

Annual Report 2015-16

BHEL - Making in India

...since 1964

Power

Power Generation plants including Thermal (up to 1000 MW), Nuclear, Hydro & Gas

BoP & Auxiliary systems, Pollution control eqpt. (ESP, FGD)

Transmission

HVAC/HVDC systems, GIS, AIS, Substation Automation, FACTS Solutions, Transmission products up to 1200 kV

Industry

Electrical & Mechanical systems (Compressors, Pumps, Motors, etc.), Control & Automation systems for Fertilizer, Paper, Refining, Steel & Sugar industries

Water

Water Management System





Defence & Aerospace

SRGM,
Turret Casting T72 Tank,
IPMS, ACS



Renewable energy

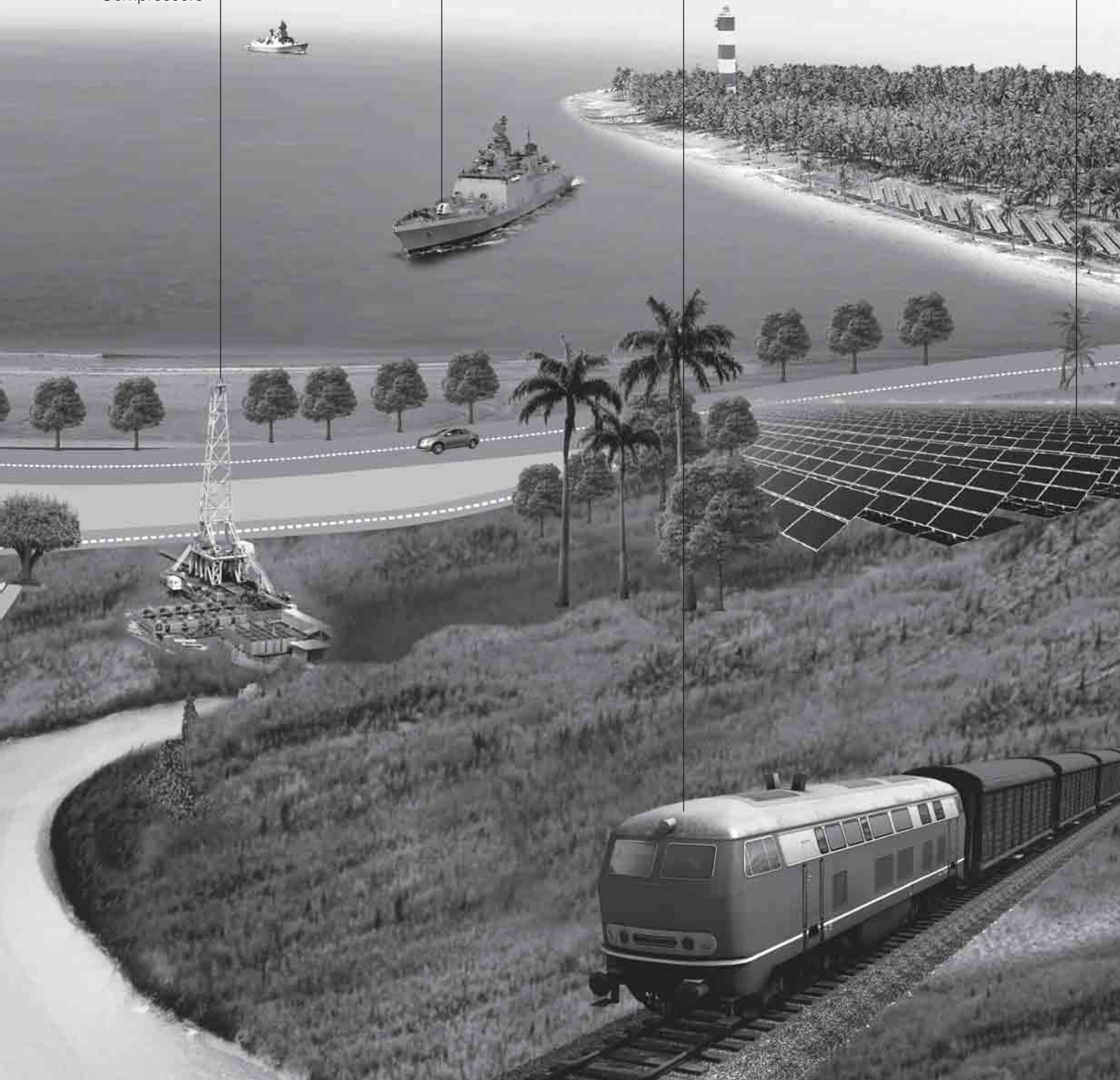
Solar PV Power plants/
Space-grade PV Panels
& Batteries

Oil & Gas

Oil Rigs & controls,
Well Heads &
Xmas Tree valves,
Compressors

Transportation

Transportation systems,
Locomotives, Propulsion
systems & Electrics



Clean Coal... Green Coal...

Boiler

- Supercritical technology - high efficiency, low emission;
- Developing Advanced Ultra Supercritical technology - Plant efficiency to improve by 10%+
- Design customized to Indian conditions - capable to operate with wide range of fuels at different loads
- State of the art design to achieve low NO_x levels

Turbine

- Efficiency levels at par with global performance levels
- Designed to minimize noise levels meeting stringent environment norms

Generator

- Efficiency levels (~99%) best in class

Auxiliaries (Pumps, Fans, Motors)

- Efficient design & optimized system solutions to minimize power consumption within power station

Electro Static Precipitator (ESP)

- Designed to maximise reduction (~99.95%) in particulate matter even for high ash Indian coal

Flue Gas Desulphurization (FGD)

- Offering solutions to reduce SO_x levels (~95%) to meet stringent environmental norms

Electrical Equipment (Transformers, Reactors, etc.)

- Optimized design to minimize electrical losses in the system

Water Treatment Plant

- Solutions for zero-liquid discharge



Contents

4

Annual Review

- 4 Letter to Shareholders
- 7 Leadership at BHEL
- 12 Year at a Glance

14

Corporate Profile

- 14 About BHEL
- 18 World of BHEL
- 20 Recognition of Excellence

23

Directors' Report

- 31 Management Discussion & Analysis
- 32 Business Profile**
(Profile and Performance of Business Segments)
- 55 Financial Performance
- 71 Sustainable Development**
- 83 Business Responsibility Report
- 88 Innovation**
(R&D and Technological Achievements)
- 93 Corporate Governance

148

Financial Statements

- 149 Financial Statements Standalone
- 196 Consolidated Financial Statements

237

Additional Information

- 238 Ten Years Financials
- 240 Value Addition Statement
- 241 Performance Annual Plan
- 241 Contribution to Exchequer
- 242 BHEL in India
- 243 Product Profile
- 252 Glossary

253

Notice

Letter to Shareholders



Dear Shareholders,

It is an honour and a privilege to present the 52nd Annual Report of your company. I am extremely humbled as I write my first letter to our valued shareholders, after assuming office on January 1, 2016. This has been a very challenging year for your company. The volatility in economic and business environment is bound to change the way we operate and create wealth for our shareholders. Holding on to our strengths and building new ones, our team of 42,000 employees is resolutely focused on achieving immediate target of regaining growth.

The Year That Was...

Today, your company is in the midst of the toughest times it has faced since its inception. The uncertain global economic order, caused by weak global recovery, slowing global trade and China's growth transition, is the 'new normal'. The desired pace of growth continues to elude the domestic industrial sector as it faces continued pressure from subdued capex and capacity underutilization. Power generation equipment industry, in particular, has been facing a tough time for the last

“ Holding on to our strengths and building new ones, our team of 42,000 employees is resolutely focused on achieving immediate target of regaining growth... ”

few years, accentuated by the ongoing energy transition. In addition to this, geopolitical disturbances in the target export markets and fluctuating energy prices have dampened the international business. The overall subdued business environment due to these factors and the current business mix affected the financial performance of the company, with the company registering a turnover of ₹ 26,587 Crore and a net loss of ₹ 913 Crore during the year.

But, the real strength of an organization lies in discovering the opportunities in its challenges. This is what we believe in, and despite the hurdles, we have

achieved some outstanding benchmarks in the year 2015-16 which reflect your company's strong fundamentals:

- An unprecedented feat in the execution of projects was achieved by commissioning/synchronizing an all-time high 15,059 MW of power generation equipment. This includes commissioning of six supercritical sets which constitutes 55% of the supercritical sets commissioned in the country during the year.
- Like in 2014-15, all the hydroelectric power projects that went on stream in the country, totalling 810 MW, were commissioned by BHEL.
- Your company booked orders worth ₹ 43,727 Crore - the highest in the last five years with 42% growth over 2014-15. With this, the company has orders worth ₹ 1,10,730 Crores for execution in 2016-17 and beyond.
- Your company secured three major orders of 765kV substations under stiff international competitive bidding for the National Green Energy Corridor project.
- 500 MW Kosti TPS - Sudan's largest thermal power plant, and two 220 kV substations in Afghanistan were successfully commissioned by BHEL.

“...unprecedented feat in the execution of projects was achieved by commissioning/synchronizing an all-time high 15,059 MW...”

We are proud of our achievements but are fully aware of the looming challenges. The company is addressing them with its persistent efforts and capitalizing on the new opportunities. As an organization, we cannot influence most of the external factors but can definitely change what is going on within us. It is time for your company to embrace the new and adapt to the market realities.

Creating BHEL of Tomorrow

In our journey of creating BHEL of tomorrow, it is our passionate endeavour to transform BHEL into an organization which is **“Responsive, Robust and Rising”** to the needs of its stakeholders. This involves orienting our strategy towards enhancing responsiveness by delayering and being simple; building new sources of strength for a robust future and diversification to attain a balanced portfolio for creating a rising organization. Your company's efforts are concentrated towards this drive and I firmly believe that this will be the bedrock of our growth in the coming years.

Responsive BHEL!

“...to create a more agile organization, we are focusing on Execution, Consolidation and Simplification...”

What we choose to embrace, to be responsive of, is a reflection of our intent. With a view to create a more agile organization, we are focusing on **Execution, Consolidation and Simplification** (ECS) as the first step. In this process, we are identifying the weak links and putting in place an organization structure that is more productive and that enables us to achieve higher operational efficiency. At the same time, we are reviewing our systems and processes to get rid of the cumbersome legacies and move towards simplification by eliminating waste and low value added activities. Accelerated execution is one of the most important facets for us to be responsive to customer's needs. Our continual efforts in this direction have resulted in commissioning /synchronization of more than 10,000 MW of power projects for the fourth consecutive year, with this year crossing an all-time high mark of 15,000 MW. This includes the highest-ever power generation capacity addition of 13,061 MW to the Indian utility segment - 23% higher than the target of Ministry of Power, Government of India and a quantum jump of 59% over the previous year.

Robust BHEL!

Your company is looking forward to build new strengths on the rock-solid foundation which we have built in our journey of over half of a century. We derive this strength from our deep-rooted focus on research & development. Standing true to the spirit of innovation-led growth strategy, the company has maintained R&D expenditure at plus 2.5% of the turnover for more than five years in a row. The company has strengthened its focus on indigenization of supercritical technology to enhance its competitiveness. Recent in-house developments include 765 kV & 1200 kV UHVAC transformer & reactor, IGBT propulsion technology for locomotives and ACEMU, STATCOM for industrial & grid applications, Phase Shifting Transformer and 500 kW PCU for solar PV generation. BHEL also made its foray into 400 kV GIS by securing the first commercial order.

“...derive this strength from our deep-rooted focus on research & development...organization structure to embrace IT as a strategic tool... focus on...people development...”

As digital tools and technologies are profoundly differentiating the way business is being conducted, your company has put in place an organization structure to embrace IT as a strategic tool for opening up new stream of opportunities in new as well as traditional business areas.

Most importantly, to fulfil this target of a robust organization, we have unhindered focus on the people development strategy which is today driven by the growing aspirations of the millennial generation of the company. We are embracing social technologies for increasing employee engagement and working towards development of employee competencies in line with the business plans through implementation of various learning & development initiatives.

Rising BHEL!

What will define us in the new phase of our journey is how well we rise to the impending challenges. Our goal is to create an organization which will convert problems into possibilities and leverage on the new opportunities emerging from 'Make in India'. Thus, our absolute focus is on creating a balanced portfolio with focus on industry business. Towards this, we are taking various steps. To harness the opportunities emerging from Government's focus on renewables, BHEL is in the process of augmenting its manufacturing capacity and enhancing EPC capability for large scale PV based plants. Company is also working towards expansion of its defence portfolio which currently includes Super Rapid Gun Mount & Integrated Platform Management System for naval ships, thermo pressed components, compact heat exchanger for Tejas, turret castings for T72 tanks and other strategic equipment. We continue to strengthen our transmission portfolio. Considerable progress has been achieved in the execution of the world's largest $\pm 800\text{kV}$, 6000MW HVDC NE-Agra project with commissioning of Pole-1 and establishment of power flow in both directions.

"...goal is to create an organization which will convert problems into possibilities and leverage on the new opportunities emerging from 'Make in India'..."

With focus on the industry, company is equally pivoted to maintain its leadership in the power sector. In order to ensure energy security, coal will continue to remain the dominant fuel for power generation in the foreseeable future in view of its abundant domestic reserves and affordability. Towards this, we have focussed on enlarging scope of offer and enhancing competitiveness by adding flue-gas desulfurization system, air-cooled condenser,

water management system and are in the process of expanding offerings for environmental solutions.

Partners in Our Journey

These are challenging times, but I am sure that our best years lie ahead. BHEL has the '**strategy, structure, and staff**' to ensure that, in both good times and tough, we make steady progress. We will not leave any stone unturned in our quest to unlock the potential and take your company to greater heights. We will continue to put unwavering emphasis on creating customer value and bolster our inherent strengths to enhance shareholder value.

"...BHEL has the 'strategy, structure, and staff' to ensure that, in both good and tough times, we make steady progress..."

Finally, I would like to express my sincere gratitude to all our stakeholders: business partners including customers and vendors for reposing their faith in us, employees for their persistent commitment, members of the Board for their wisdom, members of the Management Committee for efficiently channelizing the company's resources, and you, our shareholders, for evincing trust in our ability to steer forward BHEL in these challenging times. Various ministries of Government of India, particularly the Department of Heavy Industry, have been providing valuable guidance and support in our efforts. I am confident that we will continue to receive your support in the future.

I see a challenging, yet exciting, journey ahead for us -one of new beginnings, new opportunities and new horizons.

With best wishes,



Atul Sobti

Chairman & Managing Director

New Delhi

August 10, 2016

Leadership at BHEL

Board of Directors
(As on 10.08.2016)



Sitting from right to left

Shri Keshav N. Desiraju, Part-time Non-official Director

Shri Rajesh Kumar Singh, Joint Secretary, DHI

Shri Atul Sobti, Chairman & Managing Director

Dr. Subhash Chandra Pandey, Additional Secretary & Financial Adviser, DIPP

Shri A.N. Roy, Part-time Non-official Director

Standing from right to left

Shri S. Biswas, Director (Engineering, R&D)

Ms. Harinder Hira, Part-time Non-official Director

Shri T. Chockalingam, Director (Finance)

Shri R. Swaminathan, Part-time Non-official Director

Shri Rajesh Kishore, Part-time Non-official Director

Shri D. Bandyopadhyay, Director (Human Resources)

Shri Akhil Joshi, Director (Power)

Shri Amitabh Mathur, Director (Industrial Systems & Products)

Shri I.P. Singh, Company Secretary

Leadership at BHEL

Management Committee (As on 10.08.2016)



Atul Sobti
CMD



D. Bandyopadhyay
Director (Human Resources)



Amitabh Mathur
Director (Industrial Systems & Products)



S. Biswas
Director (Engineering, R&D)



T. Chockalingam
Director (Finance)



Akhil Joshi
Director (Power)



S. Gopinath
ED (Tiruchirappalli, PPPU & Piping Centre)



Prakash Chand
ED (HEEP), Haridwar



Rajeev Srivastava
ED (PS-SSBG), Noida



S.N. Maiti
ED (PS-WR), Nagpur



M.K. Sharma
ED (CPP, PMG & Contract Closing), New Delhi



S. Raj Sabapathy
ED (CBU), Bengaluru



A.M.V. Yugandhar
ED (HEP), Bhopal



Rajiv Garg
ED (CDT), Noida



R.K. Tiwari
ED (EDN), Bengaluru



N.R. Edkie
ED (CFFP), Haridwar



V.K. Chohan
ED (IO), New Delhi



Dr. Umakant Choudhury
ED (CTM), New Delhi



K. Mysiah
ED (BAP), Ranipet



Sandeep Narang
ED (PE&SD), Hyderabad



K. Purswani
ED (COM), New Delhi