SHAKTI
SUSTAINABLE ENERGY
FOUNDATION

ENERGY DIALOGUES

ANNUAL REPORT 2022

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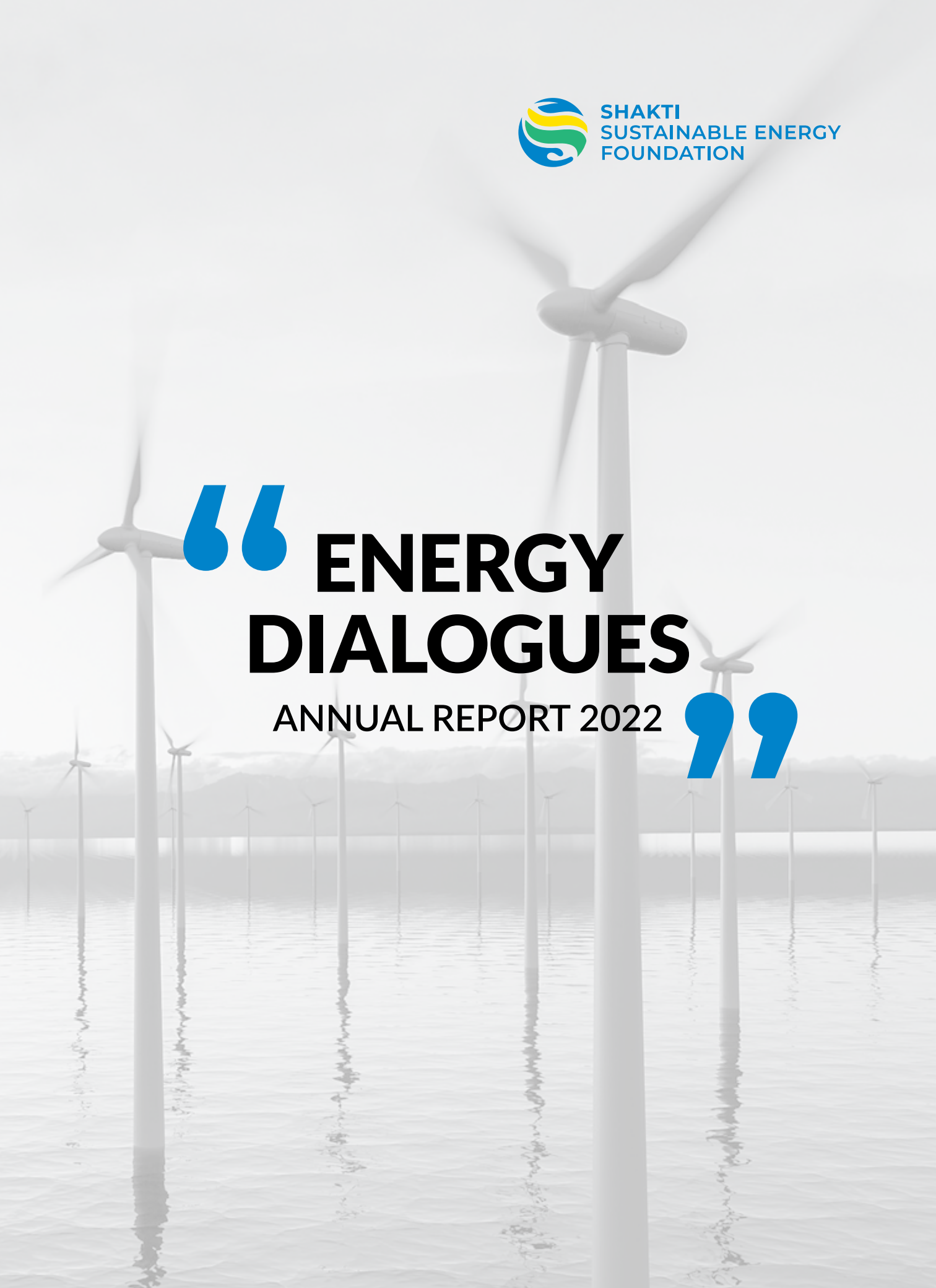

“ENERGY DIALOGUES”

ANNUAL REPORT 2022

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LETTER FROM THE CHAIRPERSON

In the recent years, Shakti has realised that its focus on clean energy and climate change, to which it has adhered to the last 13 years, needs to expand, especially if it hopes to support India in balancing decarbonisation with growth and development. Shakti looks forward to supporting the acceleration of large-scale clean energy system interventions at both the policy level and in assessing practical applicability. Shakti is now committed to tackling climate change by providing real-world solutions.

In keeping with the global decarbonisation movement, India has pledged low carbon development and take actions to address climate change. Some of the key steps that India seeks to take include increasing the share of renewable energy in the country's total energy mix, reducing carbon emissions intensities, creating more carbon sinks, promoting electric vehicles for sustainable transportation, and developing a National Adaptation Fund for Climate Change (NAFCC).

To help the nation achieve these goals, Shakti, with its expanded horizons, aims to be a trusted source for research, analysis, and recommendation services on climate change and clean energy topics. It hopes to be an active collaborator in driving change and act as a bridge-builder. Shakti looks forward to continuing to function as a policy innovator deeply invested in development of applicable policy and market-based solutions and moving them forward for its old and new areas of focus.

For achieving these goals, Shakti has taken some significant steps forward. In 2022, along with an expanded repertoire of focal topics, Shakti created a new identity for itself with a new logo, a fresh colour palette, and website that are more consistent with the changing times. In the past year, Shakti focused on growth and reinvention, while also maintaining its hard-won reputation as an important knowledge partner to policy makers and key research organisations. It was a year that witnessed Shakti expanding, diversifying, and revitalising itself.

I would like to take this opportunity to thank Shakti and its team members, led by Dr Anshu Bharadwaj, who has helmed Shakti as the Chief Executive Officer for reaffirming and refreshing Shakti's mandate competently and effectively. I would also like to convey my thanks to partners and stakeholders for their support and valuable contributions.

Jamshyd Godrej
Chairperson of the Board

LETTER FROM THE CEO

There's a general perception that economic development and environmental sustainability are contradictory to each other. This is because the model of economic development that we have come to understand comes with a high cost to the environment, especially climate change. This is the model that has been followed by the industrialised West and is based on excessively high consumption-based lifestyles, linked with a high consumption of fossil fuels.

India's recent net zero pledge is an attempt to rationalise the contradiction between sustainability and growth. This pledge is not just a mitigation pledge – it is a fundamentally different economic development model from the one that the West has followed over the last two centuries. The West is trying to decarbonise after they have achieved a very high level of development. What India is trying to do is, "decarbonise as we develop".

If India can get it right, it will be a beautiful example for the rest of the world—especially the developing countries—to follow. It's a new experiment and no other country has done it so far. This is an opportunity for India to build a future based on efficiency and clean technologies. This way, we will not have to 'catch up' to the West, and we should seize the chance to establish ourselves as leaders in this field.

Coming to the role that Shakti will be playing in this transition, we, as an organisation, are also transitioning from our focal subjects of clean energy and climate change. Shakti's work is expanding to keep pace with India's low carbon development while also balancing the nation's rapidly growing development and energy needs. Shakti is now increasing its focus on accelerating large-scale clean energy system interventions that can not only tackle climate change, but simultaneously, make communities more resilient to the impacts of climate change. Therefore, this is a new era for Shakti, where our focus of work will be different from before but promises to be very exciting indeed.

With the context having changed so much and our work horizons expanding, it was time to relook at Shakti's visual identity. We have a new logo, a fresh colour palette, and website that are more in sync with the changing times.

Shakti hopes to continue as a trusted knowledge partner for research, analysis, and advisory on climate change and clean energy topics, a capacity builder for those striving towards climate action as well as an active collaborator in driving change. Shakti will continue its role as a bridge-builder and policy innovator deeply invested in developing policy and market-based solutions and moving them forward.

Finally, I would like to express my heartfelt gratitude to all partners and stakeholders, and our Board and staff for their support and encouragement during Shakti's journey towards more expansive horizons.

Dr Anshu Bharadwaj
Chief Executive Officer

BOARD OF DIRECTORS

JAMSHYD GODREJ
Chairperson of the Board and Managing Director, Godrej & Boyce Manufacturing Company Ltd.

NITIN DESAI
Chairperson - Governing Council, TERI; Former Under Secretary General United Nations

MEHER PUDUMJEE
Chairperson, Thermax Limited

RAJIV LALL
Former Non-Executive Chairperson, IDFC Bank

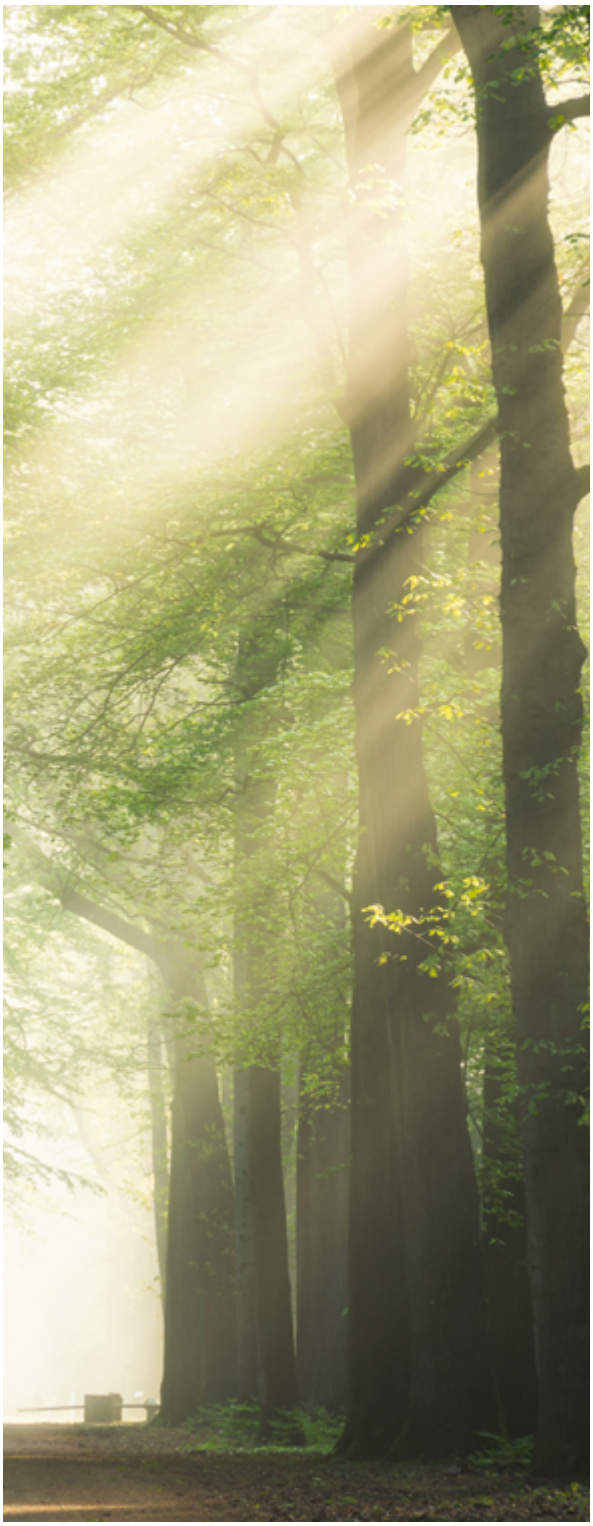
HARISH HANDE
Founder and Chief Executive, SELCO Foundation

Shakti is pleased to welcome two Board Members, who joined the Board in 2022.

SURESH PRABHU
Chartered accountant, educationist, social worker, senior politician, parliamentarian, and banker, he is the Founding Chancellor of Rishihood University, Chairperson of the drafting committee for National Cooperation Policy, and an active visiting Professor at the National Institute of Advance Studies and the London School of Economics and Political Science.

MOUTUSHI SENGUPTA
Chief of Capital Mobilisation at AVPN, she earlier led the India programme for the John D and Catherine T MacArthur Foundation as a Country Director and worked with the first southern Oxfam – Oxfam India, as its Director of Programmes and Advocacy.

Our former Board Member, **SHRI SUMAN BERY**, Former Director General National Council for Applied Economic Research, has now taken up a new position as the Vice Chairperson, NITI Aayog.



ABOUT SHAKTI

Who We Are

Shakti Sustainable Energy Foundation was set up in 2009, about 13 years back, as a regional climate foundation to catalyse clean energy adoption in the country for solving the problem of climate change.

In all these years, Shakti has partnered tirelessly with policy makers, civil society, industry, think tanks, and academia to identify and scale energy system interventions that will reduce GHG emissions and tackle climate change. Shakti and partners, have helped promote policies at both, the national and state levels, to change the country's landscape in clean energy.

Its efforts have promoted policies for the adoption of a gamut of clean energy solutions in the country, ranging from energy efficiency and electric mobility to renewable energy sources and sustainable transport.

With the context having changed so much and Shakti's horizons expanding, it was time to relook at its visual identity. It has a new logo, a fresh colour palette, and website that are more in sync with the changing times.

At the core, Shakti is:

A trusted source providing research, analysis, and recommendation services on tackling pressing climate and energy challenges.

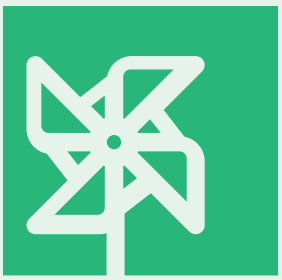
An active collaborator as Shakti employs multi-faceted and highly collaborative approaches to driving action.

A bridge-builder as Shakti convenes city, state, national and global policymakers together with civil society, industry, and academia to identify common ground and move solutions forward.

A policy innovator deeply invested develop policy and market-based solutions that inform decision makers and deliver real and lasting climate action.

OUR VISION

A clean and secure energy future



OUR MISSION

To catalyse clean energy policy solutions in collaboration with policy makers, civil society, academia, and industry

OUR VALUES

Collaboration:
We connect effectively with each other and with our partners in order to leverage expertise and maximise impact.

Ambition:
We aim for large scale and transformative change by adopting approaches that look over the horizon.

Quality:
We deliver quality analyses and information on a consistent basis.

Accountability:
We take responsibility for the impact of our efforts.

Innovation:
We seek new and creative ways to address challenges by devising solutions that are not necessarily limited to current paradigms.

What We Do

Shakti combines philanthropy, policy research and analysis, and stakeholder dialogue and engagement to address climate change issues.

It focuses on clean energy solutions for the power, industry, and transport sectors, while also exploring clean air solutions and focussing on the climate resilience imperative.

Shakti delivers strategic inputs for clean energy and climate related philanthropic investments in India through cross-disciplinary efforts and developing powerful communications strategies to build support for climate change solutions.

However, in the last decade, the context within which Shakti has been functioning has changed dramatically. Climate change was a peripheral topic 13 years back; but today, it is a predominant subject that is being discussed everywhere. In the light of India's new commitments, it is not just about energy, but it is an economywide progression where energy is an important focus but not the only one.

These changes in focus with the centre of attention getting much wider, led our leadership to reinvent the organisation's visual brand identity so that it is more in sync with the current scenario.

New Brand Identity

On November 24, 2022, Shakti launched its new brand identity along with a new website and logo. The new brand identity comes at a time when Shakti, with a longstanding 13-year heritage, is expanding its areas of focus to align with India's rapidly growing development and energy needs.

Shakti's focus is now keeping pace with India's ambitious net zero emissions pledge, which has changed the entire scenario of how the nation approaches climate change.

And so, this is a new era for Shakti, with a different focus from before, but a very exciting one.

The launch event for Shakti's new brand identity was held at the Shakti office in the presence of Shakti staff and leadership. The day was a festive one with the office being decorated in the new brand colours, and team members dressing up in these colours to celebrate the event. The formal launch event featured a video showing the changing of Shakti's logo and an address by the CEO, Dr Anshu Bharadwaj, about Shakti's past, its relationship with partners, and the rationale behind the new brand identity.

The formal launch was followed by a vibrant comprehensive training session on the guidelines for correct usage of the new brand and visual identity. This was followed by a quiz on Shakti and a celebratory lunch, where a cake with the new logo was cut. The launch event concluded with distribution of new office merchandise and stationery branded with the new Shakti logo. These included jackets, thermos flasks, pens, and pencils whose stubs can be planted to grow herbs, flowers, or vegetables.

The change in Shakti's new visual identity – its new logo, colour palette, and website – were shared with all stakeholders via social media platforms and an e-mail. The mailer included a link to the new website, a video showing the transition in logos, and another video with a message from the CEO about Shakti's new brand identity.

NEW INITIATIVES

Accelerating Civil Society Organisations Towards Climate Mitigation and Technical Excellence (ACCLIMATE) Challenge Fund

Shakti, with knowledge support from Intellecap Advisory Solutions, launched the ACCLIMATE Challenge Fund in November 2022 to strengthen and accelerate the work of Civil Society Organisations (CSOs) committed to climate action in India.

Recognising CSOs as a dynamic source of strategic and innovative climate action, the Accelerating Civil Society Organisations Towards Climate Mitigation and Technical Excellence (ACCLIMATE) Challenge Fund aims to provide capacity building opportunities in areas that include electric mobility, green hydrogen, sustainable transport, industries, cooling, net zero buildings, agriculture, coastal ecosystems, and climate finance, through a cross-sectoral approach. ACCLIMATE will seek to facilitate general operating support, capacity building, and mentorship for shortlisted organisations for a duration of 2 years.

The Challenge Fund aims to stimulate tailored responses to local context-specific problems by tapping into local knowledge and creative capacity, which is often the forte of CSOs who are deeply immersed in the local context. The fund will engage with and channel additional resources into organisations to initiate, implement, and evaluate activities in specialised fields of climate mitigation. In many cases, such support has a significant impact on the effectiveness of these organisations in fulfilling their missions.

The ACCLIMATE Challenge Fund seeks to engage with:

- CSOs with an exclusive focus on climate action who want to expand into new sectors.
- CSOs working in areas such as economic research, industrial competitiveness, rural development, urban planning, poverty alleviation, education, etc., who are looking to expand their work by building capacity on climate action.

The Challenge Fund will provide selected civil society organisations with general operating support for 2 years along with technical assistance and customised mentorship support to strengthen their internal systems and processes. Currently, it aims to support approximately 10 civil society organisations with the main objectives of:

- Building the technical capacity of CSOs (think tank/policy research/technology research institutions) in the climate change space.
- Seeking innovative and context-specific solutions (policy and/or market creation) to unique local problems by tapping into local knowledge and expertise.
- Ensuring grant funding to execute or pilot solutions that enable policies and markets.

In its first year, the Challenge Fund will focus on building greenhouse gas mitigation capacities within shortlisted CSOs across two main thematic areas:

- Policy research and analysis.
- Strategic communication.

Climate Insights Unit

The Climate Insights Unit at Shakti provides insights for impactful programmes by addressing the constantly evolving challenges of climate change and clean energy. It focuses its efforts on improving access to knowledge, efficiency and effectiveness of efforts, and the collaborative capacity of the ecosystem to address climate, policy, and philanthropic opportunities.

The Climate Insights Unit aims to:

- Identify new and emerging areas of work in mitigating climate change and support experts in these areas.
- Undertake research that can provide actionable inputs by leveraging knowledge and experience of experts.
- Build evidence through the development of unique data sets, and rigorous analysis.
- Help gather and develop evidence to gain a deep understanding of a problem, its components, and potential solutions.
- Design deeper explorations where significant knowledge gaps prevent effective problem diagnosis.
- Unlock the collective wisdom of our extensive network of partners through collaborations and convenings.
- Help to identify new opportunities for investment and provide support to the design and execution of impactful programs and existing initiatives to transform to meet new priorities.

The unit aims to provide strategic advisory inputs based on research and evidence to scope new program areas or adapt and transform existing programs to meet new requirements using analytical tools, expert inputs, and stakeholder views to craft robust theories of change, results frameworks, and evaluation parameters.

The latest undertaking of the unit has been to incorporate the theory of change approach in existing processes and help Shakti and the eco-system function better by learning to fill the gaps between what a programme/initiative does (through its activities and interventions) and how these lead to achieving desired goals.

Corporate and Philanthropic Engagement

As India embarks to balance growth with sustainable development, it must be recognised that the developmental path undertaken by India has no historical precedent or ready lessons that can be drawn from developed countries. India must carve out its own niche, become a harbinger of the new economic growth. The country's victories and triumphs will lead the way for the developing world to pioneer pathways for sustainable economic progress.

The corporate sector is expected to shoulder the responsibility and take the lead in raising investments towards efficiency and clean technologies and deliver on the economic development paradigm. Substantive capital spending will be required over the next few decades to translate the low carbon development commitment to on-ground action. Estimates forecast that, India will need large, front-loaded funding (3.5–6 per cent of GDP) and that cumulatively, the nation will require over $ 2.4–3.5 trillion[1] (roughly $ 90–120 billion per year) for the required transitions to meet the current low carbon development goals.

It is crucial that the Government develops and implements robust policies based on evidence and data, to enable and facilitate the flow of such investments. There should also be a focus on augmenting the implementation capacities of national and sub-national institutions on multiple themes.

1 Decarbonizing India, McKinsey Sustainability, October 2022
2 Estimate drawn from an analysis conducted by Climate Works Foundation
3 India Philanthropy report, Bain India, 2023, CSR ($3.3 billion); Family Philanthropy ($3.6 billion)

Mobilising Domestic Philanthropic Capital

For transformation scale and size, India requires an increase in credible knowledge and policy research institutions. As a nation, there is a need to venture into unchartered territory; this will have huge scope for innovation, disruptive ideas, and game-changing paradigms.

The current global philanthropic flows directed towards India's climate and clean energy are small—about $ 60 million per annum[2]. Although in recent years, domestic philanthropy has grown considerably to approximately $ 13 billion per annum[3], the funds flowing towards policy research do not attract much attention due to the lack of tangible short-term impacts. This is because domestic philanthropies have traditionally sought tangible social sector goals pertaining to activities in and around the community, workplace, and employees.

However, building knowledge capacities via policy research, especially at the sub-national level, is a necessary long-term investment. More pooled-in philanthropic capital needs to be brought onboard and directed towards strengthening institutional research capacities for evidence-based analyses; these institutional capacities must be nurtured and grown into credible knowledge providers.

Domestic philanthropic allocations, even if partially re-directed, can facilitate India's sustainable transition by focussing on a few big bold transition bets that can unleash innovation at scale and speed. This will require incubation and support for national and sub-national institutional capacities and systems to enable policy and practice to act in concert.

Alongside, policy support, domestic philanthropy can also direct capital to support multiple — and even conflicting — ideas and solutions that can shape the marketplace of low carbon development led ideas.

Shakti seeks to actively engage with domestic philanthropies to develop programmatic

interventions that enable the leveraging of expert knowledge to support decision makers.

Crafting a Philanthropic Pivot

An in-house team established in Shakti actively develops an understanding of the value proposition that Shakti can offer to domestic philanthropy, including building a narrative to catalyse thought leadership and ecosystem towards India's climate/ clean energy transition, through:

Frameworks, instruments and platforms around which convergence and collaboration can be built.

- For example, Making India's Intellectual Infrastructure (MITTI), which seeks to develop a unique public-philanthropic platform to augment policy research in India.

Developing direct engagement with domestic philanthropies.

- Interactions via public forums and one-on-one interactions are being explored and a few exclusive convenings are being planned to build trust and word-of-mouth recall for establishing Shakti as the go-to platform for efficient programme design and management.

Evolving a value proposition and narrative suited to domestic philanthropy.

- Developing a deep understanding of philanthropic pain points and fund deployment priorities to evolve value proposition.

- Showcasing Shakti's impacts through curated narratives or alignment with suitable partners.

Shakti has registered with the with the Ministry of Corporate Affairs to take up CSR initiatives.

PHILANTHROPY is a means to an end.

Shakti offers bespoke **SOLUTIONS** to climate and energy issues of national import.

Shakti is **TRUSTED** for its minimalist approach and maximalist impact.

Convening to gain insights from leading domestic philanthropies on developing a public-private philanthropic collaboration framework.

Chairing the convening-
Shri Suman Bery, Vice Chairman, Niti Aayog

AREAS OF FOCUS

Clean Power

Globally, there has been a paradigm shift towards renewable energy sources such as solar and wind power. Harvesting systems for renewable energy sources, if deployed carefully at scale, can reduce the emissions intensity of India's power sector and drastically improve energy access across the country.

High Renewable Energy Pathways

India's potential for generating energy from renewable sources is tremendous. It is estimated that the country can produce more than 1,000 GW of renewable energy if resources are utilised to their optimum capacity.[4] This can not only reduce the emissions intensity of the power sector but also dramatically improve energy access and energy security in the country. Decentralised energy generation from renewable sources can decrease our reliance on grid-distributed electricity and will be a boon in areas where the supply of grid-based electricity can be unreliable.

The Indian government has demonstrated its commitment to increasing the share of renewable energy in the electricity mix of the country with an ambitious target of generating 500 GW of energy from non-fossil fuel energy sources by 2030.[5]

TOWARDS 500 GW BY 2030

Shakti Sustainable Energy Foundation is supporting the acceleration of development and adoption of renewable energy systems in India's power generation sector to support the nation's transition towards clean energy. It has been engaging with power distribution companies, regulators, industries, and civil society using a three-pronged approach. One, by promoting ideas for the stability of the grid for a systematic transition focusing on interventions in energy storage, data analytics, and resource planning. Two, by encouraging the power sector to harness the potential of disruptive technologies that can promote sustainable energy generation and a green economy. And three, by supporting the strengthening of distributed energy systems to deliver affordable and reliable power to consumers.

RESEARCH INNOVATION SHAKTI EXPERT (RISE) PROGRAMME

Shakti is anchoring the Research Innovation Shakti Expert (RISE) program to provide inputs on the support policies and practices required for transitioning into high renewable energy pathways from the fossil fuel-based ones that are currently prevalent.

The RISE programme is a collaborative effort by Shakti and the MNRE to attract young experts (as RISE fellows) and civil society organisations to provide multi-year policy inputs to decision makers in key aspects of the policies and practices required to set up well-functioning high renewable energy pathways. The program will focus on critical thrust areas such as data and analytics, state resources studies, financing, markets and regulations, skilling and social transitions, domestic manufacturing, and technology and innovation. Overall, the program seeks to provide an engaging environment for policy makers with researchers, professionals, and academicians.

The programme is designed to bring experts in a multitude of renewable energy areas, industries, and sectors in contact with key stakeholders towards planning high renewable energy systems and discuss the challenges that India may face in doing so. These interactions are expected to develop well-founded intelligence studies, strategic roadmaps,

4 Niti Aayog; Government of India; 2015. Report of the Expert Group on 175 GW RE by 2022
5 National Statement by Prime Minister Shri Narendra Modi at COP26Summit in Glasgow

future scenarios, and policy solutions for India's ambitious clean energy shift. Going forward, the RISE programme is intended to strengthen sustainable development and enable the country to respond to the accelerating pace of global energy transitions.

Access to Clean Energy for Development

Shakti's Energy Access for Development programme promotes clean, affordable, and reliable energy access solutions that can help alleviate poverty and boost development and social protection. This programme focuses on finding solutions to overcome barriers in achieving the 3A'sof electricity—Assurance, Availability, and Affordability.

Shakti collaborates with technical experts, policymakers and civil society to champion integrated clean energy priorities in the health, education, and livelihood sectors. It has been working with state actors and policy networks to catalyse robust policy solutions and promote innovative technologies to close the electricity access gap for under-served and unserved communities.

DECENTRALISED RENEWABLE ENERGY AND HEALTHCARE

Despite an increase in electrification under the SAUBHAGYA scheme, many health facilities in rural India function without a regular supply of electricity. These existing systemic gaps in health services, especially for the rural poor, need to be addressed. To make delivery of health services reliable and sustainable through solutions that are climate resilient, energy efficient, and clean energy-driven, Shakti collaborated with key stakeholders across the health and energy sectors in several states including Bihar, Odisha, Karnataka, Jharkhand and others in India. The aim is to build the capacity of health institutions through training and knowledge dissemination support.

MoU WITH THE NATIONAL HEALTH SYSTEMS RESOURCE CENTRE (NHSRC)

Shakti is working with the National Health Systems Resource Centre (NHSRC)— established in 2007- to assist in policy and strategy development for provision and mobilisation of technical assistance and capacity building for health care in the different states—to enable an ecosystem for using mainstream renewable energy and DRE in public health care services.

On July 6, 2021, Shakti signed a Memorandum of Understanding (MOU) with NHSRC to promote access to more equitable, affordable and quality healthcare through the adoption of renewable energy and DRE-based electricity systems. This MoU is part of Shakti's efforts to integrate clean energy into strategies for improving development outcomes across Indian states.

Under the MoU, Shakti provides technical support for policy design and implementation, facilitates the development of tools and frameworks, and helps build the capacity of stakeholders in the health sector.

DRE IN BIHAR – HEALTH AND EDUCATION

Shakti collaborated on the development of solutions in adopting and scaling up DRE-based solutions for improving the electricity supply in Bihar. These solutions were also geared towards increasing incomes in rural households through improved production yield that follow access to quality health care.

The study indicates that the integration of DRE across the health sector value chain in Bihar will be invaluable for meeting the state's energy goals, development goals, and improvements in health indicators in a sustainable way.

The research reveals that DRE has a potential to provide 266 MW of electrical power for Bihar's health sector and can create over 13,000 new job opportunities. The DRE sector has an investment potential of ₹2,470 crore in the state's health sector and can help Bihar avoid 1.1 million metric tonnes of carbon dioxide emissions, which brings with it, immense environmental co-benefits.[6]

ENGAGEMENT WITH MINISTRY OF PANCHAYATI RAJ

Focus on propelling the use of clean energy technologies to address energy access, reduce drudgery, and improve economic opportunities at the village level, will help in achieving sustainable development goals. A recent engagement with Ministry of Panchayati Raj has been initiated to help address these isssues.

6 Shakti Foundation, 2021. DRE for Powering Health Infrastructure in Bihar

Industry, Buildings and Cooling

Industrial Decarbonisation

> **For sectors such as steel and cement manufacturing, decarbonisation can be a difficult, expensive, and slow process, with several technological barriers making this transition even more challenging.**

To meet these challenges, Shakti's industrial decarbonisation programme is working towards enhancing interactions between key industrial players, policy makers, and other significant stakeholders. Shakti is facilitating the move towards GHG emissions reduction from the industrial sector through five major undertakings. One, by helping in the development of industrial strategies for energy efficiency, resource efficiency, fuel change, demand management, and leap-frog technologies. Two, by convening coalitions for industries to facilitate knowledge sharing and encourage ambitious undertakings. Three, by advancing decarbonisation projects in the sector, particularly for small and medium scale industries. Four, by building evidence-based research and policy solutions for addressing decarbonisation challenges. And five, by facilitating the formulation of just transition plans, especially with regard to small and medium industries that are likely to be most affected by the changes required for decarbonisation.

SAMEEKSHA

To help MSMEs reach their full potential by adopting EE technologies and BOPs, a few years ago Shakti began supporting the Small and Medium Enterprises Energy Efficiency and Knowledge Sharing (SAMEEEKSHA) platform that was jointly set up in 2009 by the Bureau of Energy Efficiency, Swiss Agency for Development and Cooperation, and the Ministry of Micro, Small & Medium Enterprises (MoMSME),

with The Energy and Resources Institute (TERI) acting as the platform's secretariat.

SAMEEKSHA is involved in synergising the efforts of various agencies working towards the promotion of clean, energy efficient technologies and practices in the Indian MSME sector. It is a unique forum where industrial players interface with technology development specialists, research institutions, government bodies, training institutes, and funding agencies to facilitate this process.

Considering the crucial role of the MSME sector in providing large-scale employment opportunities at relatively low capital cost and industrialisation of rural and under-developed areas of the country, SAMEEKSHA's role and the resources it provides are becoming increasingly important. This unique initiative which is still ongoing with the support of Shakti, was also acknowledged as an important intervention in India's second Biennial Update Report (BUR) submitted to the United Nations Framework Convention on Climate Change (UNFCCC).

WEST BENGAL DEPARTMENT OF MSME AND TEXTILES, SHAKTI & TERI SIGN MoU TO PROMOTE ENERGY EFFICIENCY IN MSMEs

To promote green energy efficient technologies and practices among the MSMEs in the state of West Bengal, a tripartite MOU was signed between the Department of MSME and Textiles (MSME&T Department), Government of West Bengal; Shakti Sustainable Energy Foundation (SSEF); and The Energy and Resources Institute (TERI).

West Bengal, in the eastern region of India, is home to about 8.8 million MSMEs establishments—the highest in the country—which employ around 13.5 million people in the state.[7] Some of the energy intensive MSME sub-sectors include foundry, forging, steel re-rolling, wire drawing, galvanising, bricks, textiles, leather working, food industries, and so on. The state has about 430 MSME clusters.[8] There is a huge potential for the MSMEs in the state to reduce their energy consumption and save energy costs by switching to cleaner options. In addition, since these sectors are expected to grow rapidly over the next 10 years, large capital expenditures are being planned; for example, the up-coming Foundry Park in Howrah. These industrial parks present a unique opportunity to deploy new and efficient technologies and best practices. Under this collaboration, a deep-dive approach to energy savings will be taken; this will consist of technical assistance in undertaking a large number of diagnostic studies, promotion of new and efficient technologies, capacity building/training programs, and awareness workshops for the MSMEs.

MINISTRY OF STEEL AND SHAKTI COLLABORATE TO PROMOTE MANUFACTURING OF GREEN STEEL

The 'Perform, Achieve, and Trade' (PAT) scheme of Government of India is a major initiative that can also aid reduction in energy use in the steel industry. However, even with the expected energy efficiency improvements over the next few decades, the direct emissions from this sector in a baseline scenario are likely to treble over the next 30 years, from around 242 MMT of carbon dioxide in 2019 to 837 MMT of carbon dioxide in 2050.[9]

Shakti provided assistance to the Ministry of Steel for the development of the Vision 2047 document for the steel sector and in developing the Green Steel Mission. The intent is to enable the Ministry in transitioning the Indian steel sector to to low carbon development in line with the country's goal.

7 https://msme.gov.in/sites/default/files/MSMEENGLISHANNUALREPORT2021-22.pdf

8 https://wbmsmet.gov.in/key_initv_industrl_infrstrctr#:~:text=Government%20of%20West%20Bengal%20is,MSME%2C%20Handloom%20and%20Khadi%20clusters.

9 https://shaktifoundation.in/wp-content/uploads/2020/01/Towards-a-Low-Carbon-Steel-Sector-Report.pdf

Building Decarbonisation

Shakti seeks to work collaboratively with stakeholders across India including policymakers, civil society and practitioners to promote the uptake of low carbon development considerations in India's building sector.

In this regard, Shakti and the Confederation of Indian Industry–Sohrabji Godrej Green Business Centre (CII-GBC) undertook a joint initiative to increase awareness of net zero energy buildings in India. The initiative targeted building sector stakeholders across the country — including architects, developers, builders, product manufacturers and technology suppliers, energy service companies (ESCOs), renewable energy companies, policy makers, and regulatory bodies — with the goal of driving policy and technology solutions for net zero buildings and to mitigate GHG emissions from the building sector. The extensive stakeholder consultations led to the development of recommendations for an NZEB policy framework, a compendium of NZEB technologies and service providers, and an initial assessment of renewable energy demand aggregation of select NZEBs in India. As a part of this initiative, several capacity building programmes were organised for stakeholders on key NZEB concepts and approaches.

THE 2000-WATT CERTIFICATION OF THE SYMBIOSIS UNIVERSITY CAMPUS

Originating in Switzerland, the 2000-watt concept proposes to reduce the average primary energy usage of a world citizen to no more than 2000 watts by the year 2050 without lowering their standard of living[10]. It also proposes that access to 2000 watts of energy is enough to participate fully and comfortably in a modern lifestyle, and that it is possible with an emission signature of only one tonne of carbon dioxide a year.

The concept uses a 'Personal Energy Label' system in which individuals can check their energy consumption, making it easier to calculate energy savings and emission reductions.

The Pune Municipal Corporation is implementing this concept with the Symbiosis International University in Pune as a pilot site. The university is currently home to over 18,000 full-time students and is known

10 https://ourworld.unu.edu/en/2000-watt-society

for pursuing sustainability goals in the areas of solar energy, green mobility, and food security. With support from Shakti and the Swiss REPIC (Renewable Energy, Energy and Resource Efficiency Promotion in Developing and Transition Countries) program, the University is working with the 2000-watt Smart City Association to adapting the 2000-watt concept to the Indian context.

Going forward, the university will develop a master plan for energy, building design, construction methods, mobility, food, waste management, and other areas to realise the 2000-watt ideal. The certification of Symbiosis International University could set a benchmark for a sustainable campus and urban developments in the future.

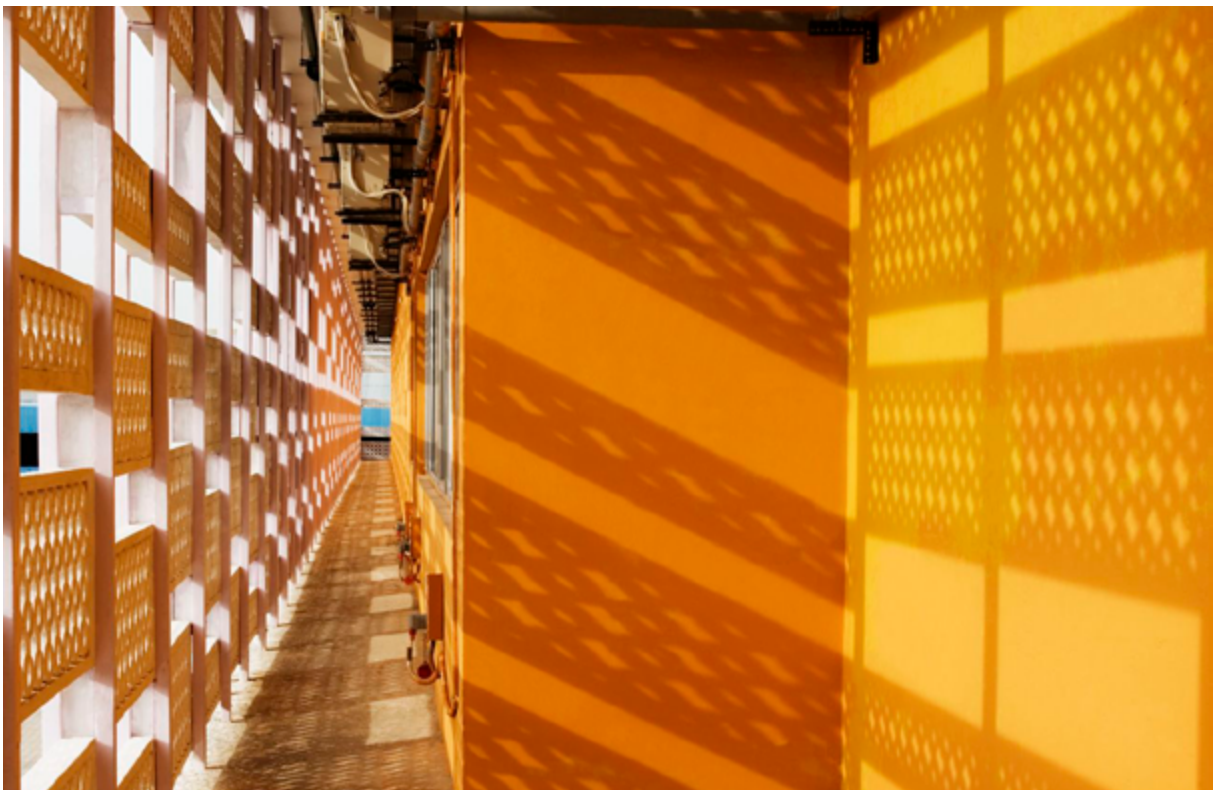
Clean Cooling

India's cooling needs are rapidly growing. This will lead to a significant increase in the energy demand for cooling, stress on the electricity grid and higher emissions, in addition to the release of hydrofluorocarbons (HFCs), which are high Global Warming Potential (GWP) gases.

Foreseeing the complex energy trends and challenges that India would have to confront, Shakti was one of the first to identify early action opportunities for cooling efficiency and reducing HFC usage. These are areas that can play a profound role in shaping a cleaner future for India.

For over five years now, Shakti has collaborated with several partners (think tanks, R&D institutions, academia etc) to build a fact base on sustainable cooling opportunities.

Now, there is a solid analytical foundation for sustainable cooling ideas in areas such as space cooling, thermal comfort in buildings, the implications of a reduction in HFC usage, and the use of alternative refrigerants—none of which existed before this effort. Shakti has also helped to convene meaningful stakeholder dialogues and outreach efforts which have helped in defining strategies for better cooling efficiency in India.



Climate Policy

Modelling Long-Term Low Carbon Development Pathways

> **Modelling long-term pathways are a critical tool to support informed decision-making for India's low carbon future.**

Since transforming economy is a vast process that takes time, modelling long-term pathways and scenarios are important policy tools to find the right solutions for key challenges in decarbonisation. Modelling long-term pathways can help in understanding the opportunities, challenges, synergies, and trade-offs of decarbonisation within the context of India's developmental priorities and climate commitments. Evidence-based analytics and econometric models give useful insights into these issues and guide policy actions towards the right directions.

To understand the feasibility of achieving low carbon development under different scenarios, Shakti collaborated with World Resources Institute (India) for a high-profile study titled '***Shaping our green future: pathways and policies for net-zero transformation***' that was featured in a Monograph published by the Observer Research Foundation (ORF). The issue brief explores four scenarios of climate action for India using a systems dynamics model called the Energy Policy Simulator for India. It investigates policy trade-offs and co-benefits and estimates the costs of climate action. It finds that deep decarbonisation in the Indian economy is possible while also boosting jobs and GDP and avoiding millions of deaths due to harmful air pollution. The low-carbon transition will require massive investments in power, industry, transport, and hydrogen, for which early policy signals are needed to accelerate technology adoption by industry, benefiting from decreasing technology costs.

This was released by the ORF at the Glasgow Climate Change Conference in 2021 as a side event just after India announced its commitment to achieving net zero by 2070.

In December 2021, Shakti signed a Statement of Intent (SOI) with the NITI Aayog to support India's energy transition. As part of a long-term modelling pathway programme, Shakti will aid the efforts of the NITI Aayog's India Climate and Energy Modelling Forum (ICEMF) to facilitate the development of long-term modelling pathways to achieve India's short- and long-term climate goals. The ICMEF has evolved as a vibrant forum that supports the energy, economic, and climate–modelling community in India. Shakti is also a part of the high-level ICEMF steering committee through which it collaborates with various institutions to co-develop the most pressing policy-relevant research questions and attempts to answer through various modelling and scientific analysis.

Shakti is also working to strengthen macro-economic and energy modelling capacities of selected institutions in India through a multi-year program. The idea behind this program is to foster robust and long-term modelling that can inform enabling and realistic pathways to achieve India's climate goals. The programme supports young research scholars from different Indian institutes of repute in developing energy and economic modelling tools. These institutions envisage to develop research brief so that they can engage with the state government meaningfully to inform policies.

The programme also aims to develop an open-source dashboard for data related to social, environmental, demographic, energy-related, etc. to help modelling institutions in data easy access for analysis.

THE GREEN HYDROGEN MISSION

In India, there is an increased focus on adopting hydrogen-based energy sources. This comes in the backdrop of India's National Hydrogen Energy Mission, which aims to help the Government in meeting its climate targets by making India a green hydrogen energy hub.

Currently, the Indian Government is targeting a production capacity of 5 million metric tonnes (MMT) of green hydrogen by 2030, which will help in averting 50 MMT of carbon dioxide emissions. However, research estimates indicate that by 2030, India's green hydrogen market can potentially grow to more than three times its current value to touch 7–9 MMT, and that the cost of producing green hydrogen can be as low as $3–3.5/Kg, especially in areas where the hydrogen plants can be co-located with production centres for fertiliser, city gas, and refineries.[11]

In early 2021, Shakti was invited to be a member of the Standing Committee that is informing the development of the National Hydrogen Energy Mission. Shakti provided initial inputs to the draft Mission Document, which will lay down India's vision and direction for hydrogen energy.

Climate Resilience

Many communities on the frontlines of climate change have begun building resilience to climate impacts with the help of governments, CSOs and other groups. But the efforts in building resilience need more urgency, innovation, and scale. Currently, there are huge gaps in planning and implementing viable climate resilience strategies. Climate impacts and risks are not yet adequately factored into decision and policy making, and much more funding is required for climate adaptation, particularly in locally led adaptation efforts.

Shakti's Climate Resilience programme seeks to work with policy makers, multilateral institutions, communities and CSOs, to build the resilience of vulnerable communities in order to withstand climate change. It supports the integration of climate risk assessment into development planning, which requires advanced data and evidence on best practices to promote equity and inclusion in adaptation efforts.

CLIMATE RESILIENCE LANDSCAPE: HOW PHILANTHROPIES CAN FILL THE FINANCING GAP

Philanthropic action has played a key role in advancing climate action in India. Yet, here, and globally, philanthropic resources remain insufficient when compared with the magnitude of the problem. Since the window to stabilise the climate is so brief, the results of current efforts matter greatly for the future of humanity. More and better funding can accelerate transition towards low carbon development that will protect vulnerable stakeholders and communities.

Shakti, in collaboration with partners working in similar field, provides an overview of climate change issues in India mapping initiatives by key stakeholders including the central government, state governments, civil society, bilateral and multilateral agencies, private sector, and philanthropic initiatives. It identifies key gaps in advancing climate resilience interventions and offers solutions to holistically address these issues. Based on this analysis, the following strategic priorities are where the philanthropic community can intervene to advance climate action in India:

Evidence-based Planning and Implementation

- Provide state governments with knowledge support that they require to develop effective roadmaps for low-carbon and climate-resilient development.
- Collaborate towards roadmaps being absorbed within the State Transition Plans or State Action Plans on Climate Change (SAPCCs) or state budgets, with the intention of ensuring definitive state buy-in.

11 Government of India, 2023. National Green Hydrogen Mission

Capacity Building

- Enhance the capacities of government officials to implement the measures outlined in the roadmaps through technical assistance.
- House experts within the Government by setting up a Project Management Unit (PMU) to promote seamless flow of information between CSOs, the research community, and policy makers. Aim to have the PMU absorbed by the state government in due time.
- Support project implementation in selected cases and help states develop detailed project reports, investment plans, green procurement guidelines, and design incentive structures and tender templates.
- Undertake these implementation activities together with concerned state officials by providing them with hands-on training in the aforementioned activities.

Enhancing Local Institutional Capacities for Climate Action

- Incubate and/or augment capacity within the existing local CSO ecosystem by training existing resource persons on climate change issues, engaging new actors through institutional grants, and providing other guidance as required.
- Simultaneously, facilitate the formation of partnerships between local CSOs and established organisations to give exposure to the local CSOs to active projects and build their capacities.

Cementing Government Ownership

- Work with the state government to either strengthen existing climate committees or constitute new ones. These committees are headed by high-level authorities within the state government and include actors from various sectors or line departments to foster government ownership.

Cross-learning at the Sub-national Level

- Work with partners across India to ensure cross-state diffusion of the learnings and findings from 'model' states.

- Support learning exchange via conventions, coalitions, knowledge products, training modules, cross-learning platforms, networks, and other available channels.

- Facilitate robust centre-state dialogues to ensure the necessary provisions are in place for state level climate action.

DISTRICT CLIMATE CHANGE ACTION PLANS

Approaches that root national climate strategies in local actions are essential for all countries as they move towards low carbon development pathways. India can serve as a critical testing ground for essential questions on how subnational commitments can contribute to better outcomes for overall national climate strategies. Since the central government devolves numerous authorities to sub-national actors, this creates opportunities for multi-level policy implementation and comprehensive climate action.

Shakti was part of the development of the district climate change action plans for six cities—Nagpur, Pune, Indore, Bhopal, Rajkot and Ahmedabad. Each action plan was prepared in consultation with the district administrations to contribute towards India's state and national plans.

Each plan is a comprehensive assessment of the projected climate variability, sectoral GHG emissions, and climate change drivers in that district. It also incorporates a comprehensive set of recommendations, in alignment with the Sustainable Development Goals (SDGs) for various climate related sectors and environmental challenges in each district, as well as the mitigation potential of each sector.

The Nagpur plan was presented to the Honourable Environment Minister of Maharashtra, Shri Aaditya Thackeray, and the Pune plan was launched by the Pune Municipal Corporation. The plans for Bhopal and Indore were launched at the SKMCCC-EPCO office, Bhopal (State Knowledge Management Centre on Climate Change-Environmental Planning and Coordination). The plans for Rajkot and Ahmedabad were released by the Hon. Chief Minister of Gujarat, Shri Bhupendra Rajnikant Patel.

Air Quality

Since 2014, Shakti has enabled strategic interventions to improve air quality management in India starting with making the brick sector cleaner. Over the years, Shakti has moved towards air quality monitoring, assessment of mitigation options, as well as catalysing evidence-based research, capacity building, and outreach.

Building on these efforts, Shakti continues to catalyse solutions for cleaner air, better health, and a more stable climate through the following strategies:

- **Strengthening the air quality data ecosystem:** Lack of adequate, robust air quality data can hinder the development of clean air plans. Shakti collaborates to strengthen the data infrastructure in non-attainment cities in order to better understand and tackle source emissions and other factors that contribute to air pollution.

- **Supporting the implementation of the NCAP:** Under the directive of the NCAP, several non-

attainment cities have developed city clean air action plans with air pollution mitigation measures. Shakti believes in the objectives of the NCAP and engages with city level stakeholders to develop and revise their clean air plans, as well as to create research evidence for informing decision making on interventions to reduce air pollution.

- **Capacity building:**
  Most of the non-attainment cities will require stronger organisational and individual capacities in terms of skills, workforce, and understanding to support their clean air action plans. Shakti facilitates the capacity building of stakeholders to address air pollution.

- **Studies on public health and air quality:**
  Poor air quality impacts human health, especially that of vulnerable groups such as children and the elderly. Shakti is contributing to studies to review and analyse this impact as well as identify effective measures to reduce the air pollution burden on these groups.

FUNDING OPPORTUNITIES FOR CLEAN AIR ACTION

Shakti has engaged with Sensing Local to publish a list of funding opportunities that support clean air action across India with the goal of accelerating action on clean air using a solutions-oriented approach. The publication takes its starting point from a study by the India Climate Collaborative titled '***Building a thriving ecosystem to tackle India's air pollution problem***', which maps and assesses India's air quality ecosystem by capturing detailed inputs from 87 air quality actors on the challenges and priority work streams for tackling air pollution. The findings were analysed to create a comprehensive list of funding opportunities for the sector categorised into themes. The analysis was followed by interviews with air quality experts and institutions who met at the Shakti supported annual convention on air quality. The information and feedback garnered were assimilated into a report titled '***Funding opportunities to support clean air action across India***'.

REMOTE SENSING PROGRAMME: SMART POLICING OF EMISSIONS ON-ROAD

Smart monitoring of on-road emissions has become necessary and inevitable. Next generation approaches such as remote sensing of the on-road fleet can help to detect real-world vehicle emissions and provide insight about local air quality problems and their solutions.

However, the use of Remote Sensing Device (RSD) for the on-road vehicle emission monitoring programme requires a national guidance framework to guide cities on the full scope of its implementation, including technology and site selection, system design, data analytics, enforcement strategies, fleet screening, technology feedback system, management of old vehicles, and enabling low emissions zones among others.

Shakti is collaborating with the Centre for Science and Environment (CSE) and other ecosystem actors to help build a framework for the RSD programme in India. There are several aspects to consider in this framework such as the nature and scope of application of the remote sensing system, technology and instrumentation, and the rules and regulations that need to govern this program.

To demystify the key aspects of remote sensing application and its technical complexity, Shakti and CSE have produced the '***Remote monitoring of emissions from on-road vehicles: a primer***' as a first step towards informing the national level guidance framework for adoption and implementation of remote sensing measurement systems in Indian cities. This primer addresses the frequently asked questions relevant for regulatory and implementing agencies.

Currently, several cities that are implementing their respective clean air action plans under the NCAP have included remote sensing measurements as part of their mitigation strategy for vehicular pollution. These cities include Mumbai, Kolkata, Asansol, Barrackpore, Durgapur, Haldia, Raniganj, and Bhubaneswar. Delhi has already been mandated to implement the Remote Sensing Device (RSD) programme by the Supreme Court of India.

CLEAN AIR ACTION PLANS FOR CITIES

Bengaluru and Surat have been identified as non-attainment cities under the NCAP and require robust planning and collaborative actions in air quality management. Both cities now have comprehensive roadmaps to tackle specific and sectoral emissions as well as detailed counteractions to mitigate and control these emissions.

- **Surat**

  In Surat, Shakti collaborated on the Surat Clean Air Action Plan (SCAP) that was prepared by the World Resources Institute India (WRI-India) in collaboration with the Surat Municipal Corporation (SMC) and the Gujarat Pollution Control Board (GPCB) using input from TERI, which conducted a source apportionment study that identified air pollution sources in Surat. The SCAP was formally released in December 2021 at the Pandit Dindayal Upadhyay Indoor Stadium in Surat by the Hon. MP Mr C R Patil in the presence of Hon. Municipal Commissioner SMC, Mr Banchhanidhi Pani, Hon. Mayor Smt. Hemali Kalpeshkumar Boghawala among other Central and State Ministers.

- SCAP recommends cost-effective interventions to reduce emissions from identified air pollution sources. Some of the recommendations include promoting clean fuel in industries, monitoring and managing construction dust, promoting non-motorised transport, halting open municipal solid waste burning, and development and conservation of green spaces along roads and traffic junctions in the city to manage road dust.

  Surat City has been ranked as the second cleanest city in India two years in row since 2021 and is aiming to top the ***Swachh Survekshan*** 2022 list.[12] However, the city has been identified

as one of the 132 non-attainment cities in India and thus requires robust planning and collaborative actions for air quality management. The SCAP project not only highlights the need for technical interventions, but also suggests institutional strengthening of the SMC and GPCB in their mitigation actions road map.

- **Bengaluru**

  Shakti collaborated on the development of two key studies titled '***Emission Inventory and Pollution Reduction Strategies for Bengaluru***' and '***Identification of Polluting Sources for Bengaluru***' by the Center for Study of Science, Technology and Policy (CSTEP). The studies identified polluting sources, activities, and hotspots in Bengaluru and recommended concrete mitigation actions to tackle them. Both studies were released in February 2022 by the Hon. Chief Minister of Karnataka, Shri Basavaraj Bommai at a high-profile stakeholder event in Bengaluru organised by the Karnataka State Pollution Control Board.

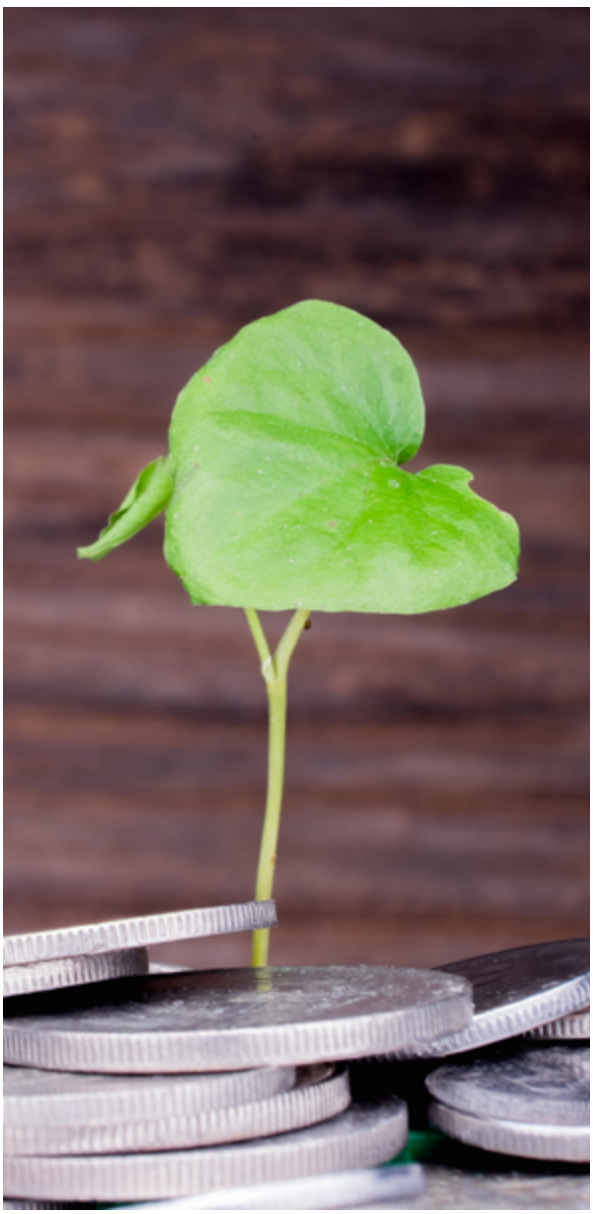
  The two studies found that road dust and transportation contribute the most to air pollution in Bengaluru city. The studies recommend a multi-pronged approach to controlling PM_{10} and $PM_{2.5}$ emissions from road dust, which includes vacuum sweeping of dust from paved roads, laying end-to-end pavements, and covering barren areas on the roadside with green cover (through geo-engineering); the study also recommends studying the efficacy of mechanical sweepers before deploying them.

12 https://vikaspedia.in/health/sanitation-and-hygiene/swachh-survekshan

13 Landscape of green finance in India 2022; Climate Policy Initiative; August 10, 2022

Climate Finance

India, like many developing countries, requires more financial resources to make the transition to clean energy that could reverse climate change and requires at least $2.5 trillion to fulfil its climate mitigation commitments by 2030. Current investments focused on mitigating climate change in India fulfil less than 25 per cent of the estimated climate financing needs. An additional $1 trillion in adaptation and resilience investments is required between 2015 and 2030, i.e., $67 billion every year, till 2030.13



Financing the clean energy transition will require proportionate, transformative increases in investment, mobilising debt, strengthening capital markets, and creating new and innovative financial instruments. Shakti's climate finance program seeks to enhance capital flows for climate mitigation and adaptation in India and to create an enabling financial ecosystem that can deliver a positive climate impact. It collaborates with members from the banking and finance industries, policymakers, technical experts, and key stakeholders to convene collective action, facilitate shared learning, and develop practical resources to scale up the overall quantum of climate finance. Shakti facilitates the integration of financial risks and opportunities from climate and environmental factors into mainstream financial decision making and aid the formation of a robust green market in India.

CARBON MARKETS

By amending the Energy Conservation Act of 2001, India has taken the initial step toward establishing the legal foundation for its own Carbon Pricing Instrument (CPI). Now, India needs a sustainable, broad, open, verifiable, and environmentally sound carbon market to meet decarbonisation goals. However, the existing market instruments in India, such as the PAT (Perform, Achieve, and Trade) and REC (Renewable Energy Certificate) systems, have been plagued by an excess of certificates/credits and have limited inclination from market enablers.

Before the outlining of the India-ETS (Emissions Trading Scheme), it is necessary to carefully evaluate the lessons learned from these market mechanisms. Shakti conducted a modelling study to understand how increasing liquidity and alleviating oversupply issues, can support scientific methods to strengthen demand. The study used a modelling approach to determine emission pathways in order to assess demand for high-quality credits in India's most polluting and difficult-to-control industrial sectors.

The primary conclusion of the study is that the country should modify its strategy to derive sectoral/enterprise targets based on GHG intensity rather than energy. These targets should be compatible with the GHG intensity of the GDP commitments outlined in the NDC. Consequently, the sectoral trajectory would be determined for the duration of the entire cycle, and there should be a downward trend in GHG emissions at the sector level for the duration of the stated time frame.

The study aimed to derive the target emission paths (with decreasing trends) for four difficult-to-mitigate industry sectors and estimates that 6.6–7 billion carbon credits will be required by 2050 for a scenario with low carbon emissions.

THE GREEN INDIAN FINANCIAL SYSTEM INITIATIVE (GIFS INITIATIVE)

The Green Indian Financial System Initiative (GIFS Initiative) has been co-created by the Small Industries Development Bank of India (SIDBI), Shakti Sustainable Energy Foundation (Shakti) and the French Development Agency (AFD). The Initiative seeks to facilitate dialogue and discussions on greening the Indian financial system between all stakeholders, promote a global flow of knowledge, streamline existing initiatives, and identify priority areas for India's climate finance actors.

Following COP 26, India has set ambitious targets with enhanced 2030 NDCs, energy independence by 2047 along with commitment towards net zero by 2070. However, current regulatory and supervisory frameworks do not address climate change comprehensively, which contributes towards information asymmetries and failure to integrate environment and climate change risks into banks' strategies and risk management systems. This is supplemented by a marked shift in global demand, where investors increasingly see Environment Social and Governance (ESG) metrics as a safeguard against risk to investment.

The Green Indian Financial Systems Initiative was conceived to drive dialogues, discussions, and actions between policy makers and global finance experts on greening the Indian financial system in early 2022. The initiative provided a common platform for different stakeholders such as financial institutions and banking practitioners, regulators, policymakers and researchers, from India and France to convene and contribute to building of shared perspectives and knowledge for the greening of Indian financial system. The GIFS Initiative expects to widen and shape the discourse around greening the financial ecosystem and support its operationalisation through the Indian institutions.

The initiative kickstarted with a virtual conference in January 2022 with European and Indian partners in a multi-stakeholder exchange with leading policy makers, civil society actors, financial institutions and banks, and think tanks participating in a discussion on three key parameters, namely, the role of regulations in managing climate-related risks, enhancing the resilience of the financial sector and mainstreaming a green taxonomy for India.

At the virtual conference, three main objectives of the GIFS Initiative were outlined:

1. To bridge the Indian climate financing gap – currently, less than 25 per cent of the green investments needed to achieve the Indian NDC objectives have been obtained; these include funds acquired through the development of adapted climate strategies for the financial sector.

2. To assist sector players (regulators, supervisors, banks, and financial institutions) in developing and implementing responsible financial practices and strengthening their resilience to climate and energy transition.

3. To encourage technical and political dialogue between the various actors in the country.

Following this virtual conference, three convenings were held in 2022.

- **Workshop on Sub National Green Finance**
  Webinar on the theme of 'Greening of finance at sub-national level' was designed by the Green Indian Financial System (GIFS). Held in April 2022, the webinar brought together think tanks and CSOs to discuss how broader economic and social development concerns can be addressed in green investments at the state level. It focused on the role of financial mechanisms in catalysing green finance and how India can transition to a more resilient, greener financial system incorporating relevant global standards on disclosures and risk management.

- **High Level and Technical Workshop**
  The GIFS Initiative held its second seminal convening in June 2022 in Paris, and brought together renowned Indian, French, and other European experts from the financial ecosystem and policy-making bodies. This convening facilitated knowledge exchange on issues pertaining to climate finance strategy, climate risk integration, mobilisation of private climate finance and financial regulation on climate risk and taxonomy.

- **Concluding GIFS Conference**
  In the third GIFS Initiative convening, French and Indian experts and leaders gathered to discuss the importance of greening the Indian financial system, particularly in view of India's presidency of the G20 in 2023. Round tables between the various financial stakeholders facilitated the sharing of knowledge on the issues and expectations from a multi-actor and multi-expertise action perspective.

  Since its inception in January 2022, the GIFS Initiative has now become a recognised label within the Indian financial system, with over 300 stakeholders, including 15 partner banks. It has been engaging in dialogues with the Indian Banks' Association (IBA) on the subjects including risks relating to finance, enabling access to climate data, and other relevant information to facilitate climate financing. In addition, GIFS has also facilitated training on climate change risks with the IBA through a series of training programmes, which began late in 2022 and will continue into 2023.

  A joint declaration between the organisers was signed during this 3rd GIFS event, further strengthening the GIFS dynamic in the coming years. A network of women experts in climate finance was also launched on the occasion, aiming to strengthen the gender focus of the initiative as well as the training and expert development components.

TRAINING FOR SENIOR SIDBI BANKERS ON CLIMATE FINANCE

Since capacity building is an important focal area for Shakti, a training programme on climate finance for senior officials at SIDBI was conducted by Shakti in collaboration with cKinetics.

The Chairperson and Managing Director, Sri Sivasubramanian Ramann of SIDBI inaugurated the

training programme. The two-hour training session delivered insights on the concepts of green taxonomy, carbon pricing, and ESG mechanisms, amongst other important topics. The training began with a simple definition of what climate change is, and progressed to discuss why it is important to define and support green initiatives. The programme also explained why and how climate change is likely to affect the banking sector, and the ways in which the sector needs to adapt itself to respond to climate risks and the policy/ regulatory changes that need to be made to combat climate change.

More than 30 senior SIDBI officials (including the General manager, Chief General Manager and Deputy Managing Director) attended the training program, which was extended by another 45 minutes due to the rich interaction.

GREENING OF FINANCE BY WOMEN (GroW)

To facilitate women's participation in the green economic dialogue and provide a platform for women to be an integral part of the transition pathway, the Green Indian Financial System (GIFS) initiative planned to launch the Greening of finance by Women (GroW) network. GroW seeks to foster women's participation in making the financial system resilient and fit for purpose, promote their leadership and knowledge, and enable them to advocate for gender considerations in financial policy, schemes, lending and investment.

By providing a platform for cross-learning among women across the globe, leveraging international and local collective intelligence, and mentoring young women professionals in the financial sector, GroW has an objective to create transformative change and impact and enhance the voice and visibility of women in green and climate finance. It will seek to complement and establish exchange with existing green initiatives, enabling women professionals to be effective agents of change and their participation will indisputably add to the efforts towards offering inclusive climate solutions and finance.

Electric Mobility

Given the connections between the transport sector and air quality, jobs, and climate change, the case for electric mobility is compelling. Shakti Sustainable Energy Foundation houses the Electric Mobility Initiative (EMI), a multi-funder effort that supports national and state level efforts towards accelerating electric mobility in India.

Through this initiative, Shakti collaborates with policy makers, industries, State Transport Undertakings (STUs), and fleet operators to boost the EV manufacturing ecosystem, while also teaming up with discoms to support the development of charging infrastructure. In addition, we aim to find solutions for hard-to-electrify segments such as heavy-duty vehicles (HDVs) and promote circular economy solutions for the recycling of batteries.

Our work also focuses on generating awareness among consumers to drive EV adoption. In all, we focus on five major pillars of electric mobility, namely, manufacturing, adoption, awareness, financing, and charging infrastructure.

The Electric Mobility Initiative (EMI) Workshop

Shakti hosted the third annual convening of the Electric Mobility Initiative (EMI) in April 2022. The two-day workshop brought together key government stakeholders and several CSO partners to discuss the barriers facing the uptake of EVs in the country and identify pathways for faster penetration.

The convening kicked off with an inaugural panel discussion featuring experts including:

Shri Sudhendu Sinha, Adviser for Infrastructure Connectivity – Transport and Electric Mobility, NITI Aayog

Shri Sajid Mubashir, Scientist at the Department of Science and Technology, Government of India

Ms Mahua Acharya, Managing Director and CEO of Convergence Energy Services Limited (CESL)

Dr O. P. Aggarwal, CEO, WRI India; and

Shri Mahesh Babu, CEO, Switch Mobility

The inaugural session was followed by participants across the CSO networks joining in parallel breakout sessions that were themed around the following topics:

- Strategies: Manufacturing, Charging infrastructure, Adoption, and Awareness
- Critical Needs and Gaps: Capacity Building
- Accelerating the Ecosystem for e-HDVs and zero emission trucks (ZETs)
- National and Sub-national Action
- Geographies
- Collaboration, Coordination and Cooperation among partners

About 40 participants from the CSO network attended these sessions. The workshop played a key role in informing the EMI strategy. During the break-out sessions, grantee partners reflected on and spoke about big, high-impact ideas that could shape the future of electric mobility in India. Grantees underscored the need to identify and boost opportunities for local collaboration that can enable smoother on-ground implementation. As next steps, the ideas with potential will be taken up for further ideation under the EMI.

Some of the highlights of the sessions included a talk by NITI Aayog on the importance of battery swapping, Faster Adoption and Manufacturing of Electric Vehicles (FAME) schemes, and Production Linked Incentive (PLI) schemes for battery manufacturing in India's electric mobility ecosystem. The talk also touched upon the need for financial models to ensure that the EV transition in India remains profitable for stakeholders in manufacturing, purchasing, and demand generation.

In another talk, a speaker from the Department of Science and Technology (DST) spoke about how personal charging for 2- and 3-wheelers could be popularised and the charging infrastructure guidelines released by the Government. The on-road charging for electrification of buses was also discussed. The need for financing of EVs was an extensively discussed topic in several sessions. Although transport agencies are increasingly interested in moving away from diesel-powered vehicles to electric mobility, this transition is proving to be difficult. The reluctance in funding from banks towards supporting EVs was also mentioned as a challenge. In addition, the need for systems using carbon credits and second-life EV batteries in the short term power markets was also discussed.

One discussion revolved around how three major problems in the transport sector in India—oil imports, road congestion in cities, and the affordability of transport for people—could be solved through electric mobility. One panellist pointed out that if even 10 per cent of the 12 billion USD spent on the health care needs that arise because of air pollution, could be

diverted towards electric mobility, the same problem could be indirectly solved by reducing air pollution. Panellists also mentioned studies that show an economic benefit of EVs, if used for more than 100 km.

Discussions on collaboration between partners was also one of the highlights of the EMI workshop. The sessions on presence, competence and collaboration led to a rich interaction between CSO partners across different areas of electric mobility, spread across the four strategic pillars, vehicle segments, and geographies. The need for the existing CSO network to collaborate with regional partners, and expanding collaboration between Indian and international partners to apply international learnings and experiences on EVs to the Indian ecosystem was a much discussed topic. The building of consortiums and knowledge sharing networks for different thematic areas were also discussed.

e-FAST (Electric Freight Accelerator for Sustainable Transport) – The National Electric Freight Platform for India

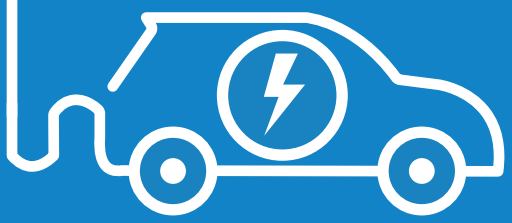
The e-FAST programme will help in the transition to e-freight by prepping the ecosystem for the change and developing the knowledge base needed to tactically inform long-term policy support mechanisms. This platform will catalyse learning by bringing together a wide range of stakeholders in the freight sector, including policymakers, freight manufacturers, logistics companies, financiers, and customer industry representatives. The programme also aims to facilitate rich, targeted discussions that can provide strategies for shaping India's freight electrification. Such learning exercises are intended to inform decision-making, help develop holistic policy formulation, enable robust day-to-day operations, reduce system-level inefficiencies, and enable an ecosystem transition.

The proposed outcomes of the e-FAST programme are:

Outcome 1:
Amongst all the stakeholders of the freight ecosystem, there will be greater awareness of the latest on-ground developments in electric freight and the ability to assess and evaluate the transition.

Outcome 2:
Potential early movers and innovators can establish viabilities for different use cases of freight operations, provide valuable learnings for other companies to enable e-freight deployment, and help identify and inform the required policy catalysts through pilots and proof-of-concept projects enabled by the platform.

Outcome 3:
National-level e-freight policies can be shaped using the assimilated learnings from the e-FAST programme. The learnings from the pilot projects can be used in identifying key areas that need policy intervention and support, while the platform-enabled stakeholder engagement will help to catalyse co-creation and conversations.



SKILLING – INDUSTRY COLLABORATION FOR CREATION OF AN EV-READY WORKFORCE

Shakti Sustainable Energy Foundation has recognised that there is opportunity to create a green skilled work force to drive adoption of EVs. It aims to collaborate with institutions, associations, skill development departments, autonomous bodies, training institutes, etc. to review and support their EV capacity building programs.

The project has three main components:

Mapping and Listing Stakeholders

It is essential to identify the stakeholders in the transition towards EVs and engage them to assess the industry requirements in terms of skills, education, employment type and duration, and roles expected from the workforce.

Stakeholder Consultations

IRI had planned to organise four round-table discussions for North, South, East and West India, of which two stakeholder consultations in Delhi (North) and Bangalore (South) have already occurred. The main takeaways from the discussions at these meetings have been:

- An active engagement with the industrial sector will be required for the successful training, delivery, and placement of a workforce with the required skills for the EV transition.
- Program designs need to be more holistic and should include information for practical usage such as for a road-side technician, on the correct methods of towing EVs and handling them in emergency situations. In addition, basic training in installation, operation, and maintenance of chargers also needs to be provided.
- There is a need for more vocational, short-term training programmes offered in a hybrid mode to inform and educate road-side technicians.
- Owners and/or drivers of EVs also need to be educated and trained on how to correctly handle and care for their vehicles.
- A Government/Association initiative for a platform specifically designed to connect and share information on the demand for and supply of skilled labour between technology companies, established Original Equipment Manufacturers (OEMs), and educational institutions is needed.

Another important milestone that the project aims to achieve is a more formal collaboration with states, industry associations, and skill development councils.

Training-need Assessment Reports

The project also aims to develop a detailed report highlighting the need, benefit, and expenses for skilling/upskilling requirements in the EV sector.

India Electric Mobility Index (IEMI)

Though national level policies provide an initial push to electric mobility, the states have a more crucial role to play when it comes to actual implementation and impact assessment. State governments can allocate responsibilities to various departments such as transport, power and industries to kickstart the e-mobility transition and encourage investment and bring in manufacturing and regulations in this sector.

The role of India Electric Mobility Index (IEMI) is to:

- Understand how policy interventions impact desired outcomes such as job creation, innovation, and adoption of electric mobility.
- Identify the relative strengths of individual states and design policy interventions for successful adoption of electric mobility.
- Evaluate the performance of different policies and to identify and incentivise the most impactful combinations of policies.

The IEMI also functions as the following:

- A recognition system that identifies which states performing well in the e-mobility sector.
- Creating healthy competition among states by highlighting their relative performances. The data and experiences from successful states can help others to formulate effective policies.
- Helping in building capacity for states and individual ministries.
- Identifying and consolidating success factors and metrics into a learning platform for stakeholders.
- Creating a comprehensive picture of the state-level challenges for the Government of India to indicate the what type of and how much central assistance might be needed.
- Taking on the role of a ready-reckoner for investors and companies to aid in evidence-based decisions on favourable investment and operations locations.

India's National Electric Bus Program

Shakti has enabled the collaboration of Convergence Energy Services Limited (CESL) and WRI India in concluding a tender to deploy 5,450 e-buses across five cities, namely, Bengaluru, Delhi, Hyderabad, Kolkata and Surat. This tender, based on a gross cost contracting (GCC) model and supported by FAME-II subsidy, led to the discovery of the lowest ever rates for e-bus operations in Indian cities; these rates are up to 48 per cent lower than those from previous tenders. The key factors that facilitated this reduction in costs were economies of scale, demand homogenisation, higher assured utilisation, lower bank guarantee costs and penalty caps, clarity on work scope, longer concession periods, better payment terms, and opportunity charging facilitation.

Overall, Shakti uses the MAAC (Manufacturing, Adoption, Awareness and Charging Infrastructure) strategy to enable a wholistic approach towards encouraging the uptake of electric mobility in India. Since one of the key barriers that has limited the adoption of EVs is its financing, Shakti is also developing financial strategies for different vehicle segments.

Cities and Climate Action

Given the magnitude of change that Indian cities will face in the coming years, planning their future growth is crucial. While much of the enabling policy framework is determined at the national and state levels, the bulk of the implementation work has to be undertaken at the urban level.

Shakti's programme on Cities and Climate Action collaborates towards decarbonising Indian cities and building resilience to climate-related shocks. It is important to help cities enforce regulations, gain access to low-carbon technologies, develop climate action policies positive to their economies, improve health, reduce adverse ecological impacts, support livelihoods and improve the liveability of urban areas.

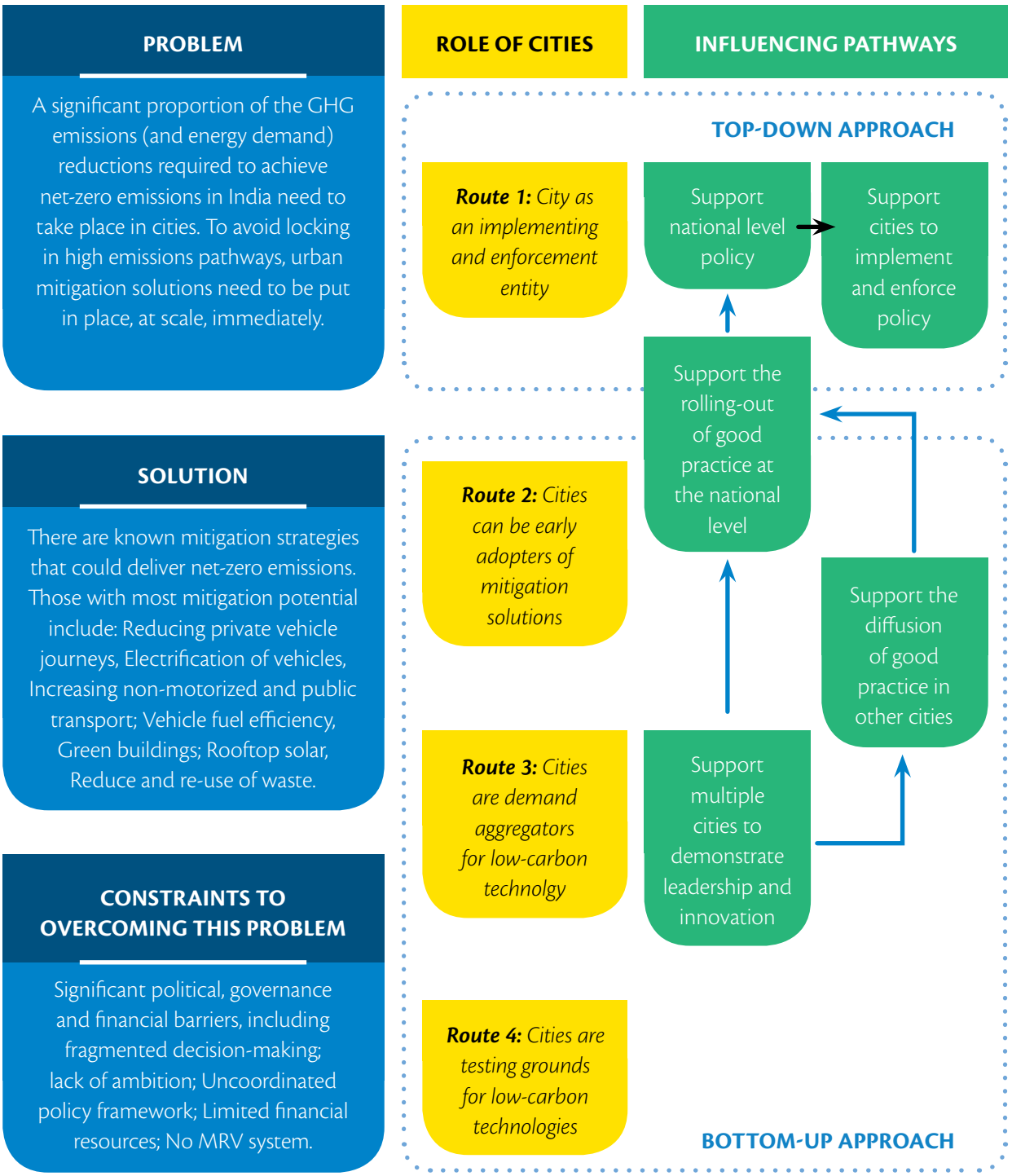
Shakti works with stakeholders at the city, state, and national levels to:

- Build leadership and unlock institutional mandates for climate action in cities
- Build and implement ambitious climate action plans, and ensure learnings across cities from early actions.
- Facilitate the identification of inequity and vulnerability around climate action, and support the integration of participative planning and resolution mechanisms.

This not only promotes social justice and equity by adopting technical fixes within extant, broken paradigms, but will help in building holistic programmes for the future that will be compliant with new and evolving climate change goals.

Evidence Creation to Explore City-level Action Plans for Achieving Low Carbon Development

In working towards this goal, Shakti has explored how city level action can contribute to achieving low carbon emissions in India. It has used various analyses to present a set of key considerations for a future cities climate programme. This form of evidence generation is crucial for future actions.



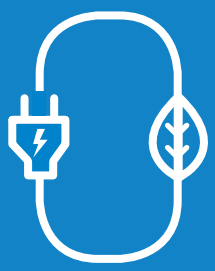
The figure above highlights the 'change pathways' that can work either as top-down or bottom-up approaches that can support the adoption of the required climate change mitigation strategies by all cities in India. Ujjain, Surat, and Indore were supported by Shakti in developing GHG emissions inventories based on data from 2019. In Ujjain, we find that the majority of GHG emissions come from the manufacturing and construction sector (41 per cent), followed by the transport (24 per cent) and the housing (18 per cent) sectors.

In Surat, however, we found that the residential and commercial buildings are responsible for a huge 72 per cent of the GHG emissions, followed by the transportation sector (17 per cent). Similarly, in Indore, the residential (37 per cent) and commercial buildings (26.5 per cent) were collectively responsible for the majority of the GHG emissions, followed by the transportation sector (16 per cent). With these data, we have also modelled possible future scenarios to predict the rise in emissions by 2030 and 2050, as well as the potential for reducing these emissions through various strategies.

Gurugram Targets Net Zero Emissions

The Cities and Climate Action programme has been central to building the climate action plan for Gurugram. Shakti is collaborating with the Gurugram Metropolitan Development Authority (GMDA) to develop a roadmap for Gurugram to achieve net zero emissions. Gurugram is one of the few cities in India that is exploring a low carbon development timeline two decades ahead of the national target of 2070.

Towards this effort, Shakti signed an MoU with the Gurugram Metropolitan Development Authority (GMDA) in June 2022. The MoU was inked by Shri Subash Yadav (Additional Chief Executive Officer, Urban Development, GMDA) and Dr Anshu Bharadwaj (CEO, Shakti) on behalf of their respective organisations. Under this MoU, Shakti will enable technical assistance to the GDMA in areas related to low-carbon development, air quality management, and climate resilience.



The plan being developed was announced on World Environment Day 2022 at a stakeholder workshop which was attended by Shri Subhash Yadav (Additional Chief Executive Officer, Urban Development, GMDA), P. Raghavendra Rao, (Chairman of the Haryana State Pollution Control Board) and representatives of local bodies and civil society.

Other Efforts for Cities to Achieve Low Carbon Development and Climate Resilience

The Cities and Climate Action programme at Shakti has further identified three main verticals for intermediate and long-term action in helping cities contribute towards achieving low carbon development targets and building resilience to climate change. These verticals address the topics of transport (to create healthy air zones), guides for building codes and urban form resilience, and waste handling.

IMPLEMENTING HEALTHY AIR ZONES (HAZ) IN CITIES:

Healthy Air Zones (HAZ) are areas in cities where targeted actions are implemented to improve air

quality, with a focus on restrictions on the entry of polluting vehicles and the promotion of cleaner modes of transport. Shakti is working towards formulating programmes for gaining widespread recognition and support for HAZs as an effective planning mechanism for combating urban air pollution, through active stakeholder engagement, knowledge creation and technical support for decision makers.

GUIDES FOR BUILDING CODES AND URBAN FORM RESILIENCE:

Shakti has identified several gaps in the conventional planning processes of urban development that hinder the adoption of form-based codes. These gaps lie in the legal frameworks, planning processes, development control regulations, and building byelaws of the conventional city planning systems. Shakti is now working with city planning agencies across India to address these issues and develop guidebooks that define a set of model form-based codes for cities.

REDUCING WASTE SECTOR EMISSIONS:

Shakti is currently working to develop a GHG emissions inventory and short term (2030) low carbon action plan for the waste sector in Bihar. The inventory will estimate emissions from domestic wastewater, industrial wastewater, and municipal solid waste. The inventory will help to generate awareness among policy-makers and decision-makers about the major sources of GHG emissions in the waste sector, establish GHG emission trend analysis, and identify mitigation potential through regulatory, infrastructural, technological, and financial measures. The low carbon action plans identify measures to improve domestic and rural solid waste and waste water management.

Sustainable Agriculture and Land Use

> **Agriculture is the backbone of the Indian economy. It is the primary source of livelihood for about 58 per cent of India's population and contributed approximately 19 per cent to India's GDP in 2021-22[14].**

Currently, India ranks second worldwide in agricultural output with over half of the nation's territory used as cropland. However, climate change is impacting annual outputs; the latest estimates indicate that increases in temperature might lead to a loss of 10–40% in crop production in India by 2080–2100. Annual agricultural income losses due to climate change can be 15–18% in irrigated areas and as high as 20–25% unirrigated areas[15].

Climate change is not only reducing crop yields, but also diminishing the nutritional quality of major cereals and lowering livestock productivity, all of which further impact income generation for farmers. Over 700 million people in rural India depend on forests and agriculture for their livelihoods, and unless action is taken, degradation in land conditions and the increasing incidence of extreme weather events can lead to a vicious cycle of poverty and climate vulnerability.

At the same time, agriculture is also highest non-carbon emitting sector with regard to India's emissions. Agricultural activity, forestry, and other land use sectors were responsible for 170.58 Mt CO2e in 2018 of the total GHG emissions in 2015 , i.e., approximately 6% of the total emissions of the country[16].

14 Economic Survey of India, 2021-22
15 Chand, R (2017), 'Doubling Farmer's Income: Rationale, Strategy, Prospects and Action Plan', NITI Policy Paper No. 1/ 2017, NITI Aayog
16 GHG Platform India

India has various policies that seek to address the impacts of climate change on agriculture, with a particular focus on increasing the resilience of Indian agriculture to climate risks and promoting adaptation measures. The nation has also committed to increasing its carbon sink through afforestation under the Paris Agreement by restoring 26 million hectares of degraded and vulnerable land, with an emphasis on degraded agricultural, forest, and other wastelands by adopting a landscape restoration approach under the Bonn Challenge[17]. The National Mission for Sustainable Agriculture (NMSA) also has various sub-missions focused on increasing the penetration of sustainable practices such as organic farming, agroforestry, water, and fertilizer management among others. The recent annual budget (2023-24) introduced various schemes geared towards promoting alternative methods of crop production such as natural farming. The budget also announced a green credit scheme to incentivise adoption of sustainable agriculture and land use practices.

By enhancing low-emission people and planet-positive agriculture and land use practices, India can substantially feed into its climate targets while also strengthening the rural economy, improving the livelihoods of local communities and women, tribal populations, and other marginalised groups, improving biodiversity, as well as building resilience against extreme weather events. Understanding the challenges that exist in implementing these objectives and identifying the ways in which the Indian agriculture sector can be supported in achieving these objectives is critical to support the scale up of sustainable, low emissions agriculture and land use in India.

The Sustainable Agriculture and Land Use program seeks to address these issues to support the scaling of practices that can contribute to reduce the negative impact of climate change on communities by increasing resilience, and improving livelihoods while at the same time supporting India's climate ambitions.

17 https://www.bonnchallenge.org/pledges/india

State-level Initiatives

The federal structure of the country means that states have primary responsibility for governing several sectors that are pivotal to addressing climate change, including electricity supply, infrastructure, and industries. Several Indian states are in the process of revising their State Action Plans on Climate Change (SAPCCs) in alignment with India's NDCs while also spearheading key climate mitigation and adaptation initiatives.

In India, there is growing momentum on state-level climate policies in areas such as renewable energy, energy efficiency, and electric mobility.

From Planning to Action: Energy Transition at Sub-national Level

States play an essential role in driving these measures to achieve the country's climate goals. Implementation of low-carbon measures should be taken as an opportunity for the states to promote economic growth and address inequality. Shakti is working on translating the national climate goals to the sub-national level and providing advisory services to plan and implement energy transition in different states.

Shakti engages with stakeholders at the state level to develop climate resilient and low-carbon development pathways for states. It seeks to build capacity among state-level stakeholders, including civil society and research institutions, to design well-informed mitigation and adaptation initiatives. Shakti facilitated the development of strategic economy-wide and sectoral plans towards meeting India's

climate goals. Its work focuses on the development of evidence-based solutions for robust policies, technology development and adoption and the mainstreaming of climate finance interventions. Shakti also collaborates with ecosystem stakeholders across India to promote cross-state diffusion of the learnings and best practices.

Shakti has engaged for over a decade with both Bihar and Tamil Nadu, supporting various decarbonisation activities across sectors such as power, transport, air quality, building, and waste. In 2020, Shakti signed an MoU with the Bihar State Government to help the state devise a low-carbon development pathway for the construction sector by 2070, and deep-dive into the transport, power, industry and waste sectors to facilitate the creation of a decarbonisation strategy.

Shakti facilitated the implementation of the Tamil Nadu Climate Change Mission by supporting the state in developing plans, providing direction, and creating roadmaps.

Bihar

The eastern state of Bihar is witnessing enhanced economic growth with major investments planned in energy, construction, transport, and other sectors. This is expected to increase GHG emissions significantly and contribute to the state's burgeoning carbon footprint. For the past decade, Shakti has been supporting the state in three broad areas—cleaner brick production, air quality management, and facilitating the deployment of decentralised renewable energy systems. A brief summary of the initiatives in each area is given below:

Cleaner Brick Production:

- Support for research on cleaner brick production and building capacity of enterprises as well as government officials on the same.
- Support in the development of a Fly Ash Brick Quality Rating System (FABQRS).

- Shakti's support contributed to the notification that all government building will utilise fly ash bricks for construction.

Air Quality Management:

- Support in the development of the Patna Clean Air Action Plan.
- Support in the establishment of a Program Management Unit in Bihar State Pollution Control Board which aids in strategic as well as day-to-day operations for air quality management.

Decentralised Renewable Energy (DRE) Systems:

- Support in the development of mini grid regulation/policy.
- Empowering Bihar's health sector with decentralised renewable energy.
- Development of an integrated power sector roadmap.
- DRE-based employment opportunities in Bihar.
- Facilitating implementation of Bihar's renewable energy policy.

The decade-long engagement also led to the signing of an MoU with the State Government on developing a roadmap for a carbon-neutral construction sector by 2040. Additionally, Shakti is supporting sectoral deep-dive studies in transport, power, industry, and waste. The State Government is keen on decarbonising its energy intensive sectors, for which, Shakti is providing technical support through partners.

With Shakti's support, the Bihar government plans to create a GHG inventory for the above-mentioned sectors, develop scenarios and options for low-carbon solutions, leverage state and national level schemes as well as other financing options, and propose implementable solutions in identified cities and towns in the short-, mid- and long term. Shakti has set up a project management unit (PMU) in Bihar for coordinating and synchronising the sectoral work and help develop a state-wide low-carbon strategy.

For the transport sector, Shakti will adopt a two-pronged strategy—promoting electric mobility and augmenting public transportation. It is also working with the state government to develop a low-carbon roadmap and operationalise the electric vehicle policy.

These projects will feed into the larger initiatives undertaken by the state government for climate

resilience and creating low-carbon development strategies. The research will also inform the work undertaken by United Nations Environment Programme (UNEP) and other civil society partners in the state.

Some other Shakti supported work related to sub-national climate policy in Bihar include:

- Supporting the Bihar government to table a green budget.
- Capacity building of government officials on climate/sustainable finance.
- Developing a roadmap for achieving commitments under the State Action Plan on Climate Change (SAPCC) for climate change adaptation and resilience.

Tamil Nadu

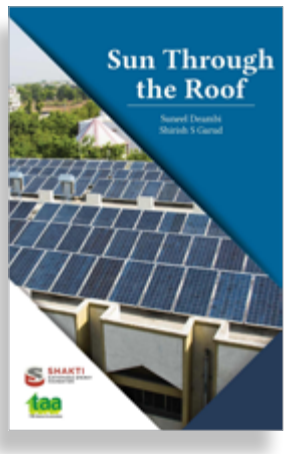
Over the past decade, Shakti has supported Tamil Nadu in the enhanced deployment of renewable energy, improving energy efficiency in small and medium industries, and the decarbonisation of the power, building, and transport sectors.

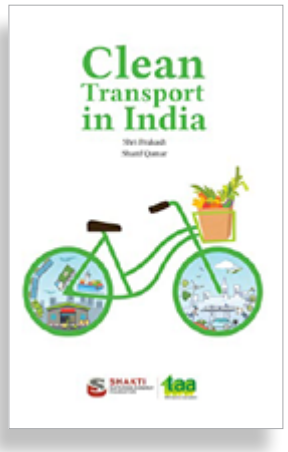
In the budget Speech for 2021–22, the State Government announced the launch of the Tamil Nadu Climate Change Mission which will focus on climate change adaptation and mitigation activities. The mission has a budgetary outlay of 5 billion INR, and its key objectives are:

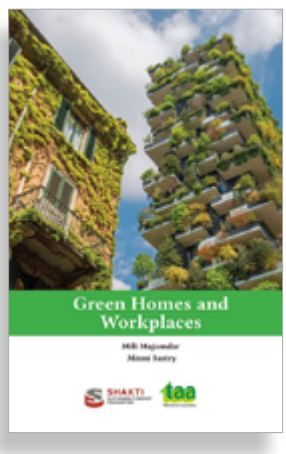
- To develop collaborations and strengthen community engagement to build long-term commitment for a low carbon development future for the state.
- To devise new strategies to reduce greenhouse gas emissions.
- To use proven climate change science and technologies to create evidence-based green models for emulation and adaptation.
- To promote successful climate change adaptation and mitigation models for replication.

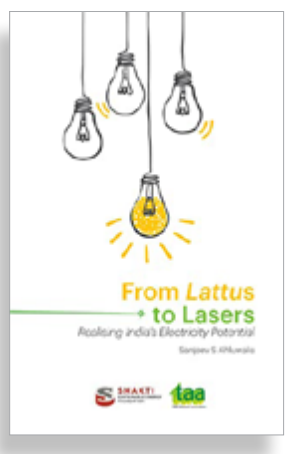
Subsequently, in October 2021, Shakti supported the implementation of the Tamil Nadu Climate Change Mission to support the state in developing plans, providing direction, and creating roadmaps to fast track the implementation of the Tamil Nadu Climate Change Mission.

OTHER INITIATIVES









Concerned Citizen Series

Shakti has supported the TERI Alumni Association (TAA) in publishing a series of eight books on topics related to energy, resources, and the environment. The idea is to share information and critical insights on these topics with citizens who are keen to know more about the issues facing society today but are lost in the deluge of information. The series has been named as the 'Concerned Citizen Series', and was edited by Yateendra Joshi and P. K. Jayanthan.

These books include:

- **Sun through the roof:**
  Suneel Deambi and Shirish Garud
- **Green homes and workplaces:**
  Mili Majumdar and Minni Sastry
- **From lattus to lasers:**
  Realising India's electricity potential: Sanjeev Ahluwalia
- **Clean transport in India:**
  Shri Prakash and Sharif Qamar
- **Dilemmas in dealing with climate change in India:**
  Manish Kumar Shrivastava
- **Energy efficiency matters:**
  Ajay Mathur and Leher V Thadani

SPECIAL HIGHLIGHTS

Shakti at COP27

Shakti participated in the 27th session of the Conference of Parties (COP27) to the UN Framework Convention on Climate Change (UNFCCC) in Sharm El Sheikh, Egypt from November 6–18, 2022. Shakti hosted three side events in collaboration with partners, fostering expert dialogue and exchange of ideas that will help countries achieve climate and development goals together.

Towards Sustainable Lifestyle for Environment (LiFE): Planning Energy Transition in Developing Nations

Shakti, Himadri Energy International, and Renew Power jointly organised a side event titled ***Towards Sustainable Lifestyle for Environment (LiFE): Planning energy transition in developing nations*** on November 8, 2022, at the Indian Pavilion. The event showcased India's progress toward climate goals, spurred by technological innovations, the nation's rich traditional wisdom, and climate-friendly practices. It laid emphasis on an environment-conscious lifestyle while fulfilling developmental goals and deliberated on how the energy transition stories of various developing nations including India, need to answer pertinent questions on the availability and implementation of leapfrog technologies, strategies to ensure a just and equitable transition and alignment of short and long-term climate goals towards the low carbon development pathway.

The event was inaugurated by Lord Adair Turner who chairs the Energy Transitions Commission, a global coalition working on achievable pathways to limit global warming while stimulating economic development and social progress. The event consisted of two-panel discussions, the first revolving around the techno-economic aspects of climate change impact mitigation, titled ***From Planning to Action – Financing the Energy Transition in the Developing World***, moderated by Mr Koyel Kumar Mandal, Chief of Programmes, Shakti Sustainable Energy Foundation, and included Dr Ajay Mathur, Director General of the International Solar Alliance; Ms Suman Sharma, Managing Director of the Solar Energy Corporation of India (SECI); Mr Zira John Quaghe, Climate Policy, Nigerian Ministry of Environment and Energy Transition Office; and Mr Edgar van de Brug, Programme Manager, Climate Action, IKEA Foundation.

Emphasising the role of India's traditional practices and women in driving the fight against climate change, Ms Vaishali Nigam Sinha, Chief Sustainability Officer, ReNew Power, opened the event and showed a video on the life of women salt pan workers in India and how these women were empowered socially and financially by skilling them to address the challenges of climate change. The second-panel discussion titled ***Role of women in delivering secure, affordable, and sustainable energy future***, moderated by Mr Anurag Tiwari, Director, Himadri Energy International Pvt. Ltd., aimed at showcasing the role of women and vulnerable communities in planning and implementing energy transition measures. The panel consisted of Ms Yamide Dagnet, Director, Climate Justice, Open Society Foundation; Mr Ankan Mitra, Head Regulatory Affairs, Tata Steel Limited; Mr Pinaki Dasgupta, Senior Consultant, Council on Climate Change Environment and Water, ASSOCHAM; Dr Irina Fedorenko, Founder and Co-CEO, Vlinder Climate; and Ms Daljeet Kaur, Climate and Environment Advisor, Foreign and Commonwealth Development Office. The event was concluded by Mr Sachin Kumar, Director, Industry, Building & Cooling Programmes, Shakti Sustainable Energy Foundation.

Various interesting points emerged during these events that highlighted why developing nations need comprehensive technical and financial support since they have huge developmental needs, and their per capita energy consumption is very low. The transition towards a low-carbon system needs to be ambitious and must be accompanied with careful decisions on environmental advantages, policy interventions for

minimal loss of livelihood, and preparing a skilled workforce. The session also highlighted how a socioeconomic lens will be key to ensuring equitable benefits across classes, sustained implementation of climate goals, and integration of low-carbon targets into developmental goals.

The Global Climate Alliance (GCA) Collaborative

Shakti and the International Solar Alliance (ISA) jointly hosted the side event ***The Global Climate Alliance (GCA) Collaborative*** on November 16, 2022, at the ISA Pavilion, Sharm-el-Sheikh, Egypt. The side event was facilitated by Dr Anshu Bharadwaj, CEO, Shakti, with Mr Jayant Sinha, a Member of Parliament, India, as the keynote speaker along with a pool of exceptional delegates,

The event shed light on how the Global South has struggled to receive climate finance from the Global North. The COP26 Summit in Glasgow revealed that the Global North countries were unable to provide their promised compensation of $100 billion per year for the Global South climate action. Currently, various estimates indicate that the Global South countries are spending about $400 billion per year on climate adaptation and mitigation measures. However, economic studies suggest that the Global South countries will have annual climate finance requirements of more than $2 trillion by 2030, much of which will have to be in commercial investments to decarbonise various sectors such as transportation, industry, and others.

The side event explored the idea of creating a Global Climate Alliance (GCA) Collaborative, a partnership between the Global South and Global North countries to address adaptation and mitigation measures to combat rapid climate change. The proposed GCA will comprise of two groups: Group A members, who will legally commit to following low carbon development pathways that lead to major GHG emission reductions by 2030 and then net zero by 2060 or 2070; and Group B members, who will legally commit to following low carbon development pathways that lead to major GHG emission reductions. Since the CBDR principle is at the heart of the proposed Alliance, it is expected that the Global North countries will join Group B and the Global South countries will join Group A. Furthermore, the GCA is expected to be instrumental in addressing the vast financing gap that faces decarbonisation in the Global South by mobilising climate finance from the Global orth to the Global South.

HUMAN RESOURCES AND ORGANISATIONAL DEVELOPMENT

The year 2022 was a recruitment heavy year with a large influx of employees. Several key positions were filled during this year, including Director – Clean Power Programme; Director – Climate Insights; Director – Communications; and Associate Director – Electric Mobility. Shakti also recruited and onboarded 30 new employees, including 14 Staff, 10 Consultants, 5 Interns, and 1 Technical Advisor.

Today Shakti is a power packed team of 59 individuals.

In 2022, Shakti introduced a new 'Work from Home Policy' after April 2022 to ease employees' transition into a new work environment after the end of the pandemic. The health insurance of employees was upgraded to include multiple benefits such as the usage of online outpatient consultations, tele/video consultations with certified doctors, online delivery of medicines, etc.

Shakti office is now sanitised at short intervals to ensure that employees have a safe and healthy workspace. A PoSH (Prevention of Sexual Harassment) sensitisation workshop was also conducted in keeping with our updated policies on mental and physical health.

Shakti's HR and organisational development department has been especially active this year with organising festival celebrations, monthly birthday celebrations, and long service award ceremonies for several employees. The department also organised a four-day team-building offsite at Goa that saw the Shakti team get together to build, connect, and bond beyond the workplace. The event used fun activities to help Team Shakti create a sense of belonging and forge team spirit through collaboration and teamwork.

ENGAGE WITH SHAKTI SUSTAINABLE ENERGY FOUNDATION

We need a sustainable future for our people, our planet, and the future generations.

But we cannot tackle climate change alone.

Collaboration is the key to usher in these critical changes.

Therefore, Shakti Sustainable Energy Foundation invites collaborations with governments, philanthropists, civil society organisations, and businesses to drive the global climate agenda and halt the worst impacts of climate change.

Why Collaborate with Shakti?

- Shakti is at the heart of clean energy and climate change discussions in India.
- Shakti supports the delivery of the Paris Agreement and low carbon development pathways.
- Shakti is recognised for enabling technical expertise and climate innovation.
- Shakti encourages climate action at all levels, including national, local, businesses, academia and civil society.
- Shakti enhances knowledge, expertise, access and outreach through our learning forums and dialogues.

Opportunities for Collaboration

- Support Shakti's programmes.
- Create strategic joint initiatives and projects with Shakti.
- Showcase thought leadership and action.
- Promote social engagement and e-learning.
- Be part of Shakti's energy and climate dialogues, events and seminars.

Connect With Us

Shakti welcomes engagements with government, philanthropists, civil society organisations, and business bilateral and multilateral organisations as well as donors who are aligned with Shakti's mandates to produce lasting results.

AUDITED FINANCIALS FOR FY 2021-22

Balance Sheet as at March 31, 2022

PARTICULARS	NOTE NO.	AS AT MARCH 31, 2022 (Rs. In lakhs)	AS AT MARCH 31, 2021 (Rs. In lakhs)
EQUITY & LIABILITIES			
Shareholders' funds			
Share capital	3	2.10	2.10
Reserves & surplus	4	20.71	164.09
Non-current liabilities			
Long term provisions	5	67.02	48.54
Current liabilities			
Trade payables	6		
Total outstanding dues of micro and small enterprises		0.85	0.68
Total outstanding dues of creditors other than micro and small enterprises		34.15	48.05
Other current liabilities	7	6,238.57	7,935.47
Short-term provisions	8	1.12	0.77
		6,364.52	**8,199.70**
ASSETS			
Non-current assets			
Property, plant, equipment and intangible assets			
Property, plant and equipment	9	31.27	43.07
Intangible assets	9	0.37	1.39
Long-term loans and advances	10	49.74	30.25
Other non-current assets	11	126.46	164.69
Current assets			
Trade receivables	12	194.07	0
Cash and bank balances	13	5,846.24	6,592.74
Short-term loans and advances	14	91.30	1332.71
Other current assets	15	25.07	34.85
		6,364.52	**8,199.70**

Income and Expenditure for the Year Ended March 31, 2022

PARTICULARS	NOTE NO.	AS AT MARCH 31, 2022 (Rs. In lakhs)	AS AT MARCH 31, 2021 (Rs. In lakhs)
INCOME			
Shareholders' funds			
Revenue from Operations	16	3,270.34	4,580.91
Other income	17	4.35	14.78
		3,274.69	**4,595.69**
EXPENSES			
Project/ programme related expenditure	18	2,540.89	4,007.44
Employee benefit expenses	19	415.48	469.25
Depreciation and amortisation expense	9	29.49	18.32
Other expense	20	418.57	491.34
		3,404.43	**4,989.35**
Surplus / (Deficit)		**(129.74)**	**(390.66)**

Note: Due to the pandemic, the Annual Reports for the years 19-20, 2020 & 21 were not released.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