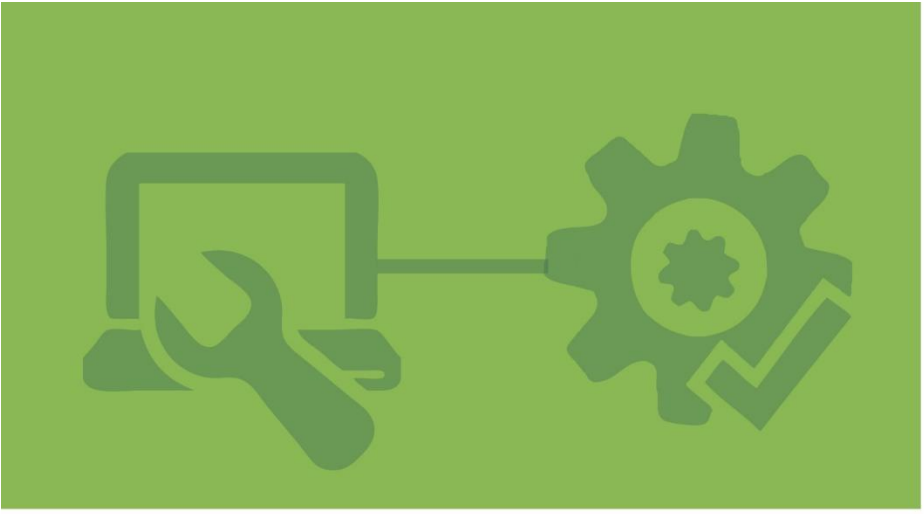
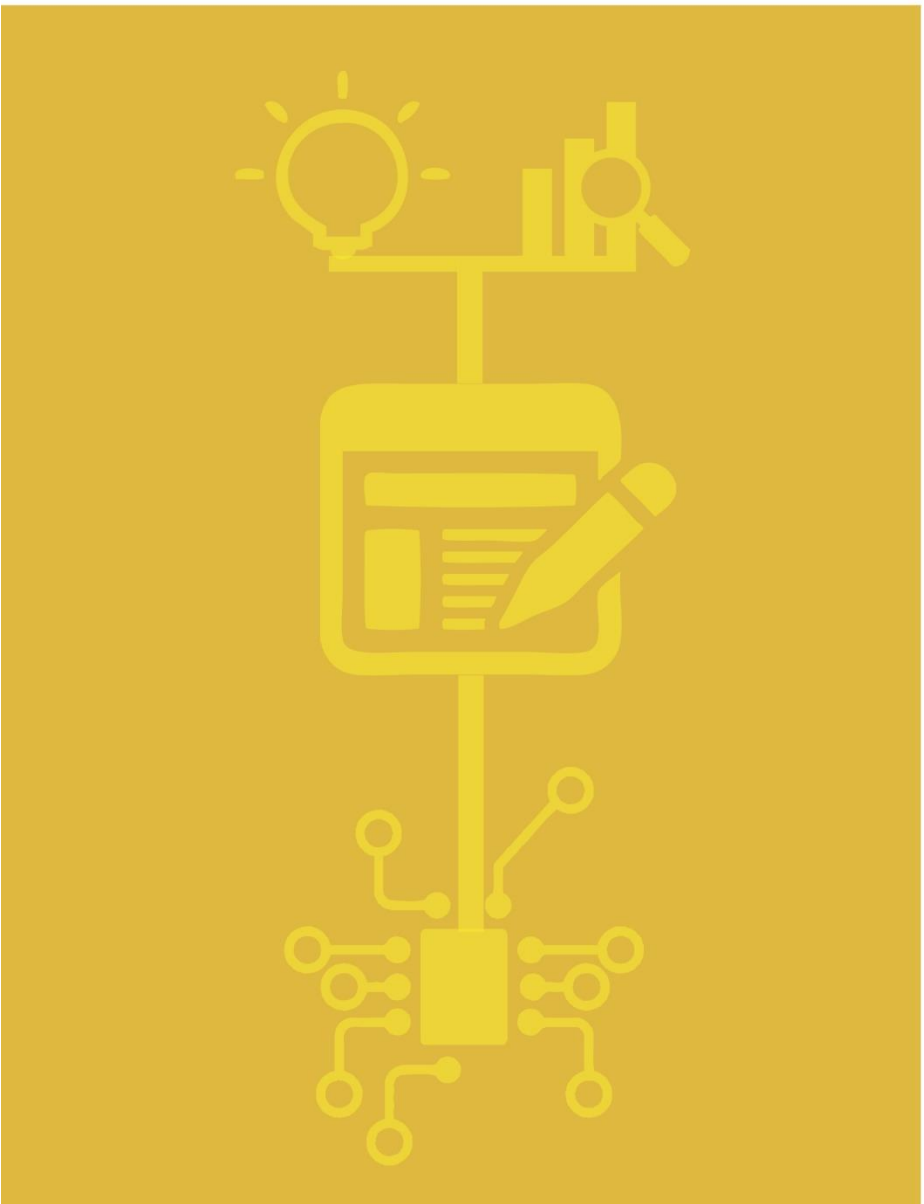
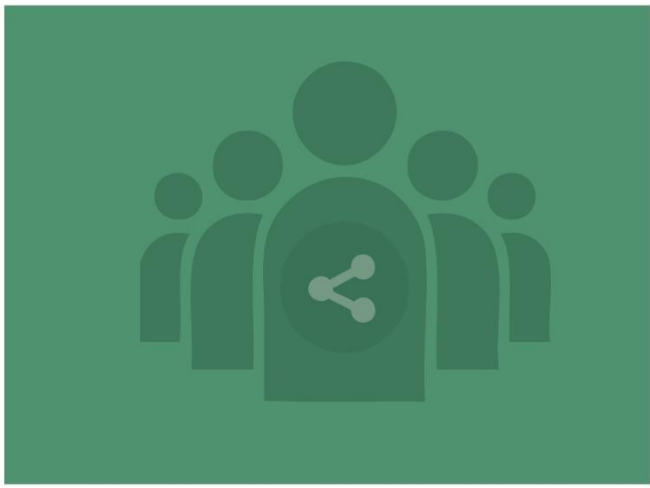
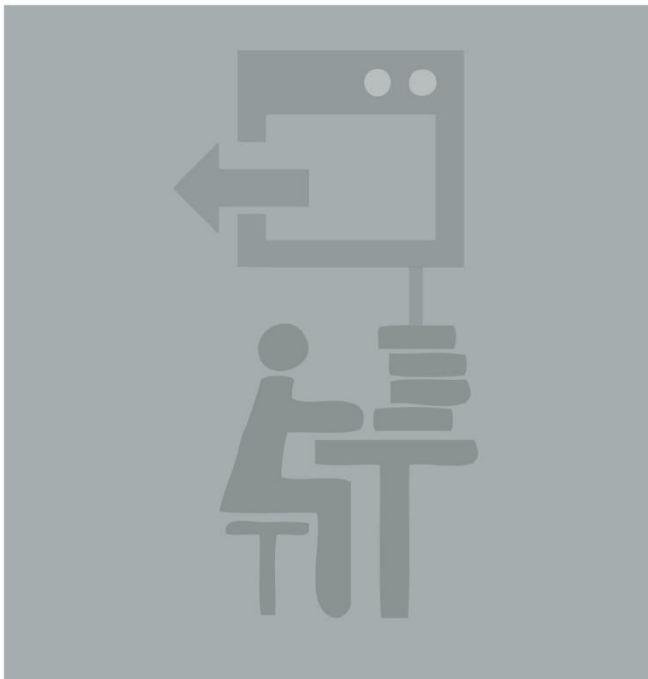


CSTEP
CENTER FOR STUDY OF SCIENCE, TECHNOLOGY & POLICY

ANNUAL REPORT 2016-17







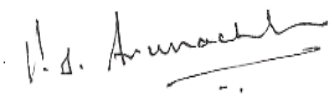
NOTE FROM THE CHAIRMAN

Technology reaches society through various channels: colleges and universities, laboratories, privately and publicly funded organisations and Think Tanks. Though the third channel continues to be a novelty in the country, it continues to grow. A few American foundations have thought it worthwhile to set-up their branches in the country.

CSTEP is now 10 years old and its studies have already made some impact on societal policies. The advantage of Think Tanks is that it is structured to be impartial and through its studies it provides options for a society to choose. Considering the use the Government makes of our studies, we are pleased with the relevance of our work. In a democratic society like India, the performance of state governments becomes very relevant, as they transform policies into performance. This role has increased more as there is a growing realisation that infrastructure projects are better implemented at a deregulated State level. This year we have worked with the Government of Karnataka (GoK) in electric power issues that are relevant in increasing its generation and using it efficiently. Because we work well with GoK, other States are also getting interested in CSTEP's activities and few have invited us to setup our branch in their capitals.

CSTEP continues to grow. We are now about 90 researchers, with over 45 PhDs and post-graduates. Our outputs have also grown and this report will provide an idea of our contributions. It is not sufficient to generate mere reports if they are not of the quality we aspire for. Hence, we had an organisational review done by an external expert on how we perform. The expert's report makes us feel that CSTEP is a happy institution to work for and it has a vision for high quality outputs. The number of projects have also grown and we are presently pursuing around 16 funded projects costing around INR 990 lakh and 7 pro-bono projects.

We have an excellent relationship with our funding agencies. On more than one occasion they have come forward to express their satisfaction with our work and have volunteered to support us. Going forward, we aspire for more and look for Core support that will help enlarge the areas of our pursuit and the quality of our outputs. When we review this year's work we are conscious of the quality of outputs that have come from every member of the Center. It is said that organisations are built around people and they determine the quality of the institution.



Dr V.S. Arunachalam, Chairman

NOTE FROM THE EXECUTIVE DIRECTOR

The last year was an eventful one for CSTEP. We initiated a presence in Delhi – NCR. This will enable us to work closely with policy stakeholders and North Indian states. We identified an office space in NOIDA and commenced operations. We also touched an overall staff strength of 100. This included several interns who came from various universities all over the world.

Overall, CSTEP continues to be a vibrant, youthful and happy organisation. We made considerable progress in new and innovative projects. Many of our existing donors continue to provide us support through new projects. In addition, we raised funding from several new donors. We are deeply grateful to all our donors, who believe in us and trust us with public funds. I also sincerely thank all my colleagues, who trusted CSTEP as an institution worthy of their career growth. We are where we are entirely because of their hard work.

We realise that we are now at a crucial juncture. After witnessing rapid growth in the last few years, we have now stabilised in terms of our research staff strength. We are conscious that growth should not come at the cost of research quality. Therefore, our focus is to internally strengthen the institution so that we continuously improve. We have already constituted an internal mechanism for review of all our projects to ensure that every CSTEP research output is of the highest quality. We define quality in four dimensions – quality of research, writing, presentation and engagement with stakeholders. We also initiated a course in "Policy Research" to strengthen the skills of our researchers so that they are better equipped to take on any policy research problem.

We are happy with where we are, however we are not satisfied. We believe that with the talent and calibre of the research staff, we can do much better. Our objective is to generate 'Thought Leaders'. Therefore, we undertook an internal exercise to take stock of our various research domains and prepared a roadmap of where we would like to be in the next 5 years. We are working with our researchers to ensure that while they work on various projects, they should have a mental roadmap for acquiring domain expertise and thought leadership. Only then can CSTEP realise its vision "To become the foremost institution for policy innovation and analysis".

Dr Anshu Bharadwaj, Executive Director

NOTE FROM RESEARCH CO-ORDINATOR

CSTEP's focus on deepening research expertise in existing areas and expanding into new areas continues. We initiated some studies on the topics of air-pollution, water supply and governance. Our work on examining issues related to NDC commitments, penetration of renewable energy sources and domestic manufacturing are of national importance.

The processes we have put in place to improve the quality of our research and outputs are now stable and ensuring that the work we do is timely and of the highest quality. Communication of our work is of paramount in this day and age. Our CPE team has been developing strategies for engagement and continues to think of ways to enhance our ability to inform policy-making.

In the past year we commenced projects with new donors. We are happy to grow our donor base through demonstration of our capability in conducting high quality studies and following it up with appropriate policy engagement. We look forward to working with all our partners in the coming years.

As always, we are excited about the prospects of the coming year. Researching policy options in areas where science and technology plays a significant role is part of our mission and we will continue to work towards the same.

Dr Jai Asundi, Research Co-ordinator

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Index Key

 Policy Context

 Research

POWER

The Ujwal Discom Assurance Yojana (UDAY) Scheme aims to improve the financial and operational efficiencies of DISCOMs.

Developing an implementation roadmap on UDAY Scheme for Mangalore Electricity Supply Company (MESCOM) and Chamundeshwari Electricity Supply Company (CESCOM) in Karnataka.

Funder: Shakti Sustainable Energy Foundation

India's renewable energy (RE) potential is much higher than the Government's 175 GW target; it is close to 400 GW. Also, cost of RE is declining rapidly.

Analysing the challenges faced with large-scale integration of RE in the grid and provide mitigation measures with policy advice, to help India reduce dependence on conventional power sources.

Funder: MacArthur Foundation

Ministry of Environment, Forest & Climate Change (MoEFCC) announced revised water consumption rules for Indian Thermal Power Plants (TPPs) to reduce the water related stresses caused and faced by these plants.

Developing and analysing reference scenarios to estimate the impact of the revised rules on water resources and TPPs, and understanding the role of water-use technologies in helping reduce stress.

Funder: NITI Aayog

Design and Development of Smart Grid Architecture

This is a pilot smart grid implementation project at the distribution level in Chandapura Division, Bangalore Rural Zone, in association with Mindteck (System Integrator) to help realise the objectives of UDAY scheme and National Smart Grid Mission.

Objective: Facilitate efficient, accurate and effective online recording, monitoring and control of energy consumption, empower consumers to participate in energy management, and increase consumer awareness regarding better load management.

Funder: Department of Science and Technology (DST), Government of India

POLICY ENGAGEMENT

India has pledged to achieve ambitious targets in its Nationally Determined Contributions (NDCs). CSTEP's report 'Quality of Life' also presents similar targets if India is to develop along a sustainable growth pathway.

Outcomes

November 2015

Member of government delegation to Washington DC for economic diplomacy on India's climate change policy.

November 2016

Attended COP22 in Marrakech as the National Focal Point and presented the technology requirements for India to achieve RE targets.

November 2016

Invited to Chair the 'Technology Needs Assessment' (TNA) Committee for Renewables constituted by MoEFCC, under the Third National Communication to UNFCCC.

January 2017

Chosen as one of three institutions to prepare long-term emission reduction strategies, while exploring India's potential energy consumption peaking year; and provide alternative development pathways, beyond 2030.

Visibility and recognition as a credible research institution in Climate Studies

Dr Anshu Bharadwaj, Executive Director, CSTEP was invited as the National Focal Point (NFP) to attend the 22nd Conference of the Parties to the UNFCCC (COP 22)

CLIMATE AND EMISSION

India pledged to reduce the emissions intensity of its GDP by 33-35% from 2005 level, by 2030, as a part of its NDC targets.

Assessing the Indian transport sector's contribution to NDC targets, based on an inter-model comparison of available technology and policy measures, identified in consultation with an advisory board.

Funder: Shakti Sustainable Energy Foundation

Developing a roadmap for achieving the NDC targets by analysing the mitigation potential of all emitting sectors and identifying state-level implementation and policy gaps in RE and energy efficiency aspects.

Funder: MacArthur Foundation

Ministry of Environment, Forest & Climate Change (MoEFCC) announced revised emission standards for Indian coal-based Thermal Power Plants (TPPs) to reduce pollution.

Conducting a Benefits-Cost Analysis of the revised standards using an integrated model comprising energy technology, pollution dispersion and financial viability components, to understand its implications on TPPs and society.

Funder: Shakti Sustainable Energy Foundation

India has shown its commitment towards fighting climate change; however, peri-urban zones, with major resource constraints, remain unaddressed.

Understanding the dynamic changes taking place in peri-urban regions and their resilience to climate change through primary data collection and analyses of census data and other secondary literature.

Funder: International Development Research Centre (IDRC)

Disaggregated data and analyses on India's greenhouse gas (GHG) emissions are not easily available in the public domain, thereby hampering informed dialogue and decision making on climate policies.

Conducting sectoral, time-series and national and state level estimation and analyses of India's greenhouse gas (GHG) emissions, as a part of GHG Platform India, a civil-society initiative.

Funder: Shakti Sustainable Energy Foundation

POLICY ENGAGEMENT: COMMITTEE MEMBERSHIPS

Rare Earth Expert Committee
Submitted a report on use of rare earths for energy security; well received by NITI Aayog and NSA officials.

Electric Vehicle Consortium
Deliberations of this forum to feed into Phase 2 of the National Electric Mobility Mission.

Battery Technical Committee
Fix the standards of batteries manufactured in India and those imported.

Working Group on Biofuels, Ministry of Petroleum and Natural Gas
Guide and monitor Life Cycle Assessment study on proposed 2G Ethanol plants.

Bangalore Metropolitan Transport Corporation
Submitted Policy Notes on Taxation Policy for Public Transport Buses and National Urban Transport Fund.

As a member of National Faecal Sludge and Septage Management (NFSSM) Alliance

Submitted Discussion Paper on gender mainstreaming in urban sanitation for inclusion in updated version of National Urban Sanitation Policy 2008.

Contributed to a Policy Note on gaps in National Urban Sanitation Policy 2008.

↓

Secretary, Ministry of Urban Development (MoUD)

CSTEP's Compendium on sanitation technologies → Manual for sanitation technologies by CPHEEO

URBAN PLUS

India's National Electric Mobility Mission Plan 2013 aims to achieve fuel security by promoting hybrid and electric vehicles (EV) with a target of 6-7 million EV sales by 2020.

Developing an implementation plan for the adoption of electric buses in Bangalore and Kolkata by identifying appropriate charging infrastructure, developing new business models and proposing suitable electricity pricing and market mechanisms. The results and related scenarios will be demonstrated to stakeholders via a data visualisation tool.

Funder: Shakti Sustainable Energy Foundation

The Sustainable Development Goals (SDGs) announced by the United Nations include a goal on inclusive cities (SDG 11) and gender equality (SDG 5). India has pledged to achieve the targets set under the SDGs.

Published a paper highlighting the need for mainstreaming gender in urban planning to create inclusive cities in India and provided suggestions on priority actions at the global and national levels, especially focusing on aspects instrumental in achieving the agenda of 'Leaving no one behind'.

Funder: Overseas Development Institute

Faecal Sludge Management (FSM) Toolbox

Jointly developed with CEPT University and Asian Institute of Technology.

- Includes a whole range of FSM technologies, tools and planning frameworks.
- Conducting awareness spreading and capacity building activities to train users in effectively applying the FSM Toolbox; also providing handholding support to organisations when requested.

Funder: Bill and Melinda Gates Foundation

ENERGY ACCESS

The Ministry of New and Renewable Energy (MNRE) announced a policy decision to encourage RTPV installation in government schools and buildings, to lead the way in encouraging higher adoption.

Assisting BESCOM in the implementation of 5 MW of RTPV systems on government schools, colleges and administrative buildings, in North and West Bangalore and the BESCOM CTAZ zone.

Funder: Bangalore Electricity Supply Company (BESCOM)

About 40% of Indian households, many of whom reside in remotely located villages, lack access to electricity. The Government released a draft National Policy on RE based Mini/Micro grid in 2016.

Designing and developing smart micro-grid technologies for large-scale, decentralised solar power applications in Indian villages - The Zero Energy Village concept.

Funder: WIPRO

Developing a detailed methodology to provide sustainable, economically viable, reliable electricity to Indian locations still facing poor energy access. A computational tool will also be developed to assist in the design of micro-grids.

Funder: Good Energies Foundation

TOOLS AND MODELS

RE ATLAS

The tool is currently categorised into two segments, namely Solar and Wind. The solar category comprises of both Concentrated Solar Power (CSP) and Photovoltaics (PV), whereas the wind category comprises of both offshore and onshore wind potentials. This tool provides land parcel details at the taluk level for each state in India. The tool is freely accessible and doesn't require any login credentials.

The Renewable Energy (RE) Atlas for India with the following features:

1. Karnataka Wind Site Allocation Data (partial dataset obtained from Karnataka Renewable Energy Development Limited)
2. Karnataka Wind Site Installation Data (partial dataset obtained from Karnataka Renewable Energy Development Limited)
3. Gujarat Wind Site Generation Data for 3 months (as reported in real time on https://www.sldcguj.com/)

Web Link: http://darpan.cstep.in/reatlas

Core grants provided by Think Tank Initiative of International Development Research Centre (IDRC) and Oak Foundation helped us build the expertise in geo-spatial analysis and acquire various data sets and tools. Grants from Shakti Sustainable Energy Foundation enabled us to procure relevant data and add Integrated Resource Planning as a component for modelling the integration of RE with conventional power sources.

CSTEM

CSTEP's Solar Techno Economic Model (CSTEM) is an open-access, computational tool that can facilitate analysis of grid-connected solar power plants. The technologies covered by the tool are Concentrated Solar Power (CSP) and Photovoltaics (PV). The tool can be used to estimate the performance of a solar power plant and the cost of electrical energy generation. This tool blends technology-centred engineering analysis with financial models. The technical model has been developed as per scientific and industrial literature. The financial model has been based on the norms specified by the Central Electricity Regulatory Commission (CERC) of India. The tool can be used to estimate the performance of a solar power plant and the cost of electrical energy generation. It blends technology-centred engineering analysis with financial models. The current version of the model can be used to perform pre-feasibility/potential assessment purposes.

The development of CSTEM is based upon work supported by the US-India Partnership to Advance Clean Energy-Research (PACE-R) for the Solar Energy Research Institute for India and the U.S. (SERIIUS) funded jointly by the U.S.

Department of Energy and the Government of India. The base version of the CSP tool (Parabolic Trough) was developed under the grant support provided by MNRE.

The CSP version of the tool currently caters to the Parabolic Trough technology and Solar Tower. The current version of Parabolic Trough, which is a stand-alone software package, is available for download at: http://www.cstep.in/CSTEM_Windows.zip or http://www.seriius.org/modeling.html.

The PV version of the tool currently caters to the fixed tilt configuration. The current version, which is a web-based tool, can be accessed at: http://cstem.cstep.in/cstem/

CSTEM RTPV

CSTEM Roof Top Photovoltaics (CSTEM RTPV) is modelled specifically to perform pre-feasibility assessments suitable to Indian scenarios. The tool considers the following factors:

- Solar geometry components which models the sun's path as seen by the location of interest
- Effect of temperature and wind speeds on module power output
- Module degradation effects
- Inverter start up voltage requirements
- Effective sizing of the plant considering location specific configuration assessment

The tool estimates the payback period and savings for a given setup as per state specific policies. These insights would aid in capacity planning and assessment of financial viability of RTPV setup.

The current version of the model solely caters to pre-feasibility/potential assessment purposes.

SANITECH

SANITECH is a pre-feasibility technology-choice decision-support tool. It is a part of the Faecal Sludge Management (FSM) Toolbox (*www.fsmtoolbox.com*), a one-stop knowledge and resource platform for FSM projects, developed by the Asian Institute of Technology, CEPT University and CSTEP. SANITECH has been validated in Warangal and through Project Tuymai.

The tool features:

- View the sanitation situation in a city through a GIS-enabled interactive user interface.
- Assess various technology options in sanitation in specific contexts.
- Compare a portfolio of context-appropriate technology choices across the sanitation value chain.
- Design context-appropriate systems from a repository of technology options.

- Take various actions and examine their impact on the performance of specific indicators.
- Build and compare scenarios on decision-support indicators.

CSTEP has prepared a comprehensive compendium of sanitation technologies, across the sanitation value chain, which provides readers information on the features, design, operation, cost, etc., of these technologies. The compendium also includes sanitation tools, which aims to list all accessible and relevant tools in the sanitation sector, with focus on tools that take FSM into consideration. Factsheets, which cover the objectives, descriptions, advantages, limitations and details of the tool, have been developed for each of these tools.

ENERGY-LAND NEXUS

As per the revised targets, set under the Jawaharlal Nehru National Solar Mission, an allocation of 40 GW of capacity is scheduled for rooftop PV (RTPV) installations.

Developing a GIS based web tool for Rooftop Photovoltaic Applications, based on Bangalore's solar RTPV potential data, which will be collected using Light Detection and Ranging (LiDAR) technology.

Funder: MacArthur Foundation

Achieving a target of 175 GW of RE capacity by 2021-22 will require strategic land-use planning, using geospatial data, made available in a visualised manner, so that maximum output can be obtained from the available land resources.

Developing a state-level integrated energy planning framework, to enable accelerated RE deployment in Karnataka, based on a roadmap which provides plant siting assessments.

Funder: Shakti Sustainable Energy Foundation

Evaluating policy choices about RE plant siting and afforestation, in terms of forest cover, low-carbon development, biodiversity and energy access in Madhya Pradesh and Maharashtra.

Funder: The Nature Conservancy (TNC)

RESOURCE AND ENERGY EFFICIENCY

Government of India has been encouraging the adoption of various forms of enhanced Energy Efficiency (EE) and Waste Heat Recovery (WHR) technologies; setting tariffs for energy generated from these sources is vital.

Based on a request from the Karnataka Electricity Regulatory Commission (KERC), determined the tariff for WHR based power plant.

Funder: Karnataka Electricity Regulatory Commission

The construction sector is facing a shortage of raw materials. The disposal of Construction and Demolition Waste (CDW) is also a major problem in urban areas; it is usually dumped in lakes and other water bodies.

Identified how CDW can be re-used to create products for the construction sector and a recycling ecosystem was proposed to address disposal-related problems through a combination of literature review, site visits and primary surveys.

Funder: GIZ India

NUMBERS AT A GLANCE

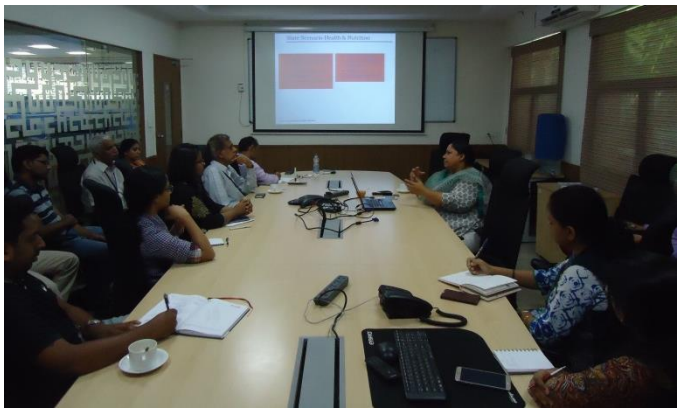
ENGAGEMENTS

1. July 15: Mohd. Sahil Ali, Dr Annapoorna Ravichander, Riya Rachel Mohan attended a "Launch of GHG website" co-organised by Vasudha Foundation, CSTEP, ICLEI - Local Governments for Sustainability, Shakti Sustainable Energy Foundation, The World Resources Institute & Council on Energy, Environment and Water (CEEW) in New Delhi.
2. August 19: Sujaya Rathi, Sandhya Sundararagavan, Dr Mridula D Bharadwaj attended a Consultation Workshop on EV Implementation Plan for Public Transportation co-organised by India Smart Grid Forum (ISGF) & CSTEP in Kolkata
3. August 30: Shakti Sustainable Energy Foundation (SSEF) & CSTEP organised by "Round Table on A Decision Analysis Framework for Integrated Resource Planning" in Bengaluru
4. September 7: CSTEP & India Smart Grid Forum, with Shakti Sustainable Energy Foundation, co-organised a "Round Table on Feasibility of Electrification of Public Transportation" in Bengaluru
5. September 23: CSTEP organised "Workshop on Peri-Urban Development and Sustainability" in Bengaluru
6. November 9: CSTEP and EMPRI co-organised a "Workshop on Gaps in Sanitation: A FSM Centric View" in Bangalore.
7. January 23-25, 2017: CSTEP & EMPRI jointly organised a workshop titled Introduction to the FSM toolbox" in Bengaluru
8. January 24, 2017: CSTEP & CEEW jointly organised a workshop on "GHG Platform India: Energy and Industries" in Bengaluru
9. January 27-28, 2017: ICSR, IIT Madras, Chennai & CSTEP jointly organised a "Conference on Peri-urban Development Programme" in Chennai.
10. February 23, 2017: AIT, CSTEP, CEPT University co-organised a "FSM Toolbox Workshop" in Chennai
11. March 23 – 24, 2017: CSTEP co-organised a "Handholding session with IIHS and Keystone Foundation" for Keystone Foundation in Coimbatore

GUEST LECTURES

1. October 26, 2016: Issues in Women, Child Development and Human Welfare in Karnataka by Smt. Uma Mahadevan, IAS, Principal Secretary, Department of Women and Child Development

2. December 5, 2016: Climate Change and Sea Level Rise by Dr Sujatha Byravan, Principal Research Scientist at CSTEP
3. January 27, 2017: How much energy and emissions does India need for decent living?' by Dr Narasimha Rao, Project Lead and Research Scholar at the International Institute for Applied Systems Analysis
4. February 1, 2017: Green Economy, drawing from her book titled 'Inside a Green Economy' by Ms. Unmuessig, President of Heinrich Boell Foundation
5. February 21, 2017: Energy use and GHG emission analysis of urban wastewater infrastructure and scoping for use of renewable energy resources, by Dr Pratima Singh, Research Scientist, CSTEP
6. March 2, 2017: Feeding Short and Long Term Policy Dialogues (with data) on Air Quality in India", Dr Sarath Guttikunda, Affiliate Associate Research Professor, Desert Research Institute and Co-Director of Urbanemissions
7. March 28, 2017: Convergence of sectors - Energy & Mobility, Mr. Amit Pathare, Group Director of New Solutions, ENGIE



Smt. Uma Mahadevan, IAS, Principal Secretary, Department of Women & Child Development in conversation with CSTEP researchers

Launch of *Fuelling Make in India- Ethanol as India's Octane Booster to Economic Growth* organised by PLR Chambers, New Delhi

CLEAN ENERGY

India's National Policy on Biofuels (2009) set a 20% blending target for all types of biofuels, while the Ethanol Blended Petrol (EBP) Programme 2003 aims to improve fuel efficiency.

Prepared a comprehensive roadmap for a biofuels-based economy, which identifies existing hurdles to implementation, maps it against international case studies and proposes solutions to achieve blending targets.

Funder: PLR Chambers

SOLAR ENERGY RESEARCH INSTITUTE FOR INDIA AND THE U.S. (SERIIUS)

- Funder: Department of Energy, Government of U.S. and DST, Government of India.
- Analysed state-level policies for solar PV module manufacturing in India to identify policy interventions required to make indigenous manufacturing cost competitive.
- Prepared design of smart micro-grid technologies for large-scale decentralised solar power applications in India.
- Conducted a comparison of the solar PV modelled output power with actual generated output for Gujarat, India.

SCOPEBIG

- Scalable CSP Optimised Power Plant Engineered with Biomass Integrated Gasification Inauguration or SCOPEBIG is a European Union funded project.
- BSPGCL provided an additional 6 acres of land; the total area of the project site is now 14 acres.
- New EPC contractor has been identified through an open global tender. They will design, develop and implement the project using state-of-the-art parabolic trough technology.

FACILITATING OFFSHORE WIND IN INDIA (FOWIND)

- Procured LiDAR and published a study on the supply chain, port infrastructure and logistics for offshore wind farm development in Gujrat and Tamil Nadu.
- Conducting a study on transmission and interconnection systems of both Gujrat Energy Transmission Corporation Limited (GETCO) and Tamil Nadu Generation and Distribution Corporation (TANGEDCO).
- Funder: European Union

HUMAN RESOURCE

UPDATES

- Performance Appraisal: New additions made to the module to enable a more 360 degree assessment of all levels of staff
- Facilitated a free medical/health check-up camp for the staff in August 2016; services provided by AON Global Insurance in association with Vikram Hospital, Bengaluru.

Anti-Sexual Harassment related activities:

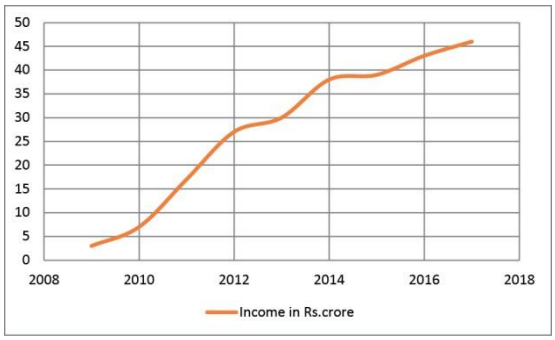
- Regular sensitisation activities: The ICC has been putting up posters in the cafeteria and will continue to do so in other common gathering places.
- Annual sensitisation and training: All staff members were sensitised on the subject.
- Survey and quiz: Deployed over intranet. The survey and quiz was aimed at creating awareness to all staff members and was made mandatory for all employees.

BUILDING CAPACITIES IN SOUTH ASIAN THINK TANKS

Capacity building in Think Tanks and other institutions in research methodologies is essential for a vibrant civil society. Based on core issues identified by a consortium of South Asian Think Tanks in research, organisational development and communications and policy engagement, customised training will be imparted. The learnings from the project will be further institutionalised in each participating organisation.

FINANCE

CSTEP is now comfortable in raising project grants and has been consistently adding new donors while deepening relationships with its existing funders. However, core funding which provides the organisation operational flexibility and vibrancy, continues to be a matter of concern. The Center's fund-raising strategies are therefore focussed on raising core support, especially from domestic sources with a view to ensure long-term sustainability.



FUNDERS AND COLLABORATORS

We thank all our funders and collaborators for their support.

Bill and Melinda Gates Foundation

Bureau of Energy Efficiency

Bangalore Electricity Supply Company Limited

Banaras Hindu University

British High Commission

Central Power Research Institute

Carnegie Mellon University

Climate Parliament

Center for Environmental ining & Technology University

Climate Works Foundation

Centre for Policy Dialogue

Chamundeshwari Electricity Supply Corporation

Centre national de la recherche scientifique

Directorate of Urban Land Transport

Defence Research & Development Organisation

Department for International Development

Deutsche Gesellschaft fur Internationale Zusammenarbeit GmbH

Department of Science and Technology

European Union

Energy Research Centre of the Netherlands

Eplf école polytechnique fédérale de lausanne

Electricity Supply Corporation of Malawi

Government of Karnataka

Gujarat Chemical Association

Government of Andhra Pradesh

Global Green Growth Initiative

Gulbarga Electricity Supply Company Limited

Hubli Electricity Supply Company Limited

International Institute of Information Technology

Institute for Social and Environmental Transition

International Development Research Center

International Business Machines

Indian Institute of Technology Delhi

Integrated Natural Resource Management

Indian Institute of Technology Madras

Indo-US Science and Technology Forum

Indian Institute of Science, Bangalore

Jamestji Tata Trust

Koninklijke Nederlandse Akademiavan Wetenschapper

Karnataka Electricity Regulatory Commission

Lawrence Berkeley National Laboratories

London School of Economics

Manipal University

Ministry of New and Renewable Energy

Mangalore Electricity Supply Company Limited

Narotam Sekseria Foundation

Next Generation Infrastructure Foundation

Overseas Development Institute

Sri Sivasubramaniya Nadar Trust

Society for Elimination of Rural Poverty

THERMAX Ltd

Think Tank Initiative

The World Bank

TU Delft University of Technology

The William and Flora Hewlett Foundation

University of Agriculture and Science

University of British Columbia

University of Ahmedabad

WIPRO

Good Energies Foundation

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