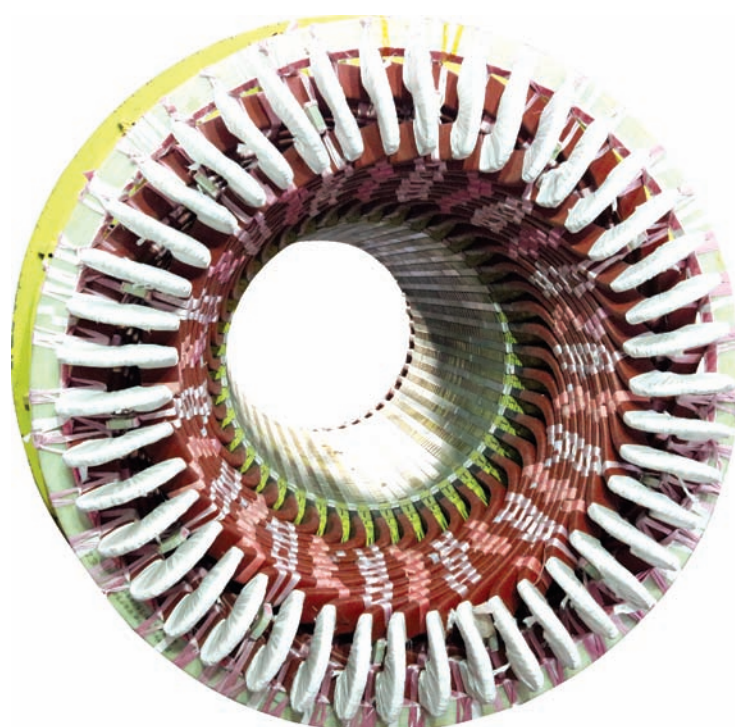
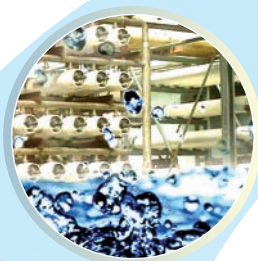




A Maharatna Company



Sustaining Leadership...  
Engineering New Growth Avenues

8<sup>th</sup> April, 2013

Press Conference Address by

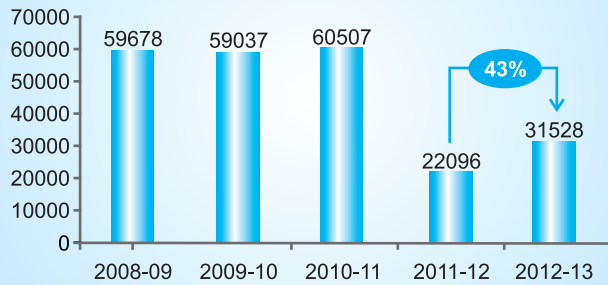
**Shri B. Prasada Rao**

Chairman & Managing Director, BHEL  
to share the company's Performance  
Highlights during 2012-2013

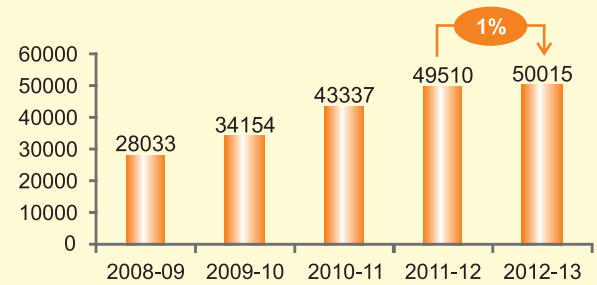


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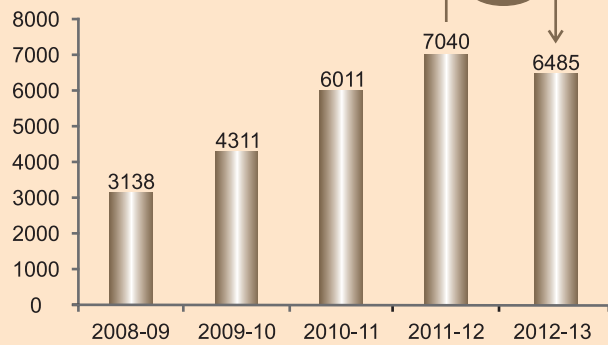
### Order Inflow (₹ in crore)



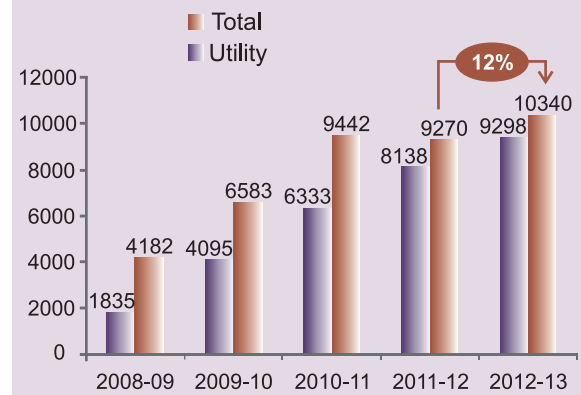
### Turnover (₹ in crore)



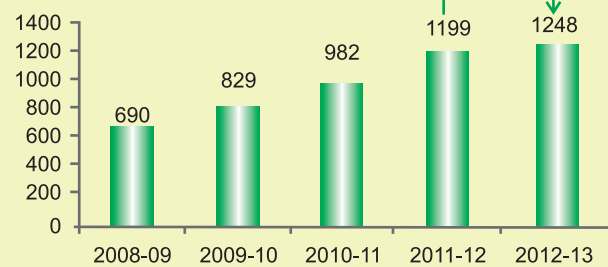
### Profit After Tax (₹ in crore)



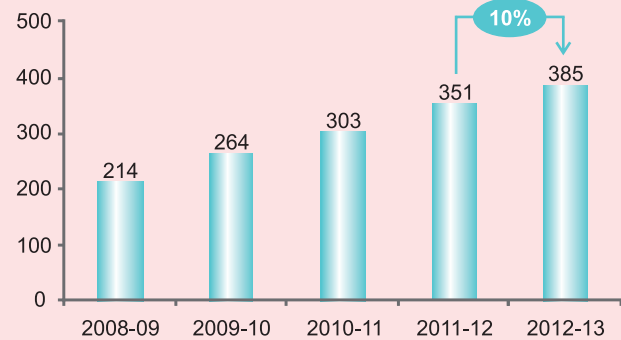
### Commissioning (MW)



### R&D Expenditure (₹ in crore)



### Patents & Copyrights filed (Nos.)



## Sustaining Leadership...Engineering New Growth Avenues

- BHEL a 'MAHARATNA' now
- Highest-ever Turnover – crosses ₹ 50,000 Cr. mark
- Turnover and Net Profit – more than double in 5 years
- Highest addition of generating capacity of 10,340 MW during the year

	2011-12	2012-13 (Provisional)	% Change
Turnover (₹ Crore)	49,510	50,015	1
Net Profit (₹ Crore)	7,040	6,485	(8)
Net worth (₹ Crore)	25,373	30,315	19.5
Earnings Per Share (₹)	28.76	26.50	(8)
Megawatts Commissioned	9,270	10,340	11.5
Orders Inflow (₹ Crore)	22,096	31,528	42.7
R&D Investment (₹ Crore)	1,199	1,248	4.1
Patents/Copyrights filed (Nos.)	351	385	9.7

## Major Highlights

**Significant achievements made even while operating in restrained business conditions.**

### Maharatna Status

- Consistent performance in a highly competitive environment enables BHEL attain the coveted 'Maharatna' status and be counted among seven select PSUs having this status

### Marketing Accomplishments

#### Significant Orders

- ₹ 31,528 Crore, worth orders secured - 42.7% higher than last year
- 9,627 MW Orders received – more than double of FY12 (3,934 MW)
- Secured orders for 8 nos. TG & 9 nos. Boilers for supercritical sets
- EPC for 2x660 MW RRVUNL Suratgarh and SG & TG for 1x 500 MW NTPC Vindhyachal secured despite stiff competition
- SG & TG for 2x800 MW Gadawara project from NTPC
- Order for 7 ESP packages for supercritical sets beating the global competition
- 28% growth in Spares & Services business segment
- Electro-mechanical package for 1,020 MW Punatsangchhu-II & 720 MW Mangdechhu Hydro Power Projects, Bhutan
- 32% increase in orders for Transformers, Reactors & Switchgears

#### Existing Customers (Brand Loyalty)

- Continued Customer Confidence – repeat order secured from NPCIL for TG package for 2x700 MWe for RAPP 7 & 8
- ONGC reposed faith by placing repeat order for refurbishment & upgradation of four Oil Rigs at Sibsagar
- Repeat orders for :
  - Wellheads from Georgia and Oman - Jindal Petroleum Operating Company, Georgia and Amran Establishment LLC
  - 1900 kW Slip Ring Induction motors from Mombasa Cement Ltd., Kenya

#### International Ventures

- Enterprise Framework Agreement with Shell for supply of Gas Turbine Generator packages to select Shell locations
- MOU with Govt. of Tajikistan for setting up two Hydro Power Projects (2x50 MW) on Zeravshan River, Tajikistan

## Engineering New Growth Areas

#### Power Sector

- Expand offerings in nuclear segment for Balance of plant control, Control centre instrumentation pkg. beyond conventional island systems etc.
- Technology Licensing Agreement for Flue Gas Desulphurisation systems to address environmental issues





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- Marketing of CHPs & AHPs as independent systems - stand alone orders received for Coal handling plant for Meja Thermal Power Project (2x660 MW)

### Transportation

- MoU signed with Indian Railways for setting up a green field coach factory for Mainline Electric Multiple Unit

### Renewables

- Highest rating SPV Power Plant orders of 10 MW each from NTPC for Unchahar and Talcher
- Commissioned 5 MW grid-connected Solar Photo Voltaic (SPV) Plant for KPCL at Mandya, Karnataka

### Transmission

- Development of in-house products viz. 765 kV Transformers & Reactors, 1200 kV Transformer, GIS, Controlled Shunt Reactor etc. : orders for 765 kV Transformers & Reactors received from Megha Engineering India Ltd. for Western UP Transmission System upgradation and BIDCO for the upcoming 3x660 MW Lalitpur TPS

### Operational Excellence

- Continued thrust on technology absorption, localisation and procurement process to improve efficiency and competitiveness viz. bulk tendering, techno commercial MoUs, e-procurement, reverse auctioning resulted in significant savings of nearly 1.5% in material, directly improving the competitiveness
- New suppliers (>1900): 20% more than that of last year
- BHEL's 500 MW thermal sets have achieved consistent availability of more than 90% for the last six years- testimony to BHEL's superior quality equipments
- Trombay 5 (500 MW) and Singrauli 5 (200 MW) clocked uninterrupted operation throughout the year – a testimony of BHEL's product excellence

### Customer Focus

- 3500 MW Capacity added in 2012-13 as against 1000 MW last year for NTPC. With this, BHEL's contribution to NTPC's capacity of 41,184 MW stands at 70%
- R&M of Boiler at Satpura 7 (210 MW) enables it run at full load even after 30 years
- 485 MW R&M jobs completed in a year – highest ever

### Commissioning

- All time high 10,340 MW of power plant equipment synchronized / commissioned including 9,328 MW Utility, 703 MW Captive/Industrial sets in the country and 309 MW in overseas markets
- Commissioning of India's first indigenously

manufactured subcritical set of 600 MW rating at North Chennai

- Commissioning of five power plants overseas in Libya, Vietnam, Tajikistan, Indonesia and Ethiopia

### Technology & Innovation

- 385 patents and copyrights filed – highest ever in a year. Company's intellectual capital stands at 2170 patents and copyrights
- R&D investment at ₹ 1,248 Crore – increase of 4.1% over last year
- Turnover from in-house developed products and services at ₹ 9,643 Crore - 19.3% of the turnover of the company
- 145 Technology Plans with over 1500 R&D projects identified for establishing self sufficiency in the areas of UHV Transmission, Transportation, Ultra Super Critical Plants, Renewable energy, IGCC, Water etc.

### Accolades

- 'SCOPE Meritorious Award' for Human Resource Management; Two 'CII-ITC Sustainability Awards 2012' for Strong Commitment towards sustainability through adoption of appropriate policy and procedures
- Engineering Export Promotion Council (EEPC)'s Top Export Award - recognition for the twenty third successive year
- 4 'ICWAI National Awards for Excellence in Cost Management'- recognition for the seventh successive year
- Indian Chamber of Commerce 'PSE Excellence Award' in the R&D, Technology & Innovation
- Golden Peacock Awards for 'Sustainability 2012' and 'National Training 2012' by the Institute of Directors
- 7 employees won Prime Minister's 'Shram Awards' and 13 employees won 'Vishwakarma Rashtriya Puraskars'



CMD BHEL receiving 'SCOPE Meritorious Award for Human Resource Management' from the Hon'ble President of India



## Performance Details

BHEL attains the coveted 'Maharatna' status through its consistent performance in a highly competitive environment. During the year, BHEL continued to set new benchmarks in project execution and saw improved order inflows while operating in a business environment that is witnessing subdued business sentiment.

### Financial Performance

- During 2012-13, BHEL recorded its highest-ever turnover of ₹ 50,015 Crore. Profit Before Tax (PBT) was ₹ 9,231 Crore. Further, Net Profit (PAT) stood at ₹ 6,485 Crore.
- An interim equity dividend of 106% was paid for 2012-13, maintaining the track record of paying dividends uninterrupted since 1976-77.
- Earnings Per Share (EPS) was ₹ 26.50
- Net Asset Value (NAV) per share went up to ₹ 123.86 reflecting the intrinsic strength of the company.
- Total export turnover (Physical + Deemed) touched ₹ 23,935 Crore.
- Total turnover in spares business increased to ₹ 3,022 Crore an increase of 8.9% over that of 2011-12.



CMD BHEL presenting the Interim Dividend Cheque for FY2012-13 to Hon'ble Union Minister of Heavy Industries & Public Enterprises

- Significantly, **India Ratings & Research (Ind-Ra)** has affirmed **BHEL's** Long-Term Issuer Rating at 'AAA' with a Stable Outlook. The ratings continue to reflect BHEL's dominant position in the Indian power equipment segment. According to the rating agency, the appreciation of the Korean Won and Chinese Yuan, BHEL's better after-sales service, lower life cycle costs of its sets and higher indigenisation of its supercritical technology than that of other players will make BHEL more competitive.

### Marketing Highlight

#### Orders Inflow

- Despite subdued business conditions in the Power & Infrastructure sectors coupled with intense

competition in domestic and overseas markets, BHEL secured orders worth ₹ 31,528 Crore, during the year. At the end of the year, cumulative orders in hand for execution in 2013-14 and beyond, stand at ₹ 1,15,180 Crore.

- The Indian Power Sector is witnessing a slowdown since the past few years. Issues of coal linkages, land acquisition and fund constraints have resulted in non finalization of new projects, especially in the private sector and some of the ongoing projects are on a slow execution path.
- In the **Power Sector business segment**, despite these challenges and intense competitive pressure, BHEL has been able to secure orders worth ₹ 22,553 Crore for supply and installation of main equipment. 67% of the orders in the domestic market were bagged by BHEL.
- Spares & Services business segment** saw an order inflow of ₹ 2,885 Crore, a 28% increase over that of ₹ 2,250 Crore in 2011-12.



660 MW Turbine LP Rotor for Bara Project, under assembly at HEEP, Haridwar

#### Significant orders in the Power sector include:

- 2x800 MW NTPC Gadarwara (SG & TG Pkgs.)
- 2x660 MW, OPGCL, IB Valley (BTG & Electricals)
- 2x660 MW RRVUNL Suratgarh (EPC)
- 2x660 MW DVC Raghunathpur (TG Pkg.)
- 3x660 MW NTPC Nabinagar (SG & ESP Pkg.)
- 2x660 MW NTPC Mauda (ESP Pkg.)
- 2x660 MW NTPC Sholapur (ESP Pkg.)
- 1x500 MW NTPC Vindhyachal Stage-V (SG&TG Pkgs.)



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- **160 MW RRVUNL Ramgarh CCPP Stage-IV (BTG)**
- **2x700 MWe NPCIL RAPP 7&8 (TG, C&I & CCI Pkgs.)**
- **2x700 MWe NPCIL KAPP 3&4 (CCI Pkg.)**
- **3x57 MW NTPC Lata Tapovan HEP(E&M)**
- **7x500 MW NTPC Projects (ESP Retrofit)**
- **9x200/210 MW NTPC Projects (ESP Retrofit)**
- **2x500 MW NTPC Projects (C&I Retrofit)**
- **7x200/210 MW NTPC Projects (C&I Retrofit)**
- In its **Industry Sector business segment**, BHEL secured orders worth ₹ **4,086 Crore** for a wide variety of products and systems for application in Captive Power, Transportation, Transmission, Oil & Gas, Renewable Energy and other Industrial products.

**Significant orders received in the Industry Sector include:**

- **Received order for indigenously developed 765 kV transformers and shunt reactors** from Megha Engineering India Ltd. for Western UP Transmission System upgradation and BIDCO for the upcoming 3x660 MW Lalitpur TPS.
- **Continued Customer Confidence** - ONGC reposed faith by placing repeat order for refurbishment & upgradation of four Oil Rigs at Sibsagar.
- **Highest value orders for motors** - 10 nos. vertical synchronous motors for Chintalapudi Lift Irrigation Scheme in Andhra Pradesh. This order will help in establishing BHEL in the irrigation sector as a motor supplier with pump OEMs.
- **Orders in Captive Power Segment for:**
  - 13.5 MW Extraction BPTG for Nalco, Damanjodi
  - 33 MW STG for Aditya Birla Chemicals Ltd
  - 23 MW STG for Paradeep Phosphate Ltd
- **Record orders for Well Heads & X-Mas Trees** from ONGC, OIL, and other drilling companies.
- **Orders in transportation sector for:**
  - 347 sets of Electrics for conventional AC EMU/DEMU; 646 nos. of Traction Motors & 196 nos. Traction Alternators received from Indian Railways against stiff competition from local and foreign suppliers.
  - Single-largest order for 47 sets of Power Converters with Control Electronics for 6000 HP WAG-9 locomotives from CLW.
  - 19 nos. Diesel Electric shunting locomotives in the range of 350-1400 HP from various non-railways customers.
- **Secured orders against competitive bidding** for 400/132 kV Switchyard at Nabinagar from NPGCL and for 220 kV Pusauli & Dehri Substations from BSEB.

- **Secured several transformer/switchgear orders** from various customers viz. PSTCL, NTPC, Reliance, Chhattisgarh, Dadra & Nagar Haveli, RRVNPL, TANTRANSCO, MPTTCL & Discoms and UP Discoms, etc.
- **Major order won** for Coal Handling Plant package for Meja Thermal Power Project (2x660 MW).
- **Order** for 7 sets of bus-ducts for 7x660 MW TPS from NTPC (Nabinagar, Mauda & Solapur).
- Target markets for **International Business** in the last few years witnessed economic uncertainty and political turmoil, thereby severely affecting capital investments. New projects are not forthcoming and planned projects are also being deferred. Under such circumstances, the company has been able to secure orders worth ₹ **2,004 Crore**. This included power plant equipment orders totaling to **1,760 MW**.



4x125 MW Kosti Thermal Power Plant, Sudan

**Significant orders received in International business include:**

- **Bhutan:**
  - **1,020 MW Punatsangchhu-II Hydro Power Project** - Electro-mechanical package for 1,020 MW Punatsangchhu-II Hydro Power Project secured, reaffirming the customer's confidence in BHEL's capabilities.
  - **720 MW Mangdechhu Hydro Power Project** - Electro-mechanical package of 720 MW Mangdechhu Hydro Power Project received. With this, the total capacity contracted by BHEL in Bhutan has reached 4,356 MW (around 98% of Bhutan's total capacity).
  - **Transformer Package for Punatsangchhu -II Hydro Power Project** – received against stiff competition. This is the fifth consecutive order in the last two years received from Bhutan.
- **Burundi: 2x10 MW Kabu Hydro Power Plant** -



## Sustaining Leadership... Engineering New Growth Avenues

successfully made maiden entry into Burundi by securing an order for Electro-mechanical package for 2x10 MW Kabu Hydro Project.

- **UAE: Fr 6B GT Rotor** - Reposing its faith in BHEL, M/s IER, UAE has placed an order for a Fr 6B Gas Turbine Rotor, following the delivery of 4 nos. Fr 6B Gas Turbines by BHEL to IER.
- **South Africa: Entry into a new market segment** - an order for OLTC for transformer was secured from M/s. AbsoluteAfrica.
- **Repeat orders for:**
  - **Wellheads from Georgia and Oman** - Jindal Petroleum Operating Company, Georgia and Amran Establishment LLC placed repeat orders strengthening BHEL's growing reputation in the international oil field equipment market.
  - **Control Equipment from USA** - Bus Extension Module secured from Metso Automation, USA.
  - **Motors from Kenya** - 1900 kW Slip Ring Induction motors from Mombasa Cement Ltd., Kenya.
- **Continued focus on After Sales Services led to orders for Spares & Services** from different parts of the world including Afghanistan, Bangladesh, Bhutan, Georgia, Indonesia, Iran, Jordan, Kenya, Libya, Malaysia, Malta, New Caledonia, Nigeria, Oman, Sri Lanka, UAE, United States and Yemen.

### Strategic Alliances

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



Signing of MoU with Indian Railways for Greenfield MEMU facility in Rajasthan

- MoU signed with Indian Railways for setting up a greenfield Mainline Electric Multiple Unit (MEMU) coach factory in Rajasthan to cater to the growing demand for more local and suburban trains.
- MoU has been signed with Govt. of Maharashtra for setting up a Power Equipment Fabrication Plant at

Sakoli, District Bhandara and to also consider possibility of setting up an integrated facility for the manufacturing of Solar Photo Voltaic systems, with the first phase envisaging manufacture of PV modules from cells with ultimate objective of expanding to cover full value chain from silicon to cells.



New Automated Solar Photovoltaic Panel manufacturing facility at EDN, Bengaluru

- Rate Contract finalised with Reliance Industries Ltd. for supply of 160-470 KW HT motors for their projects at Hazira, Jamnagar and other sites.
- MOU signed with the Ministry of Energy and Industry, Tajikistan for setting up of two Hydro Power Projects (2x50 MW) on Zeravshan River, Tajikistan.
- Enterprise Framework Agreement (EFA) signed with Shell for the supply of Gas Turbine Generator (GTG) packages to select Shell locations in Asia-Pacific, Middle-East, Central Asia, Eastern Europe and Africa. This EFA is consistent with BHEL's efforts to establish long-term relationships with key customers who can bring long-lasting value to the company.
- A Technology Licensing Agreement entered into with MHI, Japan for Flue Gas Desulphurisation (FGD) Systems required for SO<sub>x</sub> removal, both in the Power as well as Industrial segments.

### Capacity Augmentation & Asset Modernisation

- BHEL made a capital investment of ₹ 753 Crore during 2012-13 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 investment of ₹ 83 Crore.
- BHEL is augmenting its manufacturing and testing facilities for ± 800 kV HVDC Transmission Systems; and for IGBT based propulsion systems for AC EMUs & 6000 HP AC Locomotives.





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- As part of major Capacity Augmentation for modernization and upgradation of the Hot Mill of the Seamless Steel Tube Plant at Tiruchy, envisaging more than two-fold increase in capacity to 86,500 MT per annum, production trials are under way, with key facilities including the Rotary Hearth Furnace, Walking Beam Furnace and Stretch Reducing Mill having been commissioned. This will ensure secured supply chain for one of the key inputs for boiler manufacture. With introduction of state of the art technology, yield will substantially improve, enhancing competitiveness.



Shri Praful Patel inaugurating new Billet Charging Machine at BHEL Tiruchy

## Renewables & Green Initiatives

- BHEL has been contributing to the national effort for developing and promoting eco-friendly renewable energy based products on a sustained basis.

### During the year, significant renewable energy projects commissioned:

- 5 MW grid-connected Solar Photo Voltaic (SPV) Plant for KPCL at Mandya, Karnataka.
- SPV Plants at various islands of Lakshadweep:
  - Andrott (320 KW);



Grid connected 5 MW Solar PV plant in Karnataka

- Kavaratti (760 KW);
- Kadmat (270 KW).

- With this, BHEL has commissioned a total of 1900 KW SPV Plants at various Islands of Lakshadweep. This is the largest Island electrification programme using SPV modules.

- Orders have been received for 2 SPV Power plants for Unchahar and Talcher of 10 MW each from NTPC. This is the highest rating SPV Power Plant order received by BHEL so far.

- As part of its commitment towards green initiatives and contributing to sustainable development, BHEL is establishing a 5 MWp grid-interactive SPV power plant at its Boiler Auxiliary Plant at Ranipet.

- Towards preserving environment and to reduce emission of green house gases, BHEL has initiated conversion of Diesel Oil operated furnaces to Natural Gas at its Central Foundry Forge Plant at Haridwar.



500/600 MW rotor forgings facility at CFFP Haridwar

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

## Operational Achievements

### Project Commissioning

- BHEL synchronized / commissioned an all time high **10,340 MW** of power plant equipment during the year inclusive of **9,328 MW** Utility and **703 MW** Captive/Industrial sets in the country and **309 MW** in

overseas markets. This included 10 nos. 500 MW and 1 no. 600 MW thermal sets.

- The installed capacity of BHEL supplied Utility sets went up to **1,15,500 MW** and BHEL maintained its lion's share of 57% in the country's total installed capacity comprising Thermal, Hydro and Nuclear Sets. BHEL Contributed to 56% of capacity added during last quarter.
- A major milestone of the year was the commissioning of India's first indigenously manufactured subcritical set of 600 MW rating at North Chennai.
- BHEL's first two-cylinder uprated 150 MW (Reheat) rating turbine in the industrial Segment was commissioned for HINDALCO at Mahan.
- Successfully commissioned the first unit of ONGC Thermal Power Corporation (OTPC)'s 726 MW Gas based Power Plant at Palatana, in state of Tripura. Given the non-availability of adequate road infrastructure, consignments had to be transported via Bangladesh (under special agreement with the Government of Bangladesh) partly by road & partly by water ways with enroute ports of Karaikal, Machilipatnam, Kolkata and Ashuganj.



2x363 MW Gas based Power Plant, OTPC - Palatana



Unit 1 of 2x270 MW Adhunik Power TPS, Jamshedpur

- For the first time in India, Gas Turbine, commissioned by BHEL, was run with Refinery Fuel Gas for HMEL's GGSR refinery.
- The year also witnessed the commissioning of five power plants in overseas markets in Libya, Vietnam, Tajikistan, Indonesia and Ethiopia.

#### Major power projects commissioned include

- 1x600 MW Unit-2 for TANGEDCO North Chennai
- 2x500 MW Units-11 & 12 for NTPC Vindhyachal
- 2x500 MW Unit-1 & 2 for NTPC Mauda
- 1x500 MW Unit-3 for APCPL Jhajjar
- 1x500 MW Unit-2 for DVC Koderma
- 1x500 MW Unit-2 for NTPC Vallur
- 1x 500 MW Unit-5 for NTPC Rihand
- 1x500 MW Unit-6 for GSECL Ukai
- 1x500 MW for CSPGCL Korba West
- 2x270 MW Unit-1 & 2 for Adhunik
- 1x270 MW Unit-1 for IEPL Bela
- 1x270 MW Unit-1 for EPIL Amravati
- 2x250 MW Units-5&6 for UPRVUNL Parichha
- 1x250 MW GTG-3 for PPCL Pragati
- 1x110 MW GTG for RRVUNL Ramgarh
- 4x11 MW Hydro sets for NHPC Chutak
- 1x157 MW GTG in Libya
- 1x100 MW Hydro set in Vietnam
- 2x4.75 MW Hydro sets in Tajikistan
- 1x12.5 MW STG set in Ethiopia
- 1x150 MW BTG for Hindalco Mahan
- 2x60 MW STG for JP Associates
- 1x80 MW STG for OPG Energy Gummudipoondi
- 1x80 MW STG for Sterlite
- 1x43 MW STG for Action Ispat
- 1x43 MW STG for SMPL



2 x 600 MW North Chennai TPS, Chennai





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- 1x21 MW STG for Bongaigaon
- 1x250 MW Unit-9 for UPRVUNL Harduaganj
- 2x250 MW Unit-1 & 2 for BPSCL Bina
- 1x250 MW Unit-10 for MPPGCL Satpura
- 363.3 MW CCPP for OTPC Palatana
- 1x351 MW Unit 2 for GSECL, Pipavav Refinery
- 1x20 MW BTG for Maruti Suzuki
- 1x38 MW STG for Wonder Cement

### Equipment Performance

- 70% of the country's total generation of 691.4 Billion Units from Thermal Utility Sets was contributed by BHEL supplied sets.
- BHEL make 200-500 MW thermal sets, which form the backbone of the country's thermal generating capacity, operated at a Plant Load Factor (PLF) and Operating Availability (OA) of **77.4%** and **89.4%** respectively. Of these, 13 stations achieved PLF of over **90%**.
- BHEL's 500 MW thermal sets have achieved consistent availability of more than **90%** for the last six years. 170 coal based sets achieved OA higher than **90%**.
- 167 BHEL supplied coal based sets clocked uninterrupted operation of more than 90 days during the year out of which, 53 sets ran twice continuously for more than 90 days and 29 sets ran continuously for more than 200 days.
- Trombay 5 (500 MW) and Singrauli 5 (200 MW) clocked uninterrupted operation throughout the year – a testimony of BHEL's product excellence.
- 110 MW Unit-3 at GNDTPS, Bathinda is running successfully at 120 MW post Renovation, Modernisation and Up-rating.
- Central monitoring system yields completion of Performance Guarantee Test for 58 nos main plant packages.

### Continued Customer support

- 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 **176** thermal utility/captive sets.
- Responding to the customer's emergency call, BHEL took up on war footing and completed the troubleshooting and restoration of the PA Fans of 500 MW Unit-4 at Bhusawal TPS bringing back the unit in the shortest possible time in the critical monsoon season in the state. BHEL's efforts were lauded by the customer Mahagenco.

- Following successful Renovation & Modernisation work, synchronisation of both the units of the 2x65 MW Subarnarekha Hydel project of JSEB was completed in a record time of 4 months.
- In the execution of the 2xFr 5 GTG at Mina Al Refinery in Oman, all works were completed in record time in challenging conditions. The customer appreciated the exemplary support given by BHEL engineers during the execution of this project.



Reclaimer 1 and Conveyor 16B at NTECL Vallur TPP

### Supply Chain management

- BHEL continues to provide specific thrust on competitive buying by leveraging the technology and adopting modern tools like procurement through reverse auction which touched a record high of 36%. This coupled with thrust on introduction of new suppliers (addition of over 1900 suppliers on a base of approx. 20,000 registered suppliers) resulted in significant cost savings in procurement of Raw materials/components. In addition, better inventory management has resulted in reduction of inventory levels from 100 days of turnover to **83 days**, optimizing working capital management.
- In line with Govt. of India's policy on MSMEs, issued in 2012 to promote Micro and Small Enterprises (MSEs), BHEL arranged 15 MSE supplier meets including 2 specifically for MSEs belonging to SC/STs.
- Continued Thrust was given for improvement in procurement processes with a view to improve efficiency in terms of competitiveness, implementation of latest technology, expansion of vendor base and transparency in procurement.

### 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 has emphasised innovation through in-house R&D efforts and R&D investment grew **4.1%** over the previous year to ₹ **1,248 Crore**. The turnover from in-house developed products and services has clocked ₹ **9,643 Crore**, which is around **19.3 %** of the turnover of the company.
- BHEL also filed the highest-ever **385** patents and copyrights in a year, enhancing the company's intellectual capital to **2,170** patents and copyrights filed, which are in productive use.
- Design Automation and Knowledge Based Engineering (KBE) taken up for all major products across the company to offer optimized benchmark solutions.



1200 kV Transformer at PGCIL Test Station at Bina

#### Some significant developments during the year:

- A cost-effective high-pressure feed water heater for 600 MW Power Plants, meeting international standards, has been successfully developed. It has been installed at 2x600 MW North Chennai.
- To meet stringent safety requirements of 500 MW Fast Breeder Reactor based Nuclear Power Plant of

BHAVINI, a state-of-the-art unified C&I platform involving major equipment like Steam Generator, Turbine, Auxiliary Boiler and Station C&I has been designed and implemented.

- To improve the stability and reliability of power systems, BHEL has developed and manufactured a 3-Phase, 315 MVA, 400 kV class, Phase Shifting Transformer with state-of-the-art features. It will be installed at APGENCO Kothagudem.
- In the area of renewable energy, a cost-effective 250 kW grid-connected Power Conditioning Unit (PCU) has been developed, commissioned and synchronized with the grid.
- To enhance overall solar energy absorption during the day by PV arrays, BHEL has developed a modular solar thermal sun tracker which operates on a novel liquid balancing system. It enables generation of 25% additional energy during the day.
- BHEL has developed a mathematical model for predicting the dynamic behavior of 182 MW Integrated Gasification Combined Cycle (IGCC) plants. This has been used to carry out dynamic simulations for possible disturbances in the plant and to develop control systems.
- BHEL has developed a new variant '300 MW Steam Turbine' with 3.9% improved heat rate by optimizing the flow paths of HP, IP and LP turbines, while keeping the existing turbine module combination of 270 MW. The turbine has been offered for 1x300 MW Abhijeet Infra, Visakhapatnam.
- In the transportation sector, catering to RDSO's requirement for conversion of existing DC EMUs to 25 kV AC EMUs, BHEL has successfully type tested a 1200 kVA AC EMU transformer which matches the dimensions of the conventional AC EMU transformer with a 20% enhanced output.
- To improve the reliability of Oil Rigs, BHEL has developed an improved design of Casing Line Spooler Unit with electrically operated braking system to eliminate the failure of rope during reeving in or out operation.
- In its endeavour to develop environment friendly technologies, BHEL has developed Copper Indium Gallium di-Selenide (CIGS) nano-material for the absorber layer of thin film solar cells. CIGS has better performance under diffused light. 16-20% efficiency has been achieved at lab level.
- As a reliable partner in ISRO's space program, BHEL achieved a landmark with the successful deployment of its Space Grade Solar Panels and Satellite Batteries on the GSAT-10 and RISAT satellites. BHEL has supplied 278 sq. mtrs. of Space Grade Solar Panels and 42 Satellite Batteries, which are deployed on various satellites, now in orbit.



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- A state-of-the-art Test Facility for boiler feed booster pumps for power plants up to 1000 MW has been established at Hyderabad. It is used for testing the pump for full load performance and NPSH (Net Positive Suction Head) test with vacuum control. The booster pump for 660 MW NTPC Barh-II unit was tested at this facility.
- A Drop Tube Furnace facility has been established at the Coal Research Centre, Tiruchy, for testing the combustion characteristics of Indian, imported as well as blended coals. It will be used for accurate prediction of boiler performance and efficient furnace design.

### Leveraging Information Technology

BHEL's Information Technology is critical link of the organization's value chain, spearheading e-Governance, focusing on capability building through effective & efficient IT enabled integrated system development, consolidation & transformation, apart from ensuring business continuity & security, for enhancing value to stake holders & inclusive growth. Some of the key initiatives underway include:

- Launching "One BHEL"- Enterprise Resource Planning (ERP) Solution on improved standardized integrated processes across the organization.
- In-house development and progressive go-live of "Integrated Site Construction Management" solution for all the project sites
- First PSU, to successfully implement IPV6 technology for its publicly available servers.
- High Definition Video-Conferencing facility across 50 locations in BHEL and 84 nos. of virtual meeting rooms, seamlessly connecting Business, Corporate, Manufacturing Units and Sites, enabling speedy decision making, without travel of employees.
- 15 major locations of BHEL are ISO 27001:2005 compliant for Information Security Management System (ISMS).

### Human Resource Accomplishments

#### Work force & Talent Management

- Making the organization younger - average age of BHEL employees has come down to 40.7 years and that of executives to 39 years. In line with market requirements, skill upgradation of BHEL employees is a continuous process. Developmental programmes for 4.3 mandays per employee were conducted during the year. In addition, 2,202 customer personnel were trained at various units.
- As a continued thrust on Leadership Development, Development Centers were conducted for senior level executives to assess their competency levels based on BHEL's Leadership Competency framework. Around 370 executives were covered in this assessment and given feedback on their strengths and areas for development.

- To gauge and improve employee commitment of 6,000 young engineering graduates that comprise almost 50% of BHEL's executive population, an Employee Engagement survey was conducted which identified areas for improvement in various HR processes. To fill in these gaps, a series of training workshops on 'People Development' were conducted during the year for the reporting officers where they were given inputs on various aspects of leadership and subordinate development.
- As a part of welfare measures, BHEL has launched a Pension Scheme for its retired employees effective from the year 2007. More than 12,000 retired employees have benefitted under the scheme till date.
- 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'.
- A Joint Appeal on behalf of the Joint Committee for BHEL was issued apprising all employees about the prevailing business environment and the intense competition faced by the company.



800 kV Polymer composite insulator - under manufacturing at EPD Bengaluru

### 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 a part of this, BHEL undertook socio-economic and community development programmes during the year 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.
- BHEL launched a company-wide campaign titled 'Vision to all - BHEL's Call' under which employees and their families were motivated to pledge their eyes for donation. So far, around 52,000 pledges have been



## Sustaining Leadership... Engineering New Growth Avenues



received. The company has also ventured into yet another noble cause for organ donation.

- BHEL has joined hands with the Govt. of India's **'Project Udaan'** for enhancing the employability and to integrate the youth of J&K with the mainstream of the country. Under this project, **500** engineering graduates and Diploma holders will be imparted training in technical and behavioural area in the Units of BHEL over a period of 5 years (2012-17). The first batch is currently undergoing training.
- BHEL has also joined hands with an NGO named **'Udayan Care'** to support higher education of girl children from BPL families. Under the programme titled **'Udayan Shalini'**, 100 brilliant girl children, who have passed class X, shall be financially supported to pursue their education up to Post Graduation level alongside developing/enhancing their personality and employability.
- As part of social commitment, **6,139** Apprentices were trained in the company. In addition, **8,475** students/trainees from various professional institutions underwent vocational training.



Shri Atul Saraya, Director (Power) BHEL handing over the keys for Mobile Medical Unit (MMU) Vans to HelpAge India

- BHEL provided **five meal distribution** vehicles to the **Akshay Patra Foundation** for distribution of mid-day meals to poor children of government schools across Kamrup District of Assam.

### 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 Human Resource Management'**. The award was presented by the then Hon'ble President of India, Smt. Pratibha Devisingh Patil to CMD, BHEL.
- Two **'CII-ITC Sustainability Awards 2012'** for Strong Commitment towards sustainability through adoption of appropriate policy and procedures. The awards were presented by the Hon'ble President of India, Sh. Pranab Mukherjee to CMD, BHEL.



CMD BHEL receiving 'CII-ITC Sustainability Award' from the Hon'ble President of India

- BHEL was conferred the maximum number of **4 'ICWAI National Awards for Excellence in Cost Management'**, among public and private sector companies for 2011. BHEL was awarded the recognition for the seventh successive year.
- Indian Chamber of Commerce **'PSE Excellence Award'** in the R&D, Technology & Innovation category.
- **5 'National Safety Award'** to BHEL's Tiruchy unit and EPD, Bengaluru for outstanding achievements in terms of longest accident free period and lowest accident frequency rate at their works.
- **'SKOCH Digital Inclusion 2012' Gold award Trophy** in the PSU category for developing and implementing 'Drawing and Document Management System'.
- **Gold Award under the National Awards for e-Governance 2012-13** for Innovative use of ICT by PSUs for Customers' Benefits.
- **'Golden Peacock Award for Sustainability 2012'** by the Institute of Directors (IOD).





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- **'ELCINA-EFY Award for Business Excellence 2011-12'**.
- **'Golden Peacock National Training Award 2012'**.
- **'National Energy Conservation Award 2012'** for excellence in energy conservation and management.
- Other awards include **'Dainik Bhaskar India Pride Gold Award 2012'** for excellence in Central and State Public Sector Enterprises in the category of Heavy industries; **'Fastest Growing Maharatna'** award from the Dalal Street Investment Journal, Best PSU Award in the Electrical & Electronics category from Dun & Bradstreet and **'BT-STAR PSU Excellence Award 2012'** for Excellence in Innovation from Bureaucracy Today.
- **'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 third year in succession.
- 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, two units of BHEL namely HPEP Hyderabad and EDN Bengaluru won the **'Commendation for Significant Achievements in TQM'**.
- Quality Circles from 3 BHEL units won **'3 Star Gold Awards'** and 1 unit won **'2 Star Silver Award'** at the **International Convention for Quality Control Circle 2012 (ICQCC:2012)** held in Kuala Lumpur, Malaysia.
- 7 employees won **Prime Minister's 'Shram Awards'** including 1 **'Shram Bhushan'**, 1 **'Shram Shree'** and 5 **'Shram Devi'**.
- 13 employees won 3 **'Vishwakarma Rashtriya Puraskars'**.
- PSSR, BHEL secured **'First place'** for **Effective Cost Management** under Public Service Sector (Large) category.
- **The following awards were conferred in individual category:**
  - **'BT-STAR Best PSU Man of the Year Award 2012'** under Maharatna/ Navratna category to CMD, BHEL.
  - **'NITIE Distinguished Alumnus Award 2012'** to CMD, BHEL.
  - Enertia **'Power Man of the Year Award'** to CMD, BHEL.
  - Top Rankers **'Entrepreneurial Path Breaker Award 2013'** to CMD, BHEL.

- **'CNBC TV18 Best CFO Award 2013'** to Director (Finance), BHEL.
- **IPE 'Finance Leadership Award'** to Director (Finance), BHEL.
- **'HR Leadership Award'** to Director (HR), BHEL
- **'CFO 100 Roll of Honour 2013 in Corporate Governance/Financial Control'** to Director (Finance), BHEL.
- **'Bureaucracy Today PSU Director of the Year Award'** to Director (Power), BHEL.

### Planning for the Future

- In a bid to steer the company through the period 2012-17 with the objective of achieving revenue growth from multiple streams, focus is in place to expand our offerings in the power sector by building EPC capability, consolidating Spares and Services business, and expanding industry businesses in the areas of Photo Voltaics, Ultra High voltage transmission, and transportation.
- The company continues to sharpen its focus on '6-Point' priority areas for action viz. Capability Enhancement, Accelerated Project Execution, Product Cost Competitiveness & Quality, Diversification, Engineering & Technology and People Development aligned with its Strategic Plan initiatives to sustain its leadership in its areas of operations.
- Our efforts to make our supply chain agile and to accelerate project execution, sustained focus on Vendor Base Expansion, Scaling up procurement through technology initiatives, Advanced Manufacturing Action, Global Sourcing and deployment of high capacity tools and plants for project execution are underway.
- BHEL is positioning itself to remain a major contributor in Power Sector by enhancing the scope of offer for main plant packages on EPC basis by including Civil works, Electricals, CHP & AHP and water systems. Forays are being made for securing orders for standalone products based on state of the Art technology like FGD for Coal with high sulphur content, CHP/AHP, desalination plants etc.
- Developing lower rating sets with supercritical parameters providing alternatives to Utilities to take advantage of this eco-friendly technology even in lower rating sets is underway.
- As a part of structure-driven strategic initiative to expand offerings in Renovation and Modernisation of Power Plants, R&M systems group (RMSG) has been created to support R&M business.
- BHEL is increasing its scope of offer in Nuclear field with products beyond conventional island.

## Sustaining Leadership... Engineering New Growth Avenues

- To meet the requirement of bulk power transmission BHEL is addressing the requirements by development of innovation led products in the areas of Ultra High Voltage transmission (eg. 1200 KV), UHVDC, Flexible AC Transmission products (SVCs, STATCOM etc.), WAMPACS including PMUs/PDCs etc.
- The company's collaborative initiatives to address the growing demand potential in Railway Transportation including Metro & Suburban Railways include:
  - o Collaborative R&D for development of state of the art IGBT based propulsion systems in Electric and Diesel Electric Locos, AC EMUs.
  - o Strategic tie-ups with a global player for Metro business.
  - o Initiative with Indian Railways for setting up a greenfield Mainline Electrical Multiple Unit (MEMU) Coach factory in Rajasthan.
- Considering the National Action Plan on Climate Change targeting 15% of electricity generation from renewables by 2020, BHEL is looking towards expanding its capacity to manufacture photo voltaic modules & cells. The company aims to actualise this initiative backed by a supportive regulatory frame work by way of incentives & subsidies, duty structures, etc.
- BHEL, in partnership with Indira Gandhi Centre for Atomic Energy (IGCAR) and NTPC, is developing Advanced Ultra Supercritical (Adv-USC) technology for thermal power plants. With steam parameters of 310 bar and 710°C/ 720°C, coal consumption and CO<sub>2</sub> emissions will be lower by about 11% compared to a supercritical power plant.
- BHEL has initiated a major programme for Knowledge Based Engineering (KBE) and design automation in all its products. This is expected to substantially reduce the engineering cycle time and eliminate errors.
- In a bid to address the aspirations of the company to become a preeminent supplier of Industrial Boiler, Nuclear Steam Generator & supplier of equipment for process Industries, merger of BHPV, a 100% subsidiary of BHEL, is underway.
- In a bid to make headway in new product areas like Low tension (LT) Electrical motors, and Alternators for Traction applications, facilities of BHEL-EML, a Joint venture of BHEL and Kerala Govt., are being leveraged.
- Skill deficit has emerged as one of the key bottlenecks in growth of 'Indian Industry and infrastructure sector'. BHEL as responsible corporate citizen and a key player in power sector has adopted multi-pronged strategy to reduce this deficit by adoption of ITIs and extensive training of welders and fitters of customers and sub-contractors at its WRI Tiruchy and other training centres.

***BHEL's performance presented here is the result of dedication, team effort and commitment of the 49,000 strong workforce of the company and the confidence reposed by its stakeholders. We are especially grateful to the Ministry of Heavy Industry & Public Enterprises, Government of India for their unstinting support. I thank all our stakeholders, our friends from the media and my colleagues on the Board for enabling BHEL to grow from strength to strength.***

**Note: Company results for 2012-13 are provisional, subject to audit**

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