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# SUSTAINABILITY POLICY OF IIT BOMBAY

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Office of Dean (IPS)

INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

Powai, Mumbai, 400076, INDIA

## **Preamble**

IIT Bombay is among the leading technical Institutes in India. The institute is a residential campus with a current population of almost 25000 (including floating mass). The campus is a habitat of several native and seasonal biological species. The campus is spread over 489 acres out of which ~50% is green cover. Due to increase in demand for hostels, housing and academic facilities, construction activities are also going on. In order to ensure sustainable development, the current policy document is prepared.

## **Title and Application**

The policy shall be named as *IIT Bombay Sustainability Policy*. The policy shall apply to the institution and all its Students, Staff and Faculty. The sustainability policy is aligned with the sustainable development goals (SDGs) suggested by United Nations. There are seventeen verticals in SDGs which consider technical, environmental and social aspects. By implementation of this policy, IIT Bombay is firmly determined to achieve sustainability in all domains of life at campus. Further, it will contribute definitely to spread of sustainability principles out of the campus.

## **Purpose and Aspects Covered in the Policy**

The purpose of the sustainable policy is to adopt green practices which promote environment friendly ambience in the campus and develop sense of responsibility among the residents towards environmental conservation. In summary, the policy is committed to have high environment & social impact and excellent Governance in the Institute. In addition, IIT Bombay considers 'safety at working place' as an important aspect to achieve sustainability. Various sections/ departments across the Institute participate actively in the above domains. To accomplish the purpose, following activities have to be performed under different domains.

### **(A) Environmental Impact**

IIT Bombay has a Green Office Committee which is Chaired by Director IIT Bombay which looks after the environmental aspects. To ensure environmental sustainability, a dedicated administrative position, Associate Dean-III (Infrastructure Planning & Support section) is created by the Institute administration. The office of Associate Dean-III(IPS) is expected to plan, implementation and monitoring of green initiatives in the campus. The proposed initiatives are discussed in Green Office Committee for inputs.

### ***(i) Environment education***

Among higher Education technical Institutions, IIT Bombay is among the few Institutes which started study and research on environment in late seventies and established a separate academic entity in the form of Centre for Environmental Science & Engineering. Since then, the Centre is offering M.Tech. and Ph.D. programmes. The 'Centre' has been upgraded as 'Department' almost five years ago since the inception of dual degree programmes (B.Tech.-M.Tech. & MSc-PhD). In addition, other academic units (such as Department of Energy Science and Engineering, IDP in Climate Studies, Centre for Technology Alternatives for Rural Areas (CTARA), Department of Humanities & Social Sciences and Centre for Policy Studies) also offer several relevant courses related to environmental and social aspects for the students admitted in different programmes.

*Apart from this, all the undergraduates must study a basic course on Environment Studies which is mandated by Supreme Court of India, which also covers sustainability concepts. The mandatory course is jointly offered by Environmental Science & Engineering Department and Department of Humanities & Social Sciences at IIT Bombay. Further, the online course content will be made available for all campus residents.*

### ***(ii) Environmental research***

IIT Bombay research community is committed to perform research in national and global environmental issues. The faculty from different departments are conducting research on various key issues such as waste and wastewater minimization, treatment & recycling, climate change, use of sustainable construction materials, renewable energy (such as biomass, and solar), batteries, Sustainable transport planning and Efficient traffic management. The major purpose should be to develop low cost products which are affordable, durable and efficient to use. In order to invent sustainable products, inter-department collaborations are highly encouraged.

### ***(iii) Awareness Programmes***

The awareness drives will be organized time to time by public health office, students' groups, and volunteers to inculcate importance of environmental conservation and harmful impacts of unsustainable practices (such as consumption and over-exploitation of resources, food scarcity, littering and dumping of waste, wastage of water and electricity etc) to the residents. *Some of the awareness activities include collection of plastics and glass from various locations in the campus, zero waste days in messes, display of posters, plays/ skits on the roads or hostels.* These activities should essentially be organized in the months of September and October (generally during Swachhta Pakhwada) in addition to other period during the year.

Apart from this, IIT Bombay is determined to promote environmental education among kids via competitions, cleaning drives and plantation activities. Besides, the professionals working

in diverse fields or similar disciplines to improve awareness at National level are also trained through short courses and hands-on training programmes.

To motivate the students for waste minimization and its proper disposal, competitions among hostels will be planned particularly for cooked food waste minimization from hostel mess. Apart from this, mess contractors are also educated to cook adequate amount of food and excess food management to avoid wastage as well as reducing carbon footprints.

For awareness of faculty & staff and their families, door to door awareness campaign for the will be organized.

#### ***(iv) Approaches towards zero carbon emissions***

##### Sustainable transport and mobility

The increasing adoption of sustainable transport (such as walking, bicycles and electric vehicles) within the campus will contribute towards achieving zero carbon emissions. The institute has already reduced and will aim to eliminate gasoline and diesel operated vehicles, replacing them by electric vehicles in a phase-wise manner. Moreover, the residents will be encouraged through awareness programmes to use bicycles. Sufficient charging points will be provided at the key locations in the campus to avoid fuel related hassles among the residents.

Further electric buggies have to be increased for mass transit.

Apart from this, bicycles lane will be constructed to allow safe travel and encourage use of unpowered mode of transport. In addition, footpaths are being constructed for pedestrians for easy access to the academic area from hostels.

##### Water conservation and wastewater recycling

For water conservation, rainwater harvesting programmes will be executed. Check dams will be planned at storm water drains to collect and store the rainwater in sub-surface containers as well as groundwater recharging. Wherever possible, rooftop rain water will also be used to recharge the subsurface aquifer.

Wastewater from bathrooms and washbasin taps (i.e., grey water) in hostels as well as residential areas will also be recycled after suitable treatment. The plants will be constructed within the building or at a nearby common location receiving from different buildings depending upon the situation.

The stored rainwater and treated grey water will be used for various purposes including horticulture activities, vehicle washing and toilet flushing depending upon the quality.

In addition, low water flush tanks and water less urinals will be installed in rest rooms to minimize the water usage. All the taps and facets in the campus will be fitted with low-flow aerators to reduce the water consumption. Water meters will be installed at various locations

to keep a record of water consumption. Further, the supply pipes will be maintained and repaired to eliminate loss of water due to leakages.

Water audits will be performed once in a year to identify the limitations and overcome the issues.

#### Solid waste treatment and recycling

Municipal solid waste collection and disposal will be performed in scientific manner. At source, waste segregation into dry and wet waste fractions is mandatory. All the wet biodegradable waste produced from houses and hostels is processed using composting and anaerobic digestion process. The compost generated after the treatment of wet biodegradable waste, leaves and grass whereas biogas produced from anaerobic digestion is used as replacement to liquified petroleum gas in hostel messes. Thus, the goal is to reduce usage of materials obtained from non-renewable sources as much as possible.

The hostels' messes have to reduce food wastage by taking suitable measures. One of the suggestions include the use of excess food for workers of hostels and building contractors. Furthermore, the food wastage has to be avoided by conducting awareness programmes as discussed above.

The not-readily biodegradable woody material is suggested to be processed to form pellets within the campus. The pellets may then be used for energy recovery purpose. Apart from this, the dry household waste will be recycled either in-house or through an authorised recycler. Sanitary waste will be collected separately and disposed through an authorized biomedical waste collection agency.

There is ban on single use plastics. No vendor within the campus should have single use plastics. The buyers are encouraged to carry recyclable bags. For the meetings, the use of plastic bottles will be prohibited. Instead glass bottles/ jars will be used.

Biomedical waste from hospitals is being handled and stored as per Biomedical Waste Management Rules (2016) before disposal through an official agency. E-waste and discarded scrap material (such as old equipment, and their parts, unusable furniture etc.) is being recycled and disposed by auctioning through approved vendors only.

The excavated soil from various construction sites will either be reused at the same site or will be utilised for horticulture activities in different grounds.

Waste audits will be performed on regular basis to understand the performance of existing practices and taking appropriate measures for further improvement.

### Energy conservation

At IIT Bombay, appropriate measures will be taken to conserve energy. Further, the ongoing replacement of CFL by LED will help in reduction in energy usage within the campus. The residents will be encouraged to turn off the power while leaving room/ office by email posts and posters. All corridors, toilet blocks should have motion sensor activated lights and exhausts. Further, the new buildings will be made in such a way so that natural light is sufficient in day time. Energy audits will be performed periodically for continual improvement in energy systems and their usage. In future, IIT Bombay will extend solar photovoltaic installation significantly by providing it on all the rooftops in the campus. All the older fans are being replaced with energy-efficient BLDC fans. These initiatives will significantly contribute to IITB's goal of achieving a net zero campus.

### Renewable Power and Net Zero

Increasing contribution of rooftop solar photovoltaic power is an important goal for IITB. In addition, we will explore purchase of electricity from renewable sources such as solar PV and wind energy from external suppliers to target net-zero carbon goals.

### Sustainable infrastructure development

The infrastructure will be developed to provide good and healthy working environment to the building occupants. Some of its features include energy and water saving fixtures, proper ventilation (i.e., air exchange with the outside environment), and natural lighting. The new buildings will be built to target GRIHA four-star rating criteria. As much as possible, the new construction will be carried out on demolished sites and in vertical direction to occupy less land footprint (in accordance with the approval from competent government authority) and requirement of lesser piping, road widening etc. The new construction will be planned in a manner to reduce land footprint and conserve greenery.

### Road cleaning

Suitable measures will be taken to prevent dust suspension in air during road cleaning in the campus. Hence, vehicle mounted road sweeper having a provision for water spray will be used for cleaning of the roads.

### ***(v) Creation and Maintenance of green cover and landscaping***

IIT Bombay has significant green cover in the campus. The Institute will make all efforts to conserve greenery in the campus by compensatory tree plantation, growing grass and native shrubs. In addition, more playfields will be developed for students, staff and family members. Kid's parks will also be developed at various locations.

Landscaping projects of different sizes will be undertaken at roadsides and open spaces with native plant species, and seasonal flowers.

***(vi) Biodiversity management***

Suitable measures will be taken to maintain biodiversity in the campus due to increasing development activities. Butterfly gardens, medicinal plants and exotic flora & fauna will be conserved as well as created within the campus. In addition, biodiversity audits will be conducted periodically. IIT Bombay has created a protected no-construction zone next to the Powai lake, protecting the natural flora and fauna both on land, and in the wetlands leading to the lake. This area has become a hotspot of biodiversity with a very large number of birds, across a large number of species being spotted in this area.

The zone of wilderness (no construction, parks etc) has been marked on the masterplan of IIT Bombay which is attached in the end of the document.

***(vii) Handling, storage and disposal of hazardous materials and wastes***

The hazardous chemicals or materials used in research activities should be stored in the appropriate material storage cabinets. Proper ventilation should be provided wherever necessary. The disposal of hazardous liquid and solid waste should be done through authorised vendor. Proper storage of waste should be the responsibility of waste generators. These types of wastes have to be stored in leak proof containers with all precautions before handing over to the vendor. Suitable labels should be put on the containers to prevent any mishandling.

***(B) Social Impact***

***(i) Equity and well-being of campus residents***

To ensure equality and well-being of the campus residents, appropriate steps will be taken by IIT administration. Students Wellness Centre is already in existence in the campus. The students can get proper advice to resolve their issues with the help of counsellors at Students Wellness Centre.

Moreover, students as well as faculty and staff will be encouraged to participate in outdoor activities (sports etc) for improved mental and physical fitness. More play grounds and kids play areas cum parks are being developed for this purpose.

Gender cell and SC/ST cell are also established to address any gender based and caste-based grievances, respectively.

***(ii) Improved housekeeping activities***

Better housekeeping practices will be adopted to maintain clean and healthy indoor environment in the campus. Use of mechanized equipment and ensuring avoidance of direct human contact with solid and liquid waste will not only improve the cleanliness but also protect the health of housekeeping workers. For their safety and health, they are being provided the personnel protective equipment (PPE). In addition, proper training is organized for the housekeeping workers so that cleaning activities are performed efficiently.

***(C) Safety aspects***

IIT Bombay sustainability policy includes safety aspects. To ensure health and environmental safety, the Fire & Safety Section (FSS) of IIT Bombay will prepare a comprehensive document containing Standard Operating Procedures (SOPs) for lab safety, hospital safety, hostels & residences safety, road safety and construction safety. Proper measures will be taken to ensure campus safety from above activities. The students will be educated through one-day sessions to be organized by Safety Officer, FSS. Mock drills will be performed at least once in a year to train volunteer staff and students. Internal safety audits will be conducted twice a year whereas external audits will also be conducted once in two years.

***(D) Governance***

Various academic as well as administrative sections are responsible for the implementation and monitoring of different activities described above.

The above policies will be reviewed periodically to ensure meeting the sustainability goals in timely manner.



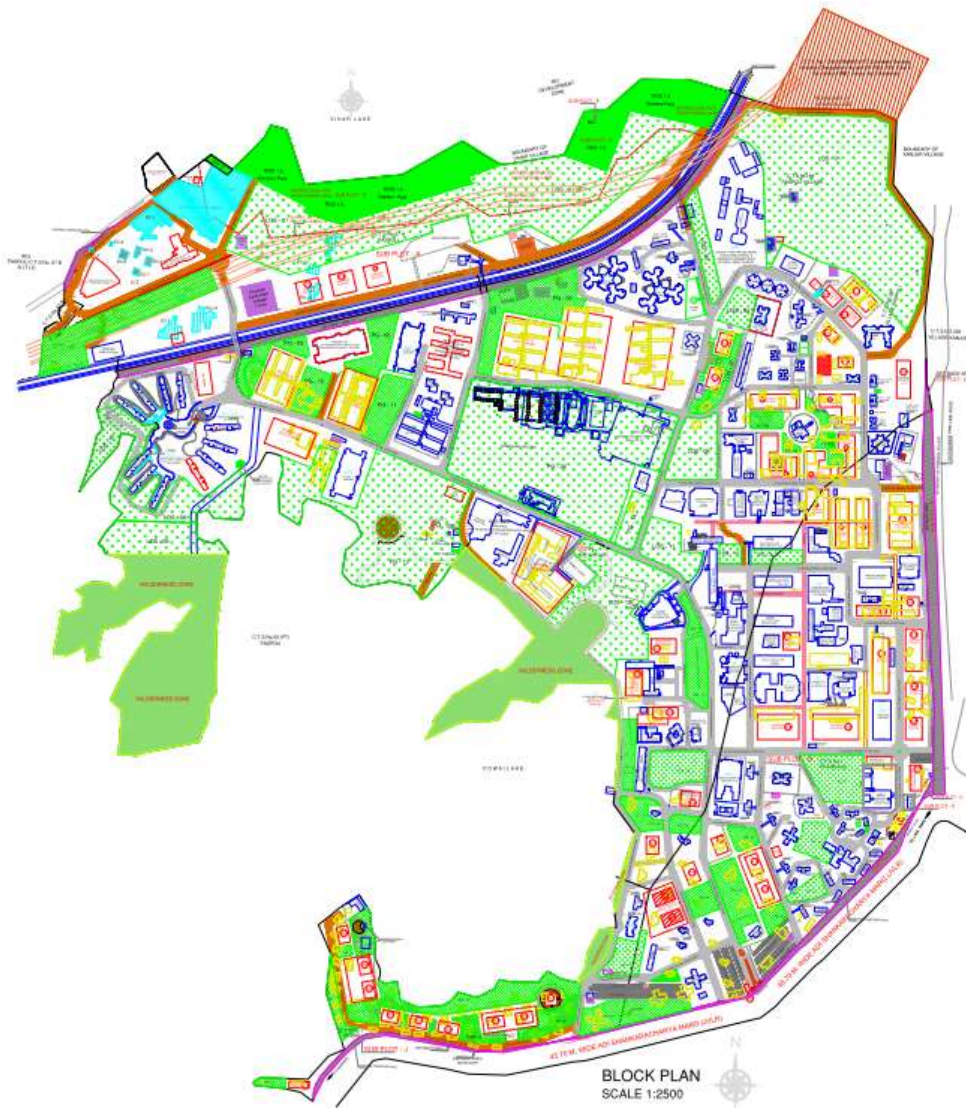


Image of Master Plan Showing Wilderness zone near lake fringe road