

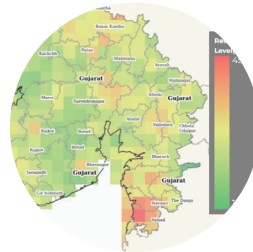


# THE BEST WAY TO PREDICT THE FUTURE IS TO CREATE IT

The warnings are dire and time is at a premium. A reimagining of the normalized routes to development and a paradigm shift that places sustainable development at the core are imperative to put the brakes on the rapid warming of the planet. A liveable Earth will remain out of bounds without global collective action on climate change, energy transitions, and environmental protection.

The Energy and Resources Institute (TERI) has been working towards these goals for 50 years. As an institution, it has been prescient in its focus on energy, climate change, and sustainable development. Working, as it does, to find solutions to mend the planet, TERI's enduring engagement in the areas of energy transitions, advanced biofuels, climate change, sustainability in agriculture, transport, buildings, forestry and water resources is focused on making critical contributions to create a cleaner and greener Earth.

A multi-dimensional organization, TERI functions across domains of policy, technology development, consultancy, and implementation. It remains resolute in its commitment to aid the country and keep the Global South firmly on the path of sustainable development.



# MISSION

Our mission is to serve as innovators and agents of change to enable policies and practices for an equitable and sustainable future through conservation and efficient use of energy and other resources.

## KEY GOALS


- Enhance access to clean energy for all
- Enable a just transition to renewable energy pathways
- Enhance energy efficiency in industries, public utilities, and buildings
- Facilitate efficient use of materials, especially iron, steel, and cement
- Enable sustainable food production through smart agri inputs and nutritional security
- Enhance ecosystem services, especially in forestry and biodiversity
- Enhance conservation, utilization of, and access to water, including watershed management
- Develop innovative solutions for clean air, regionally and in cities
- Enable planning and governance of environmentally sustainable cities
- Build resilience to adverse impacts of climate change
- Accelerate pollution abatement
- Develop technologies for generation of advanced biofuels and value-added biocommodities
- Develop the regulatory framework and alternate technology adoption roadmap for green shipping in India
- Enhance livelihood through nature-based solutions under carbon finance mechanism
- Development of innovative solutions by use of microbes for environmental protection

## CORE STRATEGIES

**Policy advisory:** Interdisciplinary and integrated policy research and analysis, financing and business model development, advisory, outreach, and capacity building among policymakers, academicians, and youth

**Technology products:** Technology development, demonstration through pilots, replication and scaling up, large-scale production, commercialization as well as capacity building among manufacturers, operators, and users

**Technical services:** Consultancy, creating standard operating procedures, testing and verification, strategy development for corporates, and capacity building of stakeholders



*TERI Coastal Education Hub, Goa, a viable platform for disseminating ecological knowledge amongst youth*

# KEY PROGRAMMES

The **Energy Programme** seeks to promote, on both demand and supply sides, energy-efficient and renewable energy (RE)-based technological solutions that will enable achieving the developmental goals along low-carbon pathways.

## Key focus

- Promote energy efficiency in various sectors, particularly the industrial sector including the highly diverse small and medium enterprises (SME) segment
- Accelerate transitions to clean energy sources through in-depth studies on themes such as integration of renewables, demand forecasting, energy storage, smart distribution grids, and application of various emerging technological solutions
- Provide a wide range of technological solutions and services for harnessing various renewable energy sources such as solar photovoltaic, solar thermal, floating solar, wind, biomass, etc.



*280 kWp solar rooftop installation at TERI Gram to meet the campus electricity needs*

**Industrial Biotechnology Programme** aims to develop bio-based technologies and implement them for sustainable environment and clean energy solutions.

## Key technologies

- Oilzapper to eliminate oil spills and manage oily sludge
- Remediation and restoration of pesticide contaminated soil by using microbial bioremediation technology
- Microbial enhanced oil recovery
- Viscosity reduction of heavy oil
- Prevention of paraffin deposition in oil well tubing

- Clean coal technology such as enhanced coalbed methanation under subsurface
- Bioconversion of carbon dioxide to methane
- A biopolymer, XC Polymer/Xanthan gum is produced through bacterial fermentation process and used as a viscosifier in oil well drilling mud



*Oilzapper production plant at TERI Gram*

## Waste, Water, and Natural Resources Programme

aims to mandate solutions for sustainable management of natural resources. It has pioneered generation of carbon credits through nature-based solutions. The Programme evaluates ecosystem services and their economic valuation, develops solutions to rehabilitate degraded lands and mined areas, and develops strategies for biodiversity conservation. The Programme is both the developer and provider of the technologies aimed towards efficient management of waste, circular economy, and resource efficiency.

## Key focus

- Research on governance of national and international policies on forests and other natural resources
- Development of ARR (afforestation, reforestation, and rejuvenation) and REDD+ (reducing emission through deforestation and forest degradation) carbon finance projects
- Valuation of ecosystems and restoration of degraded ecosystems and mined areas
- Sustainable management and value addition to forest produce and strengthening rural livelihoods
- Participatory biodiversity conservation

- Monitoring and evaluation of integrated natural resource management projects
- Training and capacity building of the stakeholders such as government officers, local communities, and institutions
- Tapping local resources to combat malnutrition
- Modelling emissions from the waste sector
- TADOX® (TERI's Advanced Oxidation Technology) selected under 'Namami Gange' Programme treats municipal and industrial wastewater
- Polymer synthesis and characterization including bio-based materials for different applications (nanocomposite development)
- Implementation of Resource Efficient and Cleaner Production (RECP) in different industries (thermal- and power-related measuring instruments)
- Strategies for circular economy and resource efficiency
- Conduct R&D and PhD programme in liquid and solid waste management

**Sustainable Infrastructure Programme** works towards promoting sustainability in the urban context by developing a wide range of solutions for buildings, mobility, urban planning, and governance of low-carbon and resilient cities. It extensively works on various aspects of water resources management including water-use efficiency, water quality, water energy-nexus, WASH, and wastewater management.

The 'GRIHA' Council which administers the 'Green Rating for Integrated Habitat Assessment' framework promotes and evaluates sustainable habitats.

### Key focus

- Provides innovative, integrated, and cost-effective solutions to mainstream sustainability in the buildings sector
- Aims to promote energy-efficient, sustainable, and low-carbon transport in India and provide policy support at the city, state, and national levels



*The Mahindra-TERI Centre of Excellence for Sustainable Habitats at Gurugram*

- Focuses on strategic planning, policy research, and capacity building to foster improved and informed decision-making for sustainable urban development
- Aims to enhance building's resource efficiency through holistic environmental performance assessment of habitats over its entire life cycle and creating a positive ecological impact
- Works on cross-cutting themes of sustainable water management with an aim to develop and implement integrated and strategic solutions

**Sustainable Agriculture Programme** has been pioneering technology development and focuses on emerging advancements in agriculture and nano-biotechnology. It promotes innovative solutions that are profitable for farming and livelihood and ensure conservation of natural resources.



*Drone-based supplemental spray on the maize crop at Hassan, Karnataka for realizing enhanced yield*

### Key focus

- Develop nano-agri inputs for enhancing nutrient-use efficiency
- Develop plant- and microbe-derived products that help reduce indiscriminate use of agrochemicals, agricultural carbon footprint while substantially improving crop yield; promoting precision and climate-resilient agriculture
- Novel tissue culture technology for mass propagation of economically important crops
- Substitute chemical fertilizers and pesticides with bio-based alternatives
- Bioremediate industrial wastelands
- Develop green technology-based functional materials from untapped natural/waste resources
- Develop superfoods and algal-based bioenergy from advanced bioresources
- Improve livelihood of micro-farming communities through access to quality planting material and watershed management technologies

- Improve climate resilience of plants through cutting-edge technologies like Trait Engineering and Genome Editing
- Develop and promote nature-based solutions from unexplored bioresources

**Climate and Air Programme** focuses on undertaking pathbreaking research in the fields of climate change and air quality. It also develops scientific and policy relevant recommendations in the areas including air, water, health, agriculture, clean energy transitions, renewables, mobility, and green buildings.

#### Key focus

- Advance the understanding of climate science by using climate models and their assessments at national, regional, and local scales to understand climate patterns and related changes
- Undertake research on climate change impacts, vulnerabilities & adaptation, GHG inventORIZATION & mitigation, international & national climate policy developments, and implementation of climate action
- Promote understanding on regional and local air quality through research on dispersion of pollutants, source apportionment studies, policy guidance & training, capacity building of officials, and implementation of pilots to improve air quality

**Green Shipping** is a collaborative programme launched by TERI to assist the National Centre of Excellence in Green Ports and Shipping (NCoEGPS) set up by the Ministry of Ports, Shipping and

Waterways (MoPSW), Government of India to undertake innovative research on commercially viable biofuel and biochemical technological solutions as well as the energy saving and renewable energy solutions specific to the ports and ships.

#### Key focus

- Development and demonstration of sustainable and cleaner fuel technologies (biochemical and thermochemical routes) for production of green hydrogen and other biofuels (biodiesel, bioethanol, biomethane, biobutanol) from second- and third-generation feeds for application in shipping, aviation, and transport
- Showcasing high value-added biochemical production for various intermediate and end-use applications
- Using integrated sustainability assessment frameworks and life cycle tools for evaluating benefits from energy transitions and resource-efficient circular economy practices in shipping, automotive, packaging, steel, and other key sectors
- Provide learning and training opportunities to relevant human resources in the MoPSW institutions including ports and shipping industry

#### REGIONAL CENTRES

Serving as extensions of the organization's work, Regional Centres help establish a strong base for TERI's projects at the grassroots by diversifying and broadening its knowledge repository and the scope of its operations.



TERI Himalayan Centre,  
Mukteshwar, Uttarakhand

## KEY AREAS

The Institute is well-connected to the corporate world via its **Council for Business Sustainability (CBS)** that serves as the interface for TERI's research. The Council is a network of Indian business leaders working on a shared commitment to mainstream sustainability in business strategies and practices. Set up in 2001, the Council recognizes and promotes leadership practices that foster sustainability in businesses.

**Centre for Sustainable Development Research and Leadership (CSDRL)** seeks to promote systemic change and drive policy innovations such as green budgeting, green public procurement, and SDGs' blueprint to mainstream sustainable development. It also serves as the Secretariat for TERI's annual flagship leadership convening the **World Sustainable Development Summit (WSDS)**.

**Social Transformation and CSR** has been engaged in technology design and customization, skilling, research, and business model development for livelihood opportunities. It has also been pivotal in pilot implementation of RE-based solutions for quality and reliable power, livelihoods, health, and education.

**Knowledge Resource Centre (KRC)** provides transformative knowledge solutions and works closely with sustainability research.

**Environment Education and Awareness (EEA)** is dedicated towards dissemination of research-based knowledge amongst the young citizenry.

**TERI Publications** synchronizes with the initiatives and outreach activities of the Institute, chiefly with publication of relevant content via both analogue and digital platforms.

## ACADEMIC ESTABLISHMENT

TERI **School of Advanced Studies** is a globally recognized deemed university in the sphere of sustainability studies.

### Key focus

- Create new knowledge through research and contribute to the discourse on sustainability issues at national and global levels
- Design and deliver academic programmes, training, and research on sustainability issues assimilating the latest science and evidence

## HEADQUARTERS

### The Energy and Resources Institute (TERI)

6C, Darbari Seth Block  
India Habitat Centre, Lodhi Road  
New Delhi - 110 003, India  
Tel: (+91 11) 2468 2100, 7110 2100  
Email: mailbox@teri.res.in

### TERI Gram

Gurugram - Faridabad Road  
Gwal Pahari, Gurugram - 122 003  
Haryana  
Tel: (+91 124) 257 9320 to 9326  
Email: vinay.pathak@teri.res.in

## REGIONAL CENTRES

### TERI Southern Regional Centre

4th Main, 2nd Cross, Domlur II Stage  
Bengaluru - 560 071  
Karnataka  
Tel: (+91 80) 2535 6590-94 (4 lines)  
Email: terisrc@teri.res.in

### TERI Western Regional Centre, Goa

233/GH-2, Vasudha Colony  
Alto-St. Cruz, Tiswadi  
Goa - 403 202  
Tel: (+91 832) 245 9306, 245 9328  
Email: teriwrcc@teri.res.in

### TERI Western Regional Centre, Mumbai

Office No. 318, Raheja Arcade  
Sector-11, CBD-Belapur  
Navi Mumbai - 400 614  
Maharashtra  
Tel: (+91 22) 2758 0021, 4024 1615  
Email: terimumbai@teri.res.in

### TERI North Eastern Regional Centre

Chachal, Mahapurush Madhabdev Path  
Hengrabari, Guwahati - 781 036  
Assam  
Tel: (+91 361) 350 0766  
Email: terine@teri.res.in

### TERI Himalayan Centre


Latey Bunga, Mukteshwar  
Nainital - 263 132  
Uttarakhand  
Tel: (+91) 94100 96074, 99901 28101  
Email: praveen.sharma@teri.res.in

### TERI School of Advanced Studies

Plot No. 10, Institutional Area  
Vasant Kunj  
New Delhi - 110 070  
Tel: (+91 11) 7180 0222 (25 lines)  
Email: registrar@terisas.ac.in



Website: [teriin.org](http://teriin.org)  
Instagram: [instagram.com/teriindia](https://www.instagram.com/teriindia)

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