A judicious blend of technology and tradition, TERI’s energy-efficient and environmentally benign complex is perhaps the first of its kind in south India. It hopes to serve as a model for urban design in similar geographical and climatic conditions. It symbolizes TERI’s faith in its research and its commitment to sustainable development. With its state-of-the-art facilities assembled in an aesthetically pleasing manner, this complex serves as an example for planners, builders, and architects.

**NATURE IN ITS ELEMENTS**

TERI’s building complex marks a novel paradigm in the creation of an energy-efficient, eco-friendly, and sustainable space, successfully facilitating all thermal, visual, and aural comforts for users. The design displays a dexterous interplay of the five basic natural elements – sun, air, earth, water and sky – with the built form, to meet all requirements of thermal, visual, and aural comfort. This energy-efficient building balances all aspects of energy use, and allows unhindered flow of intellectual energies, lighting, space-conditioning, and ventilation, by providing an optimized mix of passive solar design strategies, energy-efficient equipment, and renewable sources of energy, besides the use of materials with low embodied energy.
The innovative systems that have been incorporated in the eco-friendly building complex of the Centre constitute but a beginning

Orientation and passive ventilation
In orienting the building, an unhygienic nullah (sewer) along the south was a major challenge. The structure had to allow for a continuous reverse wind circulation system, ensuring healthy conditions within. The building, therefore, opens towards the north, taking additional advantage of the glare-free sunlight. On the south is an absorptive double wall with a cavity, which (1) provides insulation from the southern sun and (2) heats up the air within. The foul-smelling breeze flows over the building and is driven away. The wall’s cavity allows the hot air to rise (chimney action) and pull in fresh air from the north. The sections are naturally ventilated; air flows freely from the ground floor to the terrace.

Innovation at work
This building has been fashioned from carefully selected materials to achieve very low embodied energy and designed to overcome various site constraints. Its innovative use of on-site sources and sinks sets an example for many such buildings of the future.

Daylighting design
Daylight streaming through huge skylights right through to the heart of the building enriches the vibrancy of the ‘commons’ and invigorates them for cross-disciplinary encounters and discussions. The entire fenestration has been conceptualized to minimize dependence on artificial lighting during the day. Intelligent systems like energy-efficient lamps, luminaries, and control devices further reduce the lighting load.
Energy generation

The sun’s energy is being tapped by a solar water heating system serving the kitchen and other utilities. In the offing is a solar roof, where a series of photovoltaic panels integrated into the roof will capture the sun’s energy and store it in a bank of batteries, the main source of power at night.

Roof insulation

Replacing ground cover on roof lessens environmental impact

Courtyards and terraces also enliven building space

Extra thickness reduces heat gain from roof

Water resources

Recycling is essential to sustainability, and since water is such a precious resource, every attempt to create a sustainable habitat must include specific strategies to conserve it. The complex has implemented an efficient rainwater harvesting scheme. Run-off from the roofs and the paved area is collected and stored in terrace tanks and collection sumps. After purification, this can be reused for a variety of purposes, including irrigation and landscaping.

Functional layout

The linear design incorporates the office zone (75 workstations spread over two floors) and an area for relaxation, overlapping in the common dining facilities. The office block is located on the east, close to the main road for high visibility. The rooms for guests to relax in are towards the quieter western side. The work area, constituted by workstations, meeting rooms, conference facilities, libraries, and laboratories, reflects the concept of ‘caves to commons’. While the intimate spaces provided for individual work-groups are the ‘caves’, the atriums, nodes, and corridors are the ‘commons’ for wider interaction. TERI believes strongly in the single-to-whole process of teamwork, where each team has a specific role, but through interaction, new ideas evolve.
Guest house
The building has three suites and six twin sharing rooms that are aesthetically designed, with all modern-day comforts to facilitate overnight stay of guests. Delectable cuisine is made available by order, which is part of the package at the guest house training facility. There is also a state-of-the-art business centre and library.

Energy performance
The monthly bill for energy consumption is about Rs 30,000 for the entire complex, with daily average demand of 12 kW (peak at 18 kW). With floor area being 26,663 square feet, the specific energy bill works out to be Rs 1.12 per square foot, which is almost one-tenth of a conventional building with air conditioning.

About TERI Southern Regional Centre
TERI’s Southern Regional Centre was set up at Bangalore during 1990 with initial support from the Government of India and the European Commission. Its main objective was to promote concepts and practices for improving industrial energy efficiency through a concerted programme of research, consultancy, training, and information dissemination. TERI-SRC has since become a reputed name in the areas of energy efficiency, environmental services, and rural and renewable energy, and currently has three major groups.

Industrial Energy (IE)
TERI is one of the few organisations known for promoting energy efficiency practices for Indian industries. During the last 15 years, the IE group has grown as a ‘specialist organisation’ dealing with concerted programmes covering various elements of industrial energy. The emphasis is on promotion of energy efficiency improvement concepts and practices related to consultancy, training and research, and information dissemination. The thrust areas of the group include comprehensive energy auditing of major equipment performance for energy efficiency; analysis and advice on improvement possibilities for all sectors of industry falling under energy, water, and power quality; electrical safety and practical energy audit programmes; and information dissemination and awareness building programmes for industrial engineers/managers.

Environmental Studies (ES)
The ES group offers knowledge based services and solutions in the areas of policy research, analytical studies, technology design, implementation of interventions, and environmental education. Over the years, the group has expanded its portfolio of activities to address a diverse range of environmental issues across rural and urban settings. The focus areas of the group include state of environment reporting, air quality, health, rainwater harvesting, and environmental services and solutions for the industrial / corporate sector.

Rural and Renewable Energy (RRE)
TERI has been committed to enabling rural communities face challenges of energy and natural resource management in a sustainable and rewarding manner. The RRE group is mandated to direct TERI’s efforts in this sector, with an emphasis on analysis, evaluation and need assessment of energy and more importantly on implementing sustainable solutions for rural problems related to natural resource management (NRM) and energy uses. It seeks to understand and identify issues related to rural energy and livelihoods, including institutional and market linkages, at the grassroots level.

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