

INDIAN INSTITUTE OF TECHNOLOGY BHUBANESWAR



Sustainable Development Report July 2023

Committee Members

Prof. Rajesh Roshan Dash – Chairman

Dr. Vinoj V. – Member

Dr. Naresh Chandra Sahu - Member

Dr. Bibhuti Bhusan Sahoo – Convenor

Export members:

Sl. No.	Sustainable Strategies/Goals	Management	Experts/Members
1	Energy Management		Prof. C.N. Bhende Dr. S.B. Karanki Dr. C. Perumala AEE (Electrical) and AE (Electrical)
2	Transportation		Prof. P.R. Sahu Dr. P.P. Dey Dr. S.N. Panigrahi
3	Water and Wastewater Management		Prof. P. Bhunia Dr. A. Sarkar
4	Waste Management		Dr. Manaswini Behera Dr. R. Neelanchery Dr. M. Ramadas SE (Civil) and AE (Civil) Mr. P.K. Poddar
5	Forest, Plants, Flora & Fauna		Dr. Syed Hilal Farooq
6	Climate		Dr. Sandeep Patnaik Dr. R.K. Singh Dr. Kiranmayi Landu Dr. D.P Dogra Dr. Tarakant Nayak Shri Kamireddy Visweswara Reddy
7	Social Sustainability		Dr. Sasmita Barik
8	Sustainable Procurement Policy		Dr. Madhusmita Dash Dr. Seema Bahinipati Mr. P.K. Sahoo Mr. Ankit P. Bagde



SUSTAINABLE DEVELOPMENT GOALS



Introduction

The Indian Institute of Technology Bhubaneswar (IIT Bhubaneswar) is dedicated to promoting sustainability and enhancing its annual contributions to society, the economy, and the environment. This yearly assessment gives a sneak peek at some of the initiatives we have planned for 2022–2023 that will demonstrate our dedication to being a truly sustainable organisation. The COVID-19 epidemic forced students and workers to learn and work remotely or use a hybrid approach, making 2022–2023 a noteworthy year. Our communities made use of the campus for regular exercise and well-being, and our academic community helped to create pandemic response plans. At IIT Bhubaneswar, every student, professor, research project, professional service area, and campus contributes to the global sustainability and climate change agenda. IIT Bhubaneswar aspires to employ the framework of the 17 Sustainable Development Goals (SDGs) of the United Nations to direct our responsible leadership and generate positive results, with a focus primarily on teamwork. The organisation of this report around People, Partnerships, Planet, and Place serves to highlight how our sustainability purpose has expanded.

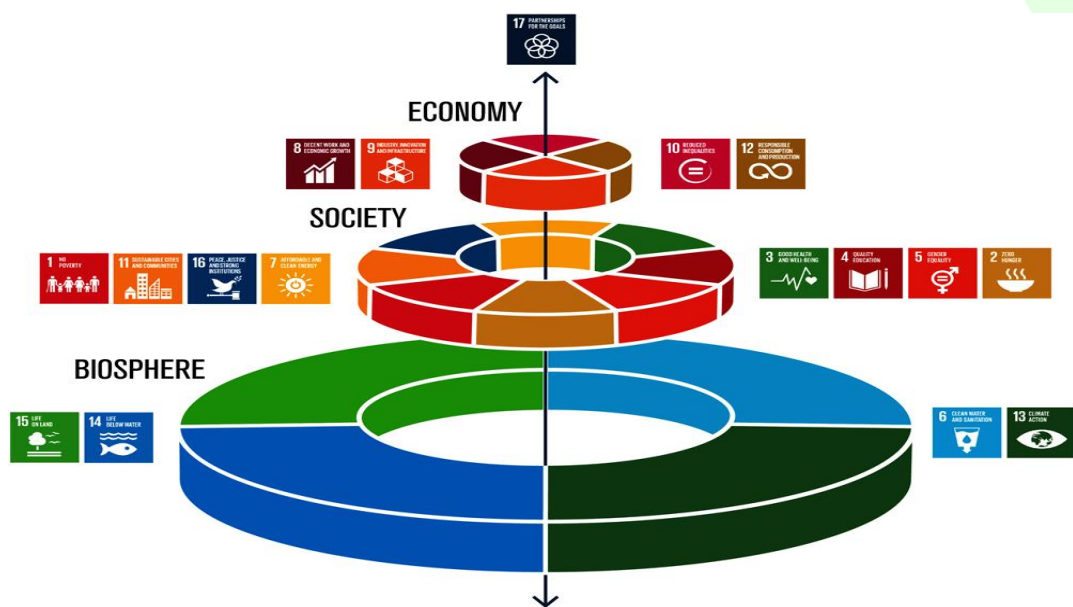
Sustainable Development

Sustainable development refers to a pattern of economic growth and development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. It involves balancing the economic, social, and environmental aspects of development in a way that promotes long-term well-being and sustainable use of resources. The concept of sustainable development was popularized by the Brundtland Commission in 1987, which defined it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The Brundtland Commission, officially known as the World Commission on Environment and Development (WCED), was established by the United Nations in 1983 to address growing concerns about the state of the global environment and the impact of human activities on it. The Commission was chaired by Gro Harlem Brundtland, former Prime Minister of Norway.

The main objective of the Brundtland Commission was to formulate a long-term global strategy for sustainable development that would address the environmental and social challenges facing the world. The Commission's work resulted in the 1987 publication of the landmark report, "Our Common Future," which popularized the concept of sustainable development and introduced the idea that economic growth and environmental protection are not mutually exclusive. The report's recommendations have had a major impact on international environmental and development policy, and it remains a seminal text in the field of sustainable development.

Several activities that were carried out throughout the year in support of the Sustainable Development Goals outlined by the United Nations. The social, the economic, and the environmental are the three essential foundations around which sustainable development is built. It is common for sustainability to be understood as referring just to the preservation of the natural environment; nevertheless, the concept encompasses a great deal more, and the three pillars of sustainability provide the most essential framework for comprehending it.



The Sustainable Development Goals (SDGs) are a set of 17 goals adopted by the United Nations General Assembly in 2015. The SDGs are a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs are:

- | | |
|--|--|
| 1. No Poverty | 10. Reduced Inequalities |
| 2. Zero Hunger | 11. Sustainable Cities and Communities |
| 3. Good Health and Well-Being | 12. Responsible Consumption and Production |
| 4. Quality Education | 13. Climate Action |
| 5. Gender Equality | 14. Life Below Water |
| 6. Clean Water and Sanitation | 15. Life On Land |
| 7. Affordable and Clean Energy | 16. Peace, Justice and Strong Institutions |
| 8. Decent Work and Economic Growth | 17. Partnerships for the Goals |
| 9. Industry, Innovation and Infrastructure | |

Educational Institutions/Universities play a crucial role in promoting and achieving the SDGs by educating students, conducting research, and engaging with their local communities to advance sustainable development. Some examples of how universities can contribute to the SDGs include:

SDG 4 (Quality Education): Offering education programs that promote sustainable development and equip students with the knowledge and skills they need to contribute to a more sustainable future.

SDG 8 (Decent Work and Economic Growth): Supporting entrepreneurship, innovation and job creation through research, incubation and business acceleration programs.

SDG 13 (Climate Action): Conducting research on climate change and providing education and training programs that equip students with the skills to tackle environmental challenges.

SDG 17 (Partnerships for the Goals): Building partnerships with governments, businesses, civil society organizations and other stakeholders to advance sustainable development at local, national and global levels.

By integrating the SDGs into their missions and operations, universities can play a critical role in advancing sustainable development and creating a better future for all.

ABOUT IIT Bhubaneswar

Indian Institute of Technology Bhubaneswar is established by the government of India in 2008 under The Institutes of Technology Act 1961 with Amendments up to 2012. The Act was passed in the Lok Sabha on 24th March 2011 and by the Rajya Sabha on 30 April 2012. IIT Bhubaneswar became an Institute of National Importance from 29 June 2012 with notification of Amendment in the Institutes of Technology Act, 1961 by the Ministry of Education, (Department of Higher Education) Government of India published in the Gazette of India dated 2 July 2012. The Institute started functioning from the campus of IIT Kharagpur on 22nd July 2008 and shifted its operation to the city of Bhubaneswar on 22nd July 2009. The Institute has adopted the concept of Schools rather than Departments for promoting inter-disciplinary research. At present, 7 schools are offering an academic programme.

Presently the academic programmes of the Institute include B. Tech. (Hons.) in Computer Science, Civil, Electrical, ECE, Mechanical Engineering, Metallurgical and Materials Engineering. The institute is also starting Dual degree courses in Mechanical and civil with intake of 10 from the academic year 2016-17. The institute offers 2 years of M.Sc. and M. Tech courses. The Institute started the Doctoral programme from the academic session 2009-2010 and offer admission to the joint M. Tech Ph.D. Programme from July 2012. The Indian Institute of Technology, Bhubaneswar (IITBBS) is also planning to start a new school of planning, architecture and design. This school will offer undergraduate, postgraduate and Ph.D. courses in all three disciplines. This will be the eighth school to function in the Institute. At present, such schools function at two other IIT's-in IIT Kharagpur and Roorkee. The Institute has broadly adopted the course curricula, syllabi

and other academic regulations of IIT Kharagpur, the mentor institute. The pedagogy emphasizes participatory, student-centric and participatory learning.

The academic programmes are equipped with very relevant courses for a budding entrepreneur, the entire institute may be used as a technology incubator and the institute has a 40,000 sq. ft. Start-up space for students to avail.



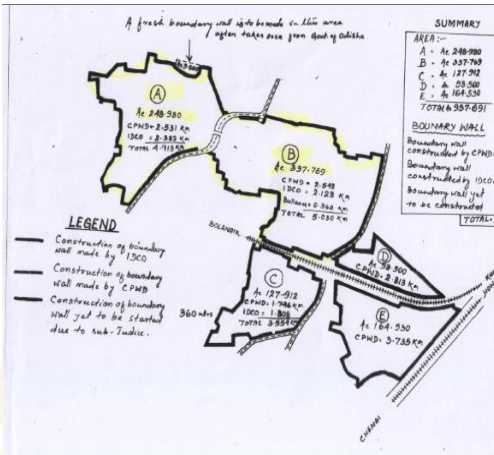
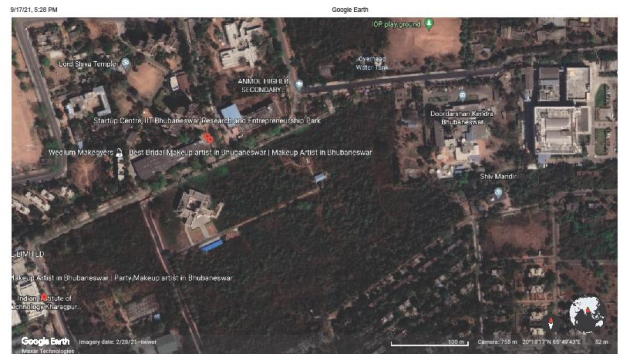
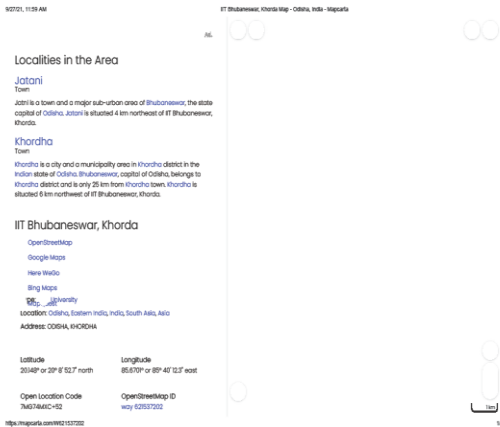
Infrastructure

Indian Institute of Technology, Bhubaneswar (IITBBS) is a 'Specialized higher education institution' situated in India. Located in a Tropical wet and dry climate, it has 2 campus sites in total. IIT Bhubaneswar campus: 50728.81 Sqm. KGP Campus - 1961.72 Sqm. IIT Bhubaneswar Campus- 50728.81Sqm. & Total- 52690.54Sqm. This Suburban campus has a total area of 38,22,570.88 Sqm. The total campus ground floor area of building is about 52690.54 Sqm and total campus buildings area is about 191612.325 m². The ratio of open space area to total area is greater than 95%. Total area on campus covered in forest vegetation is more than 35% while that covered in planted vegetation is greater than 40%. Besides this, the total area on campus for water absorption is about 2.73%.

Here are some examples of plants that may be suitable for planting in IIT Bhubaneswar:

- **Native Trees:** Trees such as Mango, Jackfruit, Neem, Arjuna, Banyan, Peepal, and Mahua are native to the region and can provide shade, improve air quality, and support biodiversity.
- **Flowering Shrubs:** Shrubs like Bougainvillea, Hibiscus, and Roses can add color and texture to the landscape, while also providing habitat for birds and insects.
- **Medicinal Plants:** Plants like Aloe vera, Tulsi, and Giloy have medicinal properties and can be used for their therapeutic benefits.
- **Herbs and Vegetables:** Herbs like Mint, Coriander, and Curry leaves can be grown in small gardens or pots and used for cooking.
- **Succulents:** Succulent plants such as Jade, Aloe, and Agave are low-maintenance and can add interest to the landscape with their unique shapes and textures.

- Palms: Palms such as Coconut, Areca, and Date can add a tropical feel to the landscape and also provide shade.
- Bamboo: Bamboo is a fast-growing and versatile plant that can be used for a variety of purposes, including building materials, and erosion control
- Avoid the grass which requires more water. In order to reduce water usage on lawn, it may be helpful to consider switching to a warm-season grass like Bermuda grass and Zoysia grass that requires less water.
- The total open space area divided by total campus population is greater than 70 Sqm./ person.



CAMPUS AREA

Status of Phase-I & Phase-II Built-up area.		
Sl no.	Name of the Building	Total Built up Area in Sqm
A. PHASE-I		
1	800 Single seater Boys' Hostel (MHR)	22048.70
2	200 Single Seater Girls' Hostel (SHR)	7286.70
3	Type-F (Grade-C Qtrs.)	4619.30
4	Convenient Shopping	235.20
5	Staff Community Centre	1111.80
6	Guest House	3331.65
7	Type-D1 & D2 (Grade-A Qtrs.)	15414.80

8	Main Building	14275.40
9	1st Year Lab Complex	4686.10
10	School of Basic Sciences	8467.50
11	School of Mechanical Sciences	8562.30
12	School of Infrastructure	8489.50
13	School of Electrical Sciences	8467.50
14	Main Gate & Security	116.30
15	LCS-1 & MRS	502.00
16	Local Electrical Sub-station-2,4,6 & 7	792.40
17	Local Electrical Sub-station-3 & 5	798.96
18	AC Plant room - 1 & 2	875.68
	Sub Total (A)	1,10,081.79
B.	PHASE-II	
1	800 Single seater Boys' Hostel(BHR)	24820.00
2	400 Single seater Girls' Hostel(GHR)	15212.00
3	800 Single seater Boys' Hostel (RHR)	24820.00
4	Type-A1 Quarter	12097.00
5	Type-A2 Quarter	
6	Type-B1 Quarter	5318.75
7	Type-B2 Quarter	5318.75
8	Type-B3 Quarter	5318.75
9	Type-B4 Quarter	5318.75
10	Type-C1 Quarter	4851.66
11	Type-C2 Quarter	4851.66
12	Type-C3 Quarter	4851.66
13	Type-D1 Quarter	3533.50
14	Type-D2 Quarter	3533.50
15	Director Bungalow	506.00
16	Commercial Complex (Academic)	652.00
17	Commercial Complex (Residential)	1027.00
18	Central Workshop	2545.00
19	Central Research and Instrumentation facilities	2725.00
20	Extension of SMS (Wing-A)	3294.00
21	Extension of SIF (Wing-A)	3262.00
22	Extension of SBS (Wing-A)	2671.00
23	Efficiency Hostel	7138.00
24	Extension of SES (Wing-A & B)	6065.00
25	Student Activity Centre	4509.00
26	School of Minerals, Metallurgical and Materials, Engineering	6085.00
27	School of Earth Ocean & Climate Sciences	6001.00
28	School of Humanities, Social Sciences & Management	1715.00
29	Lecture Hall Complex-1	25828.00
30	Lecture Hall Complex-2	
31	Lecture Hall Complex-3	
32	Dispensary	1901.00

33	Auditorium	5278.00
34	Equipment -1, 2 & 3	294.23
35	Stand building	706.00
	Sub Total (B)	2,02,048.21
	Total (A+B)	3,12,130.00

10 STRONG INSTITUTIONS

Green Campus

2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING

14 LIFE BELOW WATER



4 QUALITY EDUCATION

CLIMATE ACTION



5 GENDER EQUALITY

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

Area on campus covered in planted vegetation

Area on campus for water absorption besides the forest and planted vegetation



Area on campus covered in forest vegetation



Good Health and Well-being

The third Sustainable Development Goal aims to promote the health and wellbeing of all people at all stages of life. The Goal addresses all major health priorities, including reproductive, maternal, and child health, communicable, non-communicable, and environmental diseases, mental health, universal health coverage, and access to safe, effective, quality, and affordable medicines and vaccines for all.

Healthcare Facilities

IIT Bhubaneswar provide Health infrastructure including Sanjeevan Health Center on campus that staffed by qualified doctors and nurses who provide basic medical care, emergency care, and referrals to specialist doctors if required IIT Bhubaneswar is committed to the health and well-being of its students, staff, faculty, and adopted village, and has established a health and wellness program.

24 Hours Doctor Service	24 Hours Ambulance Service	24 Hours Staff Nurses
Life-Saving Drugs	24 Hours Pharmacy	High Quality Folding Hospital Beds
Multi-lead ECG Machine	Multiparameter Monitor	Nebulizer Machine
Wheel Chairs		



SANJEEVAN HEALTH CENTRE

Mental Health Services: Mental health services, such as counseling and therapy, is being provided on-campus to support the mental well-being of the IIT Bhubaneswar

community. This can include support for stress management, anxiety, depression, and other mental health concerns.

Health and Wellness Programs: The institution can promote health and wellness by organizing events and programs that encourage physical activity, healthy eating habits, and stress reduction techniques. Examples of such programs include fitness classes, meditation sessions, and nutrition workshops.

Yoga:

Thus, Yoga is a time-tested ancient practice and an ancient Indian gift to humanity. The Honorable Prime Minister of India for introducing the concept of International Yoga Day during his speech to the United Nations General Assembly on September 27, 2014, thereby promoting the practice of yoga worldwide. IIT Bhubaneswar promote the practice of yoga on campus in several ways:

1. **Yoga Classes:** IIT Bhubaneswar offer yoga classes on campus for students, staff, and faculty. Yoga has been made a requirement of the undergraduate program at IIT Bhubaneswar. These classes led by certified yoga instructors and offered at various levels to accommodate beginners and experienced practitioners.
2. **Yoga Workshops:** The institution organize workshops on different aspects of yoga, such as pranayama (breathing techniques), meditation, and yoga philosophy on various occasions.



Safety Measures: To ensure the safety of the community, safety measures were implemented such as providing adequate lighting, maintaining clean and well-lit pathways, and enforcing campus security protocols.

The **Students' Gymkhana** at IIT Bhubaneswar is a student-run organization that promotes extracurricular activities and sports on campus. Extracurricular activities and sports can promote good health and well-being by improving physical health, building social connections, promoting personal development, and enhancing academic

performance. Participating in these activities can help students develop a well-rounded approach to life, which can contribute to their overall happiness and well-being. It provides a platform for students to showcase their talents and participate in various activities outside of their academic curriculum. Some of the activities and facilities offered by the Students' Gymkhana include:

1. **Sports Facilities:** The Students' Gymkhana has several sports facilities on campus, including a cricket ground, football field, volleyball court, basketball court, and indoor games facilities like table tennis, carrom, and chess.
2. **Clubs and Societies:** The Students' Gymkhana also has several clubs and societies on campus, covering a wide range of interests, such as music, dance, drama, literature, and photography. These clubs and societies provide opportunities for students to explore their interests and pursue their passions.
3. **Cultural Events:** The Students' Gymkhana organizes several cultural events throughout the year, such as music and dance performances, theater plays, and literary events. These events provide a platform for students to showcase their talents and creativity.
4. **Competitions:** The Students' Gymkhana also organizes various inter-college competitions and tournaments, such as the annual sports fest and cultural fest. These events provide opportunities for students to compete with their peers from other colleges and showcase their skills.



Health Education: Educating the community on health-related topics, such as disease prevention, sexual health, and substance abuse, can also promote good health and well-being. This is being done through workshops, seminars, and other educational initiatives.



Quality Education

IIT Bhubaneswar is committed to providing quality education to its students. The institute has a strong academic structure that focuses on providing students with a well-rounded education, including a balance of theoretical and practical knowledge. Some of the ways in which IIT Bhubaneswar ensures quality education are:

- **Curriculum:** The institute's curriculum is designed to provide students with a broad understanding of the fundamentals of engineering, science, and technology. It includes a range of courses that cover various topics such as mathematics, physics, chemistry, computer science, mechanical engineering, civil engineering, humanities and social sciences, and electrical engineering. The curriculum is regularly updated to keep up with the latest developments in the field.
- **Teaching Methodology:** IIT Bhubaneswar uses a range of teaching methods, including lectures, tutorials, laboratory sessions, and project-based learning. The faculty members are highly qualified and experienced, and they use innovative teaching methods to engage students and promote active learning.
- **Research Opportunities:** The institute provides ample research opportunities for students, allowing them to work on cutting-edge research projects with faculty members and industry partners. This exposure to research helps students develop critical thinking and problem-solving skills, and it prepares them for careers in research and development.
- **Industry Partnerships:** IIT Bhubaneswar has established partnerships with several industry partners, allowing students to work on real-world projects and gain hands-on experience. These partnerships also provide students with opportunities to network with industry professionals and secure internships and job placements.
- **Support Services:** The institute provides a range of support services to ensure that students have access to the resources they need to succeed. These services include academic counseling, career counseling, library services, and student clubs and organizations.

IIT Bhubaneswar is committed to providing quality education to its students, and it is constantly striving to improve its academic programs and support services to ensure that students receive the best possible education. The Institution supports credible studies and writings on these topics. Articles on the hot topics in engineering, science, technology, and management are published by faculty members and research students.

Education and Research (ED):

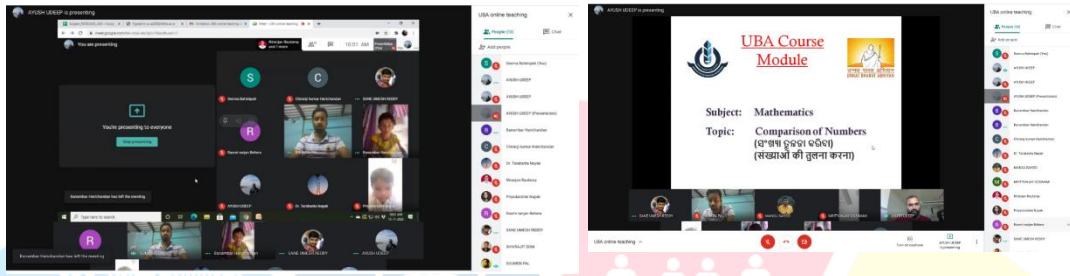
- IIT Bhubaneswar offered a wide range of courses or subject. Out of total 481 courses or subjects, 27 courses or subject are related to sustainability. The ratio of sustainability courses to total courses is greater than 5-10%.
- The institute provides mean no. of USD 0.81 million research funds dedicated per annum over the last 3 year and also the overall research funding for environment and sustainability is USD 2.27 million over the last 3 years. There are 35.85% of sustainability research funding to the total research funding.
- There are 169 no. of research paper indexed in Google scholar in sustainability (Green, environment, sustainability, renewable energy, climate change) over last 3 years.
- 5-17 events like conferences, workshops, awareness raising, practical training, etc related to the issues of environment and sustainability hosted or organized by IIT Bhubaneswar over the last 3 years. Also more than 10 numbers of student organization related to sustainability.



- IIT Bhubaneswar organizes more than three cultural activities per year for surroundings.



- IITBBS provides more than 3 number of program(s) to cope with Covid-19 pandemic i.e., internet bandwidth improvement, video conferencing facilities, online teaching methods workshop, Helpdesk group for E-Learning etc. Also organized more than 3 numbers of sustainability community services project organized and/or involving students.



Gender Equality

IIT Bhubaneswar is committed to promoting gender equality and creating a safe and inclusive environment for all students, faculty, and staff. The institute has implemented several initiatives to promote gender equality and ensure that all members of the community are treated with dignity and respect. Some of these initiatives include:

- **Gender Sensitization Workshops:** The institute conducts regular gender sensitization workshops to raise awareness about gender issues and promote a culture of respect and inclusion. These workshops are mandatory for all incoming students and faculty members.
- **Women Welfare Committee:** The institute has a Women Welfare Committee, which:
 - promote a healthy working environment for all female staff, students and faculty
 - work towards building a gender-sensitized environment at institute
 - organize workshops and awareness programmes at regular intervals towards building a gender-neutral workplace.
- **Internal Complaints Committee (ICC) :** In accordance to Section 4 (I) of the Sexual Harassment of women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 (14 of 2013) and OM dated 21.07.2009 in F.No.11013/3/2009-Esst.(A) issued by the Deptt. of Personnel & Training, Govt. of India, IIT Bhubaneswar has constituted an Internal Complaints Committee (ICC) to inquire into the complaints of sexual harassment of female employees and female students of the institute.
- **Women in Leadership:** The institute encourages and supports women to take leadership roles in academic and research programs. It also promotes women in entrepreneurship, research, and other areas where they can excel and achieve success.
- **Safe Campus:** The institute takes measures to ensure that the campus is safe and secure for all members of the community. This includes the deployment of security personnel, CCTV cameras, and other safety measures.

IIT Bhubaneswar is committed to promoting gender equality and creating a safe and inclusive environment for all members of the community. The institute's initiatives and policies reflect its commitment to diversity, inclusion, and respect for all.



Clean Water and Sanitization

IIT Bhubaneswar has been actively involved in various Clean Water and Sanitization programs to promote access to clean water and improved sanitation facilities in its campus. The aim of the IITBBS is to decrease ground water usage, increase conservation programs, and protect the habitats. The work for Rain Water Harvesting on pilot basis needs has been taken up at Argul campus have been identified. More than 50% water is conserved at IIT Bhubaneswar.



- For recycling the water like use of recycled water for toilet flushing, car washing, watering plants etc. the program is implemented partially about 1 to 25 percentage.



Lab of STP under construction



Lab of STP under construction

- More than 50% water efficient appliances are installed like using censored or automated hand washings taps, highly efficient toilet flush etc. Also more than 25-50% treated water consumed from water system treatment compared to water sources.



Consumption of treated water

- There are several initiatives also taken and for additional hand washing and sanitation facilities during Covid-19 pandemic. More than 75% building of the campus have the facilities.

Here are some measures that can be taken to ensure sustainable wastewater management:

1. Greywater recycling: The campus can recycle greywater from showers, sinks, and washing machines to reduce water consumption and wastewater generation.
2. Sewage treatment: The campus should have a well-designed sewage treatment plant to treat sewage generated on campus before discharging it into the environment.
3. Monitoring: The campus should regularly monitor water quality and discharge from the sewage treatment plant to ensure compliance with regulatory standards.
4. Awareness campaigns: The campus can conduct awareness campaigns to educate the community on the importance of water conservation, wastewater management, including the hazards associated with improper disposal.
5. Water-efficient fixtures: The campus can install water-efficient fixtures such as low-flow toilets, showerheads, and faucets to reduce water consumption and wastewater generation.
6. Use of treated sewage water: The campus can reuse treated sewage water for non-potable purposes such as irrigation, cleaning, and flushing.
7. Rainwater harvesting: The campus can harvest rainwater for non-potable uses such as irrigation, cleaning, and flushing.
8. Water-efficient landscaping: The campus can use water-efficient landscaping techniques such as xeriscaping and native plant species to reduce the demand for water.
9. Water audits: The campus can conduct regular water audits to track water usage and identify areas where water conservation measures can be implemented.
10. Groundwater recharge: The campus can recharge groundwater by creating infiltration ponds, using permeable pavements, and planting trees and vegetation.
11. Desalination: If the campus is located in a coastal area, it can do research in the use of desalination to generate potable water from seawater.
12. Parking area should be made up with porous pavement for the water recharge

Implementing these measures can help the IIT Bhubaneswar campus manage wastewater sustainably, reduce the environmental impact of wastewater, and promote a culture of environmental responsibility among the campus community.

IIT Bhubaneswar has taken several measures to ensure proper sanitization and cleanliness of its campus



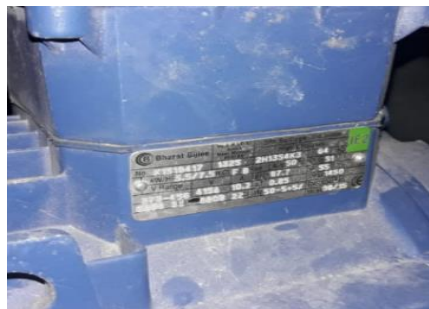


Affordable and Clean Energy

IIT Bhubaneswar is actively involved in promoting affordable and clean energy in several ways by adopting renewable energy & taking initiative for energy conservation. Some of these initiatives include:

- As an energy conservation initiative, IIT Bhubaneswar has installed energy efficient LED light fittings in all the new Buildings which are constructed in Phase-II & are now in operation. The Institute is also replacing the conventional CFL luminaries with energy efficient LED lights in the Buildings which were constructed during Phase-I.
- Star rated ceiling fans are installed in the new Buildings constructed in Phase-II.
- To bring a curb over the energy consumption inside campus, IIT Bhubaneswar has started installing multifunction energy meters in all the feeders which are feeding to different Buildings of the Institute & the regular monitoring of the Electrical energy is in progress which will be helpful in optimising the energy consumption in long run.
- For Air Conditioning system inverter based VRF system & VFD provision for chiller plant operation has been adopted as a measure of energy conservation drive.
- The energy efficient appliance usage is as follows:

Appliance	Percentage of Energy efficient appliance
LED Lamp	80%
Fan	17%
AHU Fan motors	100%



Energy efficient LED Lights used in IIT Bhubaneswar Campus & Energy efficient AHU Fan motors are used for chilled air circulation

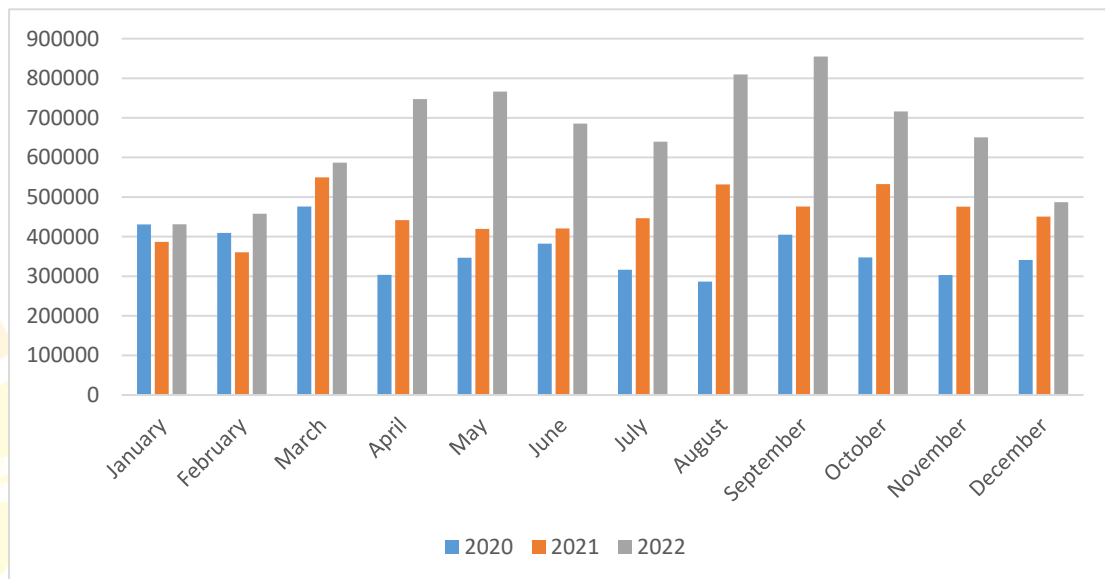
- The Institute had installed solar street lights (34 nos) inside campus. It is also planned to install additional Solar Street lights as a green initiative inside campus.
- Renewable power source i.e Rooftop Solar PV system of capacity 490 kWp was installed in 2018 & the plant was in operation till May'2019. The complete plant was damaged & non-functional during severe cyclone FANI. However the Institute could generate around 600000 kwh energy from the renewable source during its one year operation.



Solar PV panels installed over the rooftops of different buildings of IIT BBS (Presently not in operation due to failure during cyclone in May'2019)

- In IIT Bhubaneswar in the last 12 months uses 79,28,081 KWH energy for purpose like lighting, cooling, running university laboratories etc. The total electricity used is between 1535-2424 kWh per person.
- The Institute has also planned to set up a ground mounted solar PV system of capacity 1 mWp in RESCO mode.

Total Electricity Consumption 2020-2022 (IIT Bhubaneswar)



Total month wise electricity usage (kWh) in the year 2020-2022 at IIT Bhubaneswar

- IIT Bhubaneswar implemented more than 3 elements of “Green Building” such as natural visualization and day lighting, introduction of courtyards in different areas, louvers and small windows, large glazed windows, solar panel installed on rooftops, use of energy and water efficient appliances and use of green materials for construction and renovate.

- The Institute's faculty and researchers are actively engaged in research and development activities related to clean energy, including solar energy, wind energy, and energy storage.



- IIT Bhubaneswar has implemented programs like installation of Solar street lights/Solar PV plant which aims to reduce the Greenhouse emissions & to reduce the electricity consumption.



Solar Street lights.



Rooftop Solar PV which was damaged (IIT Bhubaneswar)

- The total carbon footprint, CO₂ emission in the last 12 months (2022-23) is 6,659.6 metric tons (Due to electricity) in IITBBS. And the total carbon footprints by total campus population is between 1.11-2.05 metric tons.

CO₂ (electricity)

$$= \frac{\text{electricity usage per year (kWh)}}{1000} \times 0,84$$

$$= \frac{79,28,081 \text{ kWh}}{1000} \times 0,84$$

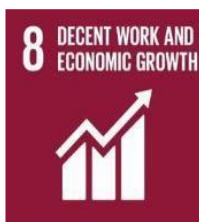
= 6,659.6 metric tons

Carbon footprint in 2022-2023= 6,659.6 metric tons (due to electricity)

- Institute need to build an eco park: Install solar panels, wind turbines, and other renewable energy sources to power the park's facilities and equipment.; Use energy-efficient LED lights for the park's pathways, buildings, and other structures.

Additionally, install motion sensors and timers to automatically turn off lights when they are not needed; Smart irrigation: Use sensors and automation to optimize the park's irrigation system. This can save water and energy by only watering the park when needed.; Green buildings: Build park facilities with sustainable materials and designs that reduce energy consumption. Install insulation, windows, and doors that minimize heat loss and gain.;

- Natural ventilation : Institute is located in the foothill of the Barunei, which offers natural ventilation for the campus communities.; Windows and Doors are designed such a way that natural ventilation is realised. Roof Ventilation: provide natural ventilation by allowing hot air to escape through vents in the roof. This creates a natural flow of air through the building.
- Institute has option for Battery operated vehicles (BOVs) for transportation within the campus of IIT Bhubaneswar. BOVs are powered by rechargeable batteries and produce zero emissions, making them an environmentally friendly alternative to traditional vehicles.
- This institute has few charging points for battery operated vehicles. However institute is making efforts to increase number of charging stations.



Decent work and economic growth

IIT Bhubaneswar is contributing to the United Nations' Sustainable Development Goal 8, which aims to promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all. The Institute is involved in several initiatives to achieve this goal, some of which include:

- Skill Development: IIT Bhubaneswar offers various undergraduate, postgraduate, and doctoral programs that aim to equip students with the skills and knowledge required to succeed in the job market.
- Industry-Academia Collaboration: The Institute has established partnerships with various industries and organizations, providing students with opportunities for internships, training, and research projects that can enhance their employability.
- Entrepreneurship Development: IIT Bhubaneswar supports entrepreneurship development by offering courses on entrepreneurship, providing mentorship and incubation support to startups, and organizing events to promote innovation and entrepreneurship among students.
- Research and Development: The Institute's faculty and researchers are involved in several research and development activities that aim to create new technologies and innovations, leading to job creation and economic growth.
- The placement cell is actively involved in promoting decent work and economic growth by facilitating employment opportunities for its students. The placement cell works closely with various industries and organizations to ensure that students are provided with quality job offers that align with their skills and interests

- IIT Bhubaneswar implemented several initiatives to promote economic growth in the nearby villages/ region in recruiting people in various department which help in economic growth of local people
- Local business establishments were preferred in supply urgent needs



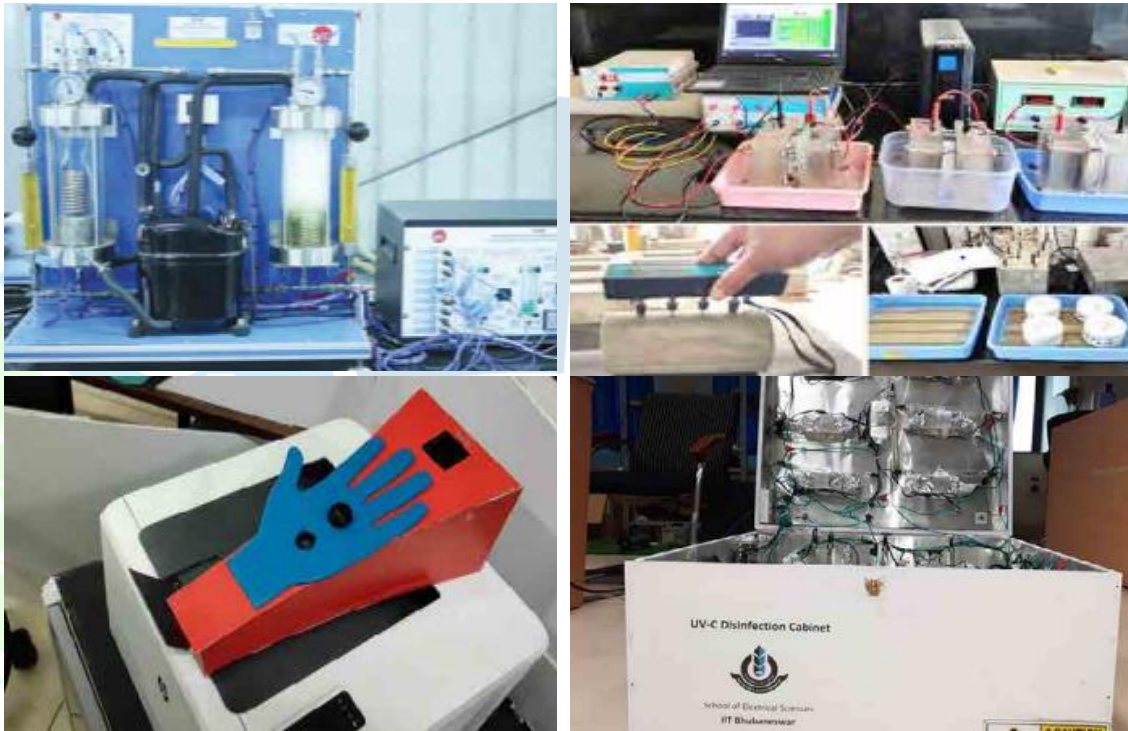
Industry, Innovation and Infrastructure

IIT Bhubaneswar is actively involved in promoting industry, innovation, and infrastructure in the region through its various initiatives. The Institute has implemented several programs and projects aimed at promoting research and development, technology transfer, and entrepreneurship, which contribute to the growth of industries and infrastructure in the region.

The research and product development being done by IIT Bhubaneswar could be successful in the fight against COVID-19. Among these are the effective creation of items like UVC chambers, low-cost ventilators, shields, sanitizers, and sanitization stations as well as the design of broad-spectrum antiviral peptides, drug repurposing, and studies on the efficacy of masks.

The activities for Research and Development have advanced quickly. A total of 100 sponsored research and consulting projects totaling roughly Rs. 18.44 crore have been approved for the Institute by various funding bodies during the fiscal year (2020–21), according to the Indian Institute of Technology Bhubaneswar. In addition to these projects that have been approved, 86 project proposals totaling approximately Rs. 58.48 crore have been made. The following are some recent industry-academia partnerships, R&D projects, and initiatives related to national/state missions that are worth quoting

- Research Partnerships A Memorandum of Understanding was signed with the Army Air Defense College in August 2020 to conduct a study on adding radar for jamming unmanned aerial vehicles. A prototype C-UAS will be created when research into various communication technologies pertinent to UAS has been completed.
- The Institute has seven initiatives listed under the "IMPacting Research, Innovation and Technology (IMPRINT)" objective, which is a national R&D mission. In addition to the projects that have been approved, there are 14 pending IMPRINT bids totaling Rs. 10.61 crore. Research Focus Areas: The institution has identified the following nine areas of research focus with the goal of producing contributions in these areas that will be well acknowledged worldwide.



Reduced Inequalities

IIT Bhubaneswar has always been proud of its commitment to inclusive education. IIT Bhubaneswar welcomes students of all backgrounds, regardless of religion, caste, or creed. It also welcomes students with disabilities. The Institute welcomes students with all types of physical disability.

The major objective is to support students with disabilities in integrating into society at large and maximising their opportunities. to lessen the disparities that result from social, cultural, and class distinctions, as well as from mental or physical impairments, as well as any other kind of discrimination brought on by cruel or inhumane actions to assist kids who come from underprivileged and socially backward backgrounds in building a future worth living to rescue them from a life of squalor and lead them to a more fulfilling one.

IIT Bhubaneswar also has a defined anti-discrimination and anti-harassment policy, along with an associated committee that looks for biased environments. Additionally, IIT Bhubaneswar provides differently-abled staff and students with special facilities to make them feel at home on campus.



Sustainable City and Communities

- Transportation systems play an important role in carbon emission and pollutant levels in IIT Bhubaneswar.
- Transportation policies to limit the number of motor vehicles on campus uses of campus buses and bicycles have been implemented to encourage a healthier environment. The pedestrian policy has encouraged students to walk around campus or through bicycles and avoid using private vehicles. The use of environmentally friendly public transportation has decreased the carbon footprint around campus.
- Total number of vehicles like cars and motorcycles with combustion engine by total campus population is more than 0.125 – 0.5

No.	Vehicle	Total Number
1	Car managed by the Institute	6
2	Cars entering the Institute	90
3	Motorcycles entering the Institute	180
	Total	276

- The ratio of total number of Vehicle with total population in the university(staff, students, faculty) is 0.138

Number of cars actively used and managed by the university = 6

- Director- 01
- Registrar- 01
- Security office- 02
- Institute transport- 02

Number of cars entering the university daily = 90

Number of motorcycles entering the university daily = 180

- Shuttle service is provided (by institute or other parties) and regular but not free. There are 4 numbers of shuttles operated in IIT with average number of passengers is 100 and runs 4 trips each day. The future goal is to minimize on campus transportation which would help to reduce carbon footprint through better planning.

- Apart from this, Zero Emission Vehicles are provided by the university but charged. There are 3 numbers of Zero emission vehicle on campus per day but due to Covid these are not operational. Number of ZEV according to total population is greater than 0.002 to 0.004.

- IIT Bhubaneswar have a ground parking area 6,723.27 Sqm. 0.17% of area out of total area is utilise for parking. No program held for limit or decrease the parking area on campus for the last 3 years (2018-2020). IIT Bhubaneswar has taken 2 initiatives for decrease private vehicles on campus.

- Institute should purchase Electric Vehicle for various day-today activities like maintenance staff or internal usage

- Institute need to involve local people to use e-rickshaws inside the campus for the students movement.
- Solar energy systems can be installed in a variety of locations, including rooftops cover parking space and open fields, making them a versatile and flexible option for generating electricity.



- The campus is cyclist and pedestrian friendly. Many have vehicle-free paths for these users. Pedestrian paths are available, designed for safety and convenience on the campus. Also the daily travel distance of vehicle inside the campus is around 2Km.
- **Traffic flow management** is an essential aspect of sustainable development in IIT Bhubaneswar campus. Here are some measures that can be taken to ensure sustainable traffic flow:
 - **Pedestrian-friendly infrastructure:** The campus should have well-planned sidewalks, pedestrian crossings, and dedicated bicycle lanes to encourage walking and cycling. This can help reduce the number of vehicles on the road and promote sustainable transportation.
 - **Smart parking systems:** The campus can implement a smart parking system that uses sensors to detect available parking spaces and guides drivers to them. This can reduce congestion and the time taken to find a parking spot.
 - **Carpooling and shuttle services:** Encouraging carpooling and providing shuttle services can reduce the number of single-occupancy vehicles on the road, thereby reducing congestion and emissions.
 - **Traffic calming measures:** Installing speed bumps, chicanes, or roundabouts can help slow down vehicles and improve safety for pedestrians and cyclists.
 - **Public awareness campaigns:** Educating the campus community about sustainable transportation options and their benefits can encourage more people to adopt sustainable modes of transportation.

Implementing these measures can help reduce traffic congestion, promote sustainable transportation, and improve the overall quality of life on the IIT Bhubaneswar campus.



Responsible production and consumption

Waste management is a critical aspect of sustainable development in the IIT Bhubaneswar campus as follows:

- Waste treatment and recycling activities are major factors in creating a sustainable environment. The activities of university staff and students on campus produce a lot of waste; therefore, some recycling and waste treatments programs have been implemented in IITBBS. Partially more than 50 to 75 percentage of waste is recycle. Further Institute organize more than three programs regarding reduce the use of paper and plastic.



Recycling practices for Institute waste (IIT Bhubaneswar)



Say No To Plastic Bags

1



- IIT Bhubaneswar has implemented a Door-to-Door garbage collection program in the campus. Separate dustbins for wet/ organic and dry waste have been installed at various locations in the campus. The residents have been provided separate dustbins for wet and dry waste. A solid waste treatment plan is being developed in the campus for treatment and recycling of institute solid waste.
- More than 75 percentage of Organic waste like garbage, discarded vegetable, and plant matter etc are disposed at Municipalty area which is further convert into compost.



Organic waste are disposed at Municipalty area which is further convert into compost & Organic Waste Management, IIT Bhubaneswar

- Inorganic waste like rubbish/garbage, trash, discarded paper, plastic, metal, etc. are treated extensively that is above 75% at IIT Bhubaneswar. Also treated partially i.e. more than 75% of the toxic waste like Bio-Medical Waste, Laboratory etc.
- Institute is implementing water waste hydrogen technology to generate hydrogen fuel from wastewater. This technology involves using microorganisms to break down organic matter in the wastewater and produce hydrogen gas as a byproduct.



Segregation of Inorganic waste (IIT Bhubaneswar)



Inorganic Waste Treatment (IIT Bhubaneswar)



Bio-Medical Waste Treatment (IIT Bhubaneswar)



The Sewage Disposal untreated into the waterways through Septic tank at IITBBS.

The School of Infrastructure has ongoing research projects related to wastewater treatment, including studies on the use of constructed wetlands for wastewater treatment, development of low-cost technologies for wastewater treatment, and the use of nanomaterials for wastewater treatment.

Here are some measures that can be taken to ensure sustainable waste management:

- Source reduction: The campus can implement source reduction strategies, such as reducing paper usage, to reduce the amount of waste generated.
- Recycling and composting: The campus can set up a recycling program for materials such as paper, plastic, glass, and aluminum cans. Composting can also be done to reduce the amount of organic waste going to landfills.
- Waste segregation: The campus can set up a system to segregate waste at the source, ensuring that recyclables and compostables are separated from other waste streams.
- Proper disposal: The campus can ensure that hazardous and e-waste is disposed of properly to prevent environmental contamination.
- Awareness campaigns: The campus can conduct awareness campaigns to educate the community on the importance of waste reduction, recycling, and composting.
- Collaboration with local authorities: The campus can collaborate with local authorities to ensure that waste is disposed of safely and sustainably.

- E-waste management : The campus should ensure that e-waste is disposed of properly, either through recycling or by following the guidelines set by the Central Pollution Control Board (CPCB).
- The campus can set up partnerships with e-waste recycling companies to ensure proper recycling of e-waste generated in the campus.
- Purchase of sustainable electronics: The campus can encourage the purchase of sustainable electronics, such as those with energy-efficient features and a longer lifespan, to reduce the amount of e-waste generated.

Some measures that can be taken to ensure sustainable management of Chemical and biomedical waste management wastes:

- Segregation and labeling: The campus should ensure that chemical and biomedical wastes are segregated and labeled appropriately to avoid cross-contamination and to identify the hazard level.
- Proper storage: The campus should ensure that chemical and biomedical wastes are stored separately in designated areas that are safe and secure.
- Disposal: The campus should follow the guidelines provided by the Central Pollution Control Board (CPCB) and engage with professional waste management companies to dispose of chemical and biomedical wastes safely.
- Training and awareness: The campus should provide training and awareness programs to staff and students to educate them about the hazards associated with chemical and biomedical wastes and the best practices for their management.
- Compliance: The campus should ensure that all relevant laws, regulations, and guidelines are followed regarding the management of chemical and biomedical waste.
- Purchase of safer chemicals and equipment: The campus should encourage the purchase of safer chemicals and equipment to minimize the production of hazardous waste.

Implementing these measures can help the IIT Bhubaneswar campus manage chemical and biomedical waste sustainably, reduce the environmental impact of waste, and promote a culture of environmental responsibility among the campus community.



Climate Action

The School of Earth Ocean and Climate Sciences (SEOCS) was founded in 2011 with the primary goal of examining how predicted climate change and their various impacts. The school is also actively working on establishing an ocean observatory to study oceanic processes and its impact on climate. Additionally, we are dedicated to achieving the Sustainable Development Goals (SDGs) of the United Nations by 2030, particularly SDGs 13 and 14 related to life below the ocean.

The institute has remarkable development on Climate change/action, the areas of research thrust with the objective of making globally well recognized contributions in these areas:

Our climate science group is very unique, collaborates with, University of Massachusetts, Hurricane Research Department of NOAA, USA, Purdue University, IMD and INCOIS and already enjoys global reputation. It has predicted the course of recent cyclones, Yaas, Amphan, Fani, and Hudhud, very accurately about 5/6 days in advance with customization of latest models to Indian conditions. At the moment it is the only alternative to IMD that helps verification. The Augmented and Virtual Reality Center of excellence is a unique center in the country helping the nation in developing an ecosystem in this strategic area. The center has sanctioned and supporting nine R&D projects. The Centre also has organized a grand hackathon on ARVR during 9th to 10th Jan 2021 with 4 winners from across the country.



Life on Land

The Sustainable Development Goals (SDGs) are a set of 17 interconnected objectives set by the United Nations in 2015 to combat issues like poverty, inequality, climate change, environmental degradation, prosperity, peace, and justice on a worldwide scale. The objectives must be accomplished by 2030.

Protecting, restoring, and promoting sustainable use of terrestrial ecosystems, managing forests sustainably, preventing desertification, and halting biodiversity loss are all part of the 15th Sustainable Development Goal. It has 12 specific goals for preserving and using the Earth's terrestrial species and ecosystems in a sustainable manner.

Plantation Initiative: IIT Bhubaneswar believes what Ralph Waldo Emerson says, "The creation of a thousand forests is in one acorn." Acorn is a symbol of prosperity, youthfulness, power and spiritual growth. Symbolically, it means that a small effort of planting a tree can go a long way in protecting nature and mother earth which you all will agree is the burning need of our times.

IIT Bhubaneswar is highly committed to promoting the green belt and hence takes humongous steps towards making the campus and nearby places green. IIT Bhubaneswar has created and maintains outstanding landscapes and greenery in the campus. Plantation of trees also helps create a wellness environment important for the campsites to enjoy the working and residential space. In addition to 45,000 plants planted in the last couple of years. This year more than 4,000 plants have already been planted.



17 PARTNERSHIPS FOR THE GOALS



Partnership for the Goals

The Institute is very actively engaged in collaborative research with many reputed universities and research organizations across the world. Some of the collaborating universities include, University of Western Ontario, London; The University of Massachusetts Dartmouth; University of North Texas, USA; Warwick Manufacturing Group (WMG) of the University of Warwick, UK; The University of Buffalo the State University of New York, USA (SUNYAB); Dr. Dash foundation, USA; Engineering Center of Materials Manufacturing, Shanghai Jiao Tong University, China; University of Auckland and many other reputed universities for joint research, student internship and faculty. The institute also had an innumerable number of distinguished visitors for academic, research and other collaborative programmes. About 47 patent applications have been filed by the Institute faculty and research students so far and the number is rising. The institute published 578 papers, last year including 449 in journals, 103 in conferences and 16 book chapter.

Sustainable Procurement Policy

Sustainable procurement policy aimed at promoting sustainable practices in the procurement process. The policy emphasizes the importance of considering environmental, social, and economic factors while making procurement decisions, and it is aligned with the Institute's commitment towards promoting sustainable development.

The sustainable procurement policy of IIT Bhubaneswar has several objectives, including:

- **Reducing Environmental Impact:** The policy aims to reduce the environmental impact of procurement activities by promoting the purchase of eco-friendly products and services. The Institute gives preference to products and services that are energy-efficient, have a low carbon footprint, and are recyclable or biodegradable.
- **Promoting Social Responsibility:** The policy emphasizes the importance of considering social factors while making procurement decisions. The Institute gives preference to products and services that are produced ethically and do not involve child labor or human rights abuses.
- **Encouraging Economic Sustainability:** The policy aims to encourage economic sustainability by promoting the purchase of locally sourced products and services. The Institute gives preference to local suppliers and vendors, which helps to support the local economy and promote economic sustainability.
- **Ensuring Quality:** The policy emphasizes the importance of ensuring the quality of products and services while making procurement decisions. The Institute considers factors such as reliability, durability, and safety while making procurement decisions.

- **Compliance with Regulations:** The policy ensures compliance with all applicable laws and regulations related to procurement. The Institute ensures that all procurement activities are transparent and follow ethical and legal standards.

IIT Bhubaneswar's sustainable procurement policy is helping to promote sustainable practices in the procurement process and contribute to the Institute's overall sustainability goals.

Conclusion

In conclusion, IIT Bhubaneswar has implemented a comprehensive sustainable development policy aimed at addressing various societal challenges and promoting inclusive and sustainable development. The Institute's efforts towards sustainable development are aligned with the United Nations' Sustainable Development Goals, and it is actively contributing to achieving these goals through its various initiatives.

The Institute has implemented various programs and projects aimed at promoting sustainable development, such as clean water and sanitation programs, affordable and clean energy initiatives, and promoting economic growth and decent work. These programs and projects are contributing to the well-being of the local communities and promoting sustainable development in the region.

IIT Bhubaneswar has also taken significant steps towards promoting industry, innovation, and infrastructure, which are crucial for sustainable development. The Institute's research and development activities, technology transfer, entrepreneurship development, and infrastructure development initiatives are contributing to the growth of industries and promoting innovation in the region.

Furthermore, IIT Bhubaneswar's sustainable development policy has a strong focus on environmental sustainability. The Institute has implemented various measures to reduce its carbon footprint, such as promoting the use of renewable energy, implementing energy-efficient measures, and promoting sustainable transportation. These measures are helping to reduce the Institute's environmental impact and promote environmental sustainability in the region.

IIT Bhubaneswar has also taken significant steps towards promoting social sustainability. The Institute's efforts towards promoting economic growth and decent work, promoting gender equality, and providing education and healthcare to the local communities are contributing to the social well-being of the region.

It is a testament to its commitment towards promoting sustainable development and contributing to the well-being of the local communities. The Institute's efforts towards sustainable development are not only contributing to the growth and development of the region but are also setting an example for other institutions to follow.