SHAKTI
SUSTAINABLE ENERGY
FOUNDATION

EnergyMatters

NEWS FILES 2019

A Clean and Secure Energy Future

- Hon'ble Vice President Shri Venkaiah Naidu launches Shakti-supported 'Electric Mobility Forum' at Connect Karo 2019
- Cooling Action Plan released as India grapples with burgeoning cooling demand
- India's second Biennial Update Report to the UNFCCC acknowledges two Shakti-supported efforts
- Shakti launches "India Electric Mobility Initiative" to advance electric mobility in India
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- Rooftop solar gets a focus at the Distribution Utilities Forum
- Distributed Renewable Energy Investment Policy Tracker (DIPTI) for India
- Driving finance for climate action in India

Shakti Sustainable Energy Foundation seeks to facilitate India's transition to a sustainable energy future by aiding the design and implementation of policies in the following sectors: clean power, energy efficiency, sustainable urban transport, climate policy and clean energy finance.

Our Vision: ***towards a clean and secure energy future***

Message from the CEO

Dear friends,

2019 has been an important year for those of us in the clean energy space. The Government of India launched several important initiatives aimed at bolstering policies that can accelerate clean energy and climate change mitigation action in India. The launch of the National Clean Air Action Plan, the India Cooling Action Plan and the second phase of FAME (Faster Adoption and Manufacture of (Hybrid and) Electric Vehicles) are stellar achievements. The Government has also set a new target to achieve an installed renewable energy capacity of 450GW by 2030 in addition to its 2022 target of 175GW. The end of the year also saw the final round of dialogues in Madrid on the Paris Climate Agreement of 2015, which will be the last before the stocktaking due in the COP 26 in 2020.

With the advent of 2020, we enter a decade that will prove critical to our ability to reign in climate change. Unless we cut our emissions drastically in this decade, limiting warming below 1.5 degrees Celsius will become very difficult to achieve.

Shakti has been working with stakeholders to mitigate emissions from India's most energy and emission-intensive sectors for over ten years now. In 2019, we contributed to significant milestones. Our support contributed to the development of the Patna Clean Air Action Plan. We engaged with the Bihar State Pollution Control Board along with our grantees to develop this critical roadmap to tackle air pollution in Patna in alignment with the mandate of the National Clean Air Action Plan. We helped to launch the State Rooftop Solar Attractiveness Index (SARAL), developed in collaboration with the Ministry of New and Renewable Energy and our grantee partners. This index evaluates the rooftop solar policy frameworks and implementation environment across states and ranks them accordingly. It is the first of its kind index to produce a comprehensive overview of the state-level measures adopted to facilitate rooftop solar deployment and is expected to strengthen the solar rooftop investment ecosystem in India. We are also advancing critical efforts in the electric mobility space in order to decarbonize transportation in India.

This is but a snapshot of the work that Shakti has done in the past year to advance policy research and action. I am pleased to share with you Energy*Matters* 2019, a compilation of our monthly newsletters highlighting our contributions. I would like to express my thanks to our staff, Board, funders, and partners who together make this important work happen.

Chinmaya Acharya
Chief Executive Officer (Interim)
Shakti Sustainable Energy Foundation

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DECEMBER 2019

Patna gets a clean air action plan

Deputy Chief Minister of Bihar Shri Sushil Kumar Modi launched the Patna Clean Air Action Plan on November 23, 2019 making Patna the first city in Bihar to have a comprehensive plan to tackle air pollution backed by a rigorous scientific methodology. The plan is both timely and relevant for Patna, one of the five most polluted cities in the world. Patna is also listed as a non-attainment city (i.e. those which do not meet the prescribed national ambient air quality standards) under the National Clean Air Programme.

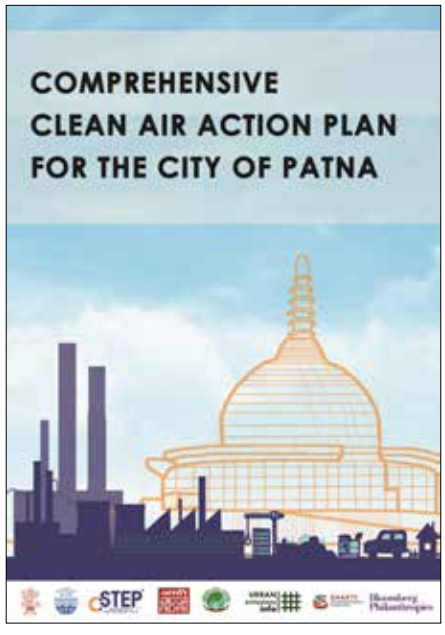
The plan has been developed by a consortium of research institutions—the Centre for Environment, Energy and Climate Change at the Asian Development Research Institute, Center for Study of Science, Technology and Policy and Urban Emissions—under the aegis of the Bihar State Pollution Control Board (BSCPB). Bloomberg Philanthropies and Shakti Sustainable Energy Foundation have supported the development of this plan.

Based on extensive research on major polluting sectors, the plan proposes control measures as well as their techno-economic feasibility. This has helped to identify measures with the highest potential to reduce pollution. According to estimates arrived at by the study, by 2030, under the business-as-usual (BAU) scenario, the total PM2.5 emission load will be approximately 28,000 tonnes per year compared with 20,000 tonnes per year taking 2018 as the base year.

Domestic (23%), transportation (19%) and industrial (11%) sectors are major polluting sources in Patna. Other sources include open waste burning (11%), dust (11%) and diesel gensets (4%). External sources account for approximately 23% of the pollution in Patna.

The plan identifies several measures to reduce pollution from these sources. Increasing the share of public transport to 40% by introducing EVs and CNG vehicles could reduce transport sector emissions by about 10%. Setting in place proper solid waste management facilities and enforcing stricter laws on garbage burning can cut down emissions from the waste sector drastically. Approximately 34% of the emissions from brick kiln pollution can be targeted by converting brick kilns from their current fixed chimney kiln model to the less polluting zig-zag model. Under the best-case scenario, the Patna Clean Air Action Plan has the capacity to cut down emissions in the city by 69% by 2030.

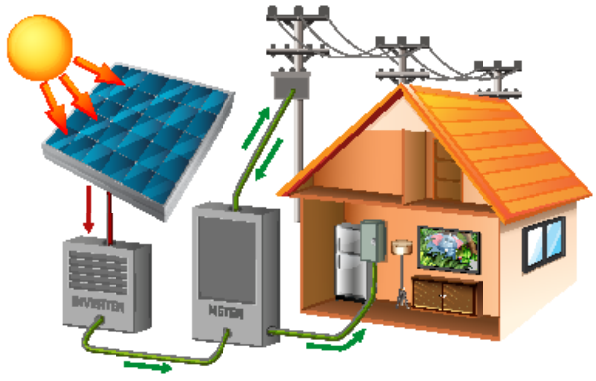
Speaking at the launch event, Shri Sushil Kumar Modi said that in order to initiate strict action against the contributing factors, the Bihar government has banned vehicles more than 15 years old in Patna. E-vehicles have also been promoted by reducing the road tax levy and increasing more numbers of charging stations. He also highlighted the fact that in order to create mass awareness among public about e-vehicles, the Chief Minister and Deputy Chief Minister were using electric cars. He also urged media houses present to dedicate a section of their daily news to reporting the air quality status of the city.



Enhancing consumer participation in Tamil Nadu's electricity sector

Tamil Nadu, with the third highest generating capacity in India, has electrified almost all of its households. Already a leader in renewable energy, the state must ensure that its energy transition is sustainable, efficient and consumer centric. Over the last year, Shakti has been supporting the Consumer Action Group (CAG) to enhance consumer participation in the state. This is part of Shakti's work on the state's energy transition, specifically to increase the uptake of clean energy, strengthen institutional reforms and foster effective and more inclusive decision making in the state.

The recent conference on 'Consumer Engagement in the Electricity Sector' convened under this initiative in Chennai on 29th-30th 2019 brought together key stakeholders including the Tamil Nadu Energy Development Agency (TEDA) and consumer groups to deliberate on this theme. Key issues such as electricity governance, energy efficiency, renewable energy, emerging technologies along with approaches for a way forward. It was also pointed out that regulations and acts must be modified to accommodate the changing power sector. Ms Richa Prasad from Shakti's Clean Power programme was on the panel 'Reimagining the Electricity Sector and Consumer Engagement', which looked at a 2040 vision for the sector.



So far, under this initiative, five Electricity Consumer Cells (ECCs) have been set up in Tamil Nadu to educate and advise consumers on electricity governance. This is an important way to promote greater transparency, accountability and participation in the sector. Going forward, steps will be taken to deepen the impact and reach of these cells.

Finalists announced for $1m Global Cooling Prize sector

Shakti is a co-supporter of the Global Cooling Prize, an innovation competition to identify a breakthrough residential cooling technology with five times less climate impact. It is estimated that 3.3 billion room air-conditioning units will be installed in the world between now and 2050. This is going to place a significant burden on our energy systems and worsen climate change. The Global Cooling Prize attempts to solve this global cooling challenge and is expected to help abate up to 75 GT CO2-eq emissions by 2050.

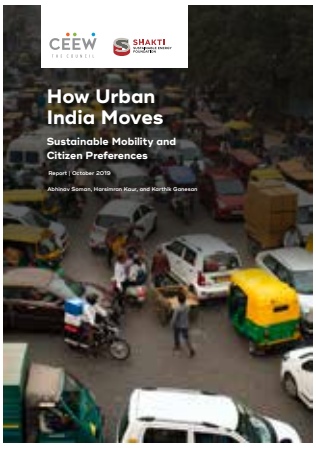
The prize saw over 2,100 participant registrations – from innovators, start-ups, research institutes, universities and key A/C industry manufacturers – of which 445 teams submitted their preliminary ideas through the intent-to-apply form. 139 teams from 31 countries followed through with their submission of the full detailed technical application.

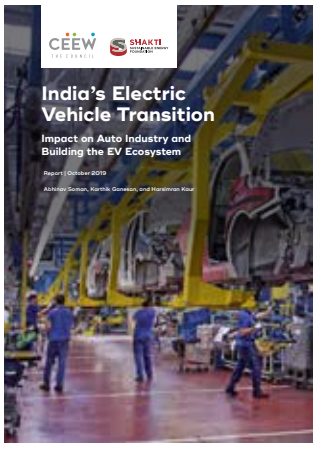
Union Minister for Science & Technology, Earth Sciences and Health & Family Welfare, Dr. Harsh Vardhan announced the eight finalists at a ceremony in New Delhi held on November 15, 2019. Each finalist will receive $200,000 to develop and deliver two working prototypes of their cooling technology for testing in India over the summer of 2020.

The Global Cooling Prize is led by Mission Innovation, the Government of India through the Department of Science and Technology (DST) and its partner organizations, the Ministry of Power, Bureau of Energy Efficiency, and Ministry of Environment, Forests and Climate Change. It is administered by a coalition of leading research institutes led by the Rocky Mountain Institute (RMI).

NOVEMBER 2019

Urban mobility and the electric vehicle transition in India





The Urban Mobility and Electric Vehicle transition in India Dialogue, hosted by The Council on Energy, Environment and Water (CEEW) and Shakti Sustainable Energy Foundation on 23rd October 2019 in New Delhi, focused on the opportunities and challenges for urban mobility and the auto-industry transition in tandem. With vehicular pollution on the rise, automakers are gearing up to meet fuel-efficiency and emission standards proposed by the government. At the same time, though a shift to electric vehicles in the near future is being planned, questions on the transition from fuel to electric power as well as the impact on the automobile sector are yet to be fully answered.

In the context of these pertinent issues, the dialogue explored several themes such as governance challenges, possible policy levers and the future course of the auto industry. Shri Amitabh Kant, CEO, NITI Aayog delivered the keynote address at the event highlighting that "For India's auto industry to stay competitive worldwide in the coming decade, we must make India a global centre for manufacturing of electric two-wheelers, three-wheelers, and compact cars."

Two recent studies undertaken by CEEW with support from Shakti were released at the dialogue and added context to the discussions. The **'Electric Vehicle Transition in India: Opportunities, Challenges and the EV Ecosystem'** study findings show that the indigenisation of electric powertrain components and battery pack assembly could produce a 5.7 per cent higher output value addition (USD 2.7 billion) for the Indian auto industry in case of an electric vehicles transition. The **'How Urban India Moves: Sustainable Mobility and Citizen Preferences'** study, surveyed 3000+ respondents for their views on sustainable mobility, throwing up some interesting findings. Overall, there is significant support among respondents for policy interventions supporting sustainable mobility and deployment of clean fuels, including demand-management policies and congestion pricing. A significant majority (71 per cent) of the respondents said that their next vehicle would likely be an EV and even greater share of surveyed population (93 per cent) was in favour of central and state governments providing incentives and subsidies for EVs.

Mitigation instruments to meet India's climate and development goals

Robust mitigation instruments and polices are critical to meet India's climate goals as well as to support the transition to a low-carbon growth trajectory. While there is a growing box of options available, tailoring these to India's unique circumstances and development priorities is a necessary. It is within this context that Shakti supported CEEW and the Environmental Defense Fund (EDF) to set up the high-level Working Group on Mitigation Instruments (WGMI) to deliberate on the potential mitigation instruments for India, and to develop a framework to evaluate these. The WGMI comprises leaders from the industry, academia and the think-tank community.

As a part of this effort, the Dialogue on 'Mitigation Instruments for Achieving India's Climate and Development Goals' held on 15th October in New Delhi, brought together keys stakeholders to focus on the Emissions Trading Scheme (ETS), carbon tax, Article 6 of the Paris Agreement, and company-level initiatives for emissions mitigation. The discussion was driven by a white paper published by the WGMI on this theme.

Based on an extensive deliberative process, the white paper presents issues for consideration while choosing appropriate mitigation instruments. It serves as a useful primer to initiate the development of a balanced and informed narrative that can address mitigation as well as development priorities simultaneously.

Peak load management for discoms to address power deficits

Discoms are expected to play a key role in meeting the '24x7 Power for All' target set by the government. But variations in demand— both seasonal as well as intra-day—can bring in inefficiencies in the electricity distribution system. These inefficiencies compel the discoms either to purchase expensive short-term power or invest to strengthen the reliability of supply. In addition, discoms must now also take into account newer forms of load such as electric vehicle charging or distributed renewable energy such as rooftop solar.

The power situation in the capital city of New Delhi is a case in point. The BSES Rajdhani Power Limited (BRPL), a Delhi discom servicing the southern and western parts of the city, faces the challenge of meeting the burgeoning electricity demand as well as dealing with significant variations in demand. In order to address these issues, Shakti Sustainable Energy Foundation commissioned PwC to develop a peak load management strategy for the BRPL. Based on extensive consumer and load research, PwC has developed Detailed Project Reports (DPRs) for three intervention area: replacement of inefficient fans with super-efficient BLDC fans, solarization of over-loaded DT's and an Automatic Demand Response programme.

The DPRs were presented at a high-level stakeholder workshop attended by representatives of the BRPL, Delhi Electricity Regulatory Commission (DERC), Bureau of Energy Efficiency (BEE), Energy Efficiency and Renewable Energy Management Center (EE&REMC), Central Electricity Authority (CEA), Central Electricity Regulatory Commission (CERC), key consumer associations and think tanks. The workshop saw brain storming sessions on finalizing the DPRs and designing a strategy for their implementation.

Knowledge Network to support the National Clean Air Programme

In early 2019, the Ministry of Environment, Forest and Climate Change (MoEFCC) launched the National Clean Air Programme (NCAP) to tackle air pollution. The NCAP aimed to reduce PM2.5 and PM10 levels by 20%-30% taking 2017 as the base year.

Among several notable steps, the NCAP mandates the setting up of a National Knowledge Network of technical and academic institutions that will serve as knowledge partners to State Pollution Control Boards (SPCBs) and non-attainment cities covered under the NCAP. In accordance with this, an umbrella alliance of IITs and other universities has been created across 18 states with IIT-Kanpur designated as the nodal agency. Shakti has supporting IIT-Kanpur to set up and operationalize this knowledge network.

The National Knowledge Network was kicked off at a three-day conference in Lucknow inaugurated by Uttar Pradesh Chief Minister Shri Yogi Adityanath. The conference was attended by representatives from international and experts and organisations, clean air start-ups and (SPCBs) as well as faculty from participating institutions. Shri Prakash Union Environment Minister, sent a message on the occasion, highlighting the momentum emission norms, BS VI and electric vehicles.

State representatives shared knowledge and best practice mitigation strategies for air pollution for various sectors. Ms. Disha Agarwal, Climate Policy manager at Shakti provided an overview of our work on this theme.

Assam leads the way at the Northeast Electric Mobility Conclave

Electric mobility is gradually gaining momentum in the Northeast. Assam recently drafted an electric vehicle policy and is deploying electric buses for public transportation. In order to boost this momentum, Shakti Sustainable Energy Foundation (Shakti) with World Resources India (WRI India) and the Assam State Transport Corporation(ASTC) organized the Northeast Electric Mobility Conclave on the 30th of October 2019, in Guwahati, Assam.

The conclave saw extensive discussions on the adoption of electric vehicles in the Northeast with a focus on planning and deployment of electric mobility policies. It was attended by a host of dignitaries including Shri Anil Srivastava, Principal Consultant and Mission Director, NITI Aayog, Shri Anand Prakash Tiwari, MD, ASTC and Shri Haricharan Boro, Vice Chairman, ASTC. Several panel experts expounded critical concepts governing electric mobility from charging infrastructure to more complex techno-economic aspects. Shri Anil Srivastava highlighted the need for India to incentivize battery manufacturing in order to grow and be more competitive.

With Assam taking this important step forward, it is expected that the discourse of the workshop will find its way to the remaining north east states aiding in the overall adoption of electric vehicles in the region.

The conclave was supported by Shakti under its Electric Mobility Forum initiative.

Driving finance for climate action in India

Since 2015, the India Innovation Lab for Green Finance has identified, developed, and accelerated innovative ideas that can unlock investment in green infrastructure. The Lab selects ideas from a highly competitive pool based on their actionability, innovation, catalytic potential and financial sustainability and moves them forward for development and piloting in India.

The recent meeting of the Lab held on 29th October 2019 saw three of the idea proponents from the Lab's recent cycle, and one from the 2016-17 cycle, make a pitch presentation to an audience comprising philanthropies and industry experts. The first of these ideas, Financing for Low-Carbon Auto Rickshaws by Three Wheels United, is a loan product that will enable drivers to purchase electric auto-rickshaws, by providing debt financing for 100 percent of the purchase and lower interest rates, with no collateral requirements. The second of these, the Residential Rooftop Solar Accelerator by Peacock Solar, is a lease model that aims to accelerate the mass adoption of residential rooftop in India, through standardized product offering, easy financing, and efficient execution at scale. Finally, Sustainable Energy Bonds by cKers Finance, deploys an aggregation model to attract impact investment to sustainable energy in India by offering debt exposure, sufficient returns, and standardized impact measures.

Following these presentations, there was a discussion on the next steps for the Lab in India particularly in context of the India's growing finance needs.

The Lab is hosted and funded by Shakti Sustainable Energy Foundation and The Climate Policy Initiative serves as the Lab's Secretariat.

OCTOBER 2019

'State of the DRE sector in India' report indicates expansion from energy access to development

On 12th September 2019, the Clean Energy Access Network (CLEAN) hosted the "Access for Development" event in New Delhi, which was co-supported by Shakti Sustainable Energy Foundation (Shakti). Mr. Harish Hande Managing Director, SELCO India and Board Member of Shakti and CLEAN, set the context for discussion at the event highlighting that energy access is increasingly being viewed as an important opportunity to redefine health care, livelihoods, education as well as address development gaps in India. The event was well attended with representatives from DRE enterprises, financiers, policy making bodies, academia, as well as experts and funders. Panel discussions on how energy could be a catalyst for holistic development and on DRE stories from the ground provided insightful perspectives on the issue.

The event saw the launch of the third Edition of the 'State of the Decentralized Renewable Energy Sector in India 2018-19' report. The report surveyed CLEAN's member organisations to assess the growth of the DRE sector in the country and future needs. It highlights 28 impactful case studies from the sector, which indicate the sector's expansion from energy access to development. It points out that the need for affordable and adaptable productive end-use of energy has not only sparked several innovative solutions such as solar dryers, freezers, sewing machines and other such applications that have had uptake in both rural and peri-urban markets, but also created new jobs and avenues for skills development in rural areas. This will bolster the growth of the DRE sector in the coming years.

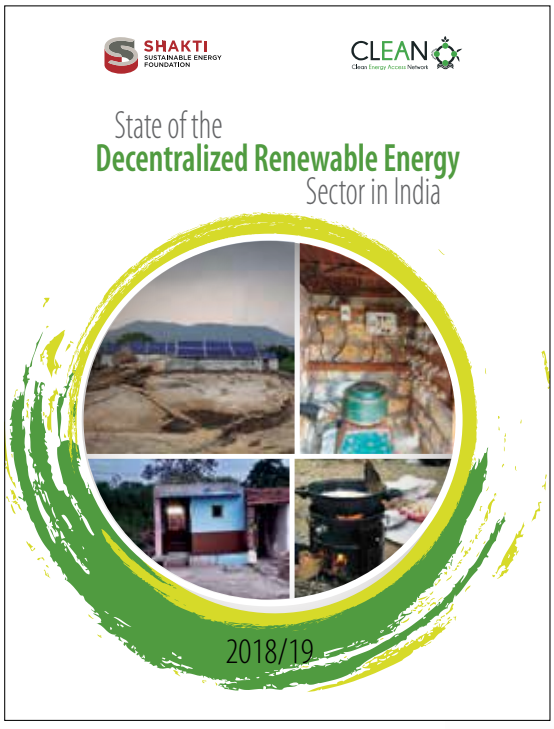
The key highlights of the report are:

Policy:

There is a need for standardization, testing, and benchmarking that will create increased awareness and acceptance among potential consumers of DRE systems and productive-use applications. In addition, a comprehensive mini-grid policy that explains the role and scope of mini-grid operators in partnership with the local utilities will help alleviate current ambiguity in the off-grid sector. While the government's LPG distribution initiatives have challenged the DRE sector, it has also opened up new, underserved regions for DRE businesses to grow.

Technology:

DRE enterprises are adapting to the growing aspirations of consumers in the previously energy-starved regions. The rise in community-based



business models and innovations is supplementing productivity increase. Similarly, the growing demand for DC mini-grid applications is calling for attention towards product standardisation and fast turn-around times.

Finance:

There is a need for a more conducive financial environment for DRE enterprises to flourish and help cater to the growing demand of affordable and reliable energy. The report found that 78 percent of enterprises surveyed had changed their business models as a result of government initiatives. About 45 percent reported profits in the last financial year, and 57 percent were able to raise capital. However, bridging access to finance remains a challenge, especially limited end-user financing, owing to lack of financiers' exposure to the sector resulting in reluctance in investing. In addition, high interest rates and collateral for bank loans continue to hinder growth.

Jobs:

The 42 CLEAN member enterprises who responded to the survey currently serve 43,00,000 customers and are responsible for 4,344 full-time jobs and 2,556 part-time jobs in the sector. A recent jobs census survey reported the creation of 95,000 direct formal jobs and 210,000 informal jobs in 2017-2018. In order for the sector to grow, a standardized, accredited, industry-relevant curriculum through stronger collaboration between government, industry, and academia will be helpful, as well as the promotion of soft skills and rural micro-enterprise trainings to close the skills gap. There is a need to formalize informal labour in keeping with globally accepted standards, and to promote the participation of women in the sector.

SDGs:

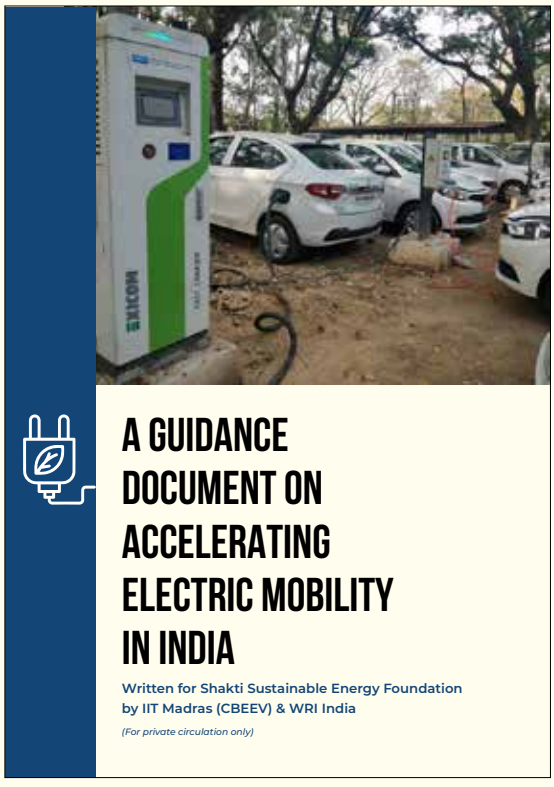
The report sets the tone for the growing contribution by DRE solutions to advance the Sustainable Development Goals (SDGs) such as ending poverty, promoting good health and well-being, quality education, decent work and economic growth, and promoting low-emission, resilient development pathways. The growth of India's DRE sector is promising and is already an integral part of the energy services solution. With a greater policy and regulatory push, the right financial spotlight and instruments, and adequate community participation, the DRE sector can help further development outcomes, along with a clean energy transition for the country.

Advancing the electrification of public transport in India

WRI India and CEPT University, in collaboration with the Ahmedabad Municipal Corporation, hosted a two-day workshop on the "Electrification of Public Transport" in Ahmedabad on 23-24th September 2019. The workshop was supported by Shakti Sustainable Energy Foundation (Shakti) under the 'Electric Mobility Forum' initiative. It brought together over 130 stakeholders from across India to facilitate knowledge sharing on the accelerated adoption of electric buses in India.

Shri Vijay Nehra, IAS Municipal Commissioner, Ahmedabad, provided the opening remarks for the workshop and shared learning from the recent procurement of electric buses for the city under the FAME scheme. He later released the Shakti-supported publication "A guidance document on Electric Mobility in India," authored by IIT-Madras with WRI, which is designed to serve as a reference point for state and local level officials. The workshop featured sessions on incentivizing the electric bus opportunity through FAME2, EV policy frameworks for states, OEM perspectives on e-mobility challenges and opportunities, amongst other relevant themes. The first day of the workshop ended with a site visit to an eBus battery-swapping and fast charging station in Ahmedabad.

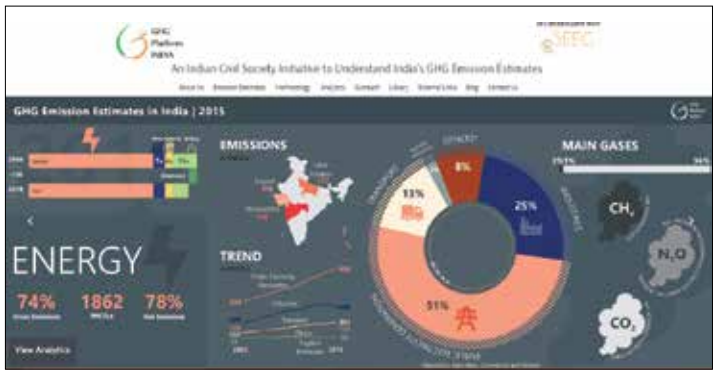
The workshop was also a pre-event in preparation for the 12th Regional Environmentally Sustainable Transport Forum in Hanoi, Vietnam on 28-31 October 2019, supported by United Nations Centre for Regional Development (UNCRD).



GHG Platform India tracks India's GHG emissions, state climate action and NDC progress

Reliable and credible GHG emissions data can enable policy action on climate change and help meet India's ambitious climate change targets. The GHG Platform India, supported by Shakti Sustainable Energy Foundation, is a unique civil-society led initiative that seeks to address this need by preparing GHG emission estimates for India. Over the last year, the Platform prepared national-level emission estimates for the years 2005-2015 and carried out a trend analysis of state level GHG emissions for 28 states and 7 union territories. The Platform also helped carry out impact evaluation of mitigation policies for Gujarat and is also assisting the development of the new State Action Plan on Climate Change (SAPCC) for Madhya Pradesh.

On 26th September 2019, the GHG Platform India organized a workshop on tracking India's emission and the implementation of the Nationally Determined Contributions (NDC). The workshop was attended by Dr J.R Bhatt, Advisor (Climate Change), MoEFCC and Mr. Ajay Raghava, Deputy Director, MoEFCC along with representatives of state nodal climate change agencies from Madhya Pradesh and Gujarat, media, civil society, think tanks and academia.



The GHG Platform India partners presented key data findings of their research as well as highlights from the policy impact evaluation of Gujarat and the mitigation potential and proposed interventions under Madhya Pradesh's SAPCC. The workshop also featured interactive discussions on the role of states in meeting the targets under India's NDC.

The GHG Platform India was acknowledged in India's second Biennial Update Report (BUR) submitted to the UNFCCC in December 2018 underscoring its valuable role in efforts contributing to the implementation of the convention.

MSEDCL hosts Distribution Utilities Forum on open access theme

The Distribution Utilities Forum, supported by Shakti Sustainable Energy Foundation, held its fifth meeting on 27th September 2019 in Mumbai, bringing together discom leaders and representatives for a dialogue on open access in the distribution sector. The meeting was hosted by the Maharashtra State Electricity Distribution Company Limited (MSEDCL) and saw the participation of 18 discoms from across India.

Mr. Sanjeev Kumar (IAS, Chairman and Managing Director, MSEDCL) set the context for the discussion and welcomed the perspectives of discoms on open access. Mr. Gireesh B. Pradhan, Honorary Chairperson of the Forum pointed out that the issue needed much scrutiny and deliberation and the views of discoms may differ from those of other stakeholders.

The Energy and Resources Institute (TERI), which acts as the Secretariat for the Forum, presented the findings of its study on issues related to open access. This was followed by a discussion on a consultative paper on open access and related challenges and opportunities. TERI attempted a quick on-the-spot poll to the rank the top five issues on open access. Retail tariff design emerged as the most critical issue that discoms would like to see resolved in implementing open access. Other stakeholders such as representative from the Open Access Users Association, system operator POSOCO and the market operator India Enegry Exchange (IEX) also presented their perspectives at the meeting.

SAMEEEKSHA, knowledge hub for MSMEs convenes stakeholders in Rajkot

For the last two years, supported by Shakti Sustainable Energy Foundation has been supporting the Small and Medium Enterprises Energy Efficiency and Knowledge Sharing (SAMEEEKSHA) platform, which pools and shares the expertise of institutions and stakeholders working to strengthen India's MSME sector. SAMEEEKSHA acts as the interface between industry, the MSME sector, government, funding agencies and academia, thus helping to promote energy efficiency and best operating practices amongst MSMEs. Its role has been acknowledged in India's second Biennial Update Report (BUR) submitted to the UNFCCC in early 2019.

This year, the platform engaged with MSME associations at the state and cluster level in order to raise awareness on sectoral best practices and to learn about the best practices being followed on the ground. The platform is also facilitating a dialogue on energy efficiency related issues between cluster associations and policy makers, which has led to valuable inputs for more informed decision making.

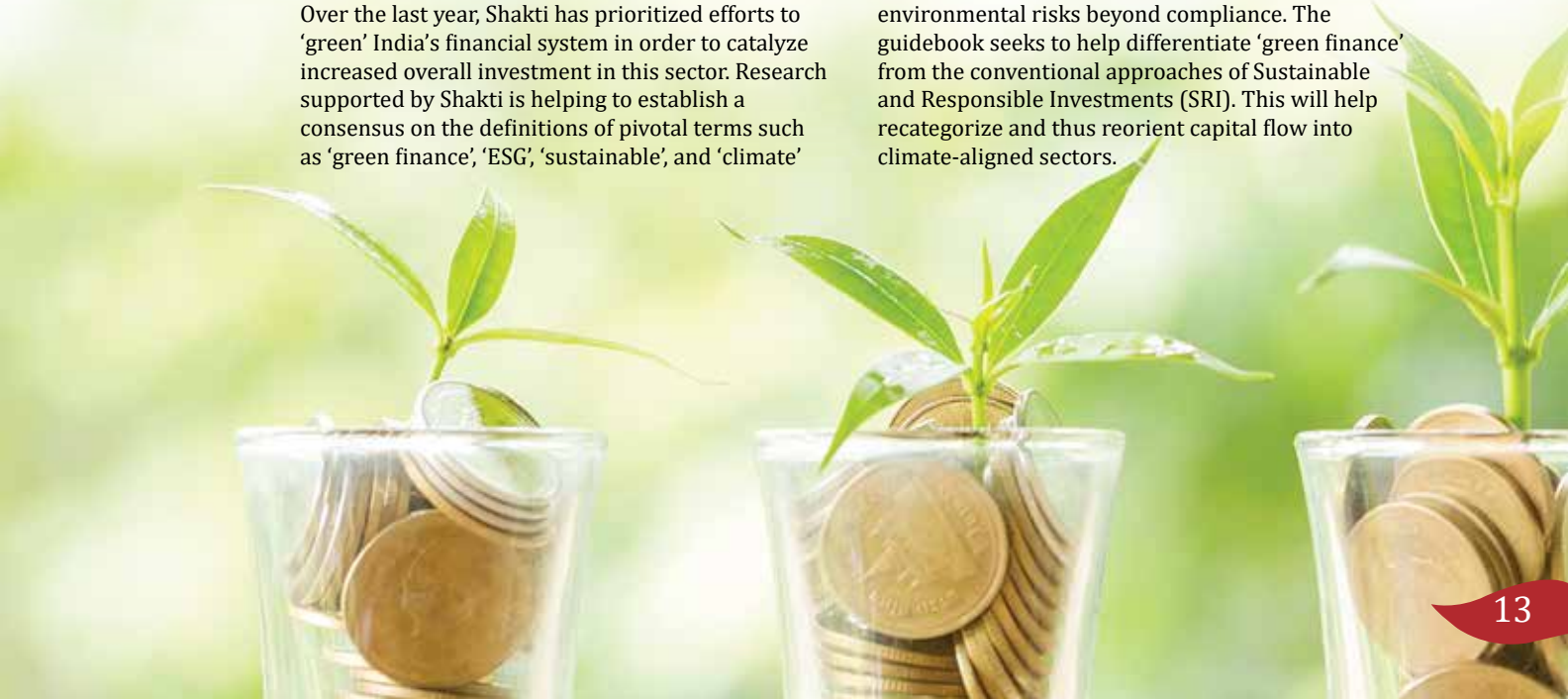
On 14th September 2019, the platform organized a meeting in Rajkot, one of the largest MSME clusters in the country comprising energy-intensive sub-sectors such as aluminium, forging, investment casting, kitchenware, machine tool, pump sets, ceramics and plastics. Several industry associations attended this meeting and participated in an open dialogue with the Bureau of Energy Efficiency (BEE) and the Ministry of MSME on scaling up energy efficiency and renewable energy. The meeting was chaired by Shri Milind Deore, Director of the BEE. Representatives from TERI and UNIDO shared best practices and energy cost savings achieved by MSMEs in similar clusters across Gujarat and the rest of the country.

Guidebook to help investors catalyze green opportunities

While India's clean energy sector continues to attract investment, there can be serious challenges to its growth trajectory if new sources of capital are not deployed to meet the increased future investment requirements. It is estimated that India will require $1.6 trillion in green investments between 2020-2030 to meet the goals set under the Paris Agreement.

Over the last year, Shakti has prioritized efforts to 'green' India's financial system in order to catalyze increased overall investment in this sector. Research supported by Shakti is helping to establish a consensus on the definitions of pivotal terms such as 'green finance', 'ESG', 'sustainable', and 'climate' finance. This research also underscores the need for Indian investors to assimilate climate considerations and risks in their portfolios as they look to tap into the investment pools of international investors.

Taking this further, a new Shakti-supported guidebook will provide guidance for investors and lenders helping them to climate-align activities to their portfolios and take a deeper view of environmental risks beyond compliance. The guidebook seeks to help differentiate 'green finance' from the conventional approaches of Sustainable and Responsible Investments (SRI). This will help recategorize and thus reorient capital flow into climate-aligned sectors.



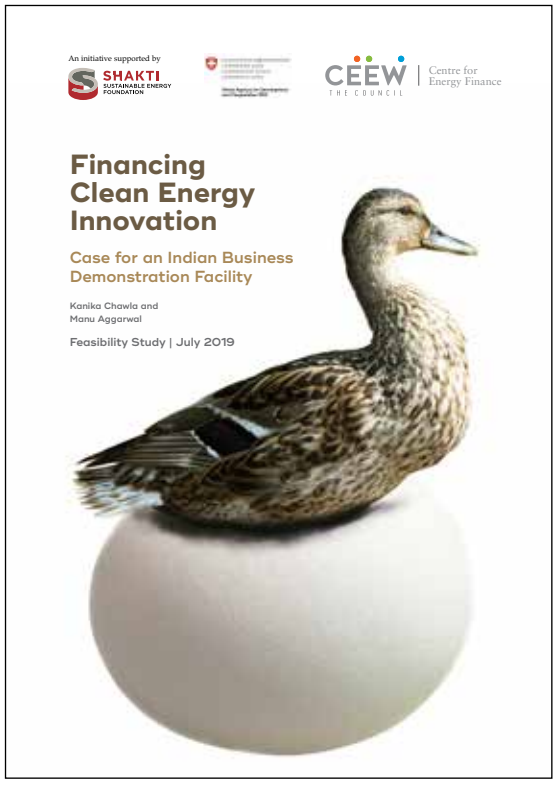
AUGUST 2019

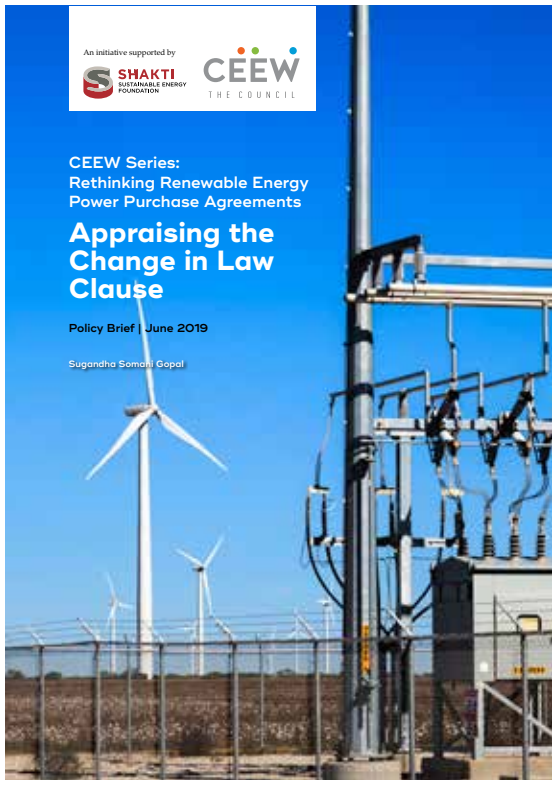
Shakti-supported initiatives featured at CEEW's Energy Horizons 2019

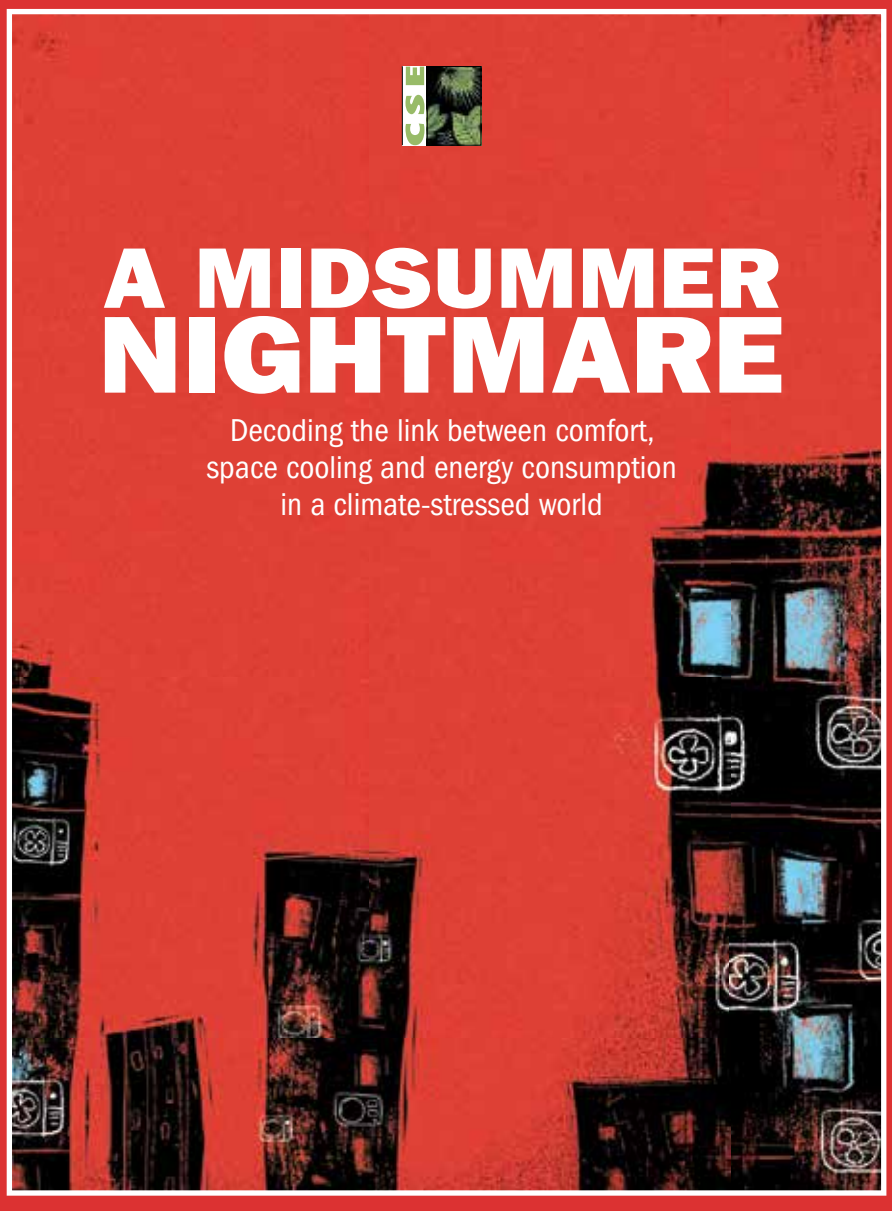
On 18-19th July 2019, Energy Horizons, the flagship event of the Council on Energy, Environment and Water (CEEW), brought together global and Indian leaders to generate thought and action leadership on the energy transition, with a focus on India. Shakti has been a continued supporter of this event since its inception in 2017. A number of critical initiatives undertaken by CEEW and supported by Shakti featured at the event helped to catalyze knowledge exchange and dialogue on clean energy deployment:

- A Toolkit for the Large-Scale Integration of Rooftop Solar
- Making Renewable Energy Power Purchase Agreements more Bankable – Appraising the Change in Law Clause
- Scaling Clean Energy Innovation: Case for an Indian Business Demonstration Facility

Mr. Krishan Dhawan, CEO of Shakti provided the keynote address at the event. Watch here. The event was marked by the presence of eminent speakers including Fatih Birol, Executive Director, International Energy Agency, Dharmendra Pradhan, Minister of Petroleum and Natural Gas Ministry of Steel, and Suresh P. Prabhu, Prime Minister's Sherpa to the G20.







Report: India must design its buildings and cities for thermal comfort and minimize AC use

As severe summer-time heat waves become the norm in India, the use of air-conditioners and the resultant energy consumption is extremely high. According to a study conducted by the Centre for Science and Environment and supported by Shakti, India will need to take urgent steps towards designing buildings that promote thermal comfort and reduce the use of air conditioning. This becomes more relevant now that the India Cooling Action Plan has highlighted the need for a for an adaptive thermal comfort model.

The study is based on an eight-year trend analysis of electricity consumption in Delhi. An important finding of this study is that power demand does not increase noticeably when the heat index is within 25-32°C. Demand starts peaking after this point is breached due to high and inefficient use of air conditioning. It also finds that in Delhi, 25-30 per cent of annual energy consumption is because of thermal stress. During peak summers, it is as much as 50 per cent.

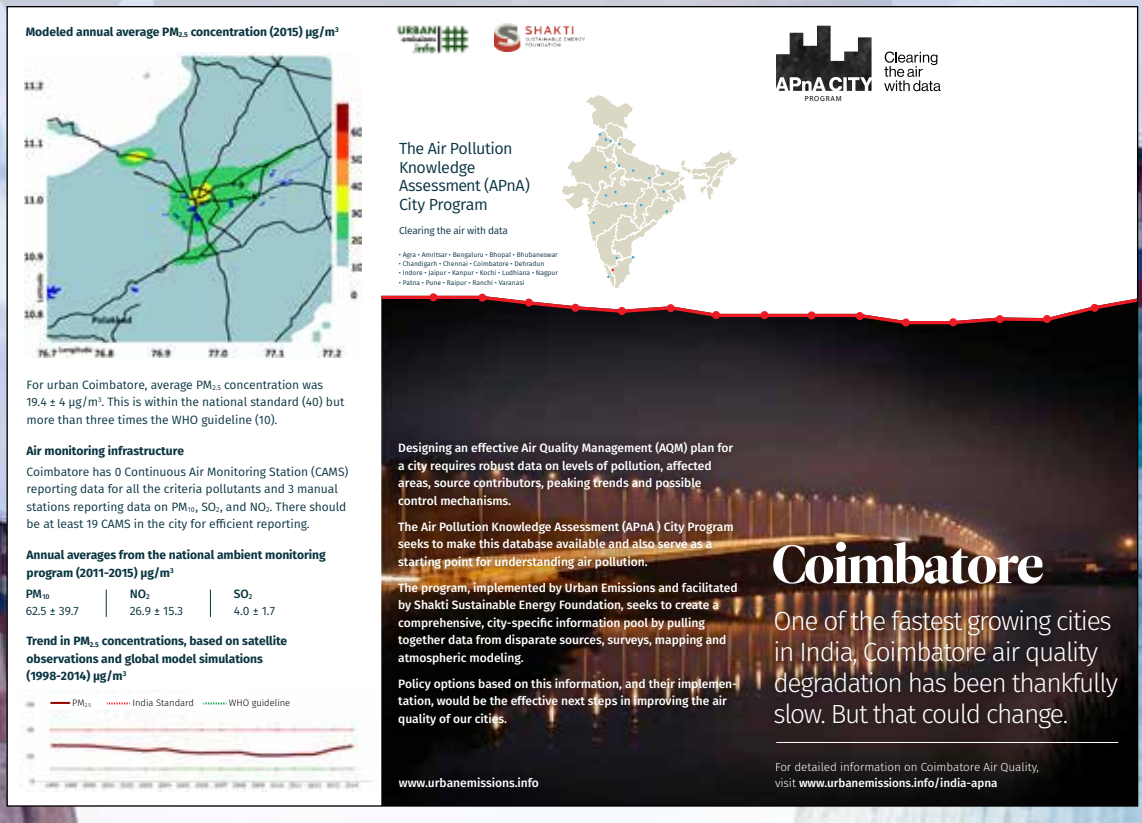
If urgent steps are not taken to address this, then the economic and environmental costs are huge. The challenge must be addressed with wide-ranging architectural design solutions, mixed use of cooling approaches (including less energy-intensive devices like fans and coolers) and improved energy efficiency of mechanical cooling methods. Else, India's energy security and climate change mitigation efforts will be deeply undermined.

Air pollution knowledge assessments for 50 Indian cities

With rapid urbanization and population growth in India's cities, air quality is constantly worsening on account of the exponential increase in infrastructure and energy needs. Currently, there is limited information of the scale of air pollution in cities except for Delhi and a few others, where continuous monitoring data is available.

The Air Pollution knowledge Assessments (APnA) city program seeks to remedy this gap by creating a baseline of air pollution related information, which can lead to better understanding of pollution source contributions. The APnA city program supported by Shakti and designed and implemented by Urban Emissions, seeks to create a comprehensive, city-specific information pool by pulling together data from disparate sources, surveys, reports, maps, and atmospheric modelling.

Covering a total of 50 cities, assessments were released for the first 20 Indian cities in 2017, followed by assessments for 30 cities in 2019. For most of the cities under the program, this is the first time modelled emissions inventory and source-based apportionment has been conducted—a necessary starting point for city governments and stakeholders to chart out strategies for better air quality. Individual city reports for all 50 cities are available on the Shakti website.



Creating civil society leaders in India's clean energy space

Strengthening India's civil society sector is essential if we are to make significant inroads into the country's clean energy challenges. For civil society organizations to succeed, their leaders require a focused mission and strategy, a solid operational model, strong governance and effective leadership.

One of Shakti's roles is to enhance the capacity of civil society organizations to participate more effectively in policy dialogue and action. In July 2019, Shakti sponsored the participation of four leaders from our grantee partners at the Strategic Non-Profit Management India program, which is conducted by the Harvard Business School (HBS) in association with the Centre for Social Impact and Philanthropy (CSIP) at Ashoka University in India. The program is designed to prepare civil society leaders to build effective, high-performance organizations that can successfully guide change.

The partners attending were Harihara Mohapatra, Chief Operating Officer, Clean Energy Access Network (CLEAN), Udai Mehta, Deputy Executive Director, Consumer Unity and Trust Society (CUTS), Dr. Satish Kumar, Executive Director, Alliance for and Energy Efficient Economy (AEEE) and Ramapati Kumar, Chief Executive Officer, Centre for Environment, Energy and Development (CEED). Mr. Chinmaya Acharya, Chief of Programs at Shakti, attended this program as well.

The program attracted the participation of 80 senior and middle management staff from civil society organizations, corporate foundations and donor organisations. Faculty included prominent HBS professor V Kasturi Rangan. This program has been a regular offering at the HBS for over 25 years now, and was started in India in 2017.

Using cleaner fuels in industrial processes

Decarbonizing the industry sector by switching to cleaner fuels like renewable energy and electricity can help meet India's climate goals. Large-scale industries have made some progress in this direction under the Perform, Achieve and Trade scheme, but Micro, Small and Medium Enterprises (MSMEs) have a way to go. To aid this transition, Shakti is supporting The Energy and Resources Institute (TERI) to explore viable and cost effective fuel switching opportunities in the MSME sector.

A stakeholder consultation workshop held on July 24th 2019 in New Delhi brought together MSMEs representatives, policy makers and civil society to examine these issues in more detail.

There are several energy-intensive MSME sectors like foundries, forging, secondary steel, chemicals, textiles, food processing, etc. where fuel switching opportunities can be explored. Findings on electrification options and implementation needs were shared with the attendees.

Rich perspectives were offered by Dr Ajay Mathur, Director-General of TERI, Mr Milind Deore Director, Bureau of Energy Efficiency and Shubhashis Dey, Shakti Sustainable Energy Foundation. The workshop was well attended by representatives from user industries, technology suppliers, Federation of Indian Chambers of Commerce, Tata Power and Small Industries Development Bank of India.

JULY 2019

Sikkim: CM launches the Sikkim Climate Inventory and Monitoring System

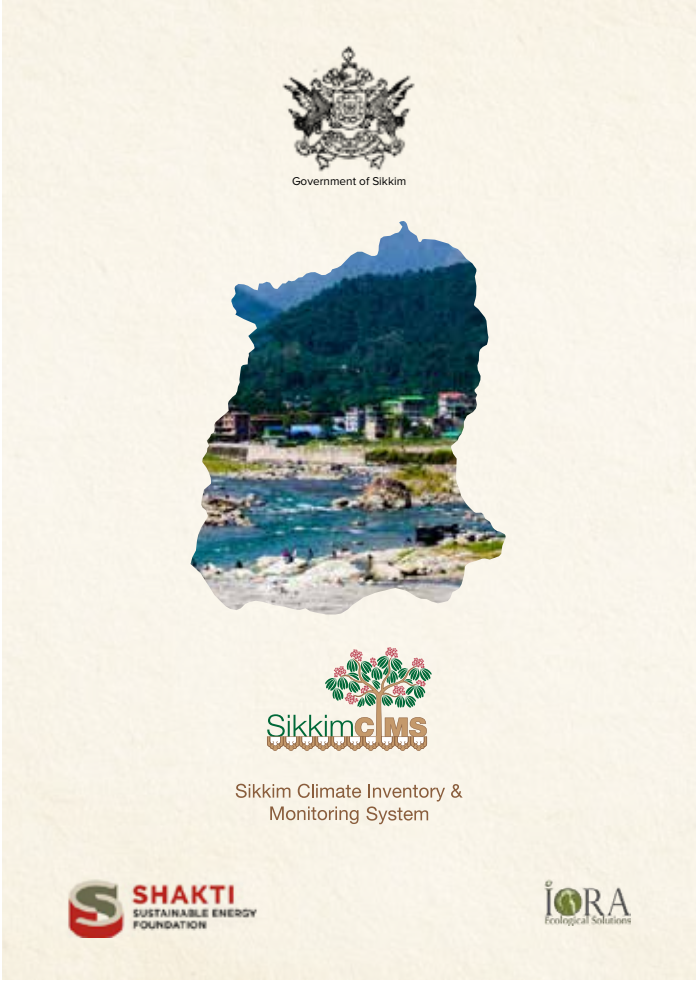
Shakti, in collaboration with IORA Ecological Solutions Pvt. Ltd., has facilitated the development and deployment of the Sikkim Climate Inventory and Monitoring System (SCIMS), a first of its kind custom designed web-based dashboard consisting of the state's GHG inventory and a climate MRV tool.

Sikkim aspires to be India's first carbon neutral state, and the SCIMS is the first step in this direction. The SCIMS is designed to assist the state in developing annual GHG emission inventories and track the progress of ongoing actions that lead to GHG emission reductions or sequestration.

The SCIMS was launched on the occasion of World Environment Day in Gangtok by the Honourable Chief Minister of Sikkim, Shri Prem Singh Tamang. During the launch, Shri M.L. Srivastava, Principal Chief Conservator of Forests (PCCF) and Head of Forest Forces (HoFF) of the Forest Environment and Wildlife Management Department (FEWMD) highlighted the key climate mitigation programs and schemes in the state.

A short video on the SCIMS was presented, which provided an overview of its goals, benefits and functionalities. More than 300 people attended the event including Department Secretaries, the Director General of Police, Members of the Legislative Assembly, students and media representatives

Sikkim is the first state in India to have a system such as this, and the SCIMS is an easily replicable model for other states to follow.



"Cost of Supply" theme at fourth Distribution Utilities Forum

The Shakti-supported Distribution Utilities Forum held its fourth meeting on 10th June 2019 in New Delhi bringing together senior officials from 18 electricity distribution companies (Discoms) from across the country. The theme of this meeting was "Cost of Supply" with a focus on the challenges faced by Discoms while using approaches to calculate the actual cost of supply.

Based on discussions with several Discoms, the secretariat for the Forum, The Energy and Resources Institute (TERI), presented insights on the subject. Discoms from Andhra Pradesh, Karnataka, West Bengal and Assam made presentations on the methodologies used by them to calculate the cost of supply. This was followed by a presentation by Pricewaterhouse Coopers (PwC) on a model to estimate cost of supply. This model was developed in collaboration with the Federation of Indian Chambers of Commerce and Industry (FICCI) and supported by Shakti.

Shri Gireesh Pradhan, former Chairman of the Central Electricity Regulatory Commission, chaired the meeting and set the context for discussion. Shri M. R Sreenivasa Murthy, former chairman of the Karnataka Electricity Regulatory Commission (KERC) was a special invitee to the Forum.

Mr Ravi Singh, CEO WWF-India made a presentation on the recent report by WWF-India titled "Renewable Energy Demand in India, A Corporate Buyers' Perspective." In addition, TERI released the final report titled "Implementing Rooftop Solar: A Discoms' Perspective developed under the aegis of the Forum."

Consumer Assistance Cells to enhance consumer engagement in the power sector

As the power sector evolves, consumers will become the focal point of the sector's value chain. Enhancing their role and participation can help drive reforms in the right direction as well as promote better governance. Shakti is collaborating with the Bask Research Foundation and CUTS International to build the capacity of consumers in Rajasthan in order for them to engage more effectively in power sector decision making processes.

Through June 19-20th, as a part of this initiative, three Consumer Assistance Cells were launched in Rajasthan—the first in Bajju village of Kolayat, Bikaner, the second jointly for Chittorgarh and Bhadesar blocks, and the third in Sawai Madhopur block.

The Consumer Assistance Cells will help rural and undeserved consumers understand the rules and regulations of distribution companies as well as their own rights and duties. In addition, the cells will provide advisory support to consumers for the redressal of grievances and also liaison with local discom representatives to improve power services.

The events saw attendance by local stakeholders including the Sarpanch of the villages,

representatives from Jaipur Vidyut Vitran Nigam Limited (JVVNL), elected consumer representatives and consumers. Dignitaries shared their views on the power sector and acknowledged the need for the cells to bridge the gap between consumers and distribution companies.

Policy imperatives for app-based shared mobility in India

India's mobility sector could soon be at the cusp of a massive transition with App-based Shared Mobility (ASM) services becoming an integral part of the urban commute. Bolstered by rapid digitization, consumers are now preferring these low-cost and convenient services.

ASM services have evolved very quickly over the last few years, but have drawn varied policy responses. For example, some states have framed fare structures or sought to restrict ASM services, whereas in other instances policies have focused on issues relating to operational control and safety regulations. At the same time, there is a limited understanding of the ASM ecosystem, despite the impact such services may have on road-congestion, vehicular emissions, vehicle ownership and local air quality, amongst other issues.

It is within this context that Shakti is supporting the Center for Study of Science, Technology and Policy (CSTEP) to assess the current policy landscape for ASM services in India and articulate key policy issues through stakeholder engagement. These inputs will feed into the development of a roadmap for ASM to evolve as a low-carbon mobility option in Indian cities.

Kickstarting this effort, a workshop was held in Bangalore on 24th July 2019 bringing together ASP providers such as Ola, Shuttle, Bounce, Vogo, Redbus, Yulu and Quickride in order to generate an informed discussion on the topic. The workshop identified several policy and regulatory issues that impacted sustainability of ASM services. Going forward, the inputs from this workshop will be used to inform deeper deliberations among industry and government on policy pathways.

Integrated cooling hub solution for farmers and the wider rural community

Shakti is engaging with the University of Birmingham, Centre for Environment Education (CEE) and the National Centre for Cold-chain Development (NCCD) to explore how integrated 'Community Cooling Hubs' can meet farmers' cooling needs as well as the wider cooling needs of rural communities in clean and sustainable ways.

The idea of Community Cooling Hubs emerged from a recently launched Shakti-supported report Promoting Clean and Energy Efficient Cold-Chain in India prepared in collaboration with MP Ensystems Private Limited and the University of Birmingham. The report provides a four-point roadmap to reduce the environmental impact of much-needed food cooling.

Within rural communities, there are often a range of cooling needs, such as those pertaining to veterinary and human vaccines and medicines, health, commercial services etc. Currently these needs tend to be considered in isolation, whereas the integrated Community Cooling Hub is envisioned to provide solutions for rural cooling needs in a far-reaching manner and sustainable manner.

This initiative was launched to support the development of protocols for designing novel community cooling hubs in India. It kickstarted with a stakeholder workshop held in New Delhi on World Refrigeration Day (26 June), which brought together representatives from Government, civil society, and research organizations to shed insights on this issue.

The SunPedal Ride visits the Shakti office

A specially designed solar assisted electric auto called the SunPedal Ride, on its 6,000 kms journey across India's Golden Quadrilateral, made a stopover at the Shakti office on day 26 of its journey after completing 2,500 kms. The Golden Quadrilateral is one of the most used highways of the country, spanning four of the biggest cities of the country, Delhi, Mumbai, Chennai and Kolkata.

Led by IIT Bombay alumni Sushil Reddy, the SunPedal Team meets with locals and stakeholders en route to talk about the significance and potential of electric vehicles. The practical demonstration of the working aspects of the solar-powered electric vehicle is the highlight of these meets.

With India grappling with climate change and rapidly increasing GHG emissions, the team aims to enhance awareness on the potential and significance of solar energy and sustainable mobility. The Shakti team took this opportunity to test-drive the solar-powered electric auto and learn more about the team's journey so far. (In photo: Shakti team rides the SunPedal)

JUNE 2019

"I want you to act as you would in a crisis. I want you to act as if our house is on fire. Because it is."

-Greta Thunberg, World Economic Forum in Davos 2019

It is now time that we talk about the climate differently. When a 16-year-old awakens the world to the climate catastrophe looming ahead, we know that the discourse on climate change is undergoing a radical transformation.

How we talk and think about climate change needs to change as the consequences of the alarming rise in GHG emissions become greater than ever before. Recently, The Guardian, a prominent news outlet worldwide and a leading voice on climate issues, announced it would use more appropriate language for the environmental crises facing the world. The preferred terms are now "climate emergency, crisis or breakdown" and "global heating" rather than "climate change" and "global warming." The idea behind the transition is that terms like climate change are "passive and gentle when what scientists are talking about is a catastrophe for humanity."

Recently the UK Parliament declared "an environment and climate emergency," making the UK the first country in the world to do so. Scotland and Wales have adopted similar language as well.

The new language adopted by The Guardian is a step toward being more real about the situation the world is facing. More and more, the downward climate spiral is being viewed as a fundamental, all-encompassing crises, worthy of attention from statesmen to the common people. Almost every new scientific report on the implications of the changing climate has increased in urgency. Last year, the IPCC report stated that the impact of a 1.5C increase in global temperatures over pre-industrial levels would "disproportionately affect

disadvantaged and vulnerable populations through food insecurity, higher food prices, income losses, lost livelihood opportunities, adverse health impacts, and population displacements". More recently, a report released by the United Nations says roughly one million species of animals and plants face the risk of extinction because of human activity.

The change in the climate change discourse isn't just restricted to the lexicon. For a long time now, polar bears and melting ice caps have been established as ambassadors of a threatened ecosystem. No doubt, these are iconic images. Unfortunately, they are numbing people to the problem and no longer provoke the meaningful engagement that they used to. The climate crises is affecting millions of people around the world, whether it is the impact on ecosystems or on human health. What we need now is visual communication that shows the impact of the climate crises on people — to catalyse stronger action.

The new climate lexicon is already changing to reflect this new stark new reality. An example, the word Solastalgia was coined by Australian philosopher Glenn Albrecht in 2003. It is loosely defined as the grief and anxiety caused by climate change.

If we are unable to admit that climate change is real, that there is scientific evidence for human-induced climate change, and use the right language to highlight the urgency, then how are we to tackle the impending adversity. We at Shakti agree that communicating the looming climate crises in a more accurate way will match ambition to the scale of the problem and lead to more meaningful action.

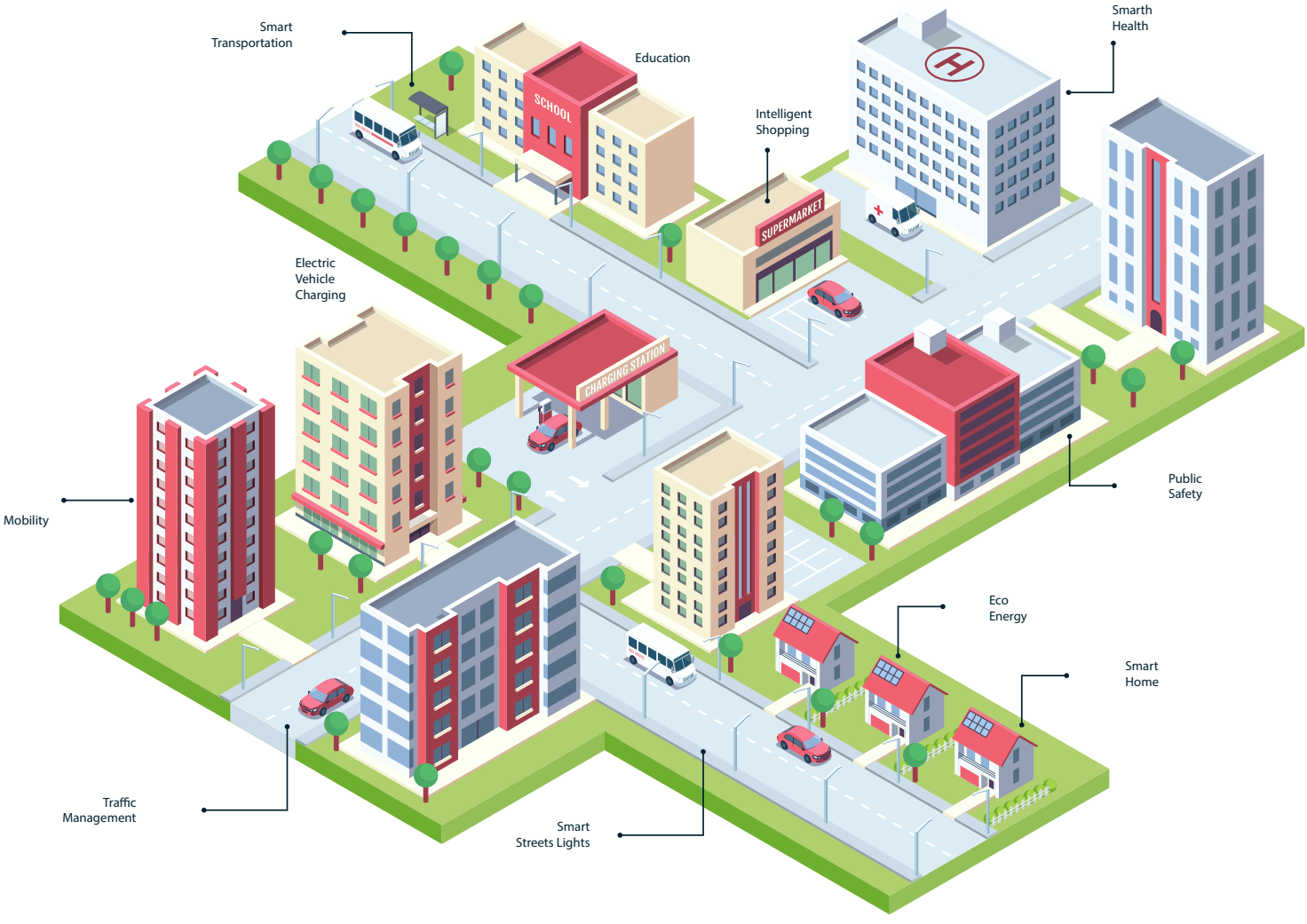
Maruti to stop diesel car production by 2020

Maruti Suzuki India recently announced its decision to stop manufacturing diesel cars from April 2020. The decision is based on the narrowed price gap between diesel and petrol as well as the impact on car prices when BS VI fuel norms are introduced in April 2020

Over the years, Shakti has been working with our grantees and partners on reducing the share of the diesel car fleet in India. Initial efforts were aimed at eliminating diesel price control which artificially priced diesel lower than petrol. Subsequently, we supported efforts to find ways to equalize the excise taxes between diesel and petrol, where petrol was being taxed at a lower rate than diesel. We also supported efforts in the Delhi capital region to not allow diesel vehicles more than ten years old to be run, as well as the move from BS II/III to BS IV, and then to BS VI standards over the past years.

These efforts have contributed to the price difference between diesel and petrol narrowing considerably over the past few years, reducing the incentive to purchase diesel cars. Diesel car sales which had climbed to 47% of total car sales in 2012-13, dropped to 19% in 2018-19. Now, the largest car maker in the country is exiting diesel completely, an important step towards transforming the transport industry and reducing its emissions footprint. It is expected that other manufacturers of small and medium cars will follow suit.

Creating the Smart Cities of the future



Over the last few years, Shakti has supported ICLEI-South Asia in collaboration with Sandeep Gandhi Architects to provide technical support for sustainable mobility and built environment interventions in six cities under the Smart Cities Mission—Jaipur, Udaipur, Kakinada, Vishakhapatnam, Gwalior and Ludhiana.

On 17th April 2019, Shakti and ICLEI-SA hosted a roundtable to highlight the positive action taken under the Smart Cities Mission along with the next steps and opportunities. The round table was a side event to ICLEI's Resilient Cities Asia Pacific 2019 event, co-hosed by the South Delhi Municipal Corporation.

The roundtable was well attended by representatives from over ten Smart Cities, project management consultancies (PMCs) for Smart Cities, academia, policy think tanks and sector experts from various national and international organizations. Key learnings from the workshop as well as the efforts supported by Shakti have been summarized in a report to be shared with Ministry of Housing and Urban Affairs.

High-level dialogue on the Enhanced Transparency Framework under the Paris Agreement

The UN Climate Change Conference (COP24) at Katowice, Poland, concluded with a deal on the Paris Rulebook—a set of guidelines to implement the Paris Agreement. Through our partner, The Energy and Resources Institute (TERI), we successfully tracked and contributed to the Paris Rulebook by providing research support and preparing position papers that informed policy makers on Article 6 (Carbon Market) and Article 13 (Enhanced Transparency Framework) of the Paris Agreement.

To further assess the implications of implementing the Enhanced Transparency Framework in India, TERI with joint support from the MacArthur Foundation and Shakti organised a stakeholder consultation on May 24th, 2019 in New Delhi. The consultation saw participation from the Ministry of Environment, Forests and Climate Change, civil society and subject matter experts.

Further, the role of Shakti-supported initiatives such as the GHG Platform India in building civil society

capacity and enhancing transparency in Greenhouse Gas (GHG) measurement were recognised during the consultation.

Over four million views and growing – Pollution Ka Kya Plan Hai

The 'Pollution Ka Kya Plan Hai' campaign–a series of one-minute videos on the perils of air pollution –hit over four million views in May 2019 just within three months of being posted on YouTube. Each video provides insights into the extent of the India's pollution problem through relevant themes such as the National Clean Air Program, health risks, Delhi's poor air quality and others, while underscoring that both citizens and policy makers must take the issue more seriously. Pollution Ka Kya Plan Hai has been produced by Central Square Foundation with content drawn from Shakti-supported reports along with research by the Centre for Science and Environment and Lung Care Foundation.

MAY 2019

Clean cold chains can reduce food loss and tackle climate change

Around 40% of perishable food in India is lost between the farm gate and retail outlet due to inefficiencies in the cold chain. Food loss and waste generate about 8% of global greenhouse gas emissions annually and 19% in India. The move away from diesel-based and carbon-intensive cold chains can help increase farmers' income, boost food security and tackle climate change. This is why Shakti is working to advance cleaner and more energy-efficient cold chains in India.

As a part of this initiative, Shakti collaborated with the University of Birmingham and MP Ensystems Private Limited to prepare a report on the cooling needs of farmers in the states of Haryana, Punjab, Maharashtra and Karnataka. The report provides a four point roadmap to reduce the environmental impact of much-needed food cooling, promoting new business models, establishing "Living Labs", creating infrastructure for training and outreach, and facilitating hackathons and IT based agri-supply chain solutions.

The report was launched at the second Clean Cooling Congress in London held from April 24-25th 2019 and hosted by University of Birmingham with the World Bank Group, the UK Department of Business Energy and Industrial Strategy (BEIS), and Mission Innovation.

Distributed Renewable Energy Investment Policy Tracker (DIPTI) for India

The new Distributed Renewable Energy Investment Policy Tracker (DIPTI) online platform is India's first comprehensive knowledge repository of the distributed renewable energy (DRE) sector. DIPTI brings together data on market progression, geographic dispersion, installation, investment flows and the policy and regulatory framework in the DRE and financial sector.

With India's massive electrification effort underway, DRE-based interventions are being viewed as a means to complement the grid and help close the energy access gap. In this regards, DIPTI is designed to empower investors and other DRE players with the data, resources and insights needed to take more informed decisions on investments and potential opportunities.

DIPTI, developed by Ckinetics and supported by Shakti, was launched on 25th April 2019 in New Delhi in the presence of key stakeholders from the DRE sector.

New Centre for Air Pollution Studies to provide policy advice for India and South Asia

Managing air quality levels in Indian cities has emerged as a complex task, and governments are seeking credible scientific studies and data to develop the policy options required to tackle bad air. The Centre for Air Pollution Studies (CAPS) was launched by the Center for Study of Science, Technology and Policy (CSTEP) to meet this critical need. CAPS seeks to provide scientific, high-quality policy advice for improving air quality in India and the South Asian region.

The role envisioned for CAPS is in line with India's policy efforts to combat air pollution, particularly the National Clean Air Action Programme. CAPS will develop the necessary scientific evidence required for informed policymaking by building emission inventories, conducting source-apportionment exercises, assessing health impacts and performing techno-economic assessments.

CAPS will be based in Bangalore and is being supported by the MacArthur Foundation, Bloomberg Philanthropies and Shakti. It was launched on April 15th 2019 at a high-level workshop attended by key stakeholders working towards cleaner air for India.

Enhancing consumer participation in Rajasthan's power sector

India's power sector is undergoing rapid and profound change. It is increasingly being realized that consumer participation can drive power reforms. Supporting efforts in this direction, Shakti is engaging with CUTS International and the Bask Research Foundation in Rajasthan to enhance the role and voice of consumers in the power sector. While over 93% of households in Rajasthan are already connected to the grid, consumers still face issues with access, quality of supply and load shedding.

This initiative was launched on 28th March 2019 in Jaipur with a workshop titled 'Capacity Building of Electricity Consumers'. The discussion at the workshop underscored the need for consumers and discoms to work together. It also proposed the setting up of Consumer Assistance Cells (CONASCs) to guide consumers through the grievance redressal process, and to allow discoms to spread awareness about consumer-centric programmes.

Representatives from discoms (Jaipur Vidyut Vitran Nigam Limited, Ajmer Vidyut Vitran Nigam Ltd), consumer groups (Consumer Legal Help Society, Upbhokta Soochna and Paramarsh Samiti), consumer activists and civil society organizations attended the workshop.

Scaling up bus-based transport in Indian cities

The lack of reliable and affordable public transport in cities is increasing people's reliance on private vehicles to meet mobility needs. This leads to more air pollution, GHG emissions and congestion in our cities. Public buses can address this challenge to a large degree, but unfortunately, bus fleets in Indian cities are on the decline.

A Shakti-convened workshop, held on 29th April 2019, brought the focus back on buses in a bid to discuss ways to scale up bus-based transport in Indian cities. The idea behind the workshop was to use a collaborative approach to identify opportunities and challenges, as well as actions that could be taken by the government, private sector and communities to enhance the public bus network.

Several important themes were covered such as national and state-level action, regulatory frameworks, planning and operations and Public Private Partnerships. The workshop saw insights and ideas emerging from diverse experts from public transport drawn from civil society, research think-tanks, academia and multi-lateral organisations.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Convening of the Working Group on Renewable Energy Policy and Finance

For almost two years now, Shakti and the Council on Energy, Environment and Water (CEEW) have convened a High-Level Working Group on Renewable Energy Policy and Finance for strategic dialogue and action that can enable rapid growth of the sector. The goal of the group is to identify policy and market interventions that can solve immediate operational issues facing project deployment, and at the same time propose big ideas for policymakers to sustain the momentum in the long-term.

The group comprises industry leaders, investors, lenders, financial institutions, and civil society. Over the last few months, the group has focused on assessing the impact of safeguard duty on imported solar cells and modules, and curtailment risk for solar and wind projects, amongst other themes.

At its most recent convening on 9th April 2019, the group reviewed emerging opportunities and challenges, and identified focus areas for the incoming government to strengthen the renewable energy sector. With the procurement of renewable energy on the rise, the group also discussed the implications of existing change-in-law-clauses in renewable energy purchase agreements and the necessary improvements.

APRIL 2019

Hon'ble Vice President Shri Venkaiah Naidu launches Shakti-supported 'Electric Mobility Forum' at Connect Karo 2019

Hon'ble Vice President Shri Venkaiah Naidu launched the Shakti-supported Electric Mobility Forum at Connect Karo 2019 organized by World Resources Institute (WRI India) in New Delhi. The Electric Mobility Forum, led by WRI India, will convene policymakers, business, philanthropy and entrepreneurs to find solutions to electrify and decarbonize transportation in India.

India is currently the world's fourth largest emitter of greenhouse gases. Rapid urbanization and increasing motorization have worsened pollution levels in our cities. The transport sector, which is also the largest consumer of oil, accounts for 13% of energy-related CO_2 emissions. Given this context, electric vehicles, which promise to be cleaner and more energy efficient, can be a game changer.

This was underscored by Hon'ble Vice President Shri Venkaiah Naidu in his keynote speech at the launch. He stated that the switch from private to public transport is essential to check congestion and air pollution in cities. He also highlighted the need for a comprehensive mobility plan for cities for the next 20-40 years.

Cooling Action Plan released as India grapples with burgeoning cooling demand

On March 8th 2019, Union Minister for Environment, Forest and Climate Change, Dr Harsh Vardhan released the India Cooling Action Plan (ICAP), which provides a comprehensive roadmap to address the country's burgeoning cooling requirements over the next 20 years. According to projections, the building sector will show significant growth in cooling demand, nearly 11 times keeping 2017-18 as base year, the cold-chain and refrigeration sectors around four times and transport air-conditioning by around five times. As India faces the reality of climate change, the release of this plan is an important development.

The ICAP has been prepared by the Ministry of Environment, Forest and Climate Change (MoEFCC) through an extensive stakeholder consultation process. Shakti has been a significant contributor to this notable development. Over the last two years, Shakti supported grantees like the Alliance for Energy Efficient Economy (AEEE), Council on Energy Environment and Water (CEEW) and The Energy and Resources Institute (TERI), Centre for Science and Environment (CSE) and CEPT University to build a fact-base on clean cooling through research and analysis.

In 2016, Shakti helped to form a 12-member civil society coalition on cooling to consolidate varied technical work and to engage meaningfully with key policy making bodies. The relevance of this coalition was recognized as both timely and relevant by Mr. Anil Jain, Additional Secretary of the MoEFCC in the report prepared by the coalition. When the need for a national cooling plan was prioritized and six thematic working groups were created by the Ministry to draft the India Cooling Action Plan, the coalition members were fully prepared. They led four of the thematic working groups working on the ICAP and had representation across all six working groups.

Aligning for solutions and amplifying impact for cleaner air

On 14-15th February 2019, Shakti and the Clean Air Platform convened health and climate grantees and funders in New Delhi. The goals of this meeting were to increase strategic coordination and alignment of air pollution initiatives, to increase impact through collective action, and to help establish formal and informal alliances among parallel initiatives to support synergies.

Over the course of the meeting, the more than 50 attendees, both funders (16 foundations and bilateral aid agencies, including the World Bank) and grantees (25+ organizations), deepened their understanding of the current landscape for air quality issues related to monitoring, modelling, impacts, communications, advocacy, mitigation measures, and city action plans. In small-group discussions, they identified top priorities, knowledge gaps, opportunities, and challenges. Donors and grantees together explored alignment of potential new initiatives.

A key outcome was identifying ways to capture and share key lessons as currently funded initiatives move forward and new initiatives begin. The meeting established a shared understanding among participants of the landscape of air pollution work in India, including the health sector's role in advancing progress. Pilot projects were identified that can be scaled up.

Making mobility more sustainable through congestion pricing

Transport Demand Management measures (TDM) such as congestion pricing can help improve mobility and reduce pollution in a rapidly urbanizing world. Congestion pricing is levied on motor vehicles passing through high use areas such as city centres in order to moderate traffic. It is an important measure for cities like Mumbai where the use of cars and two-wheelers has increased considerably. According to the Comprehensive Mobility Plan (CMP) for Greater Mumbai (2016), the total number of personal motor vehicles increased from 0.79 million in 2001 to 2.27 million in 2015. The plan also highlights the relevance of congestion pricing in this regard.

As part of efforts to inform the development of a congestion pricing strategy for Greater Mumbai, Shakti-supported a workshop to shed light on stakeholder perspectives on the issue. The workshop was organized by the Mumbai Metropolitan Region Development Authority (MMRDA) and the Institute for Transportation and Development Policy (ITDP) on 6th March 2019 in Mumbai.

Key transport governing agencies of Mumbai including the Brihanmumbai Electric Supply and Transport (BEST) as well as civil society organizations and mobility service and technology providers attended the workshop. Critical issues relating to congestion pricing schemes, technologies required, institutional measures and challenges to implementation were discussed. These inputs will be used to inform the strategy and outreach material that will be built around congestion pricing for Greater Mumbai.

Strengthening the health sector's response to climate change

Shakti was a partner to the 'National Health Conclave on Climate Change and Health – Role of the Health Sector', which was held in New Delhi on March 23rd 2019. The conclave highlighted the health impact of climate change in India and appropriate risk mitigation and adaptation strategies, with a specific focus on the health sector. It was organized by the Public Health Foundation of India (PHFI) and the Association of Healthcare Providers of India (AHPI).

According to a UN report, health risks related to climate change are on the rise worldwide posing a major burden to vulnerable populations. Air quality is inextricably linked with climate change, causing respiratory and cardiovascular illnesses. The response of the health sector to this challenge, then assumes immense significance

Given these concerns, the conclave brought together representatives from government, research institutions, academia, industry, and international agencies find solutions for accelerated action on climate change and health-related issues. It concluded with an inspiring concert themed 'Let us Live' featuring Grammy award-winning composer, music producer and environmentalist, Mr. Ricky Kej.

MARCH 2019

Creating synergies, advancing solutions at the Shakti Dialogues 2019



India is accelerating clean energy to provide affordable and reliable power to a vast population, while at the same time tackling climate change on several fronts. In many ways now, Shakti has been deeply involved in these efforts by driving policy solutions, aligning stakeholders and moving agendas forward. This year, as we celebrate our 10th anniversary, we are also immensely pleased to announce that our annual flagship event, the Shakti Dialogues turned five.

Since 2014, the Shakti Dialogues have fostered interaction amongst a diverse group of stakeholders including our grantees and partners, private players, and policy and decision makers working at the local, state and national level. The Dialogues are designed to provoke thought and strategize on topical themes on clean energy and climate action in India, explore areas of collaboration and advance collective solutions. This year's Shakti Dialogues 2019, held from 18-20th February, were no different. We convened over 100 representatives from organizations across India to deliberate on:

1. Developing financial frameworks for accelerating clean energy solutions
2. Catalyzing climate action through corporate leadership
3. Addressing challenges related to energy efficient clean cold-chains
4. Addressing climate change mitigation through sub-national actions
5. Realizing the goal of universal energy access
6. Improving the state level regulatory environment for urban transport

The sessions were introduced by Mr. Krishan Dhawan, CEO of Shakti and chaired by distinguished members of the Shakti Board and Advisory Board including Mr. Nitin Desai (Former Under Secretary General, United Nations) and Mr. Suman Bery (former Director General of the National Council of Applied Economic Research, and Mr. Harish Hande (co-founder of SELCO), as well as Mr Arunabha Ghosh (Founder-CEO of the Council on Energy, Environment and Water). A number of actionable and practical ideas emerged from the dialogues and we look forward to following up on them.

India's National Clean Air Program to get support from philanthropies and CSOs

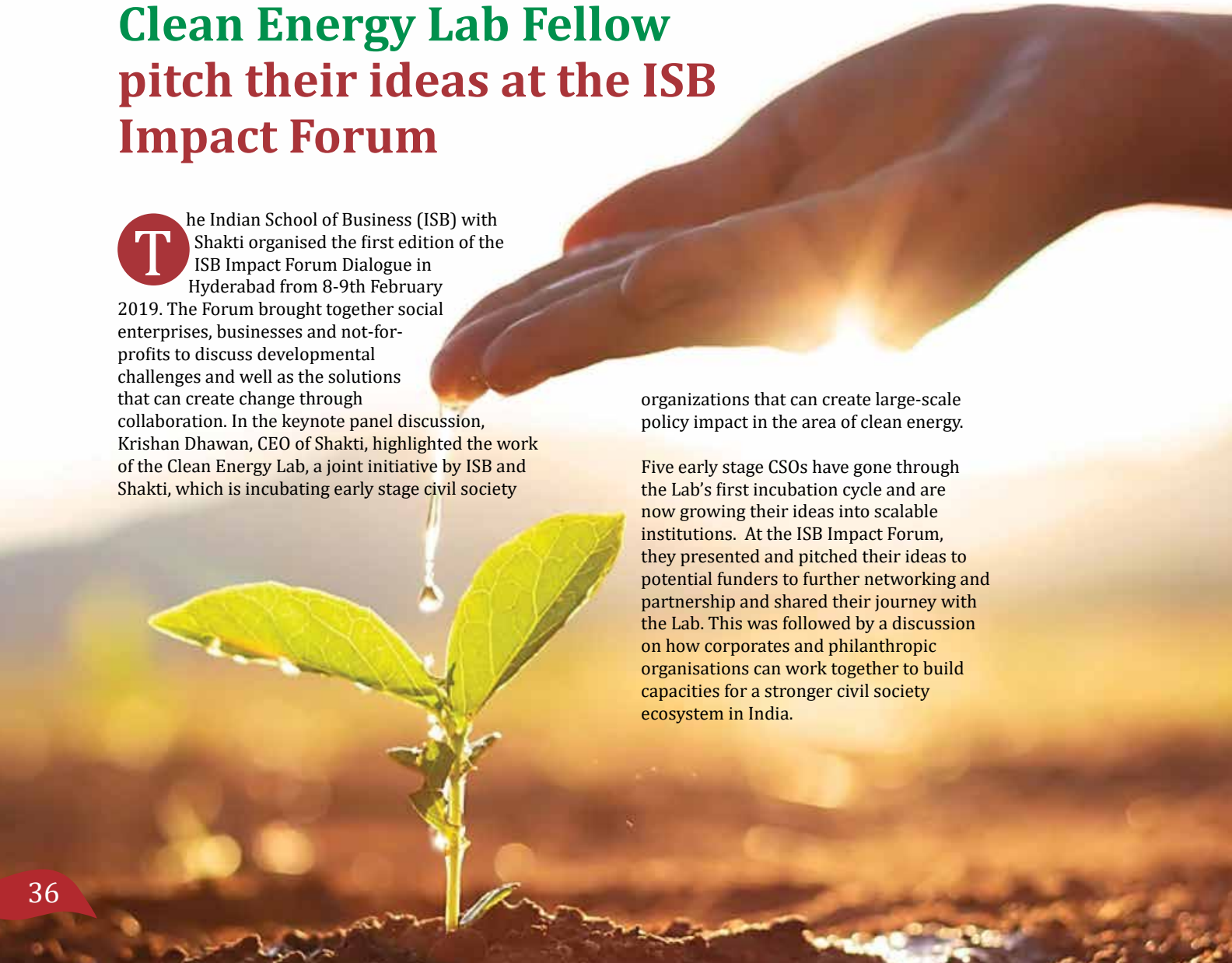
Shakti has joined hands with the Ministry of Environment, Forest and Climate Change, Bloomberg Philanthropies, The Energy and Resources Institute and other partners under a new initiative that offers technical assistance on air quality issues in support of the National Clean Air Program (NCAP). In 2017, air pollution led to 1.24 million or 12.5% of the total deaths recorded in the country and several Indian cities have seen alarming PM2.5 levels. Therefore, the need for the NCAP as well as its effective implementation holds immense importance.

As part of this initiative, Shakti is working with a group of Indian cities to create a better understanding of the sources of air pollution through the development of emissions inventories and source apportionment studies. Shakti will also help design policy solutions on the basis of data and consultations, and well as increase stakeholder capacities through knowledge exchange. "Ensuring clean air to breathe for our citizens is one of the defining challenges of our times as we continue our path of development and urbanization," said Krishan Dhawan, CEO of Shakti Sustainable Energy Foundation at the launch of the initiative at the World Sustainable Development Summit 2019 organized by TERI in New Delhi.

Clean Energy Lab Fellow pitch their ideas at the ISB Impact Forum

The Indian School of Business (ISB) with Shakti organised the first edition of the ISB Impact Forum Dialogue in Hyderabad from 8-9th February 2019. The Forum brought together social enterprises, businesses and not-for-profits to discuss developmental challenges and well as the solutions that can create change through collaboration. In the keynote panel discussion, Krishan Dhawan, CEO of Shakti, highlighted the work of the Clean Energy Lab, a joint initiative by ISB and Shakti, which is incubating early stage civil society organizations that can create large-scale policy impact in the area of clean energy.

Five early stage CSOs have gone through the Lab's first incubation cycle and are now growing their ideas into scalable institutions. At the ISB Impact Forum, they presented and pitched their ideas to potential funders to further networking and partnership and shared their journey with the Lab. This was followed by a discussion on how corporates and philanthropic organisations can work together to build capacities for a stronger civil society ecosystem in India.

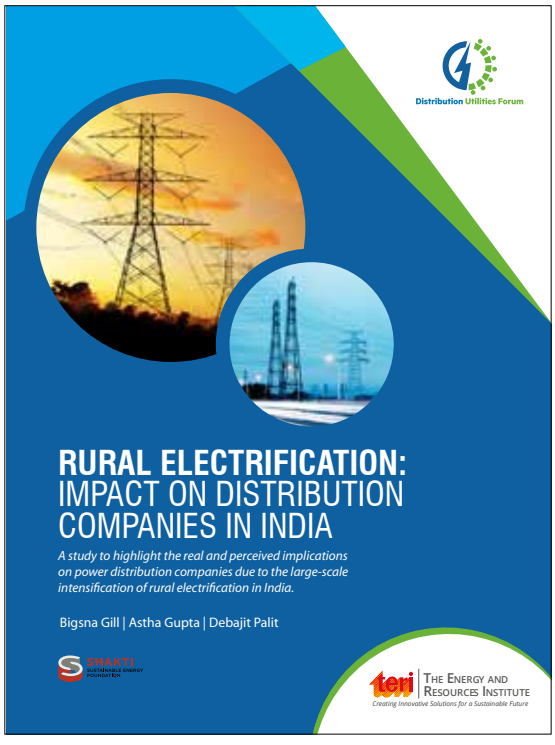


A new platform for innovative cooling strategies

The India Cooling Action Plan (ICAP) sets out a roadmap to meet the country's burgeoning cooling energy demand, which is expected to see a 15-fold increase by 2050. The goal of this plan is to provide sustainable cooling and thermal comfort for all as well as socio-economic benefits. But there is a long way to go, particularly in terms of exploring more efficient and advanced cooling technologies at affordable costs.

The Platform for Innovative Cooling Strategies is an important step towards meeting this challenge.

The platform will identify innovative and viable technology ideas suited to the Indian context. It will also recommend high potential technologies for piloting in select parts of the country advancing their transition them to the market. Shakti is supporting this platform along with the Natural Resources Defense Council (NRDC) India and Honeywell India with The Energy and Resources Institute (TERI) acting as the secretariat. The platform was officially launched at the World Sustainable Development Summit 2019 organized by TERI in New Delhi.



Rooftop solar gets a focus at the Distribution Utilities Forum

The Shakti-supported Distribution Utilities Forum held its third meeting on 22nd February, 2019 bringing together senior management of 16 electricity distribution companies (discoms) to discuss the implementation of rooftop solar systems. At the meeting, discom representatives held in-depth discussions on the challenges they face in implementing rooftop solar systems and the assistance they require to meet the 40 GW by 2022 target. The meeting also deliberated on the recently released phase II of the rooftop solar program including the expected revenue loss, adequacy of the incentives provided and metering options.

Mr. Gireesh Pradhan, former Chairman of the Central Electricity Regulatory Commission, chaired the meeting and set the context for discussion. Mr. Krishan Dhawan, CEO of Shakti and Mr. Ajay Shankar, Distinguished Fellow, TERI, were also present during the discussions. The Energy and Resources Institute (TERI), which functions as the secretariat for the Forum, shared the final report from the last meeting with the participants, titled 'Rural Electrification: Impact on the Discoms'.

Towards better planning and deployment for electric buses

In the face of increasing urbanization and air pollution, more and more Indian cities are looking at cleaner transport options such as electric buses. A few cities have launched electric buses under the Faster Adoption and Manufacturing of (Hybrid and) Electric vehicles (FAME) scheme, while many others are at different stages of planning and roll-out. Critical decisions will need to be taken around vehicle technology alternatives, incentive schemes and procurement models for electric buses, particularly in context of the soon to begin second phase of the FAME scheme.

Shakti is engaging with UITP to help cities take more informed decision in this regard. From 11th -12th February 2019, UITP hosted a training programme in Bangalore on planning and deployment of electric buses, with Shakti, the Association of State Road Transport Undertakings (ASRTU) and the Bengaluru Metropolitan Transport Corporation (BMTC). Shri DC Thammanna, Karnataka's Minister of Transport, Shri N. A. Haris, Chairman BMTC and Dr. N V Prasad, Managing Director at the BMTC provided the welcome address to the participants. The workshop was attended by approximately 40 participants from various STUs, CSOs and think tanks. Sessions provided an overview of the international market of electric buses and charging infrastructure, learning from FAME I, best practices for procuring electric buses, implementation challenges and considerations required during the transition, and lastly on how to build a roadmap and action plan for a full transition to electric buses.

FEBRUARY 2019

Patna to get clean air action plan

Shakti and Bloomberg Philanthropies are supporting the development of a clean air action plan for Patna. The plan comes at a critical time for the city, which in the last few years has seen increasing levels of air pollution. In 2018, the World Health Organisation ranked Patna as the fifth most polluted city in the world in terms of PM2.5 levels.

The clean air action plan, a first of its kind, outlines specific measures to control air pollution in Patna. Developed by a consortium of research institutions—the Centre for Environment, Energy and Climate Change at the Asian Development Research Institute, Center for Study of Science, Technology and Policy, and Urban Emissions—under the aegis of the Bihar State Pollution Control Board (BSCPB), the plan is underpinned by intensive research and several stakeholder consultations.

The key components of the plan, Patna's emissions inventory and the measures identified for pollution mitigation, were showcased at a validation workshop held on January 29th 2019 in Patna. This gave stakeholders the opportunity to review the proposed recommendations and provide inputs towards the finalization of the plan.

Several senior government officials attended this workshop including Dr. Ashok Kumar Ghosh, Chairman of the BSCPB, Shri Alok Kumar, Member Secretary of the BSCPB, Shri Chaitanya Prasad, Principal Secretary of the Department of Urban Development and Shri Sanjay Kumar Agrawal, Secretary of the Department of Transport. The workshop's keynote address was delivered by Shri Tripurari Sharan, Additional Chief Secretary of Bihar's Department of Environment Forest and Climate Change. The feedback received during the workshop will be used to finalize the Patna Clean Air Action Plan, which will be released in the next few months.

India Energy Transformation Platform to advance decarbonization pathways by 2050

India is actively taking steps to realize the goals set under the Paris Agreement. However, it must adopt a paradigm shift for planning and operating its energy systems to achieve a deeply decarbonized energy sector by 2050.

To support a long-term vision and strategy for India, Shakti along with the Center for Study of Science, Technology and Policy (CSTEP) launched the India Energy Transformation Platform, a multi-stakeholder initiative that will develop non-linear pathways for a decarbonised energy sector by 2050. For this, the platform will focus on system-level transformational solutions, technological advancements as well as market-based enablers.

The platform comprises a core group of energy experts from think tanks, development agencies, financing institutions, technology research institutions, law firms, academia and the private sector.

The first meeting of the platform was held on 8th January 2019 in New Delhi. Key action areas were identified some of which include hydrogen and its end-use applications, transport, sustainable financing and alternate market mechanisms. Members of the platform engaged in a lively discussion on challenges and opportunities that come with creating long-term sustainability pathways for India.

SAMEEEKSHA convenes southern MSMEs

The Shakti-supported SAMEEEKSHA (Small and Medium Enterprises Energy Efficiency Knowledge Sharing) platform held its second regional meeting in Coimbatore on 12th January 2019. Since its inception, SAMEEEKSHA has functioned as a collaborative platform that pools and shares the knowledge of institutions and key stakeholders working towards energy efficiency in India's MSME sector. It plays a critical role as the interface between representatives of the MSME sector, government, funding agencies and academia.

The meeting in Coimbatore brought together representatives from key government agencies, MSME Development Institutes (MSME-DIs) and several associations of various industry sub-sectors from southern India to deliberate on learnings, best practices and challenges being faced.

Mr Abhay Bakre, Director General of the Bureau of Energy Efficiency (BEE) and Mr Sudhir Garg, Joint Secretary of the Ministry of Micro, Small & Medium Enterprises (MoMSME) provided rich perspectives on these issues during their introductory remarks. In addition, insights were shared on successful energy efficiency intervention in select energy intensive clusters in southern India.

With India's MSME sector India contributing enormously to the economy, SAMEEKSHA's role and the resources it provides are being viewed an increasingly important. SAMEEKSHA was recently acknowledged in India's second Biennial Update Report (BUR) submitted to the UNFCCC, as an important intervention contributing to the implementation of the convention.

JANUARY 2019

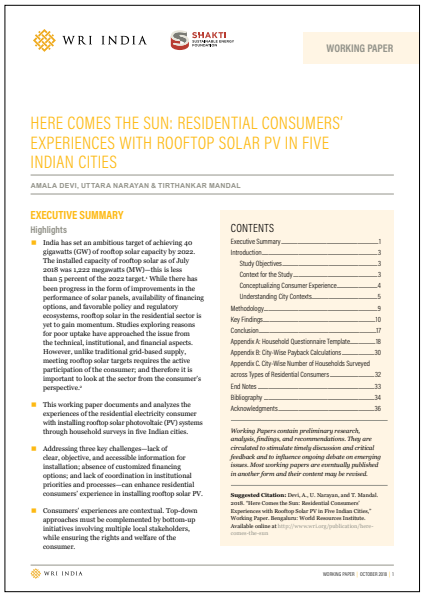
How to improve the customer experience for rooftop solar: A Shakti-funded study identifies challenges, provides solutions

Bolstered by a conducive policy environment policy and falling costs, rooftop solar has gained momentum, especially among industrial and commercial consumers. But for residential consumers, rooftop solar has not quite picked up yet, and there is very little information available on their perspectives.

To address this gap, Shakti funded a study to document consumer experiences in installing residential rooftop solar. The study surveyed households across five cities—Bengaluru, Chandigarh, Chennai, Jaipur, and Nagpur—to understand the challenges faced by residential consumers, and what has worked and not. This study has been undertaken by World Resources Institute (WRI) India.

The study identifies three key challenges. First, there is a need for clear, credible and objective information about rooftop solar PV that can be accessed by consumers. Second, the lack of customized financing options deters consumers. Third, the lack of coordination among the priorities of different government agencies has affected the consumer experience.

Addressing these issues can enhance the consumer experience and act as a significant catalyst in the adoption of rooftop solar amongst residential consumers. This is particularly relevant given the critical role this sector is expected to play in meeting India's solar and overall renewable energy targets by 2022.



WRI INDIA SHAKTI SUSTAINABLE ENERGY FOUNDATION

WORKING PAPER

HERE COMES THE SUN: RESIDENTIAL CONSUMERS' EXPERIENCES WITH ROOFTOP SOLAR PV IN FIVE INDIAN CITIES

AMALA DEVI, UTTARA NARAYAN & TIRTHANKAR MANDAL

EXECUTIVE SUMMARY

Highlights

- India has set an ambitious target of achieving 40 gigawatts (GW) of rooftop solar capacity by 2022. The installed capacity of rooftop solar as of July 2018 was 1,222 megawatts (MW)—this is less than 5 percent of the 2022 target.[1] While there has been progress in the form of improvements in the performance of solar panels, availability of financing options, and favorable policy and regulatory ecosystems, rooftop solar in the residential sector is yet to gain momentum. Studies exploring reasons for poor uptake have approached the issue from the technical, institutional, and financial aspects. However, unlike traditional grid-based supply, meeting rooftop solar targets requires the active participation of the consumer; and therefore it is important to look at the sector from the consumer's perspective.[2]
- This working paper documents and analyzes the experiences of the residential electricity consumer with installing rooftop solar photovoltaic (PV) systems through household surveys in five Indian cities.
- Addressing three key challenges—lack of clear, objective, and accessible information for installation; absence of customized financing options; and lack of coordination in institutional priorities and processes—can enhance residential consumers' experience in installing rooftop solar PV.
- Consumers' experiences are contextual. Top-down approaches must be complemented by bottom-up initiatives involving multiple local stakeholders, while ensuring the rights and welfare of the consumer.

CONTENTS

Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers are eventually published in another form and their content may be revised.

Suggested Citation: Devi, A., U. Narayan, and T. Mandal. 2018. "Here Comes the Sun: Residential Consumers' Experiences with Rooftop Solar PV in Five Indian Cities." Working Paper. Bengaluru: World Resources Institute. Available online at http://www.wri.org/publication/here-comes-the-sun

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India's second Biennial Update Report to the UNFCCC acknowledges two Shakti-supported efforts

Two Shakti-supported efforts—The GHG Platform India and the SAMEEEKSHA (Small and Medium Enterprises: Energy Efficiency and Knowledge Sharing) platform—have been acknowledged in India's second Biennial Update Report (BUR) submitted to the UNFCCC. The BUR, prepared by the Ministry of Environment, Forest and Climate Change (MOEFCC) is an important requirement towards the fulfilment of India's reporting obligation to the UNFCCC. It carries pertinent information on India's GHG inventory, mitigation actions, needs and support received.

The BUR quotes SAMEEEKSHA as a 'e-platform providing comprehensive information as well as an opportunity for representatives of the Micro, Small & Medium Enterprises (MSME) sector for an interface with policymakers, funding and development agencies, R&D institutions and academia to promote energy efficiency and best operating practices in the sector.' Shakti has been supporting the platform since last year.

The BUR further acknowledges the GHG Platform India, a collaborative platform of civil society organizations that prepares GHG emission estimates at the national level and for states. Shakti supported the setting up of the platform in 2015 to address a critical data gap—the lack of updated, reliable, and publicly accessible GHG inventories for the country.

The recognition of both initiatives by the MOEFCC in the BUR underscore their valuable role in efforts contributing to the implementation of the convention.

Shakti launches "India Electric Mobility Initiative" to advance electric mobility in India

The transformative push for electric mobility is a welcome development. The NITI Aayog estimates that the accelerated adoption of electric and shared vehicles could save $60 billion in diesel and petrol costs while cutting down as much as one gigaton of carbon emissions for India by 2030. Shakti was quick to recognize the big potential of electric mobility. We also recognize the need for bold policies and ambitious action to support this transition.

In 2018, Shakti officially launched "India Electric Mobility Initiative"—a joint philanthropic collaboration set to advance electric mobility in accordance with India's priorities. Key areas of work under this initiative include:

- Making electric mobility cost competitive
- Creating an enabling ecosystem through manufacturing, supply chain and job creation
- Demonstrating city-level pilots to showcase proof of success and replication in other cities
- Developing a charging infrastructure network across cities and highways
- Enhancing stakeholder awareness

Kickstarting with a national-level workshop held in December 2018 in New Delhi, the initiative convened key transport and civil society practitioners to deliberate on the above themes. In addition, the initiative has already commissioned research and development projects that seek to promote electric mobility in India.

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