

Sustainable Development Initiatives

BEL has taken up sustainable development projects in the areas of air conditioning, air compressor, LED lighting and carbon footprint.

BEL has established a systematic approach for conservation of natural resources. Major focus revolves around saving power and water and increasing greenery. Several initiatives have been taken in this regard.

WIND ENERGY

BEL is generating wind energy (green energy) through 2.5 MW and 3 MW capacity wind mills, thereby reducing the release of green house gases into the atmosphere. With a total capacity of 5.5 MW, BEL's wind energy plants generated 93,19,000 units during 2011-12 and generation during 2012-13 was around 93,00,000 units.

Wind Mill at Davanagere, Karnataka	2.5 MW (5X500KW)	Commissioned in October 2006	Power Generated: 2006-07 : 12,13,996 Units 2007-08 : 27,40,216 Units 2008-09 : 43,83,524 Units 2009-10 : 42,08,523 Units 2010-11 : 33,94,342 Units 2011-12 : 41, 24,850 Units 2012-13 : 41,18,850 Units Total: 240,85,000 Units
Wind Mill at Hassan, Karnataka	3.0 MW (2X1.5MW)	Commissioned in March 2008	Power Generated: 2007-08 : 1,00,237 Units (13days) 2008-09 : 63,88,922 Units 2009-10 : 57,10,303 Units 2010-11 : 55,58,644 Units 2011-12 : 70,67,350 Units 2012-13 : 69,00,900 Units Total: 325,57,000 Units
Proposed Wind Mill (Future Plan)	10 MW	To be commissioned in 2012-13	Proposal is awaiting Management Approval

BEL has placed an order for addition of 10.5 MW to be put into operation during 2013-14. With this, BEL-Bangalore will achieve carbon neutral against purchase of power.

GRID INTERACTIVE SOLAR PHOTOVOLTAIC POWER PLANT

BEL has established grid interactive Solar Power of 29.92 Kilo Watt capacity at the New Management Building at Bangalore for sharing energy for lighting system. 29.92 kWp grid connect Solar Power plant with average daily generation of about 120 units has been set up. The plant is directly coupled to the power distribution system so that in case of no load from Management block, the power generated is directly fed to the Bangalore factory power supply and is utilized.

Due to the incorporation of grid interactive system, batteries required for storage of energy are eliminated, hence green energy is generated.

The system comprises of 6 numbers of inverters for synchronization with the factory power supply.

The Solar Power System was developed and built by BEL. This has generated around 26,000 kWhr so far and resulted in avoiding carbon emission of about 24,000 Kg.

Lighting Management System (LMS)

Lighting control system has been introduced in the Office area to control light, group of lights, or all lights in a building from a single user interface device. Any light or device can be controlled from any location. This ability to control multiple light sources from a user device allows complex “light scenes” to be created. A room may have multiple scenes available, each one created for different activities in the room.

Other benefits include reduced energy consumption, and power costs through more efficient usage, longer bulb life from dimming, and reduced emission carbon footprints.

The following have been taken into consideration while designing the system suiting our requirements:

1. Daylight harvesting through light level sensors
2. Control through occupancy sensors
3. Scene creation in Conference Halls
4. Optimum utilization of electrical energy.

LED Street Lights

The street lights inside the factory are one of the major concerns in terms of security. There are around 280 street lights inside the Bangalore factory, which consists of 150W and 250W lamps. These consume a lot of power. Therefore, it was proposed to replace these lights with LED street lights in a phased manner, which will have longer life than these lights. Around 76 numbers of 250W street lights have been replaced with 70W LED street lights over the past two years. A drastic reduction in the energy consumed for factory street lighting has been observed.

Carbon footprinting initiative

To further strengthen our commitment to pursuing environmental friendly growth, BEL-Bangalore Complex has demonstrated its interest to carry out a ‘Carbon Footprint Study.’ CII-Godrej GBC team carried out the Carbon Footprint Study at BEL, Bangalore, in February and May 2012. This study was carried out in accordance with the Corporate GHG Accounting and Reporting Standard (GHG Protocol) / ISO 14064 standard which categorizes emissions into three scopes that comprises of direct and indirect emissions. BEL, Bangalore Complex, GHG emission intensity was calculated based on GHG Emissions per Rs.Crore Turnover at about 4.8 MT of CO₂/Rs.Crore Turnover in 2010-12 and this has reduced to 3.5 MT of CO₂/Rs.Crore Turnover during 2011-12.

Energy efficient screw chillers in AC plants for meeting variable cooling load demand

The old screw chiller was highly energy intensive and was operated using CFC gas. In order to conserve energy and to avoid using ozone depleting gases, it was decided to replace them with lower specific energy screw chillers. These chillers have lowest kWhr/Tr (IPLV), which is also certified by Air-Conditioning, Heating and Refrigeration Institute (AHRI). The new chiller IPLV is 0.46 kWhr/TR. Also this chiller operates with R134A, which is an eco-friendly gas. This has resulted in annual savings of 2,40,000 kWhr.

Solar Water Heating system

Hot water supply through solar water heating systems are used in the company canteens, hospital and hostels to substitute the conventional energy sources. The solar water heating plant has a capacity of 41,500 litres.

WATER MANAGEMENT

Rainwater harvesting system

There is a consistent reduction of water consumption every year in the past 10 years, which is mainly due to the implementation of a number of water conservation projects. Rainwater harvesting and innovative recharging of bore wells enable us to collect the runoff water and recharge the ground water table. The large-scale rainwater-harvesting reservoir at Bangalore unit has a capacity of 170 million litres with expected annual yield of around 234 million litres. By rainwater harvesting and recharging of bore wells, ground water yield has improved. Rooftop harvesting planned during 2012-13 is in progress, which will help in conservation of 5 ML of fresh water.

Treated Water from Bangalore Water Supply and Sewerage Board

The Company realized that any potable water saved is valuable to society. Therefore, the need to save potable water was studied. When the Bangalore Water Supply and Sewerage Board (BWSSB) came out with a proposal to supply tertiary treated water for non-potable application, by treating domestic waste water generated in the city, the Company entered into an agreement for consumption of non-potable water from BWSSB, which adds to the other sources of water. This water is available throughout the year and further ensures that the development of greenery is not constrained due to lack of water.

Biogas from canteen waste

Waste food material is collected from the canteen and fed to the biogas reactor and biogas is generated. The biogas generated is used in the canteen for light cooking. About 54 Kg equivalent of LPG is being generated in the biogas plant.

Green Buildings

The Green Buildings concept in BEL starts right from the design stage, balancing infrastructure needs and environmental protection. Some of the initiatives include:

- Using more natural lighting.
- Wind powered roof extractors for internal cooling.
- PUF insulated roofing sheets to reduce heat load.
- Orientation of buildings to avoid heat due to direct sunlight.
- Variable Refrigerant Volume System to optimize air conditioning.
- Integrated Building Management System (IBMS)

Ecological Sustainability

BEL is on a constant journey towards ecological sustainability. Luxuriant greenery is one of the hallmarks of the BEL campus, which is maintained clean and green. Around 1,35,750 different species of plants are grown in the campus, which has been inhabited by many species of birds and insects thanks to the fruits and flowers that abound. Open areas are covered with lawns and shrubs. There is around 3,74,000 Square Meters of lawn and 23,000 meters of hedges being nurtured on the campus. The green carpet of grass helps in arresting dust, absorbing heat, acts as a carbon sink and release of fresh oxygen and is a visual treat for anyone entering the factory. The resplendent greenery in the factory not only contributes to a pollution-free internal environment but also reduces the impact of pollution outside the factory. Tree plantations, spread over 170 acres of land, add to this verdure, standing as a testimony to BEL's commitment to afforestation.

Cleaner Technology

The key driver for a pollution-free environment is adopting cleaner technology for product and process design. The large volumes of BEL's Standards support its core design strength. A key factor for continual improvement is introduction of cleaner technology in manufacturing processes that has reduced the generation of pollutants to a large extent. BEL has recognised that a more effective contribution to clean environment begins at the design stage itself. Our Corporate Standards has published several guidelines connected to environment-friendly materials, components and manufacturing processes to be used across the Company. Corporate Standards has already commenced standardisation and introduction of many RoHS (Restriction of Certain Hazardous Substance) items compliant to European and other international directives. Continuing its efforts in the previous years, 25 new RoHS compliant components have been introduced, covering areas like Inductors, LEDs, Connectors, Relays, Microcircuits and Microwave Components.

Based on the above guidelines, many of the RoHS compliant processes have been introduced in PCB manufacturing and metal finishing process. Low smoke halogen cables have been introduced in the manufacturing of Naval based electronic equipments. Low VOC metal finishing operation (Polyurethane) and anti IR coating system are adopted in the process to contain pollution. Eco-friendly Chlorine-free copier paper for photocopying and laser printing has been standardised for lower environmental impact. We have completely eliminated all ozone depleting chemicals with eco-friendly non-Ozone depleting substances.

Introduction of low-Halogen / Halogen-free, fire and radiation resistant cables, new generation EMI / EMC / EMP compatible materials and components such as Aluminium Hexagonal Honeycomb Cellular Materials and Solid Silicone Materials embedded with Monel wires have resulted in lesser radiation hazard.

Emission to Air

Air emissions from processes are controlled through appropriate air pollution control equipment even though pollutants are insignificant by virtue of the nature of chemicals used in the manufacturing of electronics products. The results are substantiated with ambient air quality measured at different locations within the factory.

Water Pollution

Wastewater generated from production centres are treated to meet reusable standards and recycled for production purpose again. We have an in-built capacity to treat about 900 Kilo Litres of process wastewater per day (KLPD). Likewise, domestic effluent generated in the factory and colony is treated and recycled for horticulture purpose. We have an in-built capacity to treat about 1,800 Kilo Litres of domestic wastewater per day (KLPD) at Bangalore Complex.

Hazardous Waste Management System

Hazardous wastes generated are handled in a scientific way. BEL has established a system by constructing an exclusive, well-protected place for safekeeping the hazardous waste in an enclosed area of 640 sq meters. Intermediate stores exist in each production division wherein identified Hazardous Wastes are quantified and stored till shifting to central hazardous waste stores. These items are brought and stored in the central hazardous waste stores and disposed of as per the norms of the State Pollution Control Board. BEL has tied up with the State Pollution Control Board Treatment, Storage & Disposal Facility operators for disposal of landfillable solid hazardous waste. This system effectively prevents pollution caused by hazardous wastes.

By introduction of appropriate chemicals that generate less hazardous sludge in detoxification of wastewater and by adaption of cleaner technology, hazardous waste generation has been reduced at the process level itself. Besides introduction of Cyanide-free Zinc and Copper plating processes, use of sodium hydrides, sodium hypochlorite and sodium Meta bisulphate in place of lime, bleaching powder and ferrous sulphate, help in reduction of large volume of hazardous sludge. Hazardous wastes generated are disposed of as per

the direction of the State Pollution Control Board. There is a drastic reduction in sludge-generation as a result of several process improvements carried out.

Solid Waste Management

BEL is also taking care of disposal of Municipal Solid Waste in a scientific manner. BEL was quick to understand the issues posed by unscientific methods of disposal of municipal and other solid waste. BEL has established a system to segregate waste generated at the source itself for facilitating scientific disposal of municipal solid waste. Presently such waste is sent for processing to a well-established solid waste treatment facility in Bangalore. There is a concerted effort to reduce, recycle, reuse waste so that paper and plastic can be recycled and reused rather than sent to landfills. BEL has been participating in recycling of paper and plastic waste with M/s ITC Wealth Out of Waste scheme (WOW). This has resulted in saving of trees, energy and water, encouraging other agencies to bring out such programmes to minimise the impact on the environment.