prioritize the development and deployment of AUSC technology and low-rating supercritical sets, making them accessible for new coal-based power plants. BHEL should also explore opportunities in the coal-to-chemicals sector and bolster its presence in the nuclear power field. With the target of becoming a Net Zero Company by 2047, the Committee anticipate that BHEL will continue its resolute efforts in the pursuit of Net Zero decarbonization.

Waste Management

38. The Committee note that BHEL has implemented a Waste Management System founded on the "3R" approach, emphasizingon the reduction, reuse, and recycling of resources. The Company's commitment to minimizing raw material consumption aligns with its core objectives, with impressive results in waste management. In the case of non-hazardous waste, BHEL generated 52,696 metric tonnes, recycling or reusing the same amount. For hazardous waste, the Company generated 1,528 metric tonnes and successfully recycled or reused 1,225 metric tonnes in 2020-21. The Committee appreciate the efforts and desire the Company to continue its current waste management approach while also enhancing efforts to reuse and reduce its hazardous waste.

39. Furthermore, the Committee recognize that BHEL effectively sold scrap materials amounting to Rs. 274 crore in the fiscal year 2021-22. The proactive utilization of surplus and unused materials on-site is a commendable practice. This endeavour has notably contributed to the Company's operational income, which reached a peak of Rs. 1,058 crore in the same financial year, thereby directly benefiting the Company's overall financial performance. The Committee appreciate the efforts and encourages the Company to persist in its efforts to make effective and gainful use of surplus materials.

Corporate Social Responsibility

40. The Committee note that BHEL has consistently allocated a portion of its annual profit for CSR activities, complying with the requirements under the Companies Act, 2013. While the allocated funds have been substantial, there have been variations in utilisation. In 2021-22, BHEL allocated a CSR budget of Rs. 22.16 crore. The Company demonstrated its commitment to various CSR activities in sectors like Clean India, Educated India, Green India, Healthy India, Inclusive India, Responsible India, and more. BHEL has taken an all-encompassing approach in line with the Companies Act, 2013, and the Companies (CSR Policy) Rules, 2014. Notably, the CSR fund in BHEL is non-lapsable, and any unspent or unallocated amounts are carried forward to subsequent years, allowing for flexibility in project execution, especially for long-term projects with multiple stakeholders. The Committee recommend that BHEL should continue its commitment to Corporate Social Responsibility (CSR) activities, ensuring effective and timely utilization of allocated funds.

Cases in ARBITRATION, AMRCD and CVC

41. The Committee note from the information provided by BHEL, indicating that as of December 31, 2022, there were approximately 118 cases stemming from commercial contracts with financial implications exceeding Rs. 10 crore that remained unresolved in arbitration. Besides, there were five cases pending in the AMRCD. As of March 31, 2023, claims against BHEL was amounted to Rs.

3,843.89 crore, with counterclaims by BHEL totaling Rs. 2,622 crore within arbitration proceedings. On the same date, BHEL asserted claims amounting to Rs. 12,944.29 crore, while counterclaims against BHEL reached Rs. 24,721.18 crore in arbitration cases. The Committee recommend that the Company should expeditiously resolve these cases, collaborating with the administrative Ministry wherever necessary, and explore alternative dispute resolution methods, too. The cases under AMRCD may be resolved with priority.

42. The Committee take note of two pending cases with the Central Vigilance Commission. In one instance, involving Shri R. Anbarasu, GM (Retd.), BHEL, PS-SR, Uppur Site, an inquiry was completed on October 22, 2022, and vigilance comments were submitted to the Disciplinary Authority on November 22, 2022, with further action currently underway. In the second case, CVC conducted an Intensive Examination of BHEL Tower, Sector-16A, NOIDA, which resulted in the resolution of 14 out of 19 raised issues, based on BHEL's inputs. The CVC has also advised on system improvements and investigations for the remaining five issues, which are presently in progress. The Committee urge the Company to take appropriate actions in these cases in a time bound manner so as to prevent similar occurrences in the future.

C&AG Audit Paragraphs

43. BHEL apprised the Committee about the eight pending Audit Paras from the C&AG, each highlighting specific issues. The Committee observe for each Audit Para, as under:

(i) Audit Para 5.1 (Year: 2020-21) - Avoidable Loss: BHEL suffered a loss of Rs. 13.69 crore due to laxity in supplying complete sets of Alternate Current Electrical Multiple Units. The matter was sub-judice before the Hon'ble High Court of Kolkata. The issue was under consideration with MAB-Delhi.

(ii) **Audit Para 5.2 (Year: 2020-21) - Non-safeguarding of Financial Interest: Electronics Division, Bengaluru unit of BHEL incurred an additional liability of Rs. 11.58 crore towards payment of Safeguard Duty for clearing imports due to not taking cognizance of proposed changes in tax structure and delivery schedules. The issue was reported to be under consideration with MAB-Hyderabad.**

(iii) **Audit Para 6.1 (Year: 2019-20) - Loss Due to Non-Performance: BHEL suffered a loss of Euro 3.83 million (Rs. 28.35 crore) due to failure to deliver performance as per the contractual provisions, resulting in the invocation of Bank Guarantee by the client (Keban). The issue was reported to be under consideration with MAB-Delhi.**

(iv) **Audit Para 4.1 (Year: 2018-19) - Undue Benefit to Employees: BHEL extended undue benefits to its employees towards Late Night Snacks Allowance, amounting to Rs. 16.69 crore, in violation of guidelines. The issue was reported to be under consideration with MAB-Hyderabad.**

(v) **Audit Para 6.1 (Year: 2017-18) - Avoidable Payment of Customs Duty and Safeguard Duty: BHEL, Trichy unit, made avoidable payments of customs duty (including safeguard duty) amounting to Rs. 5.71 crore due to not obtaining amendments to advance authorization for import of seamless carbon steel tubes in time. Final ATNs were submitted to MHI on 14.07.2022.**

(vi) **Audit Para 13.1 (Year: 2014-15) - Irregular Payment Towards Leave Encashment: BHEL deviated from DPE guidelines and made irregular payments of Rs. 36.86 crore towards HPL/SL/EL encashment on superannuation over and above the ceiling of 300 days. Final ATNs were submitted to MHI on 01.09.2021.**

(vii) Audit Para 13.2 (Year: 2014-15) - Irregular Payment Towards Performance Related Pay (PRP): BHEL made a payment of Rs. 15 crore due to non-adherence to DPE guidelines on PRP. The issue was reported to be under consideration with MAB-Delhi.

(viii) Audit Para 14.3 (Year: 2010-11) - Compliance of DPE Guidelines on Perquisites and Allowances: BHEL incurred an excess expenditure of Rs. 359.55 crore due to non-compliance with DPE guidelines on perquisites and allowances. Last replies were submitted to MHI on 21.12.2020.

44. In connection with resolution of pending audit matters, the Committee are of the view that BHEL should actively engage with the concerned *i.e.* Ministry of Heavy Industries, C&AG, MAB-Delhi & Hyderabad, for speeding resolution of pending Audit Paragraphs. Regarding this, the Committee suggest for strengthening BHEL's internal controls and processes to prevent avoidable losses and irregular payments in the future. The Committee also desire that a robust online monitoring mechanism should be established to track and report compliance with guidelines on each Audit Para, reducing the likelihood of similar issues arising in the future. The suggested mechanism, if established, would facilitate a real time regular updates to the authorities concerned on the progress and timely resolution of pending Audit Paras with transparency and accountability.

Conclusion

45. The Committee take note of BHEL's current precarious situation, which has been characterized by significant challenges both within India and on the international front. BHEL is in need of comprehensive support encompassing financial, technical, and policy-related assistance etc. The Company, to remain competitive, requires modernization and the adoption of state-of-the-art technology for its equipment and machinery. It's worth noting that BHEL has

been a stalwart contributor to the nation's development for the past six decades and stands as a significant public sector undertaking. The Committee desire that the administrative Ministry and the Government must extend their support to BHEL by facilitating initiatives for its revitalization, technological upgradation and financial support etc. even through policy intervention.

New Delhi:
11 December, 2024
20 Agrahayana, 1946 (S)

BAIJAYANT PANDA
Chairperson,
Committee on Public Undertakings

*****

ANNEXURE-A

Awards passed in arbitration matters from January 2018 to December 2022 in favour of BHEL wherein award amount has been received or BHEL has no counter claim

S. No.	Claimant	Claim in Rs. (approx.)	Claims awarded in Rs. (approx.)	Respondent	Counter-claims in Rs. (approx.)	Counter-claims awarded in Rs. (approx.)	Remarks	Amount received in Rs. (approx.)
Jan 2018- Dec 2018								
1	BHEL	3,18,71,694	1,69,20,000	M/s Visa Steel Ltd.	4,51,38,625	25,00,000	Amount received after adjustment of counter claim allowed	1,44,20,000
2	BHEL	13,61,68,682	13,84,18,682	M/s Rohit Ferror Tech	44,50,00,000	0	Award in favour of BHEL. M/s Rohit Ferror Tech was referred to CIRP. Resolution plan of Tata Mining has been approved. BHEL has received the amount as per the Resolution Plan approved by NCLT.	16700000
3	M/s Indwell Constructions	371042281	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
4	M/s Power Mech Projects Ltd.	57506848	0	BHEL	0	0	Award in favour;	BHEL has no counter claim

5	M/s Power Machine (India) Ltd.	58883820	0	BHEL	101318196	43886898	Rs. 4,38,86,898/- received by BHEL.	43886898
6	M/s Abdul Haleem	1301620	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
7	M/s Sunil Hitech Engineers Ltd.	0	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
8	M/s Wexford Financial Inc. Panama	52330159	0	BHEL	26686088	0	Award accepted by BHEL.	Not challenged by either party
9	M/s Ashutosh Engineering Industries	522611	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
10	M/s AA Enterprises	2268352	686348	BHEL	0	0	Award in favour; award has been passed allowing BHEL to adjust its the recoverables.	BHEL has no counter claim
11	M/s Quality Agency	967543	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
Jan 2019- Dec 2019								
1	BHEL	0	0	M/s Southeastern Roadways	0	0	Amount received from insurance company.	Arbitration withdrawn

2	BHEL	0	0	M/s UPRV UNL	0	0	Matter settled	matter settled
3	M/s RCI Logistics Pvt. Ltd.	3655000	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
4	M/s Civcon Constructions Pvt. Ltd.	62964542	0	BHEL	7222613	0	Award accepted by BHEL. Not challenged by either party	award accepted by both parties
5	M/s Hydrotech Enterprises Pvt. Ltd.	5641167	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
6	M/s. GoGoal Hydro Power Pvt. Ltd. (Tiloth HEP, Uttarkashi)	3717391	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
7	M/s. Reliance Infrastructure Ltd.	1134301056	73879642	BHEL	377262508	239063402	After adjustment of allowed claims of Reliance, Rs. 16.52 crores (approx.) received by BHEL.	165183760
8	M/s Seasky Shipping India Pvt. Ltd.	3937765	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
9	M/s. PTC Industries Ltd.	8708000	0	BHEL	0	0	Award in favour;	BHEL has no counter claim

10	M/s. Sunil Hitech Engineers Ltd.	156500000	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
11	M/s. Indo Nabin Projects Ltd.	23433833	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
Jan 2020- Dec 2020								
1	BHEL	1304380	0	M/s Capital Electech Pvt. Ltd.	10442125	0	Award in favour;	Award accepted. Not challenged by either parties
2	M/s Orchha Dham Tours and Travels	0	0	BHEL	0	0	Arbitration matter withdrawn by the Claimant	BHEL has no counter claim
3	M/s Grand Prix Engineering Pvt. Ltd.	27034567	0	BHEL	0	0	Arbitration matter withdrawn by the Claimant	BHEL has no counter claim
Jan 2021- Dec 2021								
1	M/s ODT Dis Ticaret	0	0	BHEL	0	0	Arbitration matter withdrawn by Claimant	BHEL has no counter claim
2	M/s Zillion Infraproject Pvt. Ltd.	100000000	0	BHEL	0	0	Arbitration matter withdrawn by Claimant	BHEL has no counter claim
3	M/s Larsen & Toubro Ltd	732964000	0	BHEL	0	0	Arbitration matter withdrawn by Claimant	BHEL has no counter claim

4	M/s Control Systems	31900000	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
Jan 2022- Dec 2022								
1	BHEL	108293794	48293794	M/s HPGCL	0	0	Amount with interest received	85500000
2	M/s Yogya Enterprises	18800000	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
3	M/s. Offshore Infrastructures Ltd.	104692214	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
4	M/s GVR Associates	30700000	0	BHEL	0	0	Award in favour;	BHEL has no counter claim
Total award amount received								**325690658**

ANNEXURE-B

Awards passed in arbitration matters from January 2018 to December 2022 in favour of BHEL, wherein award amount is under contention									
S. No.	**Claimant**	**Claim in Rs. (approx.)**	**Claims awarded in Rs. (approx.)**	**Respondent**	**Counter-claims in Rs. (approx.)**	**Counter-claims awarded in Rs. (approx.)**	**Remarks**	**Amount under contention in Rs. (approx.)**	**Expenditure in Rs. (approx.)**
Jan 2018- Dec 2018									
1	BHEL	8517870433	8307765870	M/s Surana Power Ltd.	0	0	Award is in favour of BHEL. In the meantime, M/s Surana went under liquidation. BHEL has been declared as a Secured Creditor of Surana Power. BHEL choose to realise its security interest on its own. However, Liquidator challenged BHEL's decision and filed petition in NCLT, Chennai. NCLT awarded judgement in BHEL's favour. Subsequently, Liquidator appealed before NCLAT against NCLT judgment. NCLAT vide its order dated 18.06.2020 set aside the NCLT's Order dated 20.11.2019, with direction to complete liquidation process. BHEL has filed appeal in Supreme Court against	8307765870	5061750

							NCLAT's judgement. The matter is pending before the Supreme Court		
2	BHEL	12418581	11970617	M/s Jewel Metals	4465450	1465450	Execution filed by BHEL is pending	11970617	40600
3	BHEL	5782459	5782459	M/s Perfex	123749000	3272476	M/s Perfex has challeged the award. Section 34 petition is pending	5782459	100000
4	BHEL	28793091	24794593	M/s Chandra Proteco	0	0	Execution filed by BHEL is pending	24794593	9000
5	BHEL	5032512	3624587	M/s Capital Control	27439728	0	Execution filed by BHEL is pending	3624587	31530
6	BHEL	22941609	22941609	M/s TVS Logistics	0	0	M/s TVS Logistics has challenged the award. Section 34 petition is pending	22941609	Invoices not yet received
7	M/s Armtech (India) Ltd.	8305279	0	BHEL	0	250000	Award in favour; BHEL has no counter claim. Award challenged by M/s Armtech	250000	Invoices not yet received
8	M/s Sri Vigneswara Construction Co.	6533309	0	BHEL	3167847	3067847	Initiation of execution proceedings are in process.	3067847	Invoices not yet received
Jan 2019- Dec 2019									

1	BHEL	2232100000	2232100000	Karnataka Power Corporation Ltd.	0	0	Award in favour of BHEL. KPCL challenged the award under section 34 of Arbitration and Conciliation Act. The petition of KPCL has been allowed and the award has been set aside. BHEL has filed an appeal before Karnataka High Court.	2232100000	1537245
2	BHEL	21020496	1152049 6	M/s Babubhai Narottamdas & Co. Ltd.	0	0	Execution filed by BHEL is pending	1152049 6	10300
Jan 2020- Dec 2020									
Jan 2021- Dec 2021									
1	BHEL	217433145	191683879	M/s Kataria Carriers	34294068	32908068	M/s Kataria has challenged the award. Section 34 is pending	191683879	390760
2	BHEL	2124600000	620300000	M/s Bhadreshwar Vidyut Private Ltd.	2751339122	0	M/s Bhadreshwar has challenged the award. BHEL has filed execution. Both petitions are pending. M/s Bhadreshwar is under Insolvency (CIRP).	620300000	555962
3	BHEL	151365929	7218260	M/s Refex	29161706	0	M/s Refex has challenged the award. BHEL has filed execution petition. Both petitions are pending	7218260	1313069

4	M/s Bridge and Building Co. Pvt. Ltd. (BBCPL)	22428455	8813288	BHEL	30519935	6298848	Award in favour; M/s BBCPL challenged the award. The award has been set-aside by the Delhi High Court	6298848	63120
5	M/s Goel Constructions Pvt. Ltd.	22914455	2896781	BHEL	7090185	2321107	Award in favour; M/s Goel construction has challenged the award.	2321107	22000
6	M/s Bridge & Building Construction Co. Pvt. Ltd.	26000000	15629863	BHEL	40000000	17552674	Award in favour; M/s BBCPL challenged the award. The award has been set-aside by the Delhi High Court	17552674	46740
7	M/s P & R Infraprojects Ltd. (NTPL, Tuticorin project)	176153568	11567248	BHEL	140338272	16062500	Award partially in favour; Award has been challenged.	16062500	Invoices not yet received
Jan 2022- Dec 2022									
1	BHEL	683300000	249754229	M/s Rajasthan Vidyut	0	0	M/s Rajasthan Vidyut has challenged the award. Section 34 petition is pending	249754229	73600
2	BHEL	7967900000	317120000	M/s Hiranmaye Energy	570055000000	59600000	M/s Hiranmaye has challenged the award. BHEL has filed execution petition. Both petitions are pending	317120000	1079729
3	BHEL	5807800	7733770	M/s Simen Tech	5253143	0	M/s Simen Tech has challenged the award, which is pending	7733770	46724

4	M/s Karnataka CNC Tech. Pvt. Ltd.	155860691	0	BHEL	7339851	7261459	Award in favour; M/s Karnataka CNC challenged the award, wherein the award has been upheld.	7261459	200000
5	M/s Harji Engineering Works Pvt. Ltd. (HEWPL)	5713856	700042	BHEL	10762366	1823797	Award in favour; M/s Harji has challenged the award.	1823797	Invoices not yet received
Total amount under contention								**14987992941**	

APPENDIX-I

MINUTES OF THE EIGHTEENTH SITTING OF THE COMMITTEE ON PUBLIC UNDERTAKINGS (2022-23)

The Committee sat on Monday, the 7th November, 2022 from 1100 hrs. to 1245 hrs. in Committee Room 'C', Ground Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Santosh Kumar Gangwar - Chairperson

MEMBERS

LOK SABHA

2. Shri Janardan Mishra
3. Shri Sushil Kumar Singh
4. Shri Ramdas Chandrabhanji Tadas

RAJYA SABHA

5. Shri Anil Desai
6. Dr. Anil Jain
7. Shri M. Shanmugam

SECRETARIAT

1.	Shri V.K. Tripathi	-	Joint Secretary
2.	Shri Santosh Kumar	-	Director
3.	Shri G.C. Dobhal	-	Additional Director

REPRESENTATIVES OF THE BHARAT HEAVY ELECTRICALS LIMITED (BHEL)

1.	Dr. Nalin Shinghal	-	CMD
2.	Shri Subodh Gupta	-	Director (Finance)
3.	Smt. Renuka Gera	-	Director (IS & P)
4.	Shri U.S. Matharu	-	Director (Power & HR)
5.	Shri J.P. Srivastava	-	Director (E, R&D)

2. At the outset the Chairperson welcomed the Members of the Committee at the sitting convened to have a briefing from the representatives of the Bharat Heavy

Electricals Limited (BHEL) in connection with its comprehensive examination. The Committee Secretariat, then, made a Power Point Presentation explaining major issues relating to the subject.

[The witnesses were, then, called in]

3. The Chairperson welcomed the representatives of BHEL to the sitting of the Committee and also drew attention to Direction 55(1) of the 'Directions by the Speaker' regarding maintaining confidentiality of briefing before the Parliamentary Committee. The Chairperson, then, emphasized on important aspects related to the functioning and performance of BHEL, *viz*., (i) reasons for large number (5 out of 16) of vacant position in the Board of Directors of the Company; (ii) reasons for decline in profits since 2011-12 and losses; (iii) reasons for only one Joint Venture (BHEL-GE Turbine Services Pvt. Ltd.) in profit making and others either non-functional or are in the process of winding up; (iv) reasons for declining total assets of the Company from Rs. 63,764 crore in 2017-18 to Rs. 56,708 crore in 2021-22, etc.

3. Thereafter, the representatives of BHEL made a Power Point Presentation and briefed the Committee regarding composition of the Board of the Company, Company's financial status, status of completed and ongoing projects, purchase from MSMEs, level playing fields for BHEL vis-à-vis its counterparts in private sector particularly for orders below 200 Crore and restrictions on biding from sharing land borders with India, etc.

4. The Members, then, sought clarifications on various issues related to the subject *viz.* level playing fields for BHEL; achievements of BHEL in Hydrogen based engine, Nuclear steam turbines, Solar panels and batteries, coal to chemical technology and other innovations; reasons for less orders from the PSUs and Railways; steps taken for making Electric Vehicles affordable; R&D regarding manufacture of defence equipment; decline in profit, deficit of the Company, slow recovery of receivables, steps taken to reduce losses, decline in export; steps taken for reducing import; decline in production like Boiler, Traction Machine and Electrical Machine and their impact on MSMEs, etc.; Coal gasification and its commercialization; reasons for closing of

MSMEs; reasons for decline in Company's manpower and its impacts on performance of the Company etc.

5. The representatives of the Bharat Heavy Electricals Limited (BHEL) clarified on some of the issues on which information was readily available with them. In respect of points for which information was not readily available, the Chairperson desired that written replies to be furnished to the Committee Secretariat within 10 days.

[The Committee, then, adjourned.]

A verbatim copy of the proceedings has been kept on record.

APPENDIX-II

MINUTES OF THE TWENTY NINETH SITTING OF THE COMMITTEE ON PUBLIC UNDERTAKINGS (2022-23)

The Committee sat on Tuesday, the 14th March, 2023 from 1500 hrs. to 1635 hrs. in Committee Room 'C', Ground Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Santosh Kumar Gangwar - Chairperson

MEMBERS

LOK SABHA

2. Shri Lavu Sri Krishna Devarayalu
3. Smt. Poonamben Hematbhai Maadam
4. Shri Janardan Mishra
5. Shri Kinjarapu Ram Mohan Naidu
6. Shri Arvind Kumar Sharma
7. Shri Uday Pratap Singh
8. Shri Ramdas Chandrabhanji Tadas

RAJYA SABHA

9. Shri Anil Desai
10. Shri Syed Nasir Hussain
11. Dr. Anil Jain
12. Shri Prakash Javadekar
13. Dr. Amar Patnaik
14. Shri M. Shanmugam

SECRETARIAT

1. Shri Chander Mohan - Joint Secretary
2. Shri Santosh Kumar - Director
3. Smt. Mriganka Achal - Deputy Secretary

REPRESENTATIVES OF THE BHARAT HEAVY ELECTRICALS LIMITED (BHEL)

1. Dr. Nalin Shinghal - CMD
2. Shri Subodh Gupta - Director (Finance)
3. Smt. Renuka Gera - Director (IS & P)

4.	Shri U.S. Matharu	-	Director (Power & HR)
5.	Shri J.P. Srivastava	-	Director (E, R&D)
6.	Shri T.S. Murali	-	Executive Director (CSM &CC)

2. At the outset, the Chairperson welcomed the Members of the Committee at the sitting convened to have evidence from the representatives of the Bharat Heavy Electricals Limited (BHEL) in connection with its comprehensive examination. Before proceeding to have evidence of the representatives of BHEL, the Software Unit of Lok Sabha Secretariat made a Power Point Presentation on Digital Sansad Project and briefed the features of the new website of Digital Sansad towards eParliament to the Committee. Software Unit also addressed the queries and took note of suggestions made by the Committee on the features of the new Digital Sansad website. Thereafter, the Committee Secretariat made a Power Point Presentation explaining major issues relating to the subject i.e. BHEL.

[The witnesses were, then, called in]

3. The Chairperson welcomed the representatives of BHEL to the sitting of the Committee and also drew their attention to Direction 55(1) of the 'Directions by the Speaker' regarding maintaining confidentiality of evidence before the Parliamentary Committee. The Chairperson, then, emphasized on important aspects relating to the functioning and performance of BHEL, *viz*., reasons for large number (7 out of 16) of vacant position in the Board of Directors of the Company; role & responsibility of Directors; reasons for projects which were kept under ‘On Hold’ category in Power Sector, Industry Sector and International Operations; reasons for increasing number of booked orders under balance/pending in Power Sector and Industry Sector; reasons for decrease in the value of orders in Power Sector, etc.

4. Thereafter, the representatives of BHEL made a Power Point Presentation and briefed the Committee regarding composition of the Board of the Company, Company's financial status, status of completed and ongoing projects; diversification in rail transport (Vande Bharat rakes), renewable energy, defence equipment and in the field of space (batteries and solar panels); new area taken up such as Coal to Chemicals, Coal

gasification, Hydrogen and Advance Ultra Super Critical (AUSC) technology; level playing fields for BHEL *vis-à-vis* its counterparts in private sector due to discriminating terms and conditions in tenders below 200 crore; ageing equipment; Pre-qualification requirement in orders like emission control equipment; held up/delayed payments; increase in cost, etc.

5. The Members, then, sought clarifications on various issues relating to the subject viz. the current status of the core business (compressor, transformer and generator) of the Company; steps taken to make presence in International market and growth of export; steps taken to make cheaper hydrogen fuel related equipment; steps taken to resolve the 'On Hold' projects due to pending/delayed payment by State Governments; trade receivable and payable of the Company; level playing fields for BHEL vis-à-vis other private players and taking up the matter with the Ministry of Heavy Industries; steps taken for reducing import especially in solar PV panels; efforts made/being made for getting orders from the Government; details of decisions awarded against or in favour of the Company in respect of cases pending in arbitration, courts, etc.; total amount under contention; time period taken to settle cases entangled in legal process; expenses incurred on legal process during the last five years; details of cases referred to AMRCD along with status thereof; current status of various projects viz., HBDC line (from Vishwnath Charali, Assam to Agra, UP), Lata Tapowan, Abhijeet Chandva, Salma Hydropower in Afghanistan and 525 TPD recovery unit at IOCL. etc.; status of Coal gasification and its commercialization; steps taken to enhance the position of backward States in terms of solar energy; delays in projects in comparison to its counterpart; quality products of the Company; lower capacity utilization in respect of major projects; reasons for unused CSR funds; carbon generation by the Company and progress in decarbanization efforts made during last five years; transition plans on business model of the Company and its profitability as a result thereof; waste management plan for old batteries and panels; expenditure on R&D; penalties paid for default on any international orders; findings regarding Air Pollution Control Tower in NOIDA along with the status of any new such APCTs installation; Company's contribution to Atma Nirbhar Bharat Abhiyan; shifting of client oriented business mindset to contract oriented

business mindset along with its impact on Company's workforce and performance; Audit Paras objections; Company's vision for next five years, etc.

6. The representatives of the Bharat Heavy Electricals Limited (BHEL) clarified on some of the issues on which information was readily available with them. In respect of points for which information was not readily available, the Chairperson while thanking the representative of BHEL, desired that the written replies thereto may be furnished to the Committee Secretariat within 10 days.

[The witnesses then, withdrew and the Committee adjourned]

A verbatim copy of the proceedings has been kept on record.

APPENDIX-III

MINUTES OF THE SIXTH SITTING OF THE COMMITTEE ON PUBLIC UNDERTAKINGS (2023-24)

The Committee sat on Thursday, the 6th July, 2023 from 1100 hrs. to 1235 hrs. in Committee Room 'D', Ground Floor, Parliament House Annexe, New Delhi.

PRESENT

Shri Santosh Kumar Gangwar - Chairperson

MEMBERS

LOK SABHA

2. Shri Lavu Sri Krishna Devarayalu
3. Shri Janardan Mishra
4. Shri Arvind Kumar Sharma
5. Shri Sushil Kumar Singh
6. Shri Uday Pratap Singh

RAJYA SABHA

7. Shri Syed Nasir Hussain
8. Shri Prakash Javadekar
9. Dr. Amar Patnaik
10. Shri Binoy Biswam

SECRETARIAT

1.	Shri Neeraj Semwal	-	Joint Secretary
2.	Shri Santosh Kumar	-	Director
3.	Shri G.C. Dobhal	-	Additional Director

REPRESENTATIVES OF MINISTRY OF HEAVY INDUSTRIES (MHI)

1.	Shri Kamran Rizvi	-	Secretary
2.	Ms. Arti Bhatnagar	-	Additional Secretary & FA
3.	Shri Vijay Mittal	-	Joint Secretary
4.	Dr. Hanif Qureshi	-	Joint Secretary
5.	Ms. Mukta Shkahr	-	Joint Secretary
6.	Shri Rajesh Kumar	-	Chief Controller of Accounts

REPRESENTATIVE OF THE BHARAT HEAVY ELECTRICALS LIMITED (BHEL)

1.	Dr. Nalin Shinghal	-	CMD

2. At the outset, the Chairperson welcomed the Members of the Committee at the sitting convened to have evidence of the representatives of the Ministry of Heavy Industries in connection with the subject 'Comprehensive examination of Bharat Heavy Electricals Limited'. Before proceeding to have evidence of the representatives of Ministry of Heavy Industries, the Committee Secretariat made a Power Point Presentation explaining major issues relating to the subject i.e. BHEL.

[The witnesses were, then, called in]

3. The Chairperson welcomed the representatives of Ministry of Heavy Industries to the sitting of the Committee and also drew their attention to Direction 55(1) of the 'Directions by the Speaker' regarding maintaining confidentiality of evidence before the Parliamentary Committee. The Chairperson, while briefing the subject, emphasized on the important aspects relating to the Ministry of Heavy Industries (MHI) and Bharat Heavy Electricals Limited (BHEL), *viz*., progress in replacement of old and less efficient plants with Advanced Ultra Super Critical (AUSC) Technology; restriction imposed on global tender below 200 crore; and the steps being taken to start the manufacturing of certain grades of Electrical Steel (CRGO/CRNGO) in India etc.

4. Thereafter, the representatives of MHI made a Power Point Presentation before the Committee on the points comprising the background of the BHEL; diversification in rail transport (manufacturing of Vande Bharat coaches & rakes); renewable energy; defence & space equipment; coal to chemicals initiatives; coal gasification (tie up with CIL & NLCIL); Advance Ultra Super Critical (AUSC) Technology; company's financial status; vacant positions in the Board of the Company; performance of nominated Directors; level playing fields for BHEL *vis-à-vis* its counterparts in private sector due to discriminating terms and conditions in tenders below Rs. 200 crore; Status of completed and ongoing projects; online monitoring system to monitor projects; outstanding dues of BHEL and steps taken to recover them; National Green Hydrogen Mission, steps taken to manufacture Electrolyser and type-IV cylinder by BHEL; Challenges before BHEL, etc.

5. The Members, then, sought clarifications on various issues relating to the subject as under: -

i. The details of current status of old and new projects of BHEL along with the date of award of contracts, cost involved, target date of completion of projects, delay in timely execution with reasons and the steps taken to address the issues for delay in each case;

ii. Pre-COVID and Post COVID performance of the Company in terms of profit and completion of its projects;

iii. Cost of operations of BHEL *vis-a-vis* similar competitors in the private sector;

iv. Actual position of outstanding dues of the Company and steps taken for recovery against State Governments and others;

v. Details of decisions awarded against or in favour of the Company in arbitration and courts and the total amount held up therein along with the details of total expenditure incurred in these legal process;

vi. The steps taken to fill up the vacant posts of Board of Directors to avoid penalties being imposed by the Stock Exchanges on BHEL;

vii. Performance of Government nominated and Independent Directors in the Board of Directors;

viii. Long-term plans for de-carbonization and green energy related business;

ix. The reasons behind declining trend in getting orders and various steps taken to increase Order Book & profits of the Company;

x. The steps taken to increase exports of the Company which is not promising at present;

xi. The steps taken to come out from the loss making Joint Ventures of the Company;

xii. Utilization of CSR funds of the Company to the maximum extent and involving & sharing details of CSR activities by the District Magistrates with the people's representatives;

xiii. Plans to receive/generate funds for replacement of old equipment & machinery and infusion of new technology;

xiv. The reasons for low cash reserves of BHEL;

xv. The current status of thermal plant to be set up for Singareni Collieries Company Limited (SCCL) in Telangana;

xvi. The capacity and actual position of the Company to fulfill the total demand of power sector in terms of machinery;

xvii. The details of products imported by the BHEL during the last five years, the approximate cost involved therein and the steps taken to reduce the import;

xviii. The steps taken to make cheaper hydrogen fuel related equipment;

xix. Total number of patents earned by BHEL in the last 10 years along with the expenditure incurred on R&D work during the period;

xx. The steps taken to monitor the projects of BHEL effectively and the result of those project in which specific suggestions are made by MHI;

xxi. The concerted efforts being taken by MHI/BHEL through Ministry of External Affairs to get projects from abroad;

xxii. Issues related to BHEL for PSU of strategic importance and steps taken to get the status;

xxiii. The steps taken by the Ministry to support BHEL in all financial, technological & policy areas in both domestic and global markets; etc.

6. The representatives of the Ministry of Heavy Industries clarified on some of the issues on which information was readily available with them. In respect of points for which information was not readily available, the Chairperson while thanking the representative of BHEL, desired that the written replies thereto may be furnished to the Committee Secretariat within 10 days.

[The witnesses adjourned]

A verbatim copy of the proceedings has been kept on record.

7. Thereafter, the Committee decided to postpone the Local Study Visit of the Committee to Heavy Electrical Equipment Plant (HEEP) at Haridwar due to un-conducive circumstances and bad weather which was scheduled to be undertaken on 7 July, 2023.

[The Committee, then, adjourned]

APPENDIX-IV

MINUTES OF THE FOURTH SITTING OF THE COMMITTEE ON PUBLIC UNDERTAKINGS (2024-25)

The Committee sat on Wednesday, the 25th September, 2024 from 1350 hrs. to 1415 hrs. in Committee Room No. '1', Ground Floor, Extension to Parliament HouseAnnexe, New Delhi.

PRESENT

Shri Baijayant Panda - Chairperson

MEMBERS

Lok Sabha

2. Shri Tariq Anwar
3. Shri R.K. Chaudhary
4. Shri Chandra Prakash Joshi
5. Smt. KanimozhiKarunanidhi
6. Shri Kaushalendra Kumar
7. Shri Shankar Lalwani
8. Shri Mukesh Rajput
9. Shri Sukhjinder Singh Randhawa
10. Shri Kodikunnil Suresh

Rajya Sabha

11. Shri NarainDass Gupta
12. Shri DebashishSamantaray
13. Shri Arun Singh

SECRETARIAT

1. Shri NeerajSemwal - Joint Secretary
2. Smt. Jyochnamayi Sinha - Director
3. Smt. MrigankaAchal - Deputy Secretary

2. The Committee reassembled for the afternoon session of the Committee on 25 September, 2024. Hon'ble Chairperson briefly apprised the Members on the two draft

Reports that were approved during the previous term of the Committee by erstwhile Chairperson and considered as part of unfinished work of the Committee.The Committee then considered and adopted the following two draft reports, without any changes/modifications, on the following two selected subjects: -

i. 'Para No. 6.1 of Report No.3 of 2021 related to "Procurement of hardware/software item to the tune of Rs. 890.34 crores through strategic alliance relating to National Informatics Centre Services Inc" (Based on Audit Examination); and
ii. Bharat Heavy Electricals Limited (BHEL) (Comprehensive Examination)

3. The Committee authorized the Chairperson to finalize the draft Reports on the basis of factual verification as suggested by C&AG and concerned Ministry/Department for presenting the Reports during the next session of Parliament.

The Committee, then, adjourned to take-up next agenda item of the afternoon sittings.

/-------/