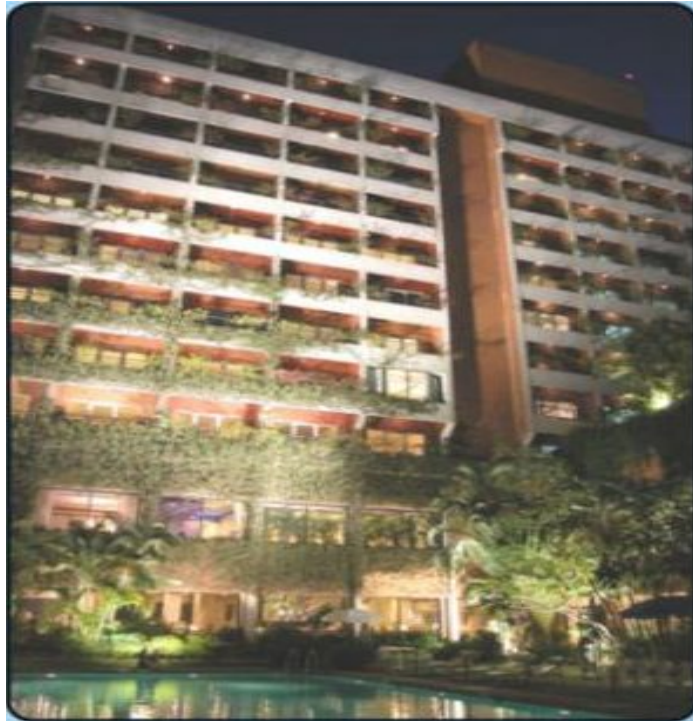


Taj Residency, Bangalore



Taj Residency Bangalore is a Five Star hotel (part of the TATA Group) located in the heart of the Bangalore city, which commenced operations on 21st March 1983.

The hotel has a total of 166 Guest rooms Business Center facilities, Fitness Centre and Beauty Parlor, Three Restaurants, Five Banquet halls (18000sft) equipped with the latest Conference and Banqueting facilities. On the service side it contains administrative offices, fully equipped internal operational departments like House Keeping, Engineering, Human Resources etc, five operational kitchen and staff facilities. The total plot area is 79194sft, total built up area is 178600sft and Air conditioned area is 130000sft the temperature maintained in the air conditioned area is 20deg C to 23deg C. except the kitchen area (20 to 30deg C)

The hotel operates 24 hours a day x 365 days a year with average of 90% occupancy & 3.3 lacs Food and Beverage covers a year. The turnover of the hotel in 2004-05 was Rs 58.00 crores. The total connected load of the hotel for 2004-05 was 2616KW approx. The hotel its ISO14001- 1996 Certified by BVQI. It will be HACCP certified by the end of this year.

Energy Conservation Policy and Commitment

Taj Residency Bangalore in alignment with its group's policy statement is committed to use Energy judiciously, efficiently with out any adverse effect on the environment and society. They have various processes systems initiative and equipment in place to ensure optimum use of Energy.

Energy Management Systems - Details.

In the year 2000 – 2001 hotel was consuming average of 341000 units per month (11216 units/day) and the Energy Management programmes was not structured and not being used to its fullest capacity. The same was discussed in the unit level and a proper plan of action was devised. The Corporate Engineering Director then approved the same. In the year 2001 as part of the initial plan the Energy Audit was carried out by M/s TATA honey and the potential saving measures were identified. Based on the above study a well-defined Energy management system was put in place in the year 2002.

1. Micro Processor Based Energy Management system.



Microprocessor based PC controlled energy control system is installed to control entire Energy Management System. The above system operates, control the total EMS as per the setting done by the Operator/Engineer, also monitors the operations as per the settings and records all the parameters with timings for the reference & records with the help of XL500 & XL 100 controllers.

2. XL500 & XL100 controllers.

XL controllers works between PC (Microprocessor) and control mechanism of the Air Conditioning system – will sense the signals from Air, Water & temperature sensors and controls them as per the settings available with Computers.



3. Screw Chiller – 300Tr (Main Part of EMS Project).

The hotel has installed new 300 Tr Screw Chiller (Energy efficient Air Conditioning Plant), which consumes 0.7KW per Tr AC out put & the latest technology available in 2002- 03. Two screw type compressors of 120 & 180 Tr s was giving very effective Air Conditioning out put as per the requirement of the hotel in the peak/normal & low levels. The in built Microprocessor control panel is available with wide range of control facilities to monitor & Control the above AC plant operations as per the settings.



4. Chilled water pumps – Primary & Secondary.

Part of EMS project 5nos 7.5Hp primary pumps are installed which will feed chilled water to the chiller of the Screw Chiller and the secondary Pumps 3nos 15Hp are installed to boost the water pressure as per the requirement of total (centralized) Air conditioning system and controlled by the EMS PC through Variable Frequency Drive as per the pressure transducer signal.





5. Back Up Control systems.

All the Air handling units are having Air pressure difference sensors – will show the air filter status on line, on line (return air) temperature sensors are installed to monitor the AC temperature of individual out lets through EMS (PC) system and to control the chilled water (motorized valves) flow as per the temperature setting with auto manual control facility through PC and XL controllers.

6. Energy Saving Lamps

All the Back Areas, admin offices & public areas of the hotel has been covered with 28watts choke less energy efficient lamps – 350Nos and PL lamps, all the guest floor corridors and some of the rooms lights are having Compact Fluorescent lamps of 7,9,11,15 & 20 watts in place of 25,40,60 & 100 watts incandescent lamps – 1350 nos.

6. Area Wise Energy Meters.

Energy meters are installed in all the outlets including guest floors main meters are connected with PC for recording the readings (hourly, daily, monthly) and the same is tabulated monthly to review variance in the Business review meetings.

New Hot Water boiler

Apart from EMS – new hot water boiler is installed with duel burners firing as per the requirements and run hour as well as fuel consumption is reduced when compared with old boilers.



Energy Conservation steps in the year 2003-04.

1. New cooling tower is installed, which will improve the AC plant efficiency. (Not measured)
2. New Walk in cooler (3.8KW) is installed in kitchen and removed 14x1.5KW of vertical coolers.
3. 6KW long heating salamanders are removed from kitchen and new instant heating salamanders - 4.8KW are installed, where the power as well as timing is also saved.
4. LPG oven installed in bakery to get instant heating – 200 – 250 deg C where the electrical one was taking hour time to get the same temperature (18Kg/day -10Hours operation approx – old Electrical oven is 12KW x 16 hours a day – $83887500\text{kcl} - 59568000\text{kcl} = 24319500 = 28611$ units/year)
5. In place of Tube lights and incandescent lamps PL & CFL lamps are installed in all the administration offices – (Not measured)

Energy Conservation steps in the year 2004-05

2. New cooling tower is installed, which will improve the AC plant efficiency in place of old ineffective cooling tower.
3. In place of old Pumps new energy efficient pumps are been installed – Hot water make up 7.5 KW to 5.5 KW, Cooling tower (STP water) make up 7.5 KW to 5.5KW, Swimming pool filtration 9.5KW to 7.5 KW, Cold water Booster 3.7KW to 2.2KW.
4. New Dry Type transformers are installed in place of old oil filled transformers where the losses are less (comply with the legal requirements of indoor installation)
5. All the light fitting in the garden areas 70-x 100watts (BC bulb) are replace with 9watts x 4 x 70nos PL lamp fittings.
6. 500Watts Halogen lamps (15nos) are replaced with 50W halogen lamps x 25nos in the front (porch) garden area
7. 5nos of Variable frequency drives are installed in the Air Handling units - will reduce the speed – energy consumption.
8. Hotel is upgraded Sewage Treatment Plant with the latest available technology where the water treatment is done effectively with better quality and clarity and used for the garden and AC plant cooling towers by investing Rs 35 Lacs.

Renewable energy & Heat recovery.

1. Solar hot water heaters (Panels).
100 nos solar hot water heaters are installed in the hotel, (each can generate 100liters of hot water per day average) 10000liters of hot per day is generated, and 50 to 70 liters of ultra diesel per day is saved, also 2hours reduction in boiler operation a day approx. (Operated through automatic timer and temperature control system)
2. De-Super heater of Screw Chiller.
The hotel has 300Tr screw chiller with De-Super heater facility where the cold water is circulated through the de-super heater and 5 to 9deg C heat has been recovered 20hours a day minimum and the same is hooked in the central hot water circulation system. (Boiler fuel saving is achieved around 15 to 20 liters per day approx).
3. Heat Exchanger – (Diesel Generator).
During power failures Diesel Generator is operated and DG's cooling is done through Heat exchanger where the water is circulated from heat recovery tank – during long run (More than a hour) almost total heat recovery water is heated up to 45Deg C from 30 to 36Deg C. (Not

Measurable since DG's are operated only during power failures (10hours a month max -Savings not calculated)

4. All the coolers and Freezers fan cooled condensers are replaced with water cooled condensers to improve the cold units performance, also to recover the condenser heat from the Cold units for hot water makes up where 3 to 6 Deg heat exchange is been achieved. 1470 liters of fuel and Rs 0.37lacs saving per year approx.

Total Productive Maintenance.

The periodic maintenance for a machine which, when scheduled at fixed regular intervals is called as Preventive Maintenance.

This Preventive maintenance has now evolved into Productive Maintenance. The process of Productive maintenance is interesting & easier. Total Productive Maintenance is being followed which consist of 7 steps, out of which only three steps are being done to achieve TPM & the next steps are for total autonomous maintenance.

- Initial cleaning.
- Countermeasures for forced deterioration & improving Hard to access areas.
- Preparation of tentative standards for autonomous maintenance.
- General inspection
- Autonomous inspection.
- Standardization.
- Full Autonomous maintenance

Total productive maintenance is a team-based activity, involving members at all levels & functions in an Organization. The effective operations of the TPM leads & helps in

- Team based activity, aimed at planned goal of Zero losses.
- Setting goals for maximizing machine effectiveness.
- Involvement of all from top executives to the bottom line employees.

TPM in the hotel has been implemented in the following equipments: Templifier, Voltas reciprocating chillers, Transformers, H/W Boilers, Generators & its surrounding areas, H.T Room, Service building, Lobby Loft & 5 AHU's inside & 3 Exhaust fans, Lift Machine Room, Terrace, Trinity AHU, Vijayanagar 1 & 2 AHU's, Banquet Ventilation & MOC ventilation which covers approximately 90% area / equipments of the hotel.

We have also gone one step ahead & started the first process of TPM in the rooms by having the Guest room history cards, just like the equipment history cards. This Guest room history card is being filled every day for each & every room, so that on analyzing these card the frequent / recurring complaints can be identified & eliminated so that the rooms are 100% defect free.

TPM is paying indirect benefits like increased equipments life, reduction in spares consumption/maintenance cost etc.

Diesel, Lube oil & waste oil storage area with fire protection facility.



Diesel Generator Room
After TPM.



ISO14001 - EMS Initiatives – Used Kitchen Oil To M/S Southern Railway to Generate – Bio Diesel.



Steps to Reduce Water Consumption

1. Regular awareness training to the departmental staffs on the importance of water conservation and methods etc.
2. Checklist is made and followed to ensure there is no water leakage in hotel water outlets as per the schedule.
3. Minimum required water pressure is maintained in the water outlets to ensure there is no excess water is flow on the water outlets.
4. Gents rest room and public area toilet urinals are covered with auto sensor for flushing.
5. Pneumatic water flushing system is installed in gents rest rooms toilets in place of on line water flushing system.
6. Pneumatic dual option water flushing system is installed in renovated guest rooms for WC flushing.
7. Shift wise, daily & monthly water consumption is monitored recorded tabulated and reviewed in monthly business review meeting.
8. Only Treated water is used for cooling tower and gardening of the hotel to reduce the fresh water consumption
9. upgrading of Sewage Treatment Plant will be completed by March 2005,
10. Installing new water meters to the main water outlets is in progress for better monitoring and control.

Steps to Reduce Electricity Conservation

1. Monthly awareness training on energy conservation is taken to the departmental staffs.
2. Energy Conservation methods is been made and forwarded to all the department to follow including engineering.
3. Effective utilization of TATA Honey Well Energy management system, and staffs are trained on the same to follow.
4. Public area and back area lighting circuits are connected with timer and LDR control.
5. Regular rounds is taken by the engineering department shift incharges and engineers to monitor and reduce the wastages.
6. Shift wise, Daily electricity consumption is monitored and area wise energy consumption is recorded daily, consumption details is given to all the kitchen, F&B outlets and staff cafeteria etc.
7. Monthly (area wise) energy consumption and total electricity consumption are tabulated and compared with Budget Vs actual, Banquet/restaurant Covers Vs consumption, consumption per occupied room etc, same reviewed in the monthly Business review meeting.
8. Only energy efficient equipments are proposed in place of old inefficient equipments.
9. Minimum required pressure is maintained in kitchen LPG distribution lines to avoid wastages.
10. LPG gas range burners are serviced regularly to ensure the blue flame to get optimum heat.
11. LPG consumption is been monitored daily/monthly and informed to the concerned kitchens to check with their sale.
12. Generators and Boilers are maintained as per the TPM standard, supplier recomondations to get optimum efficiency.
13. Boilers and generators are operated with maximum load to get optimum output & to avoid wastages.

Steps to Reduce Consumption of Paper

1. All the internal communications are done through E-mail only - except one or two cases for the hard copy records.
2. Only one sided papers are used to take Xerox & computer hard copies for to keep department records. Fresh papers are used for external communication like government agencies, suppliers and other out side agencies.
3. All the old used papers cartons are disposed to the recycler with the help of Materials Department.

Waste Management (Storage and handling)

1. All the old/scrap Items are disposed through the scrap dealer only with the help of Purchase and Finance departments.
2. Old and useful items are disposed as per the corporate directive & as per the finance manager/unit General managers advice only.
3. Used kitchen oil is collected in engineering department separately, its collected by Ms Southern railway to generate Bio Diesel for their Locomotive operation (Its given as free of cost).
4. Used Generator Lube oil, Old dirty diesel & paint waste are disposed through the KSPCB (Pollution control Board) authorised agencies.
5. Regular training is given to the department staffs for collecting/storage & disposal of hazardous wastes.

Reduction in Consumption of Plastic

1. Plastic bags are not used in engineering department - if any its disposed to the recycler with the help of Materials department.
2. Used plastic cans are handed over back to the supplier after washing - for the same clause is added in the purchase order.
3. Awareness session are conducted regularly for the department staffs on the above subjects.