Federal Ministry
for Economic Cooperation
and Development

Federal Ministry
for the Environment, Nature Conservation,
Building and Nuclear Safety

Implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

KFW

Ministry of Environment Forest
and Climate Change

Indo-German Cooperation on Climate Change

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

For over 60 years, GIZ has been working jointly with partners in India, in sustainable economic, environmental and social development. Currently, GIZ has over 300 staff in India, of whom 85% are national personnel.

India is fast emerging as an economic and industrial power. It is a member of the Group of Twenty (G20), and of the BRICS-Association of major emerging economies, named after its members Brazil, Russia, India, China and South Africa. Despite the country's rapidly growing economy, poverty and social issues remain a challenge. The burgeoning population and accelerated urbanisation in the country have resulted in an environment at risk, and greenhouse gas emissions that continue to spiral upwards. GIZ, in close cooperation with Indian partners, offers tailor-made solutions to meet local needs and achieve sustainable and inclusive growth.

The key focal areas of Indo-German cooperation are currently

- energy
- the environment
- sustainable economic development.

Our main commissioning parties are the Federal Ministry for Economic Cooperation and Development (BMZ) and the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). In addition, we work for Indian public sector clients, the European Union and foundations. The Government of India has launched several initiatives to address the country's environmental and social challenges, and GIZ is contributing to some of the most significant. For example, it is supporting the National Urban Sanitation Policy as part of the Clean India Campaign (Swachh Bharat Abhiyaan) in partnership with the Ministry of Urban Development. GIZ is also constantly exploring how to contribute to further initiatives in India.

www.giz.de

KfW Development Bank

KfW Development Bank is Germany's leading development bank and an integral part of KfW. KfW Development Bank has been working under the German Federal Government to achieve its goals in international development cooperation for more than 50 years. In this regard, KfW is both an experienced bank and a development institution with financing expertise, expert knowledge of development policy and many years of national and international experience. On behalf of the German Federal Government, and primarily the Federal Ministry for Economic Cooperation and Development (BMZ), KfW Development Bank finances and supports programs and projects that mainly involve public sector players in developing countries and emerging economies. The main objective of the German Government is to work together with the Indian Government in facilitating inclusive growth and reducing poverty.

Germany and KfW are longstanding partners of India. Since the 1950s, more than EUR 11 billion has been sanctioned by the German Government through KfW Development Bank, mainly in the fields of Energy, Financial Sector Development, Health, and Protection of the Environment and Natural Resources.. The Energy Sector is one of the focal areas of the Indo-German Cooperation and shall contribute to meeting the demand for energy services in a safe, reliable, and environmentally sustainable manner.

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Acknowledgement

Climate change is a threat to sustainable development. We need to work together to reduce and manage risk and adapt to the climate change through various actions. One single nation cannot achieve the desired results. India and Germany have been working together under bilateral technical and financial cooperation for last 50 years. This cooperation in recent times has scaled up in sectors such as renewable energy, energy efficiency, forest, urban and rural development, agriculture, water, etc.

India and Germany have had a rich cooperation engagement, both technically and financially, for the last 50 years.

In today's increasingly borderless world, global and national economies hinge on the commitments and contribution they make and the actions they take. Nations can achieve their climate change targets through knowledge-transfer, experience-sharing, skill development and resource efficiency.

We acknowledge with gratitude the inputs generated and collated by GIZ through implementation of bilateral projects and bringing out the brochure highlighting the Indo-German cooperation on climate change in India. We hope this brochure binds the spirit of cooperation to meet the intended results.

Preface

Dear Reader,

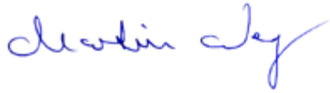
Worldwide seasons are changing, temperatures are increasing and sea levels are rising. Rainfall pattern too has become erratic and extreme weather events are now common and intense. Climate change significantly impacts our economies, communities, and our ecosystems and, our path to sustainable development and growth is severely compromised.

India is one of the most vulnerable countries to climate change as its economy is still intrinsically linked to its vast natural resource base. Climate change can adversely affect livelihood, food security, health, and ecological resources. Under the leadership of the Ministry of Environment, Forest and Climate Change (MoEFCC) India is committed to tackle climate change through multiple political initiatives. The National Action Plan on Climate Change (NAPCC) was launched in June 2008 as a national strategy and all Indian states were directed to prepare their State Action Plan on Climate Change (SAPCC). Also, the recent India's Intended Nationally Determined Contributions (INDCs) are testimony to the commitment and responsibility of confronting climate change. India is well positioned to deal with the complex nature of climate change through a highly skilled institutional landscape.

In the last 25 years, India and Germany have strengthened and broadened through multiple initiatives their cooperation and strong partnership on climate change. It continues to intensify its cooperation in developing climate-friendly and sustainable solutions for India's expanding energy and other needs. The German Federal Ministry for Economic Cooperation and Development (BMZ) cooperates technically and financially on climate change mitigation and adaptation measures. The cooperation has supported the implementation of the State Action Plans on Climate Change, promotion of investments in natural resource management and urban environment protection, climate change adaptation and mitigation and introduction of innovative green technologies. Many of the areas of collaboration are in sectors that have a great potential to mitigate greenhouse gas emissions from energy, industry and forestry.

In the recent Indo-German annual negotiations on development cooperation – held in September 2015 – 1.5 billion EUR have been committed towards various bi-lateral technical and financial projects. Eighty percent of these projects will support India in adapting to and mitigating of climate change. Additionally, the implementation of the Green Energy Corridor Partnership is underway with 1.15 billion Euros financial commitment from Germany. In the Indo-German Joint Declaration on Climate Change and Energy Technology Cooperation, Indian Prime Minister Narendra Modi and German Chancellor Angela Merkel committed to enhancing and fostering joint solutions in the field of climate change and sustainable development through initiatives such as the Indo-German Climate and Renewable Alliance. The alliance is a comprehensive partnership aimed at harnessing technology, fostering innovation and making finance for clean and renewable energy accessible and affordable. Both the countries stressed that adaptation to climate change must be a central part of a balanced Paris Agreement and will endeavour to continue their long-lasting cooperation in integrating adaptation into national and state development planning and action.

The brochure captures the broad canvas of a long-lasting Indo-German bilateral cooperation in the area of climate change adaptation and mitigation. I am certain that this document will provide an insight into our cooperation with India while also stimulating ideas for future engagement.



Dr. Martin Ney
Ambassador of the Federal Republic of Germany to the Republic of India

The Challenge of Climate Change

The 5th Assessment report of Intergovernmental Panel, released in 2014, on Climate Change (IPCC) has concluded that warming in the climate system is mainly caused by human influence. The report highlighted a warming of 0.85 ^{0}C during 1882-2012 and a rise of sea level by 0.19 m during 1901-2010. This impacts freshwater availability, oceanic acidification, food production, flooding of coastal areas and increase in the incidence of vector and water borne diseases -- all of which are associated with extreme weather events. It has been projected that continued emission of greenhouse gases (GHG) will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impact on people and their ecosystems.

Adaptation and mitigation measures to climate change are complementary strategies for reducing and managing the risks of climate change. Substantial GHG emission reduction can lessen the susceptibility of climate risks, enhance prospects for effective adaptation, and in the long term reduce the costs and challenges of mitigation, while contributing to climate-resilient pathways for sustainable development.

India with its diverse agro-climatic zones is particularly vulnerable to climate change. It is one amongst the various other challenges faced by the nation, along with increasing population, poverty and environmental degradation. As per the Second National Communication -- submitted to the United Nations Framework Convention on Climate Change (UNFCCC) by Government of India-- it is projected that the annual mean surface air temperature may rise from 3.5°C to 4.3°C while the sea level along the Indian coast is estimated to rise to about 1.3 mm/year by the end of the century. These climate change projections can adversely affect the country's human health and key economic sectors such as agriculture, water, natural ecosystems and biodiversity.

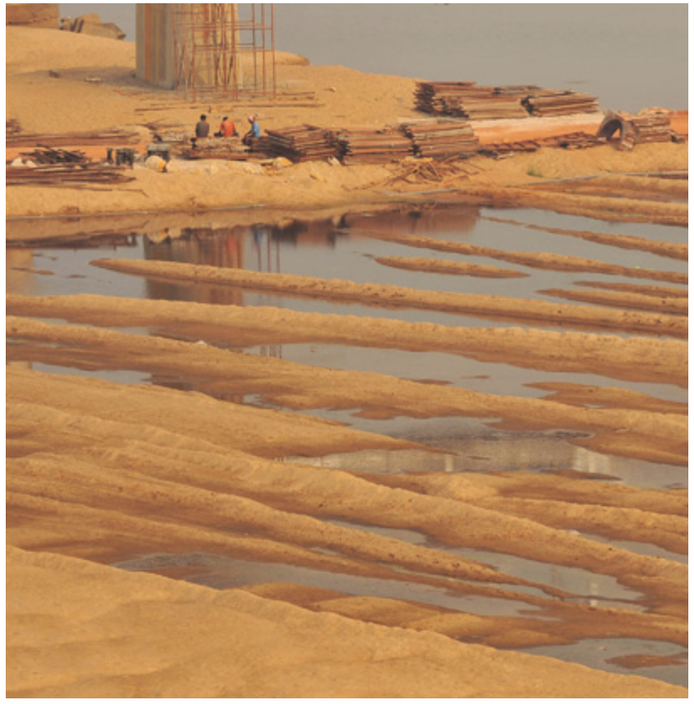
India is implementing the National Action Plan on Climate Change or NAPCC. The NAPCC identifies measures to promote the country's developmental objectives while helping address climate change issues effectively.

The NAPCC includes eight national missions in specific areas of renewable energy, energy efficiency, habitat, water, sustaining the Himalayan eco-system, forestry, agriculture, and strengthening scientific knowledge on climate change. State/Union Territory governments have also prepared their State Action Plan on Climate Change (SAPCC) which is in line with the objectives of NAPCC. SAPCCs address the priorities of state/Union Territories (UT) while creating an enabling environment for the implementation of NAPCC. These action plans and other climate change aspects are overseen and steered by the Prime Minister's Council on Climate Change, set up in 2007 and reconstituted in February 2015.

In India, the German Development Cooperation is adopting a multi-level approach to combat the risks of climate change. We give policy advice at the national and state levels - including preparation and implementation of SAPCCs; implementing projects on mitigation and adaptation and developing & testing innovative approaches and techniques.

Technical Cooperation
GIZ Approach to Tackling Climate Change

GIZ, acting on behalf of the German Federal Government and other clients, supports partner countries in implementing the Framework Convention on Climate Change. It aims to reduce emissions of greenhouse gases and adapt to the consequences of climate change. This calls for a transformative change that must be strengthened by the combined support of policy-makers, civil society and the private sector. GIZ advises on useful approaches and investments. It also implements climate policy guidelines through a wide range of practical measures in the partner countries.



Applying a Climate Lens

To ensure sustainable development despite the climate change impacts, GIZ develops the Environment and Climate Assessment for projects and programmes, and carries out Climate Proofing of strategies, investments, and policies. This ensures that climate change is considered during the project design and implementation. It also defines where innovation is necessary. These methods are field-tested and trusted by GIZ and are adjusted for adaptation.

Disseminating Tried and Trusted Techniques

Good examples of some tried and trusted techniques in the field of mitigation are: the promotion of renewable energies, energy efficiency, and forest conservation. This is true also for adaptation to climate change, once climate risks and solutions have been identified and prioritised, it is possible to use familiar techniques, such as efficient irrigation methods or planting of mangrove forests to protect coastal zones. Reinventing the wheel is not necessary in most instances.

Building Alliances

GIZ builds alliances in its partner countries and internationally with leading institutions from the government, and the scientific and business sector. It develops innovative solutions right from the stage of ideation to implementation while jointly working on its efficient dissemination.

Policy Advice

GIZ provides support to national, regional and local governments. It gives policy advice such as climate strategies in adjusting sectoral policies, capacity development and institution building. GIZ also helps to create an 'enabling environment' for investments in climate friendly technologies and foster innovation in the economic and private sector. It provides necessary environment to participate in the existing and upcoming frameworks of UNFCCC such as NAMAs. It transfers knowledge and climate-friendly technologies to partner countries while creating a room for political dialogue on results of research and experiences with climate change strategies.

Capacity Development

GIZ is dedicated towards developing capacities and competencies of those working in the context of climate change. It enables a learning and exchange process and strengthens the decision-making abilities of individuals, organisations and societies.

ICT for effective knowledge management

GIZ is active in the field of ICT to facilitate sharing of learning and knowledge around climate change adaptation. It provides interactive platforms for different stakeholders that help in synergising policies, research, innovations and adaptation challenges faced by rural communities.

GIZ PRINCIPLES FOR CLIMATE CHANGE ADAPTATION AND MITIGATION

Innovation where necessary, dissemination where possible, working hand-in-hand with strong alliance partners: are the core guiding principles of GIZ so as to make effective contributions in tackling the global challenge of climate change. GIZ builds on its strengths and successful approaches of policy advice and capacity development.

Mitigation – Reducing Emissions

There are many proven techniques and ways to reduce greenhouse gas (GHG) emissions. GIZ cooperates with institutions and partner country governments in developing appropriate sectoral policies and measures.

Power, industry, habitat and forests are amongst the chief sectors that can contribute to reductions in carbon emission. This has been stated in the submitted 'Intended Nationally Determined Contribution (INDC)' of the Indian Government to the UNFCCC, that highlights planned domestic and internationally supported climate action.

Many initiatives are jointly implemented by the Indian Government, the private sector and GIZ focussing on the mitigation of GHG. These initiatives contribute to the Indian National Action Plan on Climate Change (NAPCC) with its five missions that look at: increasing solar capacity, enhancing energy efficiency, ensuring sustainable habitat, expanding the forest cover and improving strategic knowledge.

There is an increased focus on Nationally Appropriate Mitigation Actions (NAMAs), and sectoral GHG mitigation actions. Both are key to India's sustainable development. GIZ and MoEFCC have developed two such proposals for the waste and forestry sector. In sync with the national policies on climate change, GIZ supports the design of market-based solutions (including CDM) to reduce GHGs and preparation of climate change action plans for cities.

From connecting rural households to renewable energies, supporting energy security and enhancing the energy efficiency in MSMEs to enabling the Perform, Achieve and Trade (PAT) mechanism or implementing the Energy Conservation Act, the power sector in India plays a crucial role in mitigating GHGs. GIZ works closely with the Indian Government on decreasing India's dependency on fossil fuels.

GIZ works with different ministries, businesses and institutions, to develop ways in reducing GHG emissions in the following areas:

- Renewable energy
- Energy efficiency
- Industry
- Carbon Markets
- Nationally appropriate mitigation actions, framework and concepts
- Incentives for economic and private agents to invest in mitigation
- Demand-side management
- Urban habitat and waste management

Adaptation – Preparation for Change

Proactive measures to deal with climate variability and change can substantially reduce many of the adverse impacts of climate change on human beings and natural systems. Adaptation comprises a wide range of behavioural, structural and technological adjustments. GIZ works with its partners on adaptation at all levels. It works to raise awareness for climate change impacts and the need for adaptation, enhance capacities to deal with the adverse impacts of climate change, and implement technical adaptation measures. Examples of technical measures include diversifying livelihoods, building flood defences and altering farming practices (e.g. shifting to more heat and drought-resistant crops). Adaptation also means examining policies, programmes and investments with regard to climate change vulnerability and modifying them, if necessary.

In India, GIZ collaborates with national, state, and local governments, vulnerable and affected communities, scientific institutions, private sector to adjust to a changing climate. Through these activities contributions are made to: the National Water Mission, the National Mission for Sustaining the Himalayan Ecosystem, the National Mission for Sustainable Agriculture and the National Mission on Strategic Knowledge for Climate Change of the Indian National Action Plan on Climate Change.

GIZ is currently engaged in partnerships to address the impacts of climate change in the following initiatives:

- State-level vulnerability and risk assessments
- State Action Plans on Climate Change
- Technical adaptation measures
- Climate finance
- Climate Proofing to assess risks and identify necessary adaptation measures
- Human capacity building through orientation programmes, trainings and networks
- Information and Knowledge Management for adaptation

GIZ also engages in a variety of activities that promote sustainable environmental management, such as watershed management and enhancing sustainable, natural resource-based livelihoods.

Financial Cooperation
KfW Support to Climate Change related Investments in India

Within German Development Cooperation, KFW (Development Bank) is responsible for the execution of Financial Cooperation. It extends concessional funding and grants to Indian partners for investment financing and related consultancy services. Annual project funding commitments for climate change related investments in India have been increasing continuously over the years and has reached EUR 700 million (INR 5000 crore) in 2014. The concessional resources are provided by the German government through KfW.

Financial cooperation follows the strategic direction of: mitigating the avoidable change, adapting to the unavoidable. It is well known that India faces severe challenges due to expected climate change and is ranked as one of the highly vulnerable countries. At the same time, India's energy consumption is known to expand exponentially in the coming decades, and most of the energy infrastructure still needs to be built. This opens enormous opportunities for low-carbon investments, taking advantage of national and international technology developments and cost reduction trends. India is expanding in all directions: economic growth, urban agglomerations, energy consumption, infrastructure, and thus needs to achieve even higher economic growth rates to lift the living standard of its sizeable population. KfW assists India in achieving this in a climate friendly way, and at a significant scale beyond pilot investments.

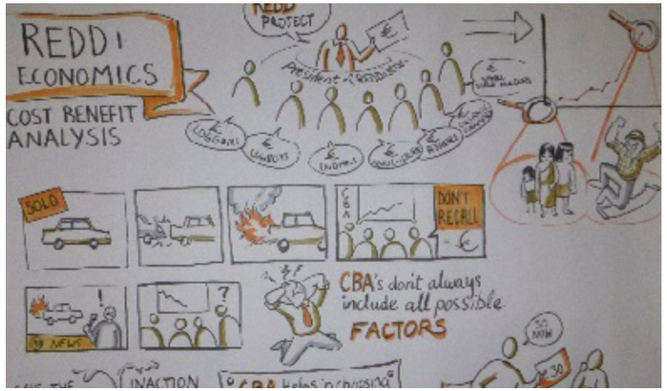
Technical Cooperation

Mitigating Greenhouse Gases

Global Carbon Markets

The Clean Development Mechanism and Joint Implementation (CDM/JI) initiative was created in 2008 by the BMUB to use the available flexible mechanisms (CDM/JI) to promote the Kyoto Protocol and to support actors using the opportunities of the carbon market. The CDM/JI-Initiative has adapted to developments in the international carbon market and international climate policy, as well as the commitment of the CDM host countries since 2008. The focus is no longer solely on the mobilisation of individual CDM projects, but also on a combination of carbon market activities in line with climate change policies of host countries.

The project seeks to improve the capacity of public decision-makers and private sector stakeholders to increase the participation of companies in channelising existing and new carbon market instruments for the implementation of national climate protection activities. Currently, key activities include supporting the National Clean Development Mechanism Authority (NCDMA) of the MoEFCC in approving project proposals and managing the Indian CDM portfolio, research and analysis for new carbon market instruments as well as extensive stakeholder engagement, capacity building and knowledge management.



The project has successfully created awareness amongst CDM project developers, supported the NCDMA in revising its CDM Host Country Approval process and developed a management information system for the same. It has evaluated the Indian carbon market and analysed sustainable development impacts of CDM projects, developed a number of innovative carbon mitigation and trading tools (VCS for REDD+, Green Freight, CSR) and participated and contributed to numerous high-level events in Asia and Europe.

Development and Management of Nationally Appropriate Mitigation Actions (NAMA) in India

Internationally there has been a growing attention towards a promising new instrument called 'Nationally Appropriate Mitigation Actions', or NAMAs. NAMAs aim at reducing greenhouse gas (GHG) emissions while fostering sustainable development in developing and emerging countries. Developed during the UNFCCC negotiations, they aim at denoting planned and voluntary GHG mitigation actions in countries that do not have legally binding emission reduction commitments.

In the Indian context, NAMAs offer a promising opportunity to support the Government in linking socially and ecologically acceptable economic growth with greenhouse gas mitigation. NAMAs can serve as proposals to access international support, in the form of capacity building, technology transfer or finances such as the Green Climate Fund. This way, the so-called 'unilateral NAMAs' (or domestic GHG-mitigation actions) will become 'internationally supported NAMAs', which may increase a country's mitigation ambition and also decrease future GHG emissions. GIZ supports the MoEFCC throughout the development of its first NAMA proposals.

The overall objective of this Indo-German cooperation project, funded by the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) and implemented by GIZ, is that the Indian Government uses NAMAs as an option for the mitigation of greenhouse gases. Also, MoEFCC provides technical support through a NAMA coordination cell. The project has a strong capacity development focus and provides technical support to develop the first NAMAs in the sectors -- waste and forestry. Further, the project supports the MoEFCC in developing a NAMA-Manual for India in order to provide guidance for future NAMA developments for line-ministries and other stakeholders. To ensure national appropriateness and in order to build the needed support for the implementation of NAMAs, the project is characterised by a multi-stakeholder driven process.

NAMA supporting the processing and disposal of Municipal Solid Waste (MSW)

India generates 144.000 tonnes per day of MSW and out of which less than 20% are scientifically treated. As we found in a feasibility study, under a BAU scenario the greenhouse gas emissions (GHG) of MSW will more than double in the next 15 years, from roughly 19 million to to 41 million tCO2eq in 2030, while cities above 1 million inhabitants will contribute over half of the total emissions in 2030.

The sector has significant GHG emission reduction potential and high environmental, health and social co-benefits. Our study concludes that the three best-performing mitigation technology options for the NAMA include 'RDF for co-processing in cement plants', 'composting' and 'biomethanation' while 'waste treatment incentives with technology-differentiated results-based payments' scored high under policy-based instruments. All options can be implemented in the Indian context and are in line with flagship programmes like the Swatch Bharat Mission, Smart Cities and the Waste to Wealth Mission under the NAPCC.

The NAMA for international support shall be based on one technology-based option combined with a fiscal policy-based instrument and will contribute to meet the INDC goal of reducing the GHG emission from the waste sector.

Resource Efficiency

Fostering Resource Efficiency and Sustainable Management of Secondary Raw Materials

India is a rapidly growing economy. In recent years, it has seen changing lifestyles that is leading to disproportionate use of existing resources. India is expected to have the world's third largest consumer group by the year 2020 - with a consumption share of 13%. With escalating consumption patterns, the demand for resources is only pointing upwards. It may lead to stressing of our economic, environment conditions and access to resources. Resource efficiency through material-efficient production processes has so far not been adequately explored by the Indian industry, particularly, the Small and Medium Enterprises (SMEs).

The German Federal Ministry of Environment, Nature Conservation, Building and Nuclear Safety (BMUB), under its International Climate Initiative (IKI), commissioned GIZ to jointly implement with the Indian Ministry of Environment, Forest and Climate Change (MoEFCC) a three year project. The focus of the initiative is on resource efficient utilisation of raw materials, especially minerals and metals, since they are required by the fast growing industry and are critical to the Indian economy. The project aims to enable key Indian institutions, responsible for the formulation of environment, climate, and industry and resources policy, to aid and establish institutional frameworks that improve resource efficiency. The project also highlights the link between conserving resources and recycling raw materials, while simultaneously saving costs. It thus strengthens the competitiveness of industries and meets India's future demand for resources. The primary focal areas identified are the Construction and Demolition (C&D) and Automotive sectors. This is due to their high volume of resource consumption and high expected growth rates.

The project aims to achieve the following:

- Creation of knowledge through market assessments to understand the material usage and identify opportunities and challenges for reuse of secondary materials in the production process.
- Demonstrate and learn from the implementation of the identified pilots in specific sectors for resource efficient production and reuse of secondary materials.
- Installation of the Indian Resource Panel (InRP) to advocate policy recommendations for resource efficient production and usage of secondary raw material that are considered and adopted by the Indian government.

Eco-Industrial Parks

Industries are one of the major contributors to climate change and with over 330 industrial parks, Andhra Pradesh and Telangana are one of the leading industrialised states of India. The preliminary estimates from four existing parks quantify emissions at approx. 2.1 – 3.5 million tonnes of carbon dioxide equivalents (CO_2 eq.) per year and for two new parks at about 18 million tonnes of CO_2 eq., as per the figures of Andhra Pradesh Industrial Infrastructure Corporation Ltd. released in 2010. In the year 2010, the Andhra Pradesh Industrial Infrastructure Corporation Ltd. and GIZ have initiated actions to convert existing industrial parks into eco-industrial parks with funding from the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety. For a new Special Economic Zone, environmental and climate issues were incorporated in elaborate site master planning. The potential for greenhouse gas emission reductions was estimated to be considerable in the industries and industrial parks and if all the calculated potentials of various demonstrated activities would be fully tapped, CO2 equivalents of 3,844,193 tons per year could be reduced. The activities have the potential for replication in other parts of India, especially those that are fast industrialising such as the state of Gujarat

In the year 2011, for the industrial estate of Naroda in Gujarat, commissioning of which dates back to 1960's, climate change vulnerability assessment and adaptation studies were undertaken in selected industries and for the whole of industrial estate. This was done under the GIZ's Advisory Services in Environmental Management Programme. Climate change adaptation plans too were developed.

Ecoprofit

At the individual industry level, 'Ecoprofit'-tool was applied for achieving ecological and economic benefits in individual industries in 14 small and medium enterprises in Hyderabad. The STENUM Environmental Consulting and Research Company GmbH from Austria started Ecoprofit in Europe in early 1990. In India, GIZ Advisory Service in Environment Management programme, funded by the German Federal Ministry for the Environmental, Nature Conservation and Nuclear Safety, STENUM GmbH, and local and international consultants have been working on the implementation of the cluster based Ecoprofit tool in individual industry level (with SME's and MSME) since 2006. The tool helps in enhancing the efficiency of industries, reducing the demand for raw materials and energy, and minimising associated environmental impacts by working on emissions, effluents and wastes control. It also builds the capacities of the industrial teams. The tool thus enables the goals of sustainable development. The main focus of the programme was to set up a competent team of three to four employees from the participating industries so as to undertake step by step process improvements, including application of cleaner production and preventive environmental approach etc. Ecoprofit is bundled with training tools, interactive exercises, onsite assistance/consultation, and working out economic and environment savings. Finally, project evaluation of participating companies reveals that companies are able to utilise their resources (raw materials, production streams, energy, water etc) optimally. They are also able to strengthen the industry sector by using Ecoprofit tools and in future they are able to minimise industry waste in all possible streams.

So far, these activities have brought in savings of over 25 million rupees to the industries, which include savings of about 836,000 kWh/year of electricity, 2,804 tons/year of coal, 11,638 tons of furnace oil, 18,158 kl/year of water and 300 tons/year of materials (primarily tyre tubes).

Urban Climate Change

Cities and Climate Change Training and 'Sustainable Urban Habitat Action Plan'

Climate change has become a pressing concern because of human behaviour and the impact it has on our environment. Climate change is felt both at a regional level and at a city level. Most often city governments feel that climate change is a larger issue beyond the purview of the local governments, whereas in the present context, climate change is as much a local phenomenon as it is a global concern. Thus it needs to be looked at from all levels.

To address this gap, Government of India launched the National Mission on Sustainable Habitat (NMSH) under the Ministry of Urban Development (MoUD) in 2008. The mission examines the challenges faced by urban local bodies due to climate change through various mitigation and adaptation measures. The sectors include municipal solid waste, water supply, urban transport, building energy efficiency, urban planning and storm water drainage. Capacity building is also an important aspect of the mission.

As urban climate change is subjective, the knowledge and awareness rigour in the urban sector institutions both at state and city level in India was minimal. This resulted in poor implementation of NMSH in cities. Perceiving this gap in understanding, planning and implementation, GIZ under the Indo German Environment Partnership (IGEP) Programme initiated two steps.

IGEP supported the development of the 'Cities and Climate Change' training for urban officials at the city and state level under the GIZ TUEWAS sector network titled 'Cities and Climate Change'. This training was enhanced by the help of audio-visual material on Indian good practices. The training was institutionalised at a local training institute MEETRA in Nashik, Maharashtra. Officials from State of Maharashtra and Nashik Municipal Corporation attended the training.

As a step towards implementing urban climate related actions, GIZ-IGEP supported Nashik Municipal

Corporation (NMC) in preparing the first climate action plan, called the Sustainable Urban Habitat Action Plan (SUHAP). This was based on the National Mission on Sustainable Habitat (NMSH). SUHAP assesses both mitigation and adaptation related climate risks and identifies an appropriate mix of actions for reducing their impacts. SUHAP recommendations have been incorporated in the revised City Development Plan. Implementation of the identified measures is planned through NMC's own funds and through funds of external agencies like GIZ and Rockfeller. Funding is also foreseen under the newly launched Government of India schemes, namely, the Atal Mission for Rejuvenation of Urban Transformation (AMRUT) and the Smart Cities Mission

Climate Change Adaptation for Industrial Areas

The project Climate Change Adaptation for Industrial Areas is being implemented in the two states of Telangana and Andhra Pradesh. It will support the Andhra Pradesh Industrial Infrastructure Corporation (APIIC) and Telangana State Industrial Infrastructure Corporation (TSIIC), which together administrate over 330 industrial areas. The project will assist these two institutions to implement climate change adaptation measures in the industrial areas and to overcome the associated negative impacts and risks for the continuation of production and businesses by industries and for the workers.

The overall objective of the project is that key decision-makers and planning authorities are able to plan and design existing and new industrial areas in a climate-resilient manner.

Working groups composed of Indian officials, professionals, research and training experts, users from industries and international experts will be established covering the following intervention areas of the project:

- development of methodologies and guidelines,
- awareness-raising and capacity development,
- policy mainstreaming and upscaling, support planning and implementation of industrial areas.

The project cooperates with partners like: Disaster Management Authorities, Chief Inspectorates of Factories and Boilers, the Industrial Areas Local Authorities (IALAs), entrepreneurs and industrial associations, such as the Association of Lady Entrepreneurs of Andhra Pradesh (ALEAP), Federation of Indian Chambers of Commerce and Industry (FICCI).

State Action Plans on Climate Change

The Government of India initiated the process of preparation of the SAPCC in 2009. It aimed to map regional climate vulnerability, examine future climate change projections and conclude sectoral implications for chalking out actionable strategies. MoEFCC and GIZ Natural Resource Management (NRM), as part of the project, 'Climate Change Adaptation in Rural Areas of India (CCA-RAI)' has provided technical assistance for the preparation of the SAPCCs to 16 states and two Union Territories (UTs) based on the request of the Ministry of Environment, Forest and Climate Change (MoEFCC).

These are Arunachal Pradesh, Assam, Dadra & Nagar Haveli, Daman & Diu Administration, Gujarat, Haryana, Jammu & Kashmir, Manipur, Meghalaya, Mizoram, Nagaland, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh and West Bengal. Out of the total supported plans, 14 SAPCCs have been endorsed by MoEFCC and rest of the plans are under various stages of finalisation.

The SAPCCs have been developed through a participatory planning process involving all major stakeholders that include government officers from various line departments, policymakers, institutions, academicians, non-governmental organisations, scientists, private sector, civil society and local communities. SAPCC includes the current and future state's climate change scenarios and the likely impacts of climate change on sectors such as water, agriculture, energy, tourism, health etc. Strategies were identified and prioritised to address the issues of the vulnerable areas, sectors and communities and their associated risks.

To operationalise the SAPCCs, MoEFCC requested GIZ-NRM to provide technical assistance for formulating proposals for funding under the SAPCCs for 11 states and two UTs. These were Andhra Pradesh, Punjab, Puducherry, Telangana, Karnataka, Gujarat, Meghalaya, Haryana, Lakshadweep, Mizoram, Nagaland, Tripura and Uttar Pradesh. GIZ in consultation with Government of Punjab, Puducherry, Telangana, Meghalaya and Karnataka initiated process of proposal development of the prioritised project. GIZ expects to complete the work of SAPCC proposal development in the rest of the states by the end of June, 2016.

Vulnerability Assessment

Assessing vulnerability to climate change is crucial for defining the risks it poses. It provides a start point for chalking measures to adapt to changing climate, and efficiently allocate financial and other resources to the most vulnerable people, regions and sectors.

Climate change vulnerability assessments are used to monitor and evaluate the success of adaptation measures. The work around vulnerability assessment (VA) forms an integral part of the project Climate Change Adaptation in Rural Areas of India (CCA RAI). The project carries out systematic VA exercises which support a comprehensive adaptive planning process at the local level demonstration projects, for piloting adaptation measures, and also at regional (State) level through climate proofing government programmes. While there are many methodologies available to assess risks and the vulnerability to the impacts of climate change, a gap between global scenarios and local risk assessments exist. MoEFCC and GIZ NRM programme supported the development of a VA approach in cooperation

with leading Indian and international institutions. The approach integrates and synthesises the outputs from various top-down and bottom-up vulnerability assessment methodologies.

Top-down indicator based vulnerability assessment for the state of Madhya Pradesh revealed current impacts of climate change and extent of vulnerability in across seven major sectors -- social, economic, agriculture, water resource, forest, health and climate. Despite some limitations of the methodology, lack of adequate data and information through climate models, the study at the state level has been a first of its kind in India. The results became part of the state's SAPCC and are being used by state departments for formulating adaptation strategies. The study is published as 'Vulnerability Assessment of Madhya Pradesh towards Climate Change'- under the MoEF-GIZ project on Climate Change Adaptation in Rural Areas of India."

CCA RAI demonstration projects on climate change adaptation carried out bottom-up vulnerability assessments in their respective project areas. The results of the vulnerability assessments were used by NGOs to define adaptation hypotheses while designing projects. In the process they developed adaptation focused on M&E frameworks.

Climate Proofing

The sustainability of public programmes, investments, or agricultural value-chains may be at risk due to climate change. GIZ has developed the tool Climate Proofing for Development to analyse whether intended benefits of investments and government schemes or agricultural production levels are threatened by the impacts of climate change. GIZ has already applied this tool in other countries, such as Mali, Morocco, Niger, the Philippines and Vietnam. It demonstrated the tool's value in developing concrete and feasible options to respond to climatic changes.

Adjusting Agricultural Value Chains

In the North Eastern Region, CCA-NER, is partnering with the Ministry of Development of North Eastern Region (MoDoNER) to focus on Climate Change Adaptation in 5 partner states (Meghalaya, Nagaland, Mizoram, Sikkim and Arunachal Pradesh). The project assists in the implementation of selected aspects of prioritised strategies of the State Action Plans on Climate Change in the water, forestry and agriculture sectors. This involves the analysis of risks to and opportunities for value chains that are economically important and also pro-poor.

Addressing Climate Risks in Watershed Development

The sustainable development and management of watersheds in India significantly contributes to increasing adaptive capacities of rural communities. However, if climate change is not accounted for in the planning process of watershed development projects, the success and ultimately the investments in the watersheds may be at risk. With the twin objective of maximising the climate change adaptation potential of watershed development as well as to make public investments in watershed more robust, the National Bank for Agriculture and Rural Development (NABARD), with the support of the GIZ Natural Resource Management programme and funding by German Federal Ministry for Economic Cooperation and Development, piloted Climate Proofing in two NABARD Watershed projects in the states of Rajasthan and Tamil Nadu. The GIZ Climate Proofing tool has been customised for NABARD's needs that are based on their guidelines for watershed development programmes. Entry points for the application of the Climate Proofing tool, in the planning cycle of the selected watershed projects, have been identified and appropriate adaptation options were implemented.

Climate Proofing//

Strengthening the Potential Environmental Benefits of MGNREGA

The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) works under the Act are largely focused on land and water resources, which include: water harvesting and conservation, soil conservation and protection, irrigation provisioning and improvement, renovation of traditional water bodies, land development and drought proofing. It has immense potential to generate environmental benefits. Under the Indo German bilateral cooperation, GIZ is supporting Ministry of Rural Development (MoRD) to harness such environmental benefits of the MGNREGA works by offering technical assistance in three partner states namely Rajasthan, Chhattisgarh and Andhra Pradesh. The key interventions are:

- Generate and create access to information on natural resources, production systems, environmental impacts of MGNREGS works and to assist in the village-level resource planning, designing and implementation.
- Demonstrate technically sound MGNREGS works to generate durable assets and thereby strengthen environmental benefits.
- Develop and demonstrate mechanisms to promote maintenance and management of assets created under MGNREGS.
- Identify capacity development needs of Gram Sabhas, Gram Panchayats and local MGNREGS administrators, develop guidelines and approaches for enhancing capacity and demonstrate in selected locations.
- Develop guidelines and approaches for monitoring environmental benefits generated through MGNREGS works.

Assess, suggest and demonstrate the institutional arrangements and management systems to optimise the flow of sustained socio-economic and environmental benefits,.

- Develop and demonstrate a strategy for diversifying employment and livelihood sources under MGNERGS, to enhance the resilience of rural communities to current climate risks and build adaptive capacity to cope with long-term climate change.

With this technical assistance at pilot sites (13 Gram Panchayats) in three states, GIZ aims to create environmentally sound and replicable models of assets. MGNREGA is India's flagship scheme in rural employment guarantee – a one of its kind globally.

Climate Change Adaptation Finance

Funding for designing and implementing climate change adaptation and mitigation plans/ projects is a complex policy issue and is a matter of intense debate in the multilateral negotiations under the UNFCCC for countries like India. As per the projection study conducted by the UNFCCC, worldwide a total additional investment of US$ 200-210 billion is required by 2030 to return Green House Gases (GHG) emissions to the current level, whereas for adaptation, it is estimated to be US$ 60-182 billion, which includes an expenditure of US$ 28-67 billion for developing countries.

Before 2010, there were not many dedicated funding windows to support climate change activities in India. An idea of a launching scheme on Climate Change was first proposed in the year 2010. A thematic scheme titled 'Climate Change Action Programme (CCAP)' with an objective to create and strengthen the scientific and analytical capacity for assessment of climate change and supporting the implementation of climate change actions in the country, was approved in 2014 with a total budgetary provision of Rs. 290 crore (EUR 41 million) for five years. Subsequently, a 'National Adaptation Fund for Climate Change' was set up in 2014-15, to support climate change adaptation actions in sectors like agriculture, water, forestry etc. A budgetary provision of Rs. 350 crores (EUR 49 million) for 2015-16 has been allocated. In the international front there are two major funds for adaptation which are Adaptation Fund and Green Climate Fund. In India NABARD is the National Implementing Entity (NIE) for accessing finance under the direct access route for both the funds. GIZ India is providing technical support to 11 states and two UTs for accessing finances from these sources.

MoEFCC and GIZ Natural Resource Management as part of the project 'CCA-RAI' demonstrated three projects located in Madhya Pradesh, Tamil Nadu and West Bengal, which have seized finance of USD 5.5 million from the Adaptation Fund Board under the UNFCCC for upscaling the project activities. GIZ-NRM programme has also supported state governments/NGOs in the process of proposal development for submission to the AFB (Adaptation Fund board) for accessing finance.

GIZ also supported in the accreditation process of NABARD as the NIE for Green Climate Fund for accessing climate change adaptation and mitigation finance for the states of India.

SEWOH : 'One World – No Hunger' initiative of German Government : Three programmes in India

The Global initiative 'One World – No Hunger' was started by the German Ministry of Economic Cooperation and Development (BMZ) in 2014. It aims to address some of the greatest challenges faced by humankind. Worldwide, almost two billion people lack daily food for leading a dignified, healthy and productive life. Spread across 13 countries, this global Initiative addresses six intervention areas, namely

- Food and nutrition security,
- Enhance resilience to prevent famine,
- Promote innovation,
- Promote socially and environmentally sound structural change in rural areas,
- Promote the protection and sustainable use of natural resources in rural areas,
- Promote responsible land use and access to land.

Under this initiative implemented by GIZ, India is part of three global programmes. These are :

1. Innovation Centres in the Agricultural and Food Sector: The project aims to use innovations in the agricultural and food sector to boost the incomes of smallholder farmers, create more employment opportunities, and to increase regional food supplies in the project's rural target areas. The project will work with a whole range of private-sector and public-sector organisations in the agricultural and food sector, including non-governmental organisations, enterprises, national and international associations, and farmers' organisations such as producer groups and cooperatives.
2. Food and Nutrition Security: The programme aims to improve food situation and resilience to food crises for the main target group comprising of women of child-bearing age, pregnant women, nursing mothers and small children. It forms the basis for enhancing the economic and social development of families and societies in general. Also, the programme supports the India government's efforts towards Scaling Up Nutrition (SUN) movement. It contributes directly to global efforts towards food security, in the implementation of the Second International Conference on Nutrition (ICN2) in 2014, which was initiated by the Food and Agriculture Organization of the United Nations (FAO).
3. Soil Protection and Rehabilitation for Food Security: The programme will promote soil conservation measures in about 4000 ha of land in selected states of India to improve crop productivity. It will also facilitate scientific cooperation and knowledge exchange among the practitioners and policymakers at the national and the international level. Land degradation is a topic of high relevance for India's food security agenda. Indian governments at national and state level show strong commitment to tackle land degradation. India has a rich experience in addressing food security and management of land resources, thus providing cross learning opportunities among the countries.

All three programmes promote networking between local innovation partners for faster and wider dissemination of innovations and learnings among the participating countries. Innovations may be technical – such as the mechanisation of agriculture, improved seed etc. However, in many cases the focus is on new paths for cooperation. Private enterprises and civil society – in Germany and the partner countries – also have a role to play in innovation partnerships.

Loss and Damage

Weather and climate-related loss and damage have increased exponentially in the last few decades. Recent projections in climate research say that a significant increase in the frequency and intensity of extreme weather events, as well as slow-onset climate-related changes, is likely. This poses a growing financial risk to the sustainable development agenda of particularly developing countries like India. As a result of these critical developments and rising concerns, the topic of climate change-related loss and damage (L&D) has taken on center-stage in the climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). It is expected that there will be greater emphasis on adaptation and L&D in the new climate agreement that is to be negotiated in Paris by end of 2015. Currently there is no commonly accepted definition on L &D in place, nor commonly acknowledged concepts or instruments to quantify economic and non-economic loss and damage. For India it is important to determine the risks and develop tools and methods to address them in order to achieve sustainable growth.

GIZ is conducting a pilot study to develop a detailed technical paper on loss and damage for India by taking

sectoral experiences from the states of Tamil Nadu and Odhisa. This will help in generating knowledge based approaches to address L&D associated with slow onset/rapid climate change events in sectors/ subsectors and states that are vulnerable to the adverse effects of climate change.

Learning about Adaptation

Knowledge management through use of ICT

GIZ works with NABARD and KfW under the UPNRM programme and promotes loan-based models for climate change adaptations. Share4Change is a web-based platform that enables cross learnings and exchanges of knowledge across various actors involved in the programme.

The project, Climate Change Knowledge Network in Indian Agriculture (CCKNIA), works with the Ministry of Agriculture to establish an ICT-enabled network for managing knowledge on climate change adaptation in Indian agriculture. This provides a two-way communication between experts, policy makers and farmers, thereby ensuring localised, timely and quality advisories on climate change adaptation.

Climate Change Knowledge Network in Indian Agriculture (CCKN-IA)

The National Mission for Sustainable Agriculture (NMSA) under the Ministry of Agriculture (MoA), Government of India, focuses on mainstreaming adaptation and mitigation measures in ongoing agricultural sector programmes. This is done to ensure economic stability, food security and sustainable livelihood.

Climate Change Knowledge Network in Indian Agriculture (CCKN-IA) is a technical cooperation project between GIZ and MoA that ensures participation of stakeholders at a national, state and district level through the exchange of updated, quality and timely advisories on climate change adaptation. It contributes to the operationalisation of NMSA.

The project is working on a pilot basis, in three Indian states. CCKN-IA has developed an open source platform called Network for Information on Climate (Ex) change or NICE. This platform facilitates effective and efficient knowledge exchange at all levels.

The project is steered by national and state level committees and through local multi-actor advisory groups. It works using the following approach -

- Developing and operationalising multi-tiered ICT platform for knowledge creation and dissemination: NICE integrates many knowledge partners with expertise in areas such as meteorology, agriculture science and extension systems to address local adaptation needs. The system is allows multimodal approach and enables a two-way communication so as to link farmers' needs to knowledge experts on a real time basis. The project turbo-charges existing mainstream extension systems and training capacities.

  Currently, over 350 users which include experts, validators, translators and others, are using NICE to generate and disseminate quality advisories.

  Besides advisories being sent as SMSs, directly to farmers; extension agents now also use tablets to disseminate advisories to farmers creating a more personal link. So far, nearly 18,200 farmers are actively receiving localised advisories generated through NICE using a multi-modal dissemination approach (SMS, poster, video links, notice boards).
- Capacity development of experts to develop localised quality knowledge on climate change adaptation: Local networks / consortium of experts have been created to facilitate effective exchange and integration of climate change adaptation knowledge.
- Mainstreaming innovations: CCKN-IA is building the capacities of local training institutions like State Agriculture Management and Extension Training Institutes (SAMETIs) and national institutions like National Institute of Agriculture Extension Management (MANAGE).
- Private sector partnership: CCKN-IA is working on a PPP mode with Reuters Market Light (RML) to provide market information and quality advisories on climate change adaptation.

Learning about Adaptation//

Capacity Development

Individuals and organisations to a large extent have the onus to steer effective adaptation action. Conducive political setting is also required for adaptation measures to work.

GIZ-India conducts workshops and training programmes in line with the strategies outlined in the National Mission on Strategic Knowledge for Climate Change under NAPCC.

GIZ Worldwide in cooperation with the Organisation for Economic Co-operation and Development (OECD) developed a training course on 'Integrating Climate Change Adaptation into Development Planning' in 2010. The intensive participatory training course aims at building a systemic thinking towards climate adaptation. It offers a set of tools to integrate adaptation into the development thinking, planning and implementation. The course is supplemented with informative literature and training aids. The project CCA RAI uses this training course and customises it to meet the learning needs and demands of stakeholders in the Indian context. The process involves assessing training needs, developing customised training content, inducting local sector experts as thematic resource persons and finally delivering the trainings. CCA RAI has conducted several trainings on Integrating Climate Change Adaptation into Development Planning since 2011 at multiple levels and for different stakeholders such as NGOs, adaptation practitioners, government officers, and others.

The training imparted to stakeholders has a multiplier effect. It is further disseminated by those trained in the course to spread awareness and knowledge on adaptation.

Government officials are also part of the trainings. It helps them integrate climate change adaptation measures into the planning processes.

GIZ NRM has also supported NABARD in developing a critical mass of officers in handling adaptation project development, appraisal, M&E for national as well as international finance sources. GIZ has also integrated climate change adaptation and finance training modules and methodolgy into the training curricula of BIRD (Bankers Institute of Rural Development).

Learning about Adaptation//

Demonstration Projects for Adaptation

MoEFCC and GIZ supported the governments of the four partner states and local communities through NGOs and other relevant stakeholders in identifying, developing and carrying out adaptation measures in pilot regions. The partner states – representing India's different agro-climatic zones – are Madhya Pradesh, Rajasthan, Tamil Nadu and West Bengal. In total, nine demonstration projects have been implemented under CCA RAI project in the four partner states.

The target groups of the projects are the vulnerable rural population of India, who depend on their natural resources for livelihood, and are therefore most susceptible to climate change. The projects cover diverse agro-ecological regions. They range from the coastal zones in West Bengal and Tamil Nadu, to rainfed crop production regions of central West Bengal and Madhya Pradesh, to pasture lands in semi-arid Rajasthan. All projects carried out under the CCA RAI component on 'climate change adaptation measures' are based on the following adaptation hypothesis: Carrying out adaptation measures leads to increasing the resilience of communities to deal with climate change. Testing, evaluating and demonstrating the results of these projects to help enrich the overall adaptation knowledge, and leading to replication of adaptation measures at a large scale. Monitoring and evaluation (M&E) frameworks were developed by the NGOs to track the progress of the demonstration projects. Local vulnerability assessments were carried out at the outset of the projects. A process called systematisation was used to document learnings from the projects and give implementers a chance for reflecting on their projects' link to adaptation, its successes, and its failures. All demonstration measures were evaluated post completion to summarise the social, environmental and economic benefits and associated costs arising from different adaptation interventions. Recommendations are available for upscaling of successful approaches.

Mainstreaming Climate Change Adaptation
(experiences from AdaptCap)

AdaptCap was an EU-GIZ combi-financed project with AVVAI Village Welfare Society (AVVAI), Academy of Gandhian Studies (AGS), adelphi and ICLEI South Asia as project implementation partners. The AdaptCap project aimed to strengthen adaptive capacities and minimise risk for coastal communities in Andhra Pradesh and Tamil Nadu. It interlinked activities of climate change adaptation (CCA), disaster risk reduction (DRR), climate change mitigation (CCM), and introduced the central role of partnership and integrated holistic planning. The project had four main components; creating a common understanding of risks posed by climate change; implementing pilot projects to mitigate the risks; capacity building of communities and local authorities; public awareness and visibility for mainstreaming of the adaptation approaches.

India's 7,500 km densely populated coastline is vulnerable to climatic changes and thus can endanger for human habitat and livelihood, environmental sustainability and agricultural productivity. Climate change, exacerbated by unchecked development, impacts the lives and livelihoods of these coastal communities. Small, rural coastal communities depend on natural resources and they lack capital and capacity to deal with the challenges that climate change brings. Even small changes to their surroundings have big impacts on their life.

Advancing governance of climate change across all levels of government and relevant stakeholders is crucial so as to avoid policy gaps between local action plans and national policy frameworks (vertical integration). It also encourages cross-scale learning between relevant departments or institutions in local and regional governments (horizontal integration). Vertical and horizontal integration has twin benefits: locally-led and bottom-up approach in which local initiatives influence national action and nationally-led plans helps in creating frameworks that in turn empowers the local decision-makers.

The project stresses on these two approaches in planning of implementing programmes in the two coastal states of India. This approach leads to synergies and reduces the risk of duplication of efforts. The vertical integration of local action (community based adaptation projects) with the developmental planning process is crucial for mainstreaming the local needs and priorities; this is also highlighted in the needs assessment survey. The horizontal integration enhances understanding among local authorities on climate change related risks and thus improves planning responses or demonstration measures in communities. Local plans can play a major role to initiate for action from the district and state authorities. Enabling linkages between the key sectors affected by climate change, match making with available funds/ schemes along with capacity building measures create a "win-win" adaptation policy.

The existing framework of Disaster Management Act and the process of developmental planning were used as entry points for the mainstreaming approach. A multilevel methodology, it combined activities at the local (village), state and national levels and used top-down and bottom-up dynamics. The top-down aspect was mainly through the framework of National Action Plan for Climate Change (NAPCC) and State Action Plans. The bottom up focused on bringing in knowledge, needs and implementation experience from the ground level into the policy, planning and programme development at the district, state and national levels. The information gathered at the local level through the AdaptCap project provided an overview on climate change impacts in certain regions within a state and district. It highlighted as to which impacts were most common and which measures were most critical to address these. It helped district level officers (or higher levels) to prioritise future actions and identify relevant offices that should be mainstreaming climate change into their existing activities. AdaptCap's principles' policy implication was that it helped in climate proofing, integrating of local, state and national planning processes with climate change and reaching out to a wider audience.

Learning about Adaptation//

Monitoring and Evaluation

M&E plays an important role especially when practitioners need to document results and improve their performance. It is especially important for chalking adaptation measures. M&E systems play two critical roles in ensuring effective adaptation:

- they support the long-term process of learning "what works" in adaptation and
- they provide a tool for practitioners to manage their work in the context of the uncertainty surrounding climate change impacts.

MoEFCC and GIZ NRM – with funding from the German Federal Ministry for Economic Cooperation and Development – has tested M&E techniques at different levels. These are drawing result chains with indicators that correspond to CCA RAI project components, aimed at enhancing the resilience of the vulnerable rural poor . It enables active learning about adaptation, techniques and processes, and tracks the effectiveness of the project. GIZ also carried out a scoping study on the proposed methodology of M&E for SAPCCs during the first phase of CCA RAI project. Based on the study, an M&E framework has been designed for Odhisa SAPCC. GIZ plans to develop M&E framework for SAPCCs of other states.

Climate Change Checklists – Madhya Pradesh

The choices we make today we make will determine the extent of climate change vulnerability we may face in the future. Development planners are advised to start taking account of the effects of climate change in their policies, strategies, projects and local government plans. The Madhya Pradesh State Action Plan on Climate Change (MPSAPCC) prepared by the Climate Change Cell of the Environmental Planning and Coordination Organisation (EPCO), Government of Madhya Pradesh, highlights key sectoral concerns and strategies to combat climatic risks through mitigation and adaptation.

The Climate Change cell of EPCO wanted to establish a mechanism that facilitates management of long term climate risks and uncertainties as an integral part of the state development planning. This intervention, initiated under the policy component of GIZ's Indo German Environment Partnership (GIZ-IGEP), developed Climate Change fitness checklists. The objective of the checklist was to contribute towards capacity development of the state government officials to coordinate and mainstream climate change issues in the developmental activities and policies.

The checklist approach supports the SAPCC's mission to address the regional concerns and to outline strategies required to develop a climate resilient state. Checklist preparation has been kept in line the SAPCC's vision, mission, strategy and actions to address Climate Change in MP. It focuses on certain sectors to provide guidance on the integration of climate sensitivity in policy-making. Also, it outlines the rationale for undertaking climate sensitisation measures and how incorporating them is beneficial to all stakeholders who formulate strategies, projects, programmes and policies. Checklists were prepared for the water and urban sector. Apart from stressing on policy issues; they went a step further and showcased the inclusion of climate change concerns at the project level in water and urban sector. A facilitator's manual was developed to make these checklists user-friendly and easy to replicate by other states. The checklists are available on the Madhya Pradesh Climate Change Knowledge Portal.

Renewable Energy

Rural Energy

The Indo-German Energy Programme – Access to Energy in Rural Areas (IGEN-Access) is a technical co-operation measure between the Federal Ministry for Economic Co-operation and Development (BMZ), Germany and the Ministry of New and Renewable Energy (MNRE), India.

The programme helps in improving the sector environment for formal and informal rural energy enterprises so as to enable them to provide affordable clean energy products and services to rural households, businesses and farmers.

Access to modern energy in rural areas in India is limited or not available : 20,000 villages are not connected to the grid (CEA, 2015); about 80 million households have limited or no access to electricity, 86% of rural households in India use biomass for cooking, and 44% use Kerosene for lighting (Census 2011). Indoor air pollution caused largely by traditional cooking practices result in 2 million deaths annually, of which most are women and children (Indian Journal of Community Medicine, 2014). 26 million diesel or electricity driven water pumps operate in India. The diesel pumps consume about 4 billion litre/a of diesel, and an estimated 85 million tons/a of coal are burned to operate grid-connected pumps (KPMG, 2014).

IGEN-Access activities aim to have a significant impact on reducing emissions by –

- Promoting solar water pumps that can save up to 1.75 million tCO_2/a when used instead of diesel pumps, and could cut emissions by 225-276 million tCO_2/a when grid-connected pumps are replaced with solar water pumps
- Supporting the Indian clean cook stove programme which aims at replacing about 3 million traditional cook stoves with energy efficient cook stoves. This cuts emissions by about 3-6 million tCO_2/a
- Promoting solar mini-grids. A small 50 KW system in an off-grid village can save up to 50 tCO_2/a (compared to electricity generated by coal power plants)

Commercialisation of Solar Energy (ComSolar)

The Jawaharlal Nehru National Solar Mission (JNNSM) targets have been revised in 2015 to 100 GW solar power capacity by 2022. With the declaration of these goals, solar energy became top priority within the energy sector. Considering the project objectives of ComSolar it is very positive that within this 100 GW target, 40 GW have been allocated to roof top PV systems. As of now the share of distributed photovoltaic systems (especially rooftops) has a miniscule share in the overall installed solar capacity of 3800 MW. It requires special attention and support.

GIZ under the ComSolar project is piloting successful business models and at the same time interacting at the policy level to improve the regulatory framework:

- **Demonstration projects** – Commercial projects having good replicability and significant CO2 reduction scope are being implemented with strong commitment from the partners (Examples: Rooftop PV portfolio of the Delhi Metro Rail Cooperation - several MW capacity installed as national lighthouse, Rooftop PV for Bangalore Cricket Stadium, 24/7 Solar thermal power plant IndiaOne in Rajasthan)
- **Policy Advisory** – Policy advisory and support to contribute to an establishment of the required regulatory framework is being done. This is one of the main prerequisite for the promotion of solar energy.
- **Capacity & awareness building** – The project organises specific training programmes, that include seminars and study trips for groups to enhance their knowledge and skills (Examples: campaign for solar process heat in industries www.soproindia.in, solar regulatory database and pathway for investors www.solarguidelines.in)

Renewable Energy//

Integration of Renewables Energies into the Indian Electricity System (I-RE)

The power sector contributes substantially to India's CO2 Emissions with 60% of the electricity production capacity from coal-fired power stations. Yet there are 300 million people who don't have access to energy. Energy security is a major issue with 31% (of total primary energy) as import dependency. The Indian government has recognised these issues and it focuses on, inter alia, the technical and economic potentials that a power supply based on renewable energies has, especially solar energy. The Government has recently announced target of 175 GW of renewables by 2022. The energy modelling studies is a pertinent tool to address the multi-dimensional challenges posed by energy system planning with high shares of fluctuating renewables.

Further, with continuing megatrend of urbanisation in India, PV roof-top systems offer an outstanding opportunity to contribute to a climate-neutral energy supply integrated into urban spaces. Indian Government has set an ambitious target of installing 40,000 MW rooftop solar systems till 2022. Aspects of safety, reliability and costs involved in the integration of rooftop solar systems into the distribution

network need to be taken into account.

The project, in a multi-level approach, aimed to support the integration of these high shares of renewables, with a special emphasis on solar rooftop, through techno-economic models, simulations and policy advisory:

- **Future Energy Vision:** A cost effective long-term energy vision for India with high share of renewables and access to energy for all through model-based energy scenarios.
- **Grid Integration of Rooftop PV:** A simulation based study on cost-efficient technical solutions for integrating high share of rooftop solar power plants in the distribution networks
- **Promotion of Rooftop PV:** Conduct studies and activities most relevant for the promotion of the solar rooftop sector.

Renewable Energy//

Solar Mapping

The Ministry of New and Renewable Energy in partnership with the GIZ's Indo-German Energy programme, funded by the International Climate Initiative of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, established a country-wide system for the collection of relevant solar data, and developed a monitoring and benchmarking system to optimise the outputs of solar systems. Data from more than 120 measuring stations is correlated with satellite data, which provides a basis for industrial development of solar energy. The project thus accelerates the planning and implementation of solar power plants, increases the current output and aims to improve forecast of production of solar power plants.

Renewable Energy//

Large Scale Grid Integration of Renewable Energy – Green Energy Corridors

The electricity system in India is facing many challenges. This is so because of increasing energy demand and a paucity of domestic energy resources – fossil fuels. Also, dependency on thermal power has resulted in an increase in India's greenhouse gas emissions.

In the National Action Plan on Climate Change (NAPCC), the development and deployment of energy from renewable sources like wind and solar is an important measure to reduce emissions and contribute to a sustainable long term growth path. India has announced that the capacity for renewable energy generation will reach 100 GW from solar and 60 GW from wind by 2022. In order to be able to evacuate electricity from these large renewable energy generation capacities, an expansion and modernisation of the intra- and interstate transmission as well as distribution grid is required. Due to their volatile nature, the large scale integration of renewable energy sources will also pose challenges to the management of the grid. Germany has expertise and experience with regard to the integration of renewable energy into its grid and the German Federal Ministry for Economic Cooperation and Development (BMZ) has thus agreed to provide concessional loans of one billion Euro through KfW bank to finance the grid expansion. The funding goes hand in hand with technical assistance measures implemented by GIZ under its Indo-German Energy Programme (IGEN). These measures will support the Indian Government in improving the framework conditions for integrating renewable energy into the grid.

At present the work is focusing on the following areas:

- Support in setting up of Renewable Energy Management Centres (REMC); this includes the areas of forecasting and balancing;
- Grid Management (recommendations on methods and tools for forecasting of variable renewable energy);
- Market design (ancillary markets, capacity markets);
- Regulatory issues (updating of existing grid codes and technical specifications, methods and tools for grid expansion and grid system stability).

Energy Efficiency

Implementing the Energy Conservation Act

India is aiming at an eight per cent annual economic growth rate of its gross domestic product. This means it must provide five to ten per cent more energy annually. In order to respond to the growing demand for energy, in a climate-friendly way, India has passed the Energy Conservation Act. In cooperation with the Indo-German Energy programme and the German KfW financed by the German Federal Ministry for Economic Cooperation and Development, India is implementing the act on all administrative levels.

Perform, Achieve and Trade Mechanism – PAT

The Perform, Achieve and Trade Mechanism – PAT is an innovative and challenging initiative under the National Mission on Enhanced Energy Efficiency. It is a market-based mechanism that assigns energy efficiency improvement targets for India's 478 industrial units, most energy-intensive, in currently eight sectors. In the next phase of PAT starting 2016, three more sectors will be added as another 300+ units. According to the scheme, industrial units that have achieved energy savings in excess of their target will be provided energy savings certificates (ESCerts). These ESCerts can be procured by the units that under-perform, to meet their target compliance requirements. Overall, the initiative provides the twin benefit of cost saving and mitigating climate change through a reduction in greenhouse gas emissions. The Bureau of Energy Efficiency and GIZ Indo-German Energy programme, financed by the German Federal Ministry for Economic Cooperation and Development, are enabling the setup of the PAT mechanism.

Energy Efficiency Certification

Household appliances and energy-intensive industrial equipment receive energy efficiency labels. This helps users to consciously choose energy-saving devices and equipment. The programme certified energy managers and energy auditors and supported the development of labelling standards. Stricter norms and standards for heavy industry, mapped out with the help of GIZ's Indo-German Energy programme (financed by the German Federal Ministry for Economic Cooperation and Development) created the preconditions for a transition towards modern, and energy-efficient technologies.

Dissemination of Energy Saving Lamps

Energy Efficiency Services Limited, a governmental organisation, founded with the support of GIZ with funding from the German Federal Ministry for Economic Cooperation and Development and the Bureau of Energy Efficiency is bringing down the cost for LED by mass purchase to ensure economies of scale.

Prime Minister launched a National Programme for LED street lighting as well as LED home lighting. Until 2016 100 cities shall have LED street lighting and 200 million bulbs being sold to residential discom customers (please expand). Consumers purchasing LED bulbs instead of incandescent lights will result in reducing peak demand by 10.000 MW.

The programme brought down prices from more than 300 INR (EUR 4.23) to less than 80 INR (EUR 1.13)/bulb within 18 months in India aiding the dissemination of LEDs worldwide

Industry

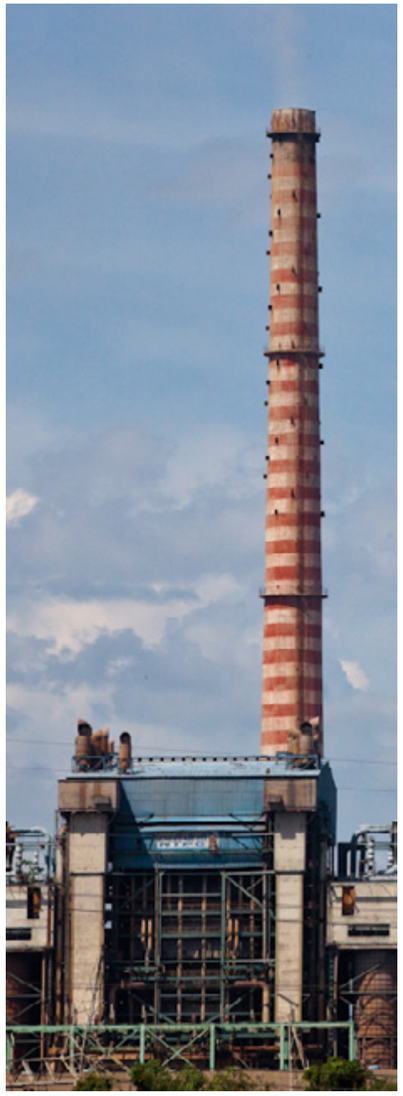
Cooling Without Warming

Many of the refrigerants and foam blowing agents used in refrigerators, freezers, air conditioning equipment and insulated 'green' buildings still contribute to the depletion of the ozone layer, harming the global climate. The hydro-chlorofluorocarbon number 22 for example, which is used as a refrigerant in most of the household air-conditioners in India, has a Global Warming Potential (GWP) of 1810. Under the Montreal Protocol hydro-chlorofluorocarbons (HCFCs) are to be phased out from 2013, but many of the ozone friendly alternatives have an even higher GWP than the substances they replace.

Through the Proklima programme, funded by the German Federal Ministry for Economic Cooperation and Development, and within the framework of the Montreal Protocol on Substances which Deplete the Ozone Layer, the Ozone Cell, MoEFCC and GIZ are providing policy advice and capacity development, training and qualification to service technicians. This cooperation also includes pilot projects for industry partners, that facilitate green technology transfer and helps in promoting a sustainable future. Proklima strongly supports the introduction of technologies based on natural gases such as Propane and Isobutane that do not deplete the ozone layer and have zero or very low GWP compared to HCFCs and hydro-fluorocarbons (HFCs).

For example, under the Ecofrig project and with support from the Multilateral Fund of the Montreal Protocol (MLF), one of India's major refrigerator manufacturers converted its entire manufacturing line to hydrocarbon based foam and refrigerant technology. Also more than 20,000 service technicians, most of them from the informal sector, have been trained all over India in better service practices and alternative technologies. In another project Indian small and medium enterprises have been supported in the phase-out of carbon tetrachloride, which has been used as a cleaning agent in textile and metal industries. Due to the high GWP of the substances that have been phased out under these projects, more than 4.4 Mio tonnes of CO_2 equivalent emission reductions have been achieved.

Within the framework of the International Climate Initiative the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Proklima works on the development and market introduction of energy efficient and climate friendly propane based household air-conditioners in India. The estimated impact of this project is more than 1.3 Mio tonnes of CO_2 equivalent emission reductions. Future activities of Proklima will focus on supporting India in the phase-out of HCFCs in the entire refrigeration and air-conditioning sector.



Sustainable Economic Development

Insulation Measures for Small and Medium Enterprises

ENERGY-EFFICIENCY: Moving India's small and medium enterprises towards a sustainable future was a Public Private Partnership (PPP) between the KAEFER-Group, the world largest provider of complete insulation solutions, and GIZ, supported by the German Federal Ministry for Economic Cooperation and Development. The PPP's objective was to provide access to advisory services, trainings and financial products to industrial Small and Medium Enterprises (SMEs) in selected regions of India which will then help them implement energy efficient insulation measures. At the same time, the project aimed to use the success on energy efficient interventions to raise the awareness of SMEs on competitive advantages of integrating sustainability measures into their operations. In two companies from the pulp & paper industry, energy efficiency measures were implemented and documented. In addition, financial institutions were trained on the importance of energy efficiency measures.

To reach its aim, KAEFER, its local subsidiary KAEFER Punj Lloyd Ltd and GIZ were drawing on the combined knowledge of three Indo-German initiatives. While the Indo-German Energy programme was supporting the technical aspects and the selection of the SME clusters, the Corporate Social Responsibility project of the Sustainable Economic Development (SED) programme focused on raising the awareness of environmentally and socially responsible behaviour of small and medium enterprises so as to reduce the demand on energy. The Micro, Small and Medium Enterprise Umbrella Project, also under the SED programme, in cooperation with Small Industries Development Bank of India (SIDBI), supported the development of financial services for select SMEs to finance the initial cost of insulation measures, implemented by the private partner KAEFER.

Financing Energy Efficiency

The Indian Micro, Small and Medium Enterprises (MSME) sector consists of approximately 46 million enterprises. It contributes to more than 8% of the Gross Domestic Product, according to figures of the Ministry of Micro, Small and Medium Enterprises (2014). Due to a large number of MSME units, the energy demand of the sector is huge. However the financial services for MSME to implement energy efficiency measures are still marginal. The Micro, Small and Medium Enterprise Umbrella Project of the GIZ Sustainable Economic Development programme and Small Industries Development Bank of India which completed in 2014 aimed to increase the capacity of Indian banks in the area of "green finance" and energy efficiency finance. To promote green finance, GIZ contracted the Frankfurt School of Finance & Management to conduct a study on international experience, analyse international good practices and propose a loan product that would improve the eco-system for the adoption of energy efficiency measures. Based on the findings, a pilot on the loan product was conducted in cooperation with State Bank of India in two MSME industrial clusters.

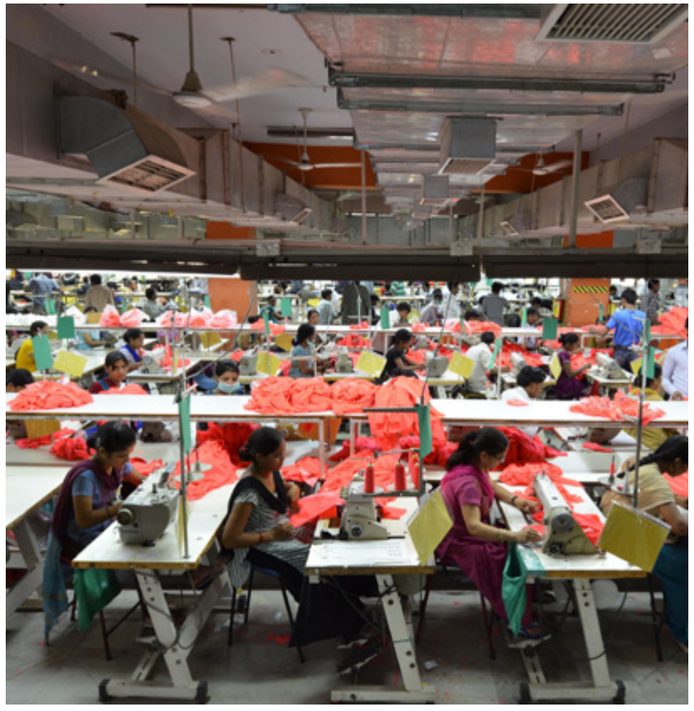
Despite broad efforts in the sector to promote Energy Efficiency (EE), the MSME market is still not responding well enough towards the implementation of EE measures proposed by numerous Energy Audits. One of the key barriers identified is the lack of reliable and affordable implementation support that MSMEs can draw upon. To address this, SIDBI launched an End to End Energy Efficiency (4E) initiative that supports MSMEs in adopting and implementing EE measures. This initiative is driven by the SIDBI's associate, viz. India SME Technology Services Ltd. (ISTSL) and draws upon the experience in the World Bank – GEF Program for Energy Efficiency. Thereby, ISTSL functions as a service provider for consultancy services in the field of technology, environment, productivity and efficiency.

The key to ISTSL's acceptance in the market lies in developing a robust engagement model with the SMEs, putting well-defined, streamlined processes in place and staffing the organisation with strong technical experts who communicate effectively with the MSME sector. ISTSL's success would increase the sector's comfort level with EE which in turn would lead to increased demand for EE financing. Based on these premises, GIZ works closely with SIDBI to drive the capacity building and institutionalisation of ISTSL. At the moment, work is underway to develop the standard operating procedures (SOPs) and contractual templates for ISTSL. These SOPs will be tested with SME units for robustness and completeness.

Sustainable Economic Development//

Sustainable Technology Innovation

The MSME sector, comprising of roughly 44 million micro companies and thousands of small and medium-sized businesses, has an enormous economic, social and environmental impact. The sector faces numerous challenges. These include pressure to use key resources like energy, water and raw materials more efficiently and to implement environmentally sustainable production processes. Improving sustainability-oriented innovations that contribute to more environmental and resource protection is therefore seen as important. By modernising and adopting green and inclusive innovations, India's MSME sector can create new economic opportunities and strengthen its long-term competitiveness.



The MoMSME-GIZ cooperation supported by the German Ministry of Economic Cooperation and Development (BMZ) aims at supporting selected MSMEs to enhance their capacity for developing inclusive and sustainable innovations by fostering cooperation between industry, academia and government. To this end the programme is setting up cooperation projects between all stakeholders that especially focus on energy and resource efficiency as well as environmental protection. Through different interventions, the project will support MSMEs to develop sustainable product, process and business model innovations.

- Contributing to the National Mission on Enhanced Energy Efficiency.

Sustainable Economic Development//

Sustainability Reporting

The business sector is a key player in tackling the climate change challenge through mitigation and adaptation measures. It requires an integration of environmental and social parameters in the businesses' core operations while also measuring and improving their performance. Disclosure and reporting to a wider set of stakeholders is also an integral part of this process. Evidence suggests that responsible business behaviour and reporting on sustainability parameters helps businesses manage their risks more comprehensively, and attract new opportunities of growth and finance.

The financial sector is also increasingly screened for its role in the sustainable development agenda. Environmental, social and governance related disclosures are a key lever for change. Against this background, GIZ's Sustainable Economic Development programme, supported by the German Federal Ministry for Economic Cooperation and Development, and partners like the Indian Institute of Corporate Affairs (MCA) have developed the National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business (NVGs, 2011). It also formulated a reporting format based on these Guidelines. In August 2012, SEBI, the market regulator made it mandatory for the top 100 companies to report on these guidelines through annual Business Responsibility Report (BRR). For the first time in India, sustainability related information is in the public domain against a systematic framework. Additionally, GIZ also engaged with SIDBI through the its 'Responsible Enterprise Finance' project with the financial sector which seeks to adapt the NVGs for financial institutions. A constant dialogue with investors, businesses and civil society forms part of the approach to demonstrate the business case for better

disclosures and performance on ESG/ sustainability. Recommendations for policy level and public institutions such as regulating bodies are drawn from here. Through these activities the framework conditions can be influenced to make mitigation and adaptation measures economically viable for businesses.

- Contributing to the National Mission on Enhanced Energy Efficiency

Sustainable Economic Development//

Climate Change Adaptation in the Indian Private Sector

Climate Change is a global phenomenon and it impacts everyone. Without remedying the current situation the lives of our future generation is severely periled. Expectations from businesses to take lead towards environment protection measures have grown. Under the Indo-German bilateral cooperation, since 2011 GIZ along with the Small Industries Development Bank of India (SIDBI) is implementing a project, funded through extra-climate funds on climate change adaptation, to strengthen the role of Indian MSMEs. The objective is to enhance and expand the service environment of Indian MSMEs in the field of climate change while also strengthening their "responsible competitiveness".

Based on two studies on climate change impacts and adaptation needs of MSMEs and resulting risks and opportunities, the online-tool www.climate-expert.in has been developed. This tool raises awareness and builds capacity of Indian micro, small and medium enterprises in the field of climate change adaptation. The Climate-Expert comes with a practical guideline on how to adapt to the Climate Change impacts and also has a qualitative instrument to analyse the potential in the value chain with regard to climate risks, adaptation measures and access to new markets. An interactive e-tool on the portal allows entrepreneurs to develop a real time adaptation strategy. Apart from the Climate-Expert tool, a pool of trainers across India has been established coming from various training institutions, academic professions and consultancies that offer Climate Change Adaptation Services to enterprises. A Training Manual was developed to equip these training organisations with support material. The Trainer Manual features power point slides with explanations, tips, background material and hand-outs. A consulting guidebook was also developed to assist future trainers and consultants to advise companies in developing and implementing a CCA strategy.

Financial Cooperation

Energy

In the domain of electricity generation, KfW assists India in expanding its zero-emission electricity generation, based on market ready renewable energy sources and technologies like Solar PV and Wind as well as small hydropower and biomass. KfW helps closing the funding gap for private investors both in terms of loan tenure and cost of borrowing through Public Development Banks like IREDA, PFC and REC. KfW also finances public utility investments for utility scale generation capacity, like for example Mahagenco in Maharashtra which builds up a portfolio of Solar PV plants under public-private partnership. India's renewables are moving towards grid parity, and Central government as well as most States takes this opportunity to satisfy growing demand for electricity.

The additional generation capacity is mostly on-grid and requires enhanced transmission capacity. India has developed the "Green Energy Corridor" concept to link generation hotspots to consumers. KfW works with Powergrid Corporation and State-level Transmission Companies to expand their power systems and improve their management to accommodate the strong expansion of renewables generation and consumption.

However, not all private households are on-grid, and access to energy remains a huge task for India. The government runs substantial programmes for off-grid power, and KfW supports investments in off-grid systems through IREDA, based on renewable energy sources.

Beyond market ready technologies and business models, India needs innovation to meet the challenges, both in terms of technologies and of business models. By providing funding and know-how, KfW contributes to such innovation, reduces financial risks and transfers its experience from Germany and the global market. As the largest development bank in Germany, responsible for the implementation of many German programmes for Energy Efficiency and Renewable Energy, as well as parts of the German "Energiewende", KfW is well experienced to transfer knowledge to India.

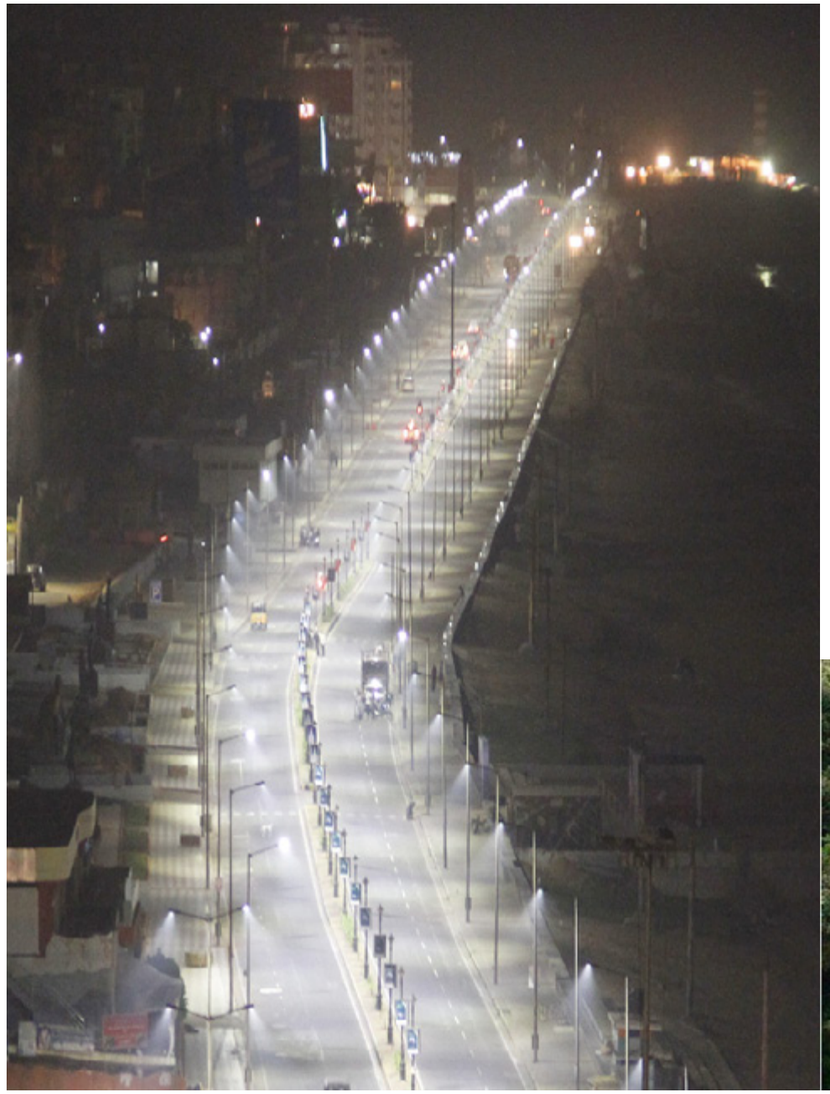
Energy//

Energy efficiency

Talking about energy efficiency, India has a large potential to reduce the energy intensity of its growth. The Indian Government has taken initiatives to improve energy efficiency on both demand and supply side. For example star ratings for household goods, certification of green buildings, PAT Scheme, and promotion of energy efficient production technologies in industry. KfW works with SIDBI for Energy Efficiency in MSME, with NHB on energy Efficient Housing, and with EESL on energy efficiency in households and public infrastructure (street lighting).

Urban Mobility

Another major energy consumer is the transport sector, mostly in the form of fossil fuels. Growth of urban population and increasing mobility needs more and more individual transport. This means increasing carbon emissions (and other impacts) of urban transport. India is responding to the situation by expanding public transport systems that commensurate with urban growth in a low-emission way. Metro systems for large cities and bus fleet expansion for urban areas, including Bus Rapid Transport Corridors and low-emission propulsion systems are India's preferred solutions today. Providing more transport capacity while reducing its energy intensity is the plan. KfW supports these efforts, with a clear emphasis on low-carbon technologies and systems, while also promoting innovation in public transport like non-motorised transport, system integration and management concepts that aim to improve the service quality of public and non-motorised transport, making it more attractive to leave your car at home.



Climate Change Adaptation

Adaptation to unavoidable change is an enormous task in a country like India, with numerous eco-zones, huge variety in vulnerability and coping capacity and simply the large scale of its population and geography. Thus, priorities have to be set, which India has done in the National Action Plan on Climate Change and State Action Plans. Various programmes are under way, and KfW is supporting them. Additionally, all KfW investment financing needs to ensure that an investment is "climate-proven", i.e. it is reasonably safe from damage due to climate change impact over the lifetime of the investment.

For a long time, KfW has been supporting the climate resilience of ecosystems, thus increasing adaptive capacity of people (livelihoods). Admittedly, these programmes were designed with a look at watershed and soil management in the 1990s, but it turned out that they generate significant adaptation benefits. On this foundation, new programmes integrate climate parameters and vulnerability assessments and provide better targeted adaptation solutions for rural households. Today, the emphasis of KfW support in India is on watersheds, soil and forest ecosystems that are the livelihood of the rural people.

The need for adaptation in urban development is different from the natural resource based regions of the country. Flooding, drought, heat islands, severe storms, is only some of the likely consequences of climate change. Climate sensitive urban planning as well as climate proven infrastructure is the need of the hour. In its efforts to support Indian urban development, KfW supports municipalities to prepare its infrastructure for such climate induced events by reducing the vulnerability of urban assets and people, and by enhancing institutional capability to adapt to weather induced challenges.

Climate Finance

Climate financing will remain a major topic for India. Implementing the agreements under UNFCCC, including the Green Climate Fund (GCF), is of major concern for the country.

As an accredited Agency under the GCF, KfW can access GCF funds for projects in India, as and when India requests such support via KFW.

List of Involved GIZ Programmes

GIZ Indo-German Environment Partnership on Urban and Industrial Development (IGEP-UID)

- Carbon Markets
- Development and Management of Nationally Appropriate Mitigation Actions (NAMA) in India
- Eco-Industrial Parks
  - Eco-Profit
- Resource Efficiency
  - Fostering Resource Efficiency and Sustainable Management of Secondary Raw Materials
- Urban Climate Change
  - Cities and Climate Change
  - Training and 'Sustainable Urban Habitat Action Plan'
- Climate Change Adaptation in Industrial Areas
- Learning About Adaptation
  - Climate Change Checklists – Madhya Pradesh
  - AdaptCap

GIZ Indo German Energy Programme (IGEN)

- Carbon Markets
  - Dissemination of Energy Saving Lamps
- Energy Efficiency
  - Implementing the Energy Conservation Act
  - Perform, Achieve and Trade Mechanism – PAT
  - Energy Efficiency Certification
- Renewable Energy
  - Rural Energy
  - Commercialisation of Solar Energy
  - Integration of Renewables Energies into the Indian Electricity System (I–RE)
  - Solar Mapping
  - Large Scale Grid Integration of Renewable Energy - Green Energy Corridors

GIZ Natural Resource Management Programme (NRM)

- Climate Proofing
  - Adjusting Agricultural Value Chains
  - Addressing Climate Risks in Watershed Development
  - Strengthening the Potential Environmental Benefits of MGNREGA
- Learning About Adaptation
  - Knowledge management through use of ICT
  - Capacity Building
  - Climate Change Knowledge Network for Indian Agriculture
  - Monitoring and Evaluation
  - Demonstration projects
- State Action Plans on Climate Change
- Vulnerability Assessment
- Loss and Damage
- Climate Finance
- SEWOH : 'One World – No Hunger' initiative of German Government : Three programmes in India

GIZ Sustainable Economic Development (SED)

- Energy Efficiency
  - Sustainable Technology Innovation
  - Financing
  - Energy Efficiency
  - Insulation Measures for Small and Medium Enterprises (Public Private Partnership)
- Sustainability Reporting
- Climate Change Adaptation in the Indian Private Sector

List of Involved KfW Programmes

Adaptation

- Himachal Pradesh Forest Ecosystems Climate Proofing Project
- Watershed Development Rajasthan
- Multipurpose Cyclone Shelters Orissa

Energy Efficiency

- Energy Efficient Credit Facility for SME
- Energy Efficient New Residential Housing
- Energy efficiency in public buildings and infrastructure (Phase II)
- Credit line demand side energy efficiency
- SIDBI Energy Effeciency in SMEs

Hydropower

- Promotion of Hydropower NEEPCO
- Shongtong Karcham Hydropower Plant
- Himalaya Hydropower Programme (HPPCL)
- Pare Hydroelectric Power NEEPCO

Mitigation

- Climate Friendly Urban Mobility
- Renewables
- Rural Elecrification Cooperation II
- IREDA Programme Sustainable Energy
- Clean Energy for Rural Development - REC
- Promotion of New Renewable Energy Projects (IREDA)
- Green Energy Corridors
- Promotion of Green Power (IREDA)
- Access to Clean Energy
- Environment and Energy Investment Program IIFCL

Solar PV

- Solar Photovoltaic Plant Sakri
- Research Cooperation Clean Energy Technology
- Large Scale Solar Power Programme (NTPC)
- Land Neutral Solar Photvoltaic Power

List of Abbreviations

AFB	Adaptation Fund Board
BEE	Bureau of Energy Efficiency
BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
BMZ	German Federal Ministry for Economic Cooperation and Development
CCA	Climate Change Adaptation
CCA NER	Climate Change Adaptation in North-East Region
CCA RAI	Climate Change Adaptation in Rural Areas of India
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CFL	Compact Fluorescent Lamps
CO_2	Carbon Dioxide
CO_2 eq.	The concentration of carbon dioxide that would cause the same amount of radiative forcing as a given mixture of carbon dioxide and other greenhouse gases (IPCC 2007)
CPU	Carbon Procurement Unit
CSR	Corporate Social Responsibility
CTC	Carbontetrachloride
DRR	Disaster Risk Reduction
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HCFCs	Hydrochlorofluorocarbons
HPPCL	Himachal Pradesh Power Corporation Limited
ICL	Incandescent Lamp
IIFCL	India Infrastructure Finance Company Ltd.
IGEN	Indo-German Energy programme
IREDA	Indian Renewable Energy Development Agency Limited
JNNSM	Jawaharlal Nehru National Solar Mission
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
MoA	Ministry of Agriculture
MCA	Ministry of Corporate Affairs
MNRE	Ministry of New and Renewable Energy
MoDoNER	Ministry of Development of North Eastern Region
MoEFCC	Ministry of Environment, Forest and Climate Change
MoMSME	Ministry of Micro, Small and Medium Enterprises
MoRD	Ministry of Rural Development
MoUD	Ministry of Urban Development
MSME	Micro, Small and Medium Enterprises
MSWM	Municipal Solid Waste Management
NABARD	National Bank for Agriculture and Rural Development
NAMA	Nationally Appropriate Mitigation Actions
NAPCC	National Action Plan On Climate Change
NEEPCL	North Eastern Electric Power Corporation Limited
NGO	Non Governmental Organisation
NRM	Natural Resource Management
PoA	Programme of Activities
PPP	Public Private Partnership
REDD	Reducing Emissions from Deforestation and Degradation
SIDBI	Small Industries Development Bank of India
SAPCC	State Action Plan On Climate Change
SED	Sustainable Economic Development
SME	Small and Medium Enterprises
UNFCCC	United Nations Framework Convention on Climate Change

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