



Growth & Innovation

The cornerstone
of a dynamic enterprise



3rd April, 2012

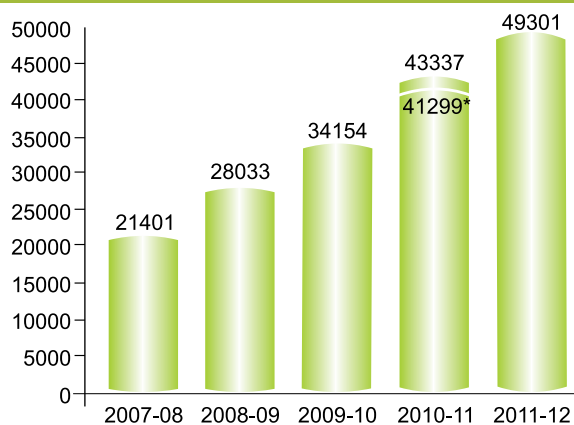
Press Conference Address by

Shri B. Prasada Rao

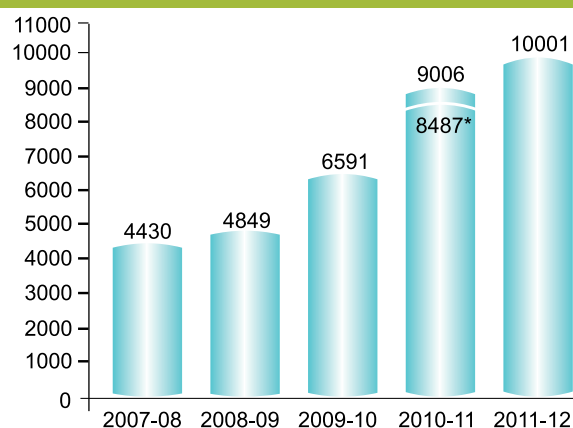
Chairman & Managing Director, BHEL

to share the company's Performance Highlights during 2011-12

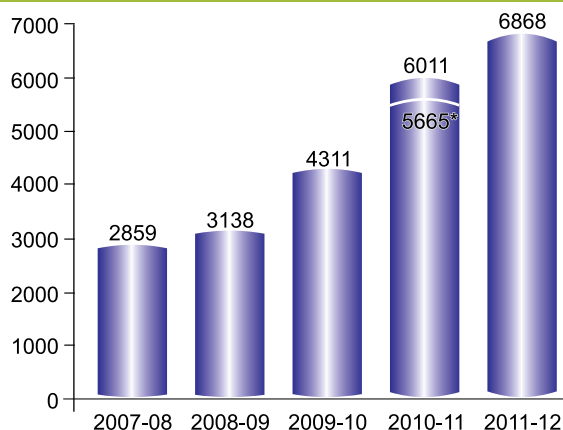
Turnover (₹ in Crore)



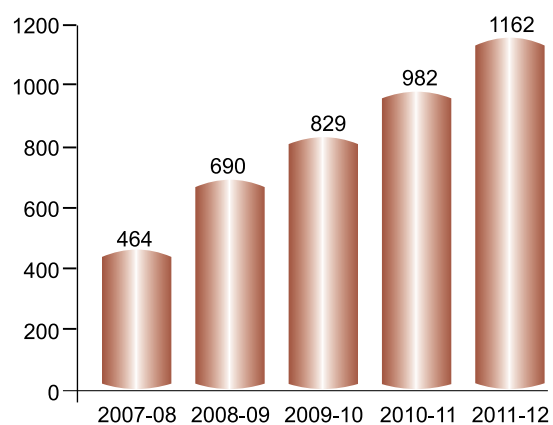
Profit Before Tax (₹ in Crore)



Net Profit (₹ in Crore)



R & D Investment (₹ in Crore)



Note: *Excluding onetime impact of change in policy related to provisions for warranty obligations for earlier years

Record Performance under difficult market conditions

- Financial - Highest turnover and profit
- XI Plan capacity addition - nearly double of that achieved in X Plan period
- Increased focus on Engineering and R&D - highest R&D expenditure and highest patents/copyrights filed

	2010-11	2010-11*	2011-12 (Provisional)	% Change
	(A)	(B)	(C)	(C/B)
Turnover (₹ Crore)	43,337	41,299	49,301	↑ 19.4
Profit Before Tax (₹ Crore)	9,006	8,487	10,001	↑ 17.8
Net Profit (₹ Crore)	6,011	5,665	6,868	↑ 21.2
Net worth (₹ Crore)	20,154	19,808	24,947	↑ 25.9
Earnings Per Share (₹) @	24.56	23.15	28.06	↑ 21.2
R&D Investment (₹ Crore)	982	982	1,162	↑ 18.3

Note: * Excluding onetime impact of change in policy related to provisions for warranty obligations for earlier years
@ Calculated on post split on number of shares for 2010-11 on like to like basis

Major Highlights

Technology & Innovation

- Highest no. of 351 Patents/Copyrights filed in a year – a patent a day
- R&D investment at Rs. 1162 Crore – 18% higher than the previous year
- Established Four new Centres of Excellence, taking the total tally to 13
- BHEL's space-grade Solar Panels for high power applications successfully deployed in ISRO's high power communication satellite GSAT-8, launched recently from French Guyana

Marketing Accomplishments

New Orders

- Existing customers repose confidence with new orders - 2x660 MW Supercritical sets from DB Power (MP) Ltd., 2x660 MW Steam Generator order for Mauda supercritical thermal project of NTPC and for new rating thermal set of 300 MW from Abhijeet Projects Ltd.
- Main plant equipment package for 2x600 MW Singareni Thermal Power Project from Singareni Collieries Co. Ltd.
- Contract signed with PGCIL for setting up the world's first + 800 kV, 6,000 MW UHVDC multi-terminal transmission system to supply hydro power across 1,700 kms. (North East to Agra), with highest ever converter capacity, in consortium with ABB
- ONGC reposes confidence in BHEL by placing an order for 6 nos. state-of-the-art AC Drilling Rigs
- Bagged Single largest Raw Material Handling System (RMHS) order worth Rs.1,395 Crore from NMDC
- Maiden entry into 765 kV substation segment with

order for 765/400 kV substation at Raichur from PGCIL

Product Offerings

- Introduced new rating 300 MW sets, further enhancing our range of thermal sets on offer in subcritical as well as supercritical range
- First time in the country new rating 525 MW thermal sets commissioned
- Achieved stabilization of CFBC boiler technology under Indian conditions with India's largest 250 MW CFBC boiler and two 125 MW CFBC boilers
- India's first and highest rating indigenously developed 1200 kV class Transformer successfully test charged to cater to 1200kV UHVAC Transmission Systems

International Ventures

- Export orders from 21 countries
- Forayed into a new market – Ukraine
- Power & Transmission projects commissioned in Oman, Taiwan, Nepal & Afghanistan
- Executing 24 nos. contracts in 19 countries across the world

Operational Excellence & Quality

- 9 Power Stations out of 12 and 10 power stations out of 13 equipped with BHEL equipment were awarded with Govt. of India's National Awards for Meritorious Performance for the years 2009-10 & 2010-11 respectively, reinforcing the reliability and quality of BHEL equipment
- BHEL sets contributed 69% of the power generated in the country in FY 2011-12
- Consistent Operating Availability of 500 MW thermal sets at more than 90% for last five years

Strategic Initiatives

New Strategic Plan

- Crafted a new Strategic Plan for the period 2012-17 to steer the company with a vision of becoming a global engineering enterprise
- Offerings in Power Sector would be expanded by building EPC capability
- Focus would be on Transportation, Transmission, Defence, Renewables, Nuclear and Water segments

Focus on Renewables

- Sets new record in SPV business - 15 MWp of Solar Power Plants installed across the country
- Two eco-friendly Grid-Interactive Solar Power Plants of 5 MWp for IOCL & 3 MWp for KPCL

Commissioning

- Highest ever commissioning achieved by BHEL for Utilities totaling to 8,410 MW. This includes 8,138 MW of capacity addition (29% higher than last year) and 272 MW synchronized & awaiting clearance from utilities for capacity addition
- BHEL commissioned 13 sets of 500 MW during the year against previous high of 8 sets

Accolades

- 'SCOPE Meritorious Award for R&D, Technology Development and Innovation' was presented to BHEL by the Hon'ble President of India, Smt. Pratibha Devisingh Patil
- 'MoU Excellence Award 2009-10' as the Top

Performing CPSE in 'Industrial Sector' was presented to BHEL by the Hon'ble Prime Minister of India, Dr. Manmohan Singh

- Only PSU to be conferred the NDTV Profit Business Leadership Award for the second year in succession
- Awarded EEPC's Top Export Award for Project Exports for the twenty second year in succession
- Ranked as the Best Engineering company to work for in the Engineering & Automotive category by Business Today magazine



CMD BHEL receiving 'SCOPE MoU Award for Excellence & Outstanding Contribution to Public Sector Management 2009-10' from the Hon'ble Prime Minister

Performance Details

BHEL completed another successful year 2011-12, in the backdrop of subdued investment climate in the country, deferment of orders in its business areas and demand contraction in the economy adversely affecting the Engineering & Capital Goods Industry. The company withstood all these pressures because of its inherent strength and strong fundamentals

Financial Performance

- BHEL notched up its highest-ever turnover of Rs. 49,301 Crore, registering a growth of 19.4% over the previous year. Profit Before Tax (PBT) surged 17.8% at Rs. 10,001 Crore, during the year, compared to Rs. 8,487 Crore in the year before
- Net Profit (PAT) rose 21.2% at Rs. 6,868 Crore against Rs. 5,665 Crore in the previous year. During the year highest ever interim equity dividend of 136% was paid for 2011-12, maintaining the track record of paying dividends uninterrupted since 1976-77
- Earnings Per Share (EPS) stood at Rs. 28.06 an increase of 21.2% over that of 2010-11
- Net Asset Value (NAV) per share stood at Rs. 101.9 reflecting the intrinsic strength of the company

- Total export turnover (Physical + Deemed) touched Rs. 22,014 Crore
- Note: * Excluding onetime impact of change in policy related to provisions for warranty obligations for earlier years



CMD, BHEL presenting the Interim Dividend cheque for FY 2011-12 to Hon'ble Union Minister of Heavy Industries & Public Enterprises.

Marketing Achievements

Orders Inflow

Despite stagnation in the power sector and intense competitive pressure in domestic and overseas markets, BHEL secured orders worth Rs. 22,096 Crore, during the year. At the end of the year, cumulative orders in hand for execution in 2012-13 and beyond, stand at about Rs. 1,34,681 Crore.

- From being one of the most rapidly growing sectors till last year, the power sector in India has witnessed a sharp slowdown during 2011-12. Project developers are facing numerous constraints which have affected on-going as well as new projects due to factors like Coal allocation, Gas allocation, Environmental clearance, Land acquisition, Financing, Legal issues, etc. As a result, the bidding process of many projects was delayed and many projects, for which bids had been opened more than a year ago, could not be concluded
- In the **Power Sector business** segment, BHEL continued to demonstrate its competitiveness by bagging most of the Power Plant & associated equipment orders placed during the year, in the country. Orders worth Rs. 13,937 Crore were secured during the year

Significant orders received in the Power sector include:

- *Main plant equipment package for 2x660 MW Singrauli Supercritical power project from DB Power (MP) Ltd.*
- *Main plant equipment package for 2x600 MW Singareni Thermal Power Project from Singareni Collieries Co Ltd.*
- *2x660 MW Steam Generator order for Mauda supercritical thermal project of NTPC against bulk tender*
- *First ever order for new rating thermal set of 300 MW rating from Abhijeet Projects Ltd.*

- In its **Industry Sector business** segment, BHEL secured orders worth Rs. 8,782 Crore for a wide variety of products and systems for application in Captive Power, Transportation, Transmission, Oil & Gas, Renewable Energy and other Industrial Sectors, thus strengthening its diversification efforts in non-Power business

Significant orders received in the Industry Sector include:

- **Continued Customer Confidence** - 4 STGs (3x32 MW for Vilayat & 1x20 MW for Harihar) from Grasim Pulp & Fibre Division; 2xFr6B GTGs from Reliance and 6th Fr6B GTG from IOCL, Vadodara
- **First Fr6FA GTG-based Cogen plant order from KRIBHCO** against stiff competition from Thermax, Siemens & Ansaldo. This is also BHEL's first GTG order with Chiller for enhanced power output.
- **Bagged Single largest Raw Material Handling System (RMHS) order** worth Rs.1,395 Crore from NMDC for their 3 MTPA Integrated Steel Plant being set up at Nagarnar, Chhattisgarh
- **Bagged Single largest order** for 85 sets 25 kV AC EMU (Conv.) from ICF, Chennai and for 870 sets of Wheel and Axle assembly from the Railway Board
- **Secured Major order for supply of 6 nos. state-of-the-art AC Drilling Rigs from ONGC**, received after a gap of 18 years. Rigs with AC drives are the latest trend worldwide, as rig operation becomes more efficient due to high power factor of AC motors
- **Record orders for motors** from CHP/AHP suppliers for 217 motors and for 15 nos. 980-6500 KW motors from Manikgarh Cement. 9 new customers added in the industrial motors business, which significantly enhanced business reach



On-shore AC drilling rigs

- **Secured orders for 765/400 kV substation at Raichur, 400/220 kV Aurangabad substation & 400 kV Wardha substation Extn. package from PGCIL**, against stiff competition. The 765/400 kV substation order has paved the

way for BHEL's maiden entry into the 765 kV substation segment

- **Secured orders for 14 nos. 285 MVA, 400 KV Generator Transformers** for KAPP and RAPP nuclear power plants of NPCIL
- **Secured orders for 28 nos. Power Transformers** from PSTCL of 100 MVA, 220/66kV and 12 nos. 160 MVA, 220/66kV, 19 nos. 160 MVA, 220/132kV Auto Transformers and 32 nos. 132kV Transformers from MPPTCL
- **Breakthrough** in NTPC for supply of busducts through competitive route. BHEL secured orders for 7 sets of busducts for NTPC's 660 MW projects at Mauda, Solapur and Nabinagar

- In **International Business**, the year 2011-12 witnessed unforeseen turmoil in various parts of the globe impacting BHEL's international business prospects. The widespread financial instability in Europe and political volatility in Middle East & North Africa (MENA) region has caused delays in financial closure & project financing resulting in postponement of finalisation of new projects. This recent political and civil unrest in the MENA region and increasing security concerns have adversely affected business prospects in our traditional markets. In spite of such difficult and uncertain trends, BHEL has made persistent efforts in maintaining its volume of international business. Though certain large orders expected to be finalised during the year were delayed, concerted efforts have helped us maintain our footprints with orders from 21 countries across the world

Significant orders received in International business include:

- ❖ **Ukraine - Entry into new market** - BHEL made its maiden entry into Ukraine by securing an order for a 27 MW Steam Turbine Generator (STG) package from the ArcelorMittal group. BHEL has secured order for Steam Turbine from a European country after a gap of 15 years. This order has opened up new business opportunities in the CIS market
- ❖ **Single largest export order for Transformers** - BHEL secured the single largest export order for transformers for Punatsangchhu-I Hydroelectric Project, Bhutan



PDO Amal Site in Oman

- ❖ **Letter of Intent received for 6x170 MW Punatsangchhu-II Hydroelectric Project, Bhutan**
- ❖ **Repeat order for Motors from Kenya** - Winning the confidence of existing customers, BHEL secured repeat orders for Motors from Mombasa Cement Ltd., Kenya for supply of 2500 kW and 1400 kW Slip Ring Induction Motors
- ❖ **New product in existing market - Wellheads from Georgia** - For the first time, an order for Wellheads has been secured from the CIS market. This is also the maiden export order for Wellheads from Georgia and has been received from the Jindal Petroleum Operating Company. This will enhance BHEL's prospects in the CIS market for oilfield equipment
- ❖ **Footprints strengthened in 21 countries across the globe** - Orders for other products including revival of 15 MW STG from Indonesia, transformers from Iraq, motors from Bangladesh, Yemen and Nigeria and soot blowers from UAE have been secured
- ❖ **Continued focus on After Sales Services led to orders for Spares & Services** from different parts of the world including Australia, Bangladesh, Bhutan, Georgia, Indonesia, Iraq, Kazakhstan, Malaysia, Malta, Oman, Saudi Arabia, Sri Lanka, UAE, United States, Vietnam and Yemen

Strategic Business Initiatives

Strategic Alliances

Aimed at maximising business through mutually beneficial strategic tie-ups, BHEL signed / formalized the following alliances during the year:

- BHEL's Joint Venture Company with

Karnataka Power Corporation Ltd. (KPCL) - Raichur Power Corporation Ltd. achieved financial closure for the 2x800 MW Yeramarus power plant in November, 2011. The equity has been subscribed to the extent of 50% by KPCL, 26% by BHEL and 24% by IFCL. Debthas been tied up with PFC and a consortium of commercial banks. The JVC has already placed the order on BHEL for main plant equipment

- An MoU was signed with HMT (International) Ltd. for cooperation in enhancing overseas business
- An MoU has been signed with PT. Mega Urip Pesona, Indonesia for setting up a 2x200 / 2x250MW coal fired steam power plant in Indonesia
- An MoU has been signed with the Govt. of South Sudan for setting up a 4x70 MW thermal power plant on EPC basis in South Sudan
- An MoU has been signed with M/s. Welter Zahnrad, GmbH, Germany, for the supply of internals for Gear Boxes, used in Pulverisers

Capacity Augmentation & Asset Modernisation

- BHEL made a capital investment of Rs. 1,068 Crore during 2011-12 towards augmentation of manufacturing capacity and modernisation of facilities in manufacturing units and at power project sites
- Focused attention was given on rebuilding and retrofitting of existing facilities to enhance their life, accuracy and productivity through an additional investment of Rs. 76 Crore
- In the XI Plan period (2007-12), BHEL has made a capital investment of Rs. 6,246 Crore

as against Rs. 1,092 Crore in the X Plan- a six-fold increase. During this period, BHEL has:

- Enhanced its capability to deliver power plant equipment from 6,000 MW to 20,000 MW per annum
- Established 3 new plants viz. Centralised Stamping unit, Jagdishpur; New Fabrication Plant at Jagdishpur and Power Plant Piping unit at Thirumayam
- Augmented manufacturing capacity for AC locos from 30 to 50 nos. per annum
- Enhanced transformer manufacturing capacity from 23,500 MVA to 45,000 MVA per annum

Focus on Renewables

- BHEL has been contributing to the national effort for developing and promoting renewable energy based products on a sustained basis. During the year, the company set a new record in its Solar Photovoltaic (PV) business, by commissioning 15 MWp of Solar Power Plants in various parts of the country. This includes 5 MWp IOCL Phalodi, 3 MWp KPCL Raichur, 2 MWp India Bulls Power Ltd Bareilly, 4MWp India Bulls Power Ltd, Katol, and 1.18 MWp in Lakshadweep. These projects are based on Crystalline Silicon Photovoltaic (cSi PV) technology which is well proven and has the longest operational experience across the world
- Under the aegis of the National Mission on Clean Coal Technology, BHEL, in association with IGCAR, NTPC and other organizations, is developing Advanced Ultra Supercritical Technology with MS/RH temperature of 700°C and MS pressure of 300 ata. Once operational, plants based on this technology will operate at efficiency exceeding 45% under Indian ambient conditions
- An MoU has been signed with IOCL and IIT-Rajasthan for joint development work in the Concentrated Solar Power (CSP) area. Products and systems developed under this joint effort will be tested and demonstrated at the Solar Field being created at IIT-Rajasthan's upcoming campus at Jodhpur.
- BHEL continued its commitment towards environment conservation with the completion of several Environment Improvement Projects (EIPs). These projects helped in enriching the environment, conservation of precious resources like energy, water, fuel oil, coolant,



Sh. Praful Patel inaugurating the new state-of-the-art Electrical Machines Shop at BHEL Bhopal



Country's Largest Diesel Grid-Interactive Solar Power Plant of 760 kWp capacity, commissioned by BHEL at Lakshadweep

lubricant, mitigating environmental pollution. Major EIPs included plantation of trees in and around units/sites, rainwater harvesting projects and energy & resource conservation projects, utilization of non-conventional energy sources, noise level reduction system, chemical storage & handling system, etc.

Operational Achievements

Project Commissioning

- Highest ever commissioning achieved by BHEL for Utilities totaling to 8410 MW. This includes 8138 MW of capacity addition (29% higher than last year) and 272 MW synchronized & awaiting clearance from utilities for capacity addition. In addition, BHEL also commissioned 535 MW of captive/industrial sets in the country and 325 MW in the overseas market taking the total commissioning /synchronization to 9270 MW during the year
- Significantly, thermal and hydro units with a cumulative capacity of 1,625 MW were commissioned at various power stations across the country in a span of just 24 hours
- During the XI Plan period BHEL commissioned 25,385 MW of Utility sets against 13,613 MW achieved in X Plan period
- The installed capacity of BHEL supplied Utility sets went past the **One Lakh MW mark totaling to 1,06,202 MW** and BHEL maintained its lion's share in the country's total installed capacity of 1,80,413 MW
- Full load operations of NTPC Simhadri Unit 4 achieved within 6 hrs of synchronization indicating BHEL's equipment reliability and commissioning prowess.
- For THDC India Ltd, 100% targeted capacity



153 MW Captive Power Plant commissioned by BHEL in GGS Refinery

addition was achieved during the XI plan despite flooding at Koteswar power station of THDC

- BHEL has achieved 100% commissioning in Private sector, for both thermal & hydro projects against the 11th plan target.
- India's largest 250 MW CFBC boiler, set up at Neyveli for NLC, has achieved full-load operation using lignite. After commissioning the same has been handed over to customer for commercial operation
- In addition, two 125 MW CFBC boilers have been set up at Barsingsar for NLC which are fired by Palana lignite characterized by high shrinking ash
- BHEL's first 1xFr-9 FA Gas Turbine-based Combined Cycle Power Plant (CCPP) of GSEGL commissioned at Hazira (351 MW) Gujarat during the year followed by 2xFr-9 FA CCPP of PPCL at Pragati-III (750 MW- Module 1) Delhi
- BHEL commissioned 13 sets of 500 MW during the year against previous high of 8 sets



250 MW CFBC Boiler at Neyveli. Largest of its kind in India & also in South Asia



*490 MW (Unit 5) of NCTPP Dadri commissioned by BHEL
- the winner of GOI's National Award for Early Completion*

- 490 MW National Capital Thermal Power Project Dadri Unit-5 of NTPC Ltd., supplied and commissioned by BHEL, was awarded with the Government of India's National Award for Early Completion
- BHEL has established a multi-modal logistics system for safe transportation of sophisticated ODC consignments

Major power projects commissioned include:

- ❖ 2x525 MW Unit-1&2 for Maithon Power Ltd
- ❖ 2x500 MW Unit-1&2 for DVC Durgapur
- ❖ 1x500 MW for APGENCO Kothagudem
- ❖ 1x500 MW for KPCL Bellary-2
- ❖ 2x500 MW Unit 4&5 for MSPGCL Bhusawal
- ❖ 1x500 MW Unit-2 for APCPL Jhajjar
- ❖ 1x500 MW for MSPGCL Khaperkheda
- ❖ 1x500 MW Unit-1 for DVC Koderma-1
- ❖ 1x250 MW Unit-6 for WBPDCS Santaldih
- ❖ 1x250 MW Unit-8 for UPRVUNL Harduaganj
- ❖ 1x250 MW Unit-1 for NLC Neyveli TS-2 Expn



2x525 MW Right Bank Maithon Project

- ❖ 351 MW CCPP for GSEGL Hazira
- ❖ 1x250 MW STG-1 for PPCL Pragati
- ❖ 1x500 MW Unit-1 for NTECL Vallur
- ❖ 1x500 MW Unit-4 for NTPC Simhadri
- ❖ 2x100 MW Unit-3&4 Hydro set for THDC Koteshwar
- ❖ 1x37 MW for APGCL Lakwa
- ❖ 2x126 MW GTGs in Oman
- ❖ 1x63 MW Hydro set in Taiwan
- ❖ 2x5 MW Hydro sets in Nepal
- ❖ 153 MW CCPP for GGSRL Bhatinda
- ❖ 1x50 MW STG for Facor Power
- ❖ 1x48 MW STG for India Cements
- ❖ 1x33 MW STG for GNFC
- ❖ 1x28 MW STG for Siruguppa Sugars & Chemicals
- ❖ 1x25 MW STG for ACC Wadi
- ❖ 1x20 MW STG for Basai Steel
- ❖ 1x17.5 MW STG for Maruti Suzuki
- ❖ 1x80 MW STG Monnet Ispat
- ❖ 1x60 MW STG My Home Industries
- ❖ 1x20 MW STG CPCL Chennai

Equipment Performance

- Nearly 75% of the country's total generation of 612 Billion Units from Thermal Utility Sets was contributed by BHEL supplied sets. Similarly 42% of country's generation from Hydro sets and 66% of country's generation from Nuclear sets was contributed by BHEL sets.
- BHEL make 200-500 MW thermal sets, which form the backbone of the country's thermal generating capacity, operated at a PLF and OA of 79% and 89% respectively. Of these, 14 stations achieved PLF of over 90%. (Budge-Budge, Dahanu, Amarkantak, Lehra Mohabbat Bhatinda etc).
- Consistent availability above 90% for last five years for 500 MW thermal sets.
- 152 BHEL coal based sets achieved OA higher than 90%.
- 221 BHEL supplied coal based sets clocked uninterrupted operation of more than 90 days during the year out of which, 47 sets ran twice continuously for more than 90 days and 14 sets continuously ran for more than 200 days.
- BHEL Nuclear sets registered an OA of 90.9% and PLF of 76.1% in 2011-12 against OA of

82.7% and PLF of 63.2% in 2010-11.

- 10 Nuclear sets with BHEL equipment ran continuously for more than 90 days during the year
- 9 Power Stations out of 12 and 10 power stations out of 13 equipped with BHEL equipment were awarded with Govt. of India's National Awards for Meritorious Performance for the years 2009-10 & 2010-11 respectively, reinforcing the reliability and quality of BHEL equipment

Customer focused services

- BHEL reinforced its commitment in providing prompt and efficient service to its customers aimed at facilitating uninterrupted power supply and keeping power plants in good running condition. During the year, BHEL overhauled 140 thermal utility/captive sets
- Responding to the customer's emergency call, BHEL took up on war footing and completed the restoration of Unit-1 of Chukha Hydro Electric Project (HEP) in Bhutan in just nineteen days. Replacement of critical components of Units 1&2 of Tala HEP was also carried out to the satisfaction of the customer.
- Rehabilitation of Devighat HEP, Nepal (3X5 MW) completed successfully within 247 days against the planned schedule of around 270 days
- Despite challenging conditions, BHEL successfully completed setting up of the 220/110 kV Kabul Substation Project in Afghanistan. An appreciation letter has been received from the customer
- Customer UJVN Ltd appreciated the annual maintenance activity of Chilla Power House which was achieved on time for first unit and before time for other two units resulting in their successful full load operation.
- BHEL developed & commissioned Isolation Logic in Jojobera Units-1,2&3 preventing frequent collapse of internal grid of Tata Steel in case of any disturbance in DVC grid

Technology & Innovation

The R&D efforts of the company are aimed at improving the performance and efficiency of existing products, and also developing new products using state-of-the-art technologies and processes. Focus is on the relevance to the needs of the country to remain contemporary both in

terms of technology & features vis-à-vis global benchmarks.

- BHEL pursued aggressive in-house efforts and encouraged innovation in line with the 'Decade of Innovations (2010-2020)' declared by the Govt. of India. As a result, R&D investment of the company has registered 18% growth over the last financial year at Rs. 1,162 Crore. A growth of 22% has been recorded in turnover from in-house developed products and services that clocked a turnover of Rs. 9,512 Crore, which is around 19.3% of the turnover of the company
- BHEL also filed the highest-ever patents and copyrights in a year, enhancing the company's intellectual capital to 1786 patents and copyrights filed, which are in productive use.
- In order to facilitate advanced R&D activities in focused areas with state-of-the-art facilities and specialized manpower, BHEL has established **13 Centers of Excellence**. These Centers have been focusing on development of new products, processes, analytical tools for improvements in design, enhancing efficiency and life cycle in existing products, meeting the company's and national requirement of developing new products and systems for both industrial and strategic applications. During the year, BHEL has established four new Centres of Excellence, in the areas of:
 - Advance Fabrication Technology
 - Coal Research Centre
 - Nano Technology application
 - UHV lab for GIS development
- An MoU has been signed with Indian Institute



Centre for Nano Technology

of Science (IISc), Bangalore, covering a broad area of joint research opportunities to facilitate BHEL to engage in collaborative research. This aims at accelerating the pace of development and demonstration of new products, systems and concepts

Some of the significant developments during the year include:

- v As part of its endeavour to offer the most contemporary products & technologies to customers, BHEL has successfully designed, manufactured and commissioned India's highest voltage Power Transformer of 1200 kV 333 MVA rating at the 1200 kV National Experimental Substation of PGCIL. The Single Phase Interconnecting Transformer has been developed and manufactured with in-house engineering and manufacturing technology.
- v First 400/220/33kV 500 MVA Auto Transformer manufactured by BHEL for POWERGRID has been tested successfully.
- v The first 765 kV 80 MVA single phase Shunt Reactor developed with in-house technology has been tested successfully as per IEC standard.
- v BHEL has introduced new rating 300 MW thermal sets, with an improvement of 3% in heat rate over the existing 270 MW rating, leading to more efficient and environment-friendly power generation. BHEL has already won its first order for this rating for Visakhapatnam TPP from the Abhijeet Group through competitive bidding
- v BHEL has developed India's largest 15 MVA, 33/6.9 kV, 3 phase, 50 Hz, Natural Air cooled Dry Type Cast Resin Transformer. The new transformer offers advantages over conventional oil filled transformers in respect being free from the risk of fire and being maintenance-free. The transformer will be used for supplying power to huge dredgers employed for open cast coal mining for continuous extraction of coal for Ultra Mega Super Thermal Power Project.
- v For the nation's first Prototype Fast Breeder Reactor based power plant, new systems have been engineered for the first time to cater to specific needs of safe and reliable operation of the plant, such as OGDHR [Operation Grade Decay Heat Removal System], SGTSDC [Steam Generator Tube Side

Depressurisation Circuit], etc. In-house capabilities have been utilised to complete mechanical, electrical and C&I design for various regimes of operation and to ensure reliable and safe operation of these critical subsystems

- v An indigenous design & manufacturing capability has been established for Main steam stop valve for 660 MW supercritical power plant applications. A cost-effective, new design variant of Swing Check Non return Valve has also been developed to take care of sudden pressure surge during valve opening required for water storage down comer lines of 660 MW Supercritical Boilers and economizer inlet line of 600 MW Projects
- v Continually striving to improve the economies of solar PV systems, BHEL has developed an optimized printing process for solar cells for achieving higher aspect ratio (Grid line height / Grid line width) resulting in an all-time high solar cell conversion efficiency of 18% along with enhanced PV module output from 227 W to 240 W. BHEL has also developed a new LASER based isolation technique adopted for removal of junction at edges of crystalline silicon solar cells leading to enhancement of yield to 99% and gain in efficiency
- v As a reliable partner in ISRO's space program, BHEL achieved a major landmark with the successful deployment of its Space Grade Solar Panels on the GSAT-8 satellite. Launched from French Guyana, the satellite is ISRO's heaviest satellite, weighing in at about 3100 Kg at lift-off. The four Solar Panels supplied by BHEL for GSAT-8, have an area of over 5 sq. mtrs. each, totalling to around 21 sq. mtrs. and comprise multi-junction Solar Cells in series and parallel combinations, with a total power capacity of 4.5 kW. BHEL has supplied 51 Space Grade Solar Panels totalling to 221 sq. mtrs. in area for various satellites of ISRO, which are deployed on INSAT 3A, INSAT 3E, GSAT 2, GSAT 3, GSAT 4, IRSP 5 and EDUSAT satellites, now in orbit
- v In its efforts at automating fabrication processes, BHEL has automated the welding process for 'Manufacture of Bifurcate Components' used in re-heater coils and low temperature super heater coils (LTSH) of fossil boilers. The automated process has enhanced productivity and lowered defect rate.



1200 kV, 333 MVA Ultra High Voltage Auto Transformer

- v With an endeavour to remain contemporary in technology, BHEL has implemented state-of-the-art IEC61850 protocol on C&I platform to address compatibility at control panel as well as Human Machine Interface sides that allows seamless integration of various third party IED's (Intelligent Electronic Device) in Hydro Power Plants
- v **For the benefit of its customers** in terms of improved product life, a cost-effective new variety of 'Ceramic Liners for Coal Nozzle Tips' having better thermal shock resistance, has been developed for the first time in India. These liners have enhanced the life of nozzle tips and shall also be deployed in 660/ 800 MW supercritical power plants

Human Resource Accomplishments

Work force & Talent Management

- In line with changing market requirements, the knowledge and skills of BHEL employees are continuously upgraded. Developmental programmes for 15.10 mandays per employee were conducted during the year. In addition, 1,916 customer personnel were trained at various units
- Manpower is being ramped up in a commensurate and timely manner and - 4,771 persons have been recruited in 2011-12. With this, BHEL has recruited more than 20,000 people at various levels in the last five years.
- In Talent Management, Competency Assessment remained an area of focus during the year. For the senior leadership, Development Centres were organized for assessment of leadership competencies based on BHEL's Leadership Competency Framework. Around 160 senior executives at



Hon'ble Prime Minister of India with Shram Award Winners

the level of GM and AGM were covered through this exercise. Based on the assessment, competency gaps have been identified and Individual Development Plans have been created to bridge the gaps. In addition, competency assessments were carried out for around 900 junior and middle level executives using a Psychometric tool, based on which areas for development have been identified. Going forward, the assessment data will also be used for our Career and Succession Planning processes.

- To gauge and improve employee commitment, an Employee Engagement survey was conducted which has thrown up areas for improvement in various HR processes. Action Plans are being finalized to address these areas
- Industrial Relations continued to remain cordial contributing to production and productivity. Thrust on participative culture continued during the year through the apex level bipartite forum, 'Joint Committee'

Corporate Social Responsibility

- BHEL is a committed Corporate Citizen fully alive to the need of building synergy between business and Corporate Social Responsibility (CSR) as an integral part of its business strategy. As part of this, during the year, BHEL undertook socio-economic and community development programmes to promote education, improvement of living conditions, health and hygiene in villages and communities located in the vicinity of its manufacturing plants and project sites spread across the country



Mid Day Meal Van funded by BHEL as part of CSR Initiatives

- Reaching out to the distressed victims in the earthquake-ravaged areas of Sikkim, BHEL has made a humble contribution to help alleviate their suffering
- BHEL reiterated its commitment to the **United Nations' Global Compact Programme on CSR** and continued to play a lead role in promoting the set of core values enshrined in its ten principles on human rights, labour standards, environment and anti-corruption. It intends to advance these principles within its sphere of influence and has made it a part of its strategy, culture and day-to-day operations and demonstrated its commitment through regular pooling of communication of progress (COP) on the United Nations Global Compact website and by organizing National Conventions to disseminate the concepts of Global Compact
- As part of social commitment, 7,941 Act Apprentices were trained in the company. In addition, 8,419 students/trainees from various professional institutions underwent vocational training

Accolades

Continuing its tradition of winning prestigious national/ international awards, the organisation and its employees won several awards during the year. Notable among these included:

- **'SCOPE Meritorious Award for R&D, Technology Development and Innovation'**. The award was presented by the Hon'ble President of India, Smt. Pratibha Devisingh Patil to CMD, BHEL
- **'MoU Excellence Award 2009-10'** as the Top Performing CPSE in 'Industrial Sector'. The award was presented by the Hon'ble Prime



CMD, BHEL receiving SCOPE Excellence Award in Individual Category' from the Hon'ble Prime Minister of India

Minister of India, Dr Manmohan Singh to CMD, BHEL

- BHEL became the only PSU to be unanimously selected for the **'NDTV Profit Business Leadership Award'** for the second year in succession. The award for 2011 was conferred to BHEL in the industry vertical of 'Engineering'
- BHEL was conferred the maximum number of **3 'ICWAI National Awards for Excellence in Cost Management'**, among public and private sector companies for 2010. BHEL was awarded the recognition for the sixth successive year
- **'Essar Steel Infrastructure Excellence Award 2011'** was awarded to BHEL by CNBC TV18
- **3 'National Safety Award'** to BHEL's Hyderabad and Trichy units for outstanding achievements in terms of longest accident free period and lowest accident frequency rate at their works
- Under the **Rolta Corporate Awards 2010** of Dun & Bradstreet, BHEL was selected as the **top Indian company under the 'Engineering / Capital Goods' sector**
- The **'Intellectual Property Award 2011'** was conferred on BHEL by CII
- BHEL also won the **'Golden Peacock Award for Occupational Health & Safety 2011'** and the **'Golden Peacock Award for Innovation Management 2011'** in the Manufacturing Sector category
- BHEL was awarded the **'EXIM Achievement Award'** in the Import Category by the Tamil Chamber of Commerce.



CMD, BHEL receiving the NDTV Profit Business Leadership Award 2011 in the Engineering category from Hon'ble Union Minister for Finance



Mr Anand Sharma Hon'ble Union Minister for Commerce & Industry presenting the Intellectual Property Award 2011 to Mr B Prasada Rao CMD BHEL

- Other awards include '**Dainik Bhaskar India Pride Gold Award 2011**' for excellence in Central and State Public Sector Enterprises in the category of Heavy industries; '**Gentle Giant**' Award from the Dalal Street Investment Journal and '**Enertia Award 2011**' under the category Technology & Innovation for Conventional Energy (Thermal, Nuclear, etc.)
- For its outstanding export performance, BHEL has won the Engineering Export Promotion Council (EEPC)'s **Top Export Award** for the twenty second year in succession.
- BHEL has been ranked the **Ninth Most Innovative Company in the world** by the renowned US business magazine **Forbes**. Significantly, BHEL is the only Indian engineering company on the list, and is ranked much higher than similar multinational companies in the power equipment field.
- BHEL was recognised as the '**Best Engineering Company to Work For**' in the Engineering & Automotive category by Business Today magazine.
- Continuing its winning streak in the **CII Exim Award Scheme for Business Excellence** as per the globally recognised model of European Foundation for Quality Management, three units of BHEL namely HPEP Hyderabad, EDN Bangalore and Power Sector Eastern Region won the 'Commendation for Significant Achievements in TQM'. In addition, its BAP Ranipet Unit, was awarded 'Commendation for Strong Commitment to Excel'.
- 3 Quality Circles won **Gold Medals** for their case studies at the International Quality Circle Conference (ICQCC – 2011) held in Yokohama, Japan.
- **8 Prime Minister's 'Shram Awards'** including 2 '**Shram Bhushan**' and 5 '**Vishwakarma Rashtriya Puraskars**.
- **The following awards in individual category conferred on CMD, BHEL:'**
 - **SCOPE Excellence Award 2009-10** in individual leadership category (Maharatna & Navratna PSEs) by the Hon'ble Prime Minister of India, Dr. Manmohan Singh'
 - **Eminent Engineering Personality of India Award** from the Institution of Engineers (India) at the Indian Engineering Congress '**Forbes India Leadership Award 2011**' in the 'Best CEO Public Sector' category'
 - '**Sivananda Eminent Citizen Award-2011**' of the Sanatana Dharma Charitable Trust by H.E. Sh. E.S.L. Narasimhan, Hon'ble Governor of Andhra Pradesh
 - '**9th Wärtsilä Mantosh Sondhi Award**' by Mr. Björn Rosengren, President and CEO, Wärtsilä Corporation for outstanding contribution to the energy sector in India.

Looking Ahead

- Strategic Plan 2012-17, crafted recently, attempts to steer the company with a vision of becoming a global engineering enterprise. It comprises expanding our offerings in the power sector by building EPC capability, focus on industry businesses, expansion of spares & services and adoption of a collaborative approach.
- In spite of the current stagnation in Power Sector, we believe that the power sector will continue to remain a major contributor to our top line with transportation and transmission emerging as the next big business verticals.

We will continue to strengthen our presence in the Nuclear, Renewable and Water segments

- We will continue to sustain our focus on innovation to develop strong capabilities in product development and engineering. To uphold our reputation for excellence in our core capability of 'Engineering & Technology', we will continue to upgrade existing products and systems to contemporary levels and develop new products through continuous in-house efforts as well as through acquisition of new technologies
- In recent years, BHEL has expanded its manufacturing capacity. We are taking various initiatives to streamline our manufacturing value chain for full exploitation of a strong manufacturing base
- BHEL has recruited more than 20,000 highly talented and competent people at all levels during last five years. We are in the process of

reorienting our Human Resource focus to develop not only each person's competencies, but also their performance and potential in alignment with our ongoing business challenges. Leadership development, competency mapping, performance linked pay, career planning and succession planning initiatives are in various stages of implementation

- '6-Point Agenda' viz. Capability Enhancement, Accelerated Project Execution, Product Cost Competitiveness & Quality, Diversification, Engineering & Technology and People Development will continue to drive us for reaping an execution premium to put us ahead of our peers
- Notwithstanding the uncertainties in the business environment and rising intensity of competition, we aspire to reach a turnover level of US\$20 billion dollar by 2017

BHEL's performance in the just concluded year was made possible by untiring efforts of more than 49,000 members of its family and the confidence reposed by its stakeholders. We are grateful to the Ministry of Heavy Industries & Public Enterprises for their unstinted support and policy interventions. I thank all our stakeholders, our friends from the media and my colleagues on the Board for enabling BHEL to scale new heights.

Thank You Customers

“ Heartfelt Congratulations to all employees working with you along with BHEL on achieving Highest Load of 526 MW of DSTPS, Unit # 2 (500 MW) ”



(R.N. Sen)
Chairman

“ First Unit of 525 MW of Maithon Power Project achieved Full Load..... This has been possible due to the unstinted support of BHEL in completing the supplies and providing support in erection and commissioning of the unit ”



(Anil Sardana)
Chairman

“ I take pride in the fact that it has been the toil and dedication of team work of our partners including BHEL that has helped us realize the goal of setting up of a state-of-the-art refinery..... We convey our sincere gratitude and will be glad to associate with BHEL in our future ventures ”



(Prabh Das)
MD & CEO

“ It was a great moment when the 4th unit of Koteshwar HEP was commissioned..... Commissioning within six months could be achieved due to co-operation received from various units of BHEL..... dedicated efforts made on war footing by BHEL teams and the firm support of the Top Management ”



(R.S.T. Sai)
Chairman & Managing Director

Note: Company results for 2011-12 are provisional, subject to audit

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