



# The Role of the Private Sector to Scale Up Climate Finance in India

Final Report

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On behalf of:



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Environment, Nature Conservation,  
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## **Project**

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# Executive Summary

## Context

India has taken substantial steps to achieve its development objectives while addressing the threats posed by climate change. The Government has introduced National and State Action Plans on Climate Change, set up new institutions such as IREDA to scale up financing and established the Solar Energy Corporation of India (SECI) to facilitate implementation of national strategies. However, reports from the Ministry of Finance and the Low Carbon Expert Group have found that India faces a multi-billion dollar funding gap to implement its climate plans. The reports acknowledge that the bulk of the investments required to implement India's climate plans would come from the private sector.

In this context the public sector has a key role to play by providing the right signals and incentives to drive private investments. Typical barriers, such as high risk perception, lack of upfront

capital and high transaction costs, deter private sector investments. It is important to consider how available public finance can be used to develop "investment-grade" low carbon policy and regulatory frameworks to leverage private funds. In India, this will be crucial to work towards a successful implementation of mitigation schemes and in particular NAMA concepts to achieve transformational change.

In addition to the signals from a targeted low carbon and resilient policy framework, private sector investment decisions are influenced by broader macroeconomic policies, such as electricity market structure, fuel subsidies, central bank guidelines and international financial regulations (e.g. Basel III). Currently, there are conflicting signals from these broader macro-economic policies potentially driving institutional investors towards lower risk investments in tried and tested fields like fossil fuel production.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH contracted Ricardo-AEA and IIEC to review existing private climate finance flows in India and analyse the current challenges and opportunities for the private sector to scale up investment. A key part of the study was to develop a framework to define and measure private climate finance. A number of project developers, financiers, donors and government officials were consulted to obtain relevant information and discuss the findings.

### **The key findings of the report are as follows:**

- Tracking private climate finance flows is very complex, mainly due to definitional issues for public and private climate finance, data confidentiality issues and lack of common

approach (or incentive) to track climate friendly investments. Most forms of private finance in India have been leveraged by international and national public finance.

- Around USD 34 billion has been invested in India to mobilise private climate finance, predominantly in renewable energy, energy efficiency and transport.

- Since 1991, Multilateral Development Banks (MDBs) and bilateral finance institutions (BFIs) have mobilised around USD 8.4 billion leading to leveraged private finance flows.

- Local Private Finance Institutions, along with Local National and Private Banks have accounted for USD 9 billion of private finance in India since 1999.

– A mixture of local and international private investors have financed USD 16.3 billion worth of investment since 2001 and till 2019.

- Private investment will continue to rise in the future, as indicated by India's growing low carbon environment market, and the increasing number of environmental/green funds.
- The private sector in India faces significant institutional, financial, technical and behavioural barriers.

– Lack of policy clarity and engagement with private sector on climate change policy framework are the main institutional and policy barriers.

– There are numerous financial and economic barriers but the short-term nature of the local debt market, high credit risk and the lack of insurance (risk guarantees) particularly stand out.

– There are numerous technical and knowledge barriers leading to a lack of a regular pipeline of bankable projects.

– Limited fora to engage with the private sector and non-compliance with environment and social safeguards are the main behavioural barriers. Large Indian financing institutions (FIs) and corporates comply with voluntary and certain mandatory environment and social safeguard (ESS) standards not replicated by smaller business units.

- The National Mission on Enhanced Energy Efficiency (NMEEE) and the National Solar Mission (NSM) are showing strong potential to engage and leverage private finance by removing key barriers.

- There is strong potential and ambition from the private sector to scale up climate investments, but to do so, there are a number of measures to be taken:

– Regulatory reforms and incentives are required to provide long term certainty and reduce investment risks;

– Indian FIs need to develop new or scale up existing financing instruments, especially long term debt finance and risk guarantee instruments;

– In India only large private FIs and project developers have strong corporate social governance standards; compliance with environmental and social safeguard (ESS) measures is generally low.

- International credit lines have played a key role in scaling up private sector energy efficiency financing in India by addressing capital constraints, strengthening institutional structures and investing in capacity building.
- International NAMA financing can help to scale up private investment by creating the right policy environment, removing sector specific technical barriers, providing different forms of finance and support to implement large public-private programmes.
- International public financing can assist private sector in India to access funds from the GCF by improving compliance with more stringent fiduciary, environmental and social safeguard and MRV standards.

## Tracking private climate finance flows is very complex

There are no clear and agreed definitions for private and public climate finance which often makes it difficult to distinguish climate finance from both sources. Data confidentiality is an issue when tracking private finance. There are also data gaps for certain sectors, often where private institutions readily undertake investments, but are not

necessarily categorised as 'climate action'. Defining the boundaries and scope of low-carbon and climate friendly investments has also been difficult as there is no common approach across all financial institutions.

**Most forms of private climate finance in India have been leveraged by international and national public finance.** A broad range of institutions and sources are involved in mobilising

private climate finance in India. These include – a) multilateral and bilateral institution credit lines, which mobilise commercial financing from Indian FIs by providing funds to the institutions, which they can then on-lend to project developers or implementers, b) private finance leveraged by national public sector banks (e.g. State Bank of India) and financial institutions (e.g. IREDA) in India, c) finance that has been provided by private banks (e.g. Yes Bank) and financial institutions (e.g. IDFC) and d) mixture of local and international private investors (e.g. CDM investments). The data sources used for this study were a combination of project-level and aggregate data from a variety of sources.

**Around USD 34 billion has been invested in India to mobilise private climate finance, predominantly in renewable energy, energy efficiency and transport sectors**

**Multilateral Development Banks (MDBs) and bilateral finance institutions (BFIs) have**

**mobilised around USD 8.4 billion leading to leveraged private finance flows.** International credit lines continue to play a key role, contributing approximately USD 4.4 billion in the last ten years through loans to Indian banks and project developers for investments in energy efficiency within the building technology, industrial applications and renewable energy sectors.

**Local Private Finance Institutions (PFIs) along with Local National and Private Banks have accounted for USD 9 billion of private finance in India.** Most of this investment (USD 8.6 billion) originated from PFIs, mainly in the renewable energy (USD 4.8 billion) and clean technology (USD 3.6 billion) sectors.

**A mixture of local and international private investors have financed USD 16.3 billion worth of investment since 2001 and till 2019.** Renewable energy investments accounted for USD 14 billion, whilst transport investments made up the remainder.

**Private finance investment varies significantly across all sectors in India**



India has seen approximately USD 19 billion of investment in the **Renewable Energy (RE)** sector since 1999. A combination of financial sources and instruments were utilised, however the majority has been a mixture of local and international private investors financing initiatives in the form of debt



**Energy efficiency (EE)** investments (within the building technology, the industry applications and part of the 'Mixed' category) have accounted for approximately USD 3 billion of private finance in India since 1994. The majority, 2 USD billion, of finance has been provided by multilateral development banks (World Bank and ADB) in the mixed EE category.



The **Transport sector** has had an investment of approximately USD 4.6 billion; supporting initiatives in modal shift from road to rail/long distance rail infrastructure; modal shift to public transport and road infrastructure planning and improvements



Private equity being invested in the **Cleantech sector** since 2005 totalled USD 3.6 billion from 116 deals (VCCEdge, n.d.); unfortunately a breakdown of this information was not available due to confidentiality and commercial reasons.



Since 2006 approximately USD 174 million of private finance has been invested in the **Waste Management sector**. This encompasses investment in waste services (municipal and industrial), waste to energy, e-waste management, solid waste processing and recycling.



The **forestry sector** received USD 1.8 billion worth of investment from JICA since 1991 directed towards India's national Afforestation Program. This was provided in the form of ODA loan assistance, and therefore is not strictly private investment.

Private investment will continue to rise in the future, as indicated by India's growing low carbon environment market, and the increasing number of environmental and green funds

**India's Low Carbon Environmental Goods and Services (LCEGS) market in 2011-12 was USD 323 billion.** It was ranked 4th in the world, behind USA, China and Japan respectively. Furthermore, in BNEF's Climates cope 2014 report, which evaluates climate-related investment on a country-by-country basis, India was ranked 4th out of 55 countries reviewed and it had its best performance on Low Carbon Business and Clean Energy Value Chain parameters (BNEF, 2014).

**The estimated total market value of all the financial assets under management (AUM) by the environmental and green funds in India is currently approximately USD 222 billion.**

There are an increasing number of environmental and green funds in India, primarily investing in renewable energy companies, technology providers and infrastructure sectors. The majority of funds reviewed in this study were managed by venture capital firms.

**The Renewable Energy Market in India is anticipated to see investments worth USD 200 billion by 2022.** India has been able to achieve only 13% of its renewable energy potential, which as of March 2014 was 216,918 MW. The planned USD 100 billion investment to develop India's solar market would increase the capacity to approximately 175 GW by 2022.

**The environmental technologies market is currently estimated to be worth approximately USD 9 billion per year, and is expected to grow by 15% annually** (CCI, 2013). In addition to this, it is estimated that the industrial energy efficiency market potential in 2018 will be around USD 27 million (CCI, 2013).

**The water and waste management sectors have investment plans of USD 50 billion over the next five years.** The Indian municipal solid waste (MSW) management market is expected to grow at a Compound Annual Growth Rate (CAGR) of 7% by 2025 while e-waste management market is expected to grow at a CAGR of 10.03% during the same period.

Large Indian FIs and corporates comply with voluntary and certain mandatory environment and social safeguard (ESS) guidelines not replicated by smaller business units

**The Indian business environment is slowly changing its stand from being reactive to government push to proactively undertaking steps to integrate climate concerns into their business practices**

- Most corporates who are disclosing their ESS related practices are either following the IFC performance standards or have signed up to the Equator Principles.
- A handful of corporates have also signed up to the Standard & Poor's Bombay Stock Exchange Carbonex and Greenex and others are disclosing their ESS practices under the CDP India initiative.
- While public sector units and large corporates have taken steps to introduce ESG in their day to day business, SMEs are still lagging behind.

**Investors across the world have become aware of growing climate, environment and social risks and expect FIs and corporates accessing finance to adhere to stricter ESS standards**

- India needs to proactively bring about a change in complying with ESS standards to attract more international finance to and from the private sector.
- SMEs require substantial capacity building/hand holding to comply with international ESS standards. Compliance with ESS standards (for all organisation sizes) could greatly help to scale up climate finance in India.

The private sector in India faces significant institutional, financial, technical and behavioural barriers

**Lack of policy clarity and engagement with the private sector on a climate change policy framework are the main institutional and policy barriers**

- Government of India (GoI) has provided regulatory mechanisms and economic incentives for engaging the private sector but actual deployment has been slow.
- There has been major private sector investment in the RE sector, but government incentives to attract

private investment in other climate-related sectors has been limited.

- The private sector has had limited engagement with the Government of India in climate change decision-making, and in coordinating a national financing strategy that encourages private sector investment in climate-related activities.

**There are numerous financial and economic barriers but the short-term nature of the local debt market, high credit risk and the lack of insurance (risk guarantees) particularly stand out**

- Private sector investment is restrained as the debt market is usually characterised by short-term loans with high interest rates, which raises the cost of capital significantly.
- Indian Banks have enough liquidity but are apprehensive of entering into new business sectors.
- Indian Financial Institutions (FIs) have greater reliance on asset financing using balance sheet assets which deters equity funding. Project financing based on projected cash flows and involving equity investors, banks or other lending institutions that provide loans to the operation is more suitable as it securitises the cash flow.
- Indian insurance companies are not permitted by the Insurance Regulatory and Development Authority (IRDA) of India to develop advanced insurance solutions such as performance guarantees. Corporate clients see the need for performance guarantees and can obtain cover from outside India. Indian insurance companies lack the expertise and are dependent on foreign partners.
- Distribution companies do not pay power generating companies on time affecting their credit risk. This deters banks from lending to power generating companies due to the high risk on return, for these investments.
- It is difficult for external debt to flow to India. External funders have to comply with complex remittance policies and the External Commercial Borrowings (ECB) guidelines are very strict.
- Due to lack of strong policy framework and voluntary requirements, companies are more likely to borrow for production and growth.

**There are numerous technical and knowledge barriers leading to a lack of a pipeline of bankable projects**

- There is limited understanding of climate risks in private sector investments. Private sector engagement in climate change has been limited to greenhouse gas (GHG) accounting, and there has been no use of robust climate risk screening tools by the private sector.
- Technical knowledge of low carbon sectors to increase investments from FIs perspective have mostly been driven by senior management; project officers appraising the project do not have the requisite knowledge of low carbon sectors.
- Significant scale-up of capacity and removal of barriers are still required to create a strong pipeline of investible projects. Bankable projects are increasingly being developed but mainly in the RE sector. Developing a strong pipeline of bankable projects in the EE sector is still a big challenge. Several barriers such as high transaction costs, small project size, lack of EE understanding amongst financial institutions, etc. have hindered the process.
- Financing energy efficiency projects is more risky due to the small size of the projects and dispersed nature of the technologies. Indian FIs (such as TCCL and ILFS) do not currently have the capacity to cater for the project sizes the Energy Service Company (ESCO) market generates.
- Project developers and financial intermediaries find eligibility criteria and reporting requirements of donors to be extremely onerous. International donors have onerous access and reporting requirements and lengthy project application timescales; which disincentives Indian project developers.

**There are limited fora to engage with the private sector and non-compliance with environment and social safeguards are the main behavioural barriers**

- FIs often view compliance with ESS standards as tedious to follow, and do not add value to the monitoring process. Public banks in India are not obliged to adhere to the Equator Principles; there are few private sector institutions, such as IDFC, PTC Financial who are signatories of the framework, but mainly because it is a pre-requisite by large international institutions, such as the IFC, to allocate climate funds.
- The limited open forum for the private sector to engage with the government in developing policy for the country is a barrier for project financiers,

and developers. There has been no clear initiative from the public sector to engage with the private sector in the low carbon space, in particular in the drafting of the national mitigation strategies.

- There is a lack of trust in the private sector to undertake investments in certain sectors, by the public sector. Thus the leveraging does not occur to the extend it should, as there is a lack of initiative to combine public-private sector funds.

## National climate policies are showing positive signs for scaling up private climate finance

**The National Mission on Enhanced Energy Efficiency (NMEEE) and the National Solar Mission (NSM) are showing strong potential to engage and leverage private finance by addressing key barriers**

	NMEEE	NSM
Objective	The NMEEE promotes innovative policy and regulatory regimes, financing mechanisms, and business models to promote energy efficiency	The NSM aims to achieve grid parity for solar electricity through research & development, domestic production, large scale deployment, and long term and predictable policy that encourages private sector participation in the solar business
Institutional / Political	<p>Setting up of committees for implementation of PAT, PRGFEE and VCFEE</p> <p>A robust framework for implementation of the PAT, using highly consultative process</p> <p>Initiation of new programmes e.g. MTEE's Super-Efficient Equipment Programme (SEEP)</p> <p>Creation of EESL (super ESCO) as a corporate entity to provide market leadership under EEFP</p> <p>Assigned state nodal agencies for implementation of the Mission at the state level</p>	<p>FITs, RECs, RPOs, Power bundling, Accelerated depreciation benefit,</p> <p>Asset liability mismatch and non-availability of long term debt is acknowledged by lenders</p> <p>Stricter enforcement of RPOs to steer the market further.</p>
Financial / Economic	Designed and soon to be implemented new financial mechanisms, in the form of partial risk guarantee fund and venture capital fund, building the confidence of FIs to invest in EE	<p>AD benefit, CDM, MDB financing, bank guarantees,</p> <p>Renewable Energy Infrastructure Development Fund (REID), off-grid fund, viability gap funding (VGF), credit guarantees, charge exemptions.</p> <p>Generation Based Incentives, Manufacturing incentives, Off grid incentives</p> <p>Project financing by IREDA and PFC</p>
Technical / Knowledge	<p>Preparing bankable project DPRs, to build capacities of ESCOs to seek financing from financial institutions</p> <p>Standardizing ESCO performance contracts, to assist ease of understanding of such contracts by project implementers and also financiers</p> <p>Developing performance measurement and verification tools, tailored for Indian EE projects</p>	<p>Creation and up-gradation of Solar Energy Centre for R&amp;D</p> <p>Setting up of Solar Energy Corporation of India (SECI) for facilitating financing, training and capacity building, enhancing technical know-how on solar</p> <p>Supporting a number of Centres for R&amp;D in different institutes</p>
Private Sector Engagement	Sub programmes are primarily designed to encourage private sector investment and finance in the various programmes on EE in India by developing a project pipeline and new financing instruments	The NSM been very successful in attracting private sector investment by creating new financing, implementation and regulatory structures

## There is strong potential and ambition from the private sector to scale up climate investments, but to do so, there are a number of measures to be taken

The stakeholder consultation provided some important lessons and suggestions to scale up private sector investments in climate-related sectors. These are summarised below.

### **Regulatory reforms and incentives are required to provide long term certainty and reduce investment risks**

- The role of the public sector to provide clear policy framework and mitigate some of the risks is crucial to remove some of the barriers for private climate finance. It was highlighted that if financing is made available at market rates with longer terms, many of the financing barriers to low carbon sectors could be overcome.
- Private sector participation is expected to increase in the near future once major implementing climate change programmes are launched under the NAPCC missions. It is expected that programmes such as PRGF and Viability Gap Fund, the Energy Efficiency Mission and Green India Mission can attract large private sector investment.

### **Indian FIs need to develop new or scale up existing financing instruments, especially long term debt finance and risk guarantee instruments**

- There are some good lessons to be learnt from private financing instruments currently being used in India (e.g. debt, equity and partial risk guarantees) to finance grid connected solar power projects. Debt based financing compared to equity can reduce the cost of capital.
- Providing performance and risk guarantees are “the need of the hour”, without which large scale and long term investments for climate mitigation is not likely to happen. A realistic

short-term option for project developers to tap into low cost climate finance is to bring in quality projects in RE and EE sectors and access low cost capital by using government or donor backed guarantee structures (e.g. USAID, WB and BEE).

- New financing structures that encourage more equity and long term debt at lower interest rates are already being developed by FIs but need to be scaled up. There is a need for a quasi-equity structure from banks that encourage a move from asset financing to project financing; this should be complemented with new financial insurance products for risk guarantees.

### **In India only large private FIs and project developers have strong corporate social governance standards; compliance with environmental and social safeguard (ESS) measures is generally low**

- Some of the large FIs such as TATA clean tech and Infrastructure Leasing & Financial Services Limited (ILFS) have strong corporate climate change strategies or governance structures.
- Greater recognition and inclusion of ESS/Social Environment Management Standards (SEMS) into investment decisions will help Indian FIs and project developers to access international climate finance.
- There is potential and capacity to develop better climate-related governance and capacity in banks and FIs in India.

## International credit lines have played a key role in scaling up private sector EE financing in India

The EE sector has been a beneficiary of international credit lines addressing capital and

capacity constraints. International finance today is more needed than ever for achieving India’s ambitious development and climate objectives. A brief summary of the main pros and cons of international credit lines supporting private sector investment is shown on top of next the page.

Pros	Cons
<ul style="list-style-type: none"> <li>• Addressed the issues related to insufficient availability of up-front capital for EE projects</li> <li>• Addressed sector specific barriers such as capacity of loan officers, building awareness and develop best available technology lists</li> <li>• Helped in institutional strengthening of the recipient financial institutions for EE projects</li> <li>• Leveraged domestic public and private financing</li> </ul>	<ul style="list-style-type: none"> <li>• Donor credit lines with more stringent requirements were not utilised by FIs and project developers</li> <li>• The borrowers and loan officers had difficulties in evaluating the eligibility of proposed EE projects with respect to this onerous requirement</li> </ul>

### International NAMA finance can help in creating the right policy environment to scale up private investment

- The NAMA mechanism offers a way for international financial support to enable emission reductions across all sectors, and offers the ability to mainstream climate into development finance.
- Better understanding of sector specific barriers and potentials would help dedicated public international NAMA financing to strategically leverage domestic private sector investments.
- International climate finance can provide different forms of finance and support along the NAMA programme and project life cycle trajectory – requiring a blend public and private capital, from international and national sources.
- International climate finance should aim to move from policy to programme NAMAs in India to leverage private finance. India needs to prioritise large scale sector programmes to ensure low carbon and climate resilient growth. This investment can be supported by ‘Programme NAMAs’ that combine government incentives and financial mechanisms to overcome investment barriers and risks, catalyse private investments and improve the profitability for private investors.

### International public finance can assist private sector in India to access funds from the GCF

- The private sector would need support to comply with GCF fiduciary standards. Organisations like

GIZ, World Bank etc. could support FIs and project developers strengthen their fiduciary capacities and showcase best practice through pilots.

- Indian FIs and project developers would also need to improve their ESS standards. International public finance can help private sector to adopt Equator Principles or IFC Performance Standards for accessing funds from the GCF.
- One area where the private sector in India needs urgent support is to design and implement climate resilient and smart cities. India’s city governance and finance structure require substantial capacity building for accessing and mobilising climate finance. Private sector access to GCF modalities could lead to various public-private partnerships and this in turn could lead to huge consortiums to develop climate resilient urban infrastructure.
- International climate finance and GCF could set up guidance teams to help countries develop MRV structure in relation to both finances as well as emission reductions. The GCF could alternatively have a dedicated due diligence team that employs the guidance structure for MRV to assess proposals. It could be made mandatory that only those proposals having good MRV structures in place could be eligible to access international climate finance or funds from the GCF.

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# 1. Introduction

## 1.1 Objective of the study

India faces the dual challenge of rapid economic growth and combating adverse climate change impacts. Estimates from the Ministry of Finance and the Low Carbon Expert Group have found that a multi-billion dollar funding gap exists to implement the government's climate plans (Planning Commission of India, 2014). National budgets are allocating funds to climate-related programmes, and international public funds are gearing up to support countries to mitigate greenhouse gases (GHG) emissions. However, these funds are either not being capitalised (quickly and sufficiently) or not being dispersed due to institutional, technical and financial barriers. The reports from the Ministry of Finance and the Low Carbon Expert Group acknowledge that the bulk of the investments required to implement India's climate plans, would come from the private sector. Private sources for climate funding are also increasing, recent estimates suggest that globally there are already 45 carbon markets and 6,000 private equity funds providing climate change finance. Each of these public, private, bilateral and multilateral sources offers new opportunities for countries to address their climate and development needs. The International Energy Agency (IEA) has predicted that 40% of global climate investment in 2020 will come from private households, 40% from businesses and 20% from government.

The main objective of this study was to review existing private climate finance flows in India with the primary focus to analyse current barriers and the potential for the private sector to scale up investment. The main findings cover:

- Estimates of private finance flows by type of institution, financial instruments and sectors.
- How climate change and sustainable development

considerations are being incorporated in corporate governance and decision making.

- The potential for public finance to scale up private investment. In the Indian context, this will be crucial to work towards a successful implementation of mitigation schemes and in particular of 'Nationally Appropriate Mitigation Actions' (NAMA) concepts as well as their "transformational character".
- Current barriers that prevent project developers and financiers from investing in climate projects.
- The role of international climate finance in scaling up private sector investments.

## 1.2 Report structure

This report is structured as follows:

- Section 1 introduces the study covering the main objectives, background and study methodology
- Section 2 provides an overview of India's private sector climate finance flows and investments
- Section 3 provides a summary of current practices by Indian financiers and corporates to integrate climate change into business decisions
- Section 4 presents our findings on private sector potential to finance and implement national climate plans
- Section 5 provides a summary of the role of international funding in scaling up private climate finance.

## 1.3 Private climate finance

In the wake of the Inter governmental Panel on Climate Change's (IPCC) 5th Assessment Report and recent United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties, the imperative for shifting private finance

towards “climate-friendly” (i.e. low-carbon and climate resilient) infrastructure investments has never been stronger. The New Climate Economy (2014) report similarly highlights the importance of private sector engagement in climate finance activities. The risks associated with failure to act are now clear, and unlike the financial crisis, there is no possibility of a “bailout” at a later stage if the advice of the scientific community is not taken.

The challenge of scaling up private sector investment has become central to global international funding to help developing countries respond to climate change; in particular in the context of commitments made under the Copenhagen Accord in 2010 to mobilise finance approaching USD100 billion a year from public and private resources. In parallel to the activities of multilateral and bilateral institutions, a number of multilateral climate funds (MCF) have been created to channel finance that have a broad mandate for ‘private sector engagement’,<sup>1</sup> a term which means the provision of funds both to and by the private sector.

### **What is the challenge for the public sector?**

The private sector investment problem is rooted in political and policy uncertainty/volatility. Private sector lacks sufficient long-term market visibility as well as the necessary incentives to invest in the short-to-medium term. Innovative financing instruments and replicable financing structures will play a central role in mobilising private sector finance, but they are no substitutes for long-term political commitment from governments, ‘investment-grade’ policy and regulatory frameworks.

To meet the climate challenge, finite public money will need to be used judiciously, where it can deliver the biggest bang-for-buck or “transformational impact”. There is a growing (but not universal) consensus that measures to leverage private sector capital lie at the heart of this, in particular:

- through the funding or fostering of “investment-grade” policy frameworks e.g. NAMAs, Low

Emission Development Strategies (LEDs), low carbon action plans;

- the strengthening of local capital markets in order to develop and increase adoption of innovative financing mechanisms for the private sector (e.g. quasi-equity, green/climate bonds market<sup>2</sup>);
- the use of various de-risking mechanisms; and
- the co-financing of marginal projects with a compelling public interest.

### **How does the private sector see the climate challenge?**

Most forms of private finance, not necessarily climate-related, operate on a simple principle of balancing financial costs (risks) and financial returns (rewards). In practice, the risk-reward paradigm depends on a broad range of factors that determine financial decision-making, the nature and direction of flows. Most significantly the financial case for climate friendly investments often does not stack up (i.e. the risk/reward equation is not a viable or sufficiently compelling when compared to conventional or non-infrastructure investments), particularly in developing country markets where the country risk factors are typically greater. Some projects will be marginal due to their small scale, disbursed costs and benefits or public good nature. This is further compounded by absence of indicators to quantify and monetise non-carbon benefits. Adaptation and energy efficiency (EE) investments often fall into this category.

In simple terms, the key factors to incentivise private sector investment fall under two main categories: providing the right economic signals, and reducing the risk to the investor. The policy drivers that can support private sector investment range from light touch communication and information sharing, to regulatory instruments. Economic instruments help in financing various stages of low carbon development, from the research phase to full commercialisation. Multilateral and bilateral donors as well as international development agencies (such as GIZ) are providing support to a range of GHG mitigation policies and instruments in Asia and in the rest

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1 IFC, GCF private sector window, bilateral institutions such as KfW and PROPARCO subsidiary to the French Development Agency (AFD).

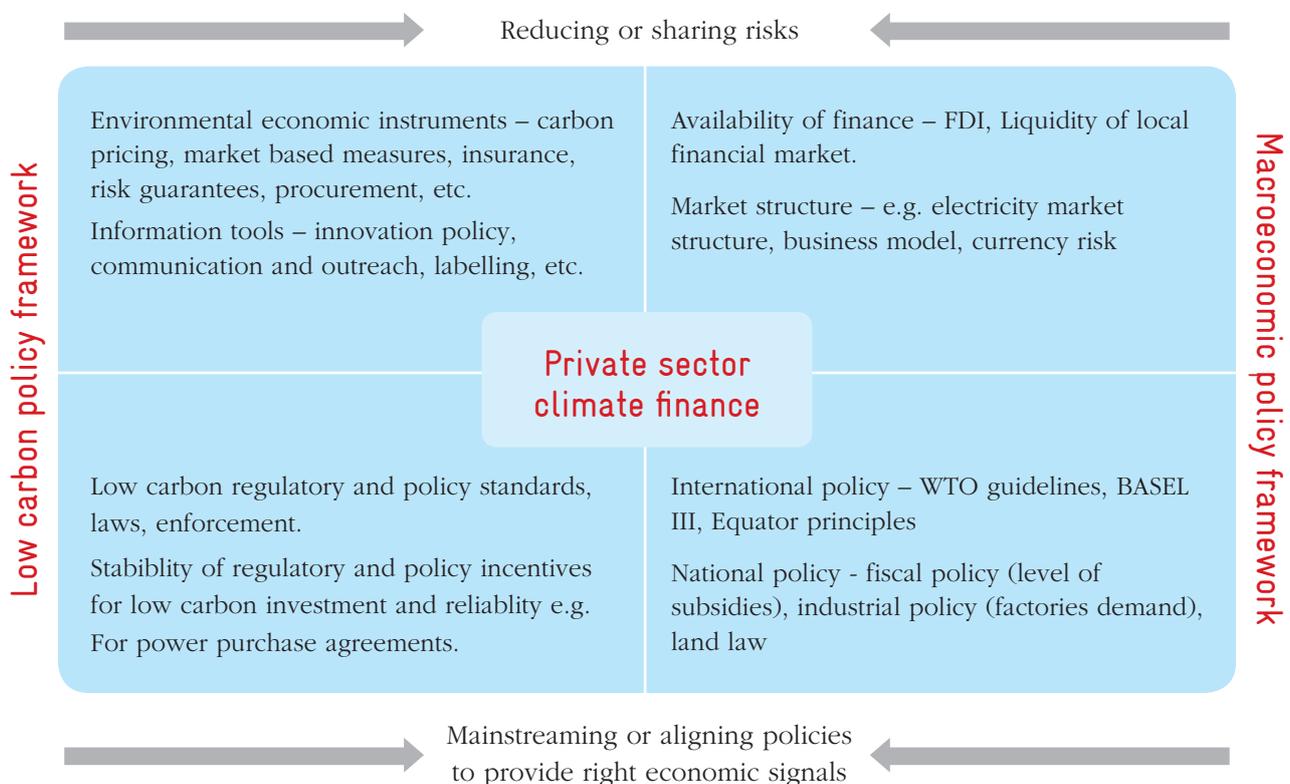
2 See for example IFC USD 1bn green bond January 2013, EBRD USD 250m green bond September 2013, African Development Bank USD 500m green bond October 2013.

of the world. These provide further opportunities for private sector investments, including Clean Development Mechanism (CDM), Emission Trading Systems (ETS) and the domestic and supported NAMAs. Strong legal frameworks provide long term certainty and less investment risks. The need for investment in new energy and climate friendly infrastructure worldwide is obvious as a response to both the rapid economic growth in emerging economies, and existing infrastructure in developed countries coming to the end of its capital life. However, challenges for private sector investment arise not only from conflicting signals from targeted low carbon and resilient policy framework, but also broader macroeconomic policies (Figure 1). Currently, there are strong forces pulling the private sector in different directions, including:

- Efforts to increase energy security: while these will coincide with emissions reductions in some countries (e.g. new nuclear in India), the emergence of shale gas in the US has been a game changer and has ended US short-term interest in renewable energy (RE) as a means to increase energy security.

- Progress towards global carbon pricing: elegant in theory, and with positive recent developments; but it is struggling to get off the ground quickly, and is neutralised by on-going subsidies for fossil fuels.
- Corporate social responsibility and sustainable reporting trends, and market/regulatory developments are positive developments. However, the extent to which this is driving actual investments in climate-friendly infrastructure remains unclear.
- Risk exposure from ‘un-burnable carbon’ embedded in major asset portfolios; however it is unclear how seriously this is being taken by asset managers and credit rating agencies in the short to medium term.
- Perverse consequences of the regulatory response to the global/Eurozone financial crisis, such as new financial regulations (e.g. Basel III) that are potentially driving institutional investors towards lower risk investments in tried and tested fields, like fossil fuel production.

Figure 1: Private climate investment is driven by providing the right economic signals and reducing or sharing risks



## 1.4 Methodology

A multipronged approach was developed to review existing private climate finance flows in India with the primary focus to analyse current barriers and the potential for the private sector to scale up investment. The current private sector funding landscape is complex and there is a varying degree of transparency by different sources, with a particular lack of information at sector and country level. See Section 2.2 for more details on tracking climate finance flows in India. The overall methodology of the study involved:

- A **desk-based review** of existing multilateral and bilateral flows, national financial mechanisms and instruments, and private sector financing to scale up climate investment. Information has been synthesised on the main sources, type of instrument, type of sector, description of activities and timeline (where available).
- A **discussion** of existing policies and programmes (e.g. national climate missions) which are currently engaging with the private sector in the design, implementation and financing of climate programmes and strategies. Three detailed case studies were undertaken to demonstrate the effectiveness of existing national strategies designed to engage and leverage private capital.
- **Stakeholder consultations** were undertaken to understand the barriers and future potential to scale up climate investments in the sectors considered in this study. Stakeholder specific questions were developed for all the interviews. These focused on the following key information points underpinned by prompts to ensure appropriate coverage of main issues of interest (see Appendix 2 for the interview pro forma):
  - The ability of private finance institutions to attract private and public climate finance (both domestic and international);
  - The role of private finance institutions and project developers to support or complement

emerging national climate finance institutional frameworks;

- The potential for integration of national sustainable development strategies into public-private partnership mandates (e.g. NAMAS, other GHG mitigation concepts, technology transfer targets, etc.); and
- Examine how climate change and sustainable development considerations have been integrated in the investment decisions.

### 1.4.1 Limitations of the study

The study faced three main limitations. The first was the lack of good quality data for private climate flows. There are limited publically available sources collecting information on private flows. Some data on renewable energy and clean technology is available by subscription or one-off payments. There was no budget allocated to purchase proprietary information. The granularity of the data was also an issue. A key challenge was breaking down the data on certain climate flows by public and private actors; and by different sectors. Most financial institutions (FIs) do not account for low carbon sectors separately, so obtaining this data directly from the institutions was very challenging. See section 2.2 for more details on the complexity of estimating private climate finance flows. The second limitation was getting a clear picture of the barriers and opportunities across all sectors. The availability of experts, information and knowledge for renewable energy and EE sector was disproportionately higher than for example for waste and forestry. As such, the depth and quality of the findings are higher for the RE and EE sector. Appropriate efforts were made to capture as much information as possible for the waste, forestry and transport sectors. Lastly, the findings of the study are based on interactions held during the course of the study with stakeholders and are reflective of stakeholder views and not necessarily reinforced with other sources of evidence, in all cases.

## 2. State of Play of Private Sector Climate Finance in India

### Key messages:

- India has a robust and mature financial sector; in the last three years the services sector has seen the greatest increase, driven by the growth in the financing, insurance, real estate, and business services.
- In terms of private finance climate investment, a mixture of local and international private investors accounted for the largest flow of investment in India, totalling USD 16.3 billion since 2001<sup>3</sup>; Multilateral Development Banks (MDBs) and bilateral finance institutions (BFIs) have mobilised around USD 8.4 billion leading to leveraged private finance flows. By sector, renewable energy received the greatest investment, totalling USD 19.1 billion<sup>4</sup>. EE investments<sup>5</sup> (within the industry applications and building technology sectors) have accounted for approximately USD 3 billion of private finance in India since 1994.
- Private equity funds in India have seen an increased investment in climate-related sectors (notably RE, infrastructure and clean tech); the estimated value of all the financial AUM of these funds is USD 222 billion<sup>6</sup>.
- India's current and potential green market is substantial; in 2011-12 the Low Carbon Environmental Goods and Services market was estimated at USD 323 billion, and the environmental technologies market is currently estimated to be worth approximately USD 9 billion per year (and is expected to grow by 15% per year). The Renewable Energy Market in India is anticipated to see investments worth USD 200 billion by 2022; and the water and waste management sectors have investment plans of USD 50 billion over the next five years.
- Tracking the private investments in India has come with some difficulty; this has mainly been attributed to issues with data confidentiality and accessibility, large data gaps in certain sectors and that there is no clear, and agreed, definitions of private and public climate finance.

This chapter provides a brief overview of India's financial and economic performance as backdrop for analysing private climate finance flows. The chapter provides a summary of private sector

flows including the main sources (international and domestic), by sector and where possible, the financing mechanisms used.

<sup>3</sup> We have excluded the finance source 'mixture of public and private finance' in this comparison, as it was not possible to determine the exact proportion of private finance from these sources

<sup>4</sup> This comparison excludes transport, as the source of the finance was from a mixture of public and private sources (no breakdown was available)

<sup>5</sup> Please note, this figure is not in addition to the international credit lines mentioned above.

<sup>6</sup> Please note, this total is not the sole investment in climate/green investments. It is a total for all the investments in all the sectors by the funds identified through VCCEdge.

## 2.1 India has achieved substantial economic growth on the back of a robust financial and investment climate, though social development continues to be a challenge

India has a robust and mature financial sector. Its capital markets have outperformed most developing countries over the last year. However, macro indicators including reduced economic growth, high fiscal deficit, high inflation, and fluctuating conversion rate have impacted negatively on international capital inflow in the country, particularly in 2012-13 and 2013-14. A large part of this slowdown can be attributed to delays in project implementation, and in some cases has discouraged investment in the country. Bottlenecks in approving projects, lack of infrastructure and over-involvement of the state in business activities, among other elements have been cited as the key reasons for this dwindling growth. Revival of this growth did however begin by end of 2013-14, which attained further vigour in 2014-15. The International Monetary Fund's recent report, posing an extremely positive stance for India, has predicted that India is set to become the world's fastest-growing major economy by 2016 ahead of China (IMF, 2014).

**For the climate sector, large-scale infrastructure financing has been hindered by the difficulties**

**of securing long-term loans and bonds.** In addition, financial instruments such as foreign currency advances and international guarantees require the Reserve Bank of India's (RBI) approval, which has led to delays and restrictions on investment. While the country has experienced high growth rates<sup>7</sup> in the last few years (2005-06 to 2010-11) on average, it has performed poorly in terms of social development indicators. Reflecting on India's recent past and current trends, there have been a mixture of successes and failures; snapshots of some of the country's key features of the economy are presented in Table 1. The chapter presents, in brief, some recent trends in India's social, economic and financial profile.

### 2.1.1 Economic progress

**Having achieved high growth levels from 2004-05 to 2011-12, the Indian economy has experienced challenges that have culminated in less than 5% growth of GDP (at factor cost at constant prices) for two consecutive years,** as outlined in Figure 2<sup>8</sup> (for the 2012-13 and 2013-14 periods). The 'slowdown' has largely been triggered by a combination of: persistent uncertainty in the global outlook (caused by the crisis in the Euro market) and general slowdown in the global economy and domestic structural constraints. The slowdown is in line with trends in other emerging economies, but relatively deeper.

Table 1: Key Features of India's Economy

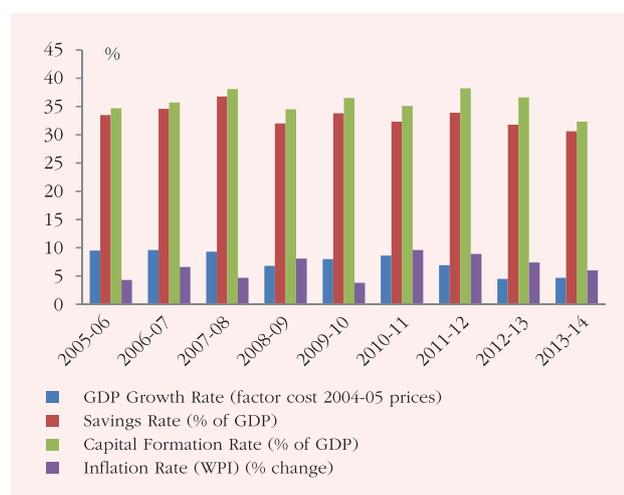
Infrastructure	Diversity of Economy	Banking Sector	GDP Growth	Socio-economic development
Rapidly growing, but deficits remain	Large diversities	Rapidly growing Currently worth Rs. 81 trillion (USD 1.31 trillion)	Around 8% in 2010-11, down to 5% in 2013-14	Low
Stock Market	Capital Market	Listed Companies	Dominant Sector	Foreign Investment
Robust stock market	Yes	Approx. 5,500	Banking	High and rising

<sup>7</sup> Often referred to as one of the fastest growing economies of the world

<sup>8</sup> \* Number for Saving Rate and Capital Formation Rate for 2011-12, 2012-13 and 2013-14 are based on new estimates taking 2011-12 as the new base year.

**The upward trend of inflation (nearly 7.4% in 2012-13) in India had played a significant part in the slowdown in growth, savings, investment, and consumption.**

Figure 2: Key Economic Indicators – India



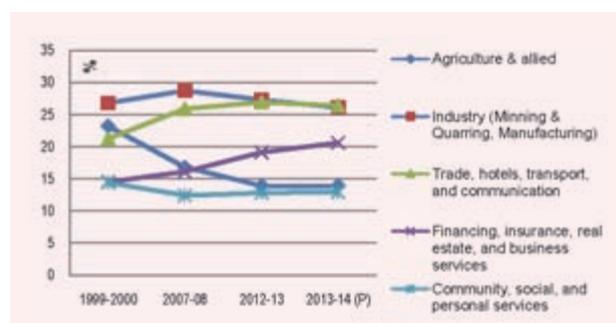
Source: *Economic Survey*, 2014-15

Government of India (GoI) recently published the *Economic Survey 2014-15*. The survey reveals a perceptible improvement in macro-economic indicators in 2013-14, which strengthened in 2014-15. Economic growth, measured by growth in gross domestic product (GDP) at constant market prices, was estimated at 5.1% and 6.9% respectively during 2012-13 and 2013-14, which was higher than the corresponding figures of 4.7% and 5.0% released under the 2004-05 series in May 2014. This high growth occurred in a year when both the savings and investment to GDP ratios were lower than the average of a number of years, and when the level of imports (that are generally positively associated with GDP) actually declined by 8.4% in real terms. One of the reasons why the real GDP growth rate for 2013-14 appears to be strong is the lower GDP level in 2011-12 and 2012-13 along with lower GDP deflators than were thought hitherto (GoI, 2014). These indices point to the fact that the national circumstances in the country are on a way to a positive growth scenario in the future. And that overall decline in growth and investments in the country for the year 2012-13 and 2013-14, also has impact on growth of low carbon sectors and general finance available for low carbon activity in the country.

It is worth noticing the drastic change in the composition of India's GDP: the share of agriculture and allied sectors has been consistently declining while that of industry and services is increasing

(Figure 3 and Table 2). The share of financing, insurance, real estate and business services has been consistently rising; more so since 2004-05.

Figure 3: Sectoral share of GDP (%)



Source: *Economic Survey*, 2013-14

However, the pace of expansion has not been balanced. The biggest drivers of the increased share of the service sector since 2004-05 were the growth of the communications, banking and insurance sectors.

Table 2: Growth in Gross Value Added at Constant (2011-12) Basic Prices (%)

Sector	2012-2013	2013-2014	2014-2015
<b>Agriculture, forestry &amp; fishing</b>	1.2	3.7	1.1
<b>Industry</b>	2.3	4.5	5.9
Mining & quarrying	-0.2	5.4	2.3
Manufacturing	6.2	5.3	6.8
Electricity, gas, water supply, & other utility services	4	4.8	9.6
Construction	-4.3	2.5	4.5
<b>Services</b>	8	9.1	10.6
Trade, hotels & restaurants, transport & communication	9.6	11.1	8.4
Financing, insurance, real estate & business services	8.8	7.9	13.7
Community, social, & personal services	4.7	7.9	9

Source: *Economic Survey*, 2013-14

Focussing specifically on the last three years, the services sector triggered the growth momentum in 2013-14 (Table 2). Services like trade and repair services, rail transport, communication and broadcasting services, and miscellaneous services achieved double-digits/close to double-digits growth during the year. Financing, insurance, real estate, and business services, has been one of the most dynamic sectors in the economy in recent years, and is believed to have driven growth in the current year. This also implies that a robust and a growing financial services sector in the country places India in a better position with an appetite for exploring new areas of financial activities such as climate financing.

Rising investment rates are a necessity for higher economic growth. India's sectoral investment rates have shown a rising trend across sectors in the last decade. The latest indicators highlight the fact that the revival of growth had started in 2013-14 and attained further vigour in 2014-15 (recovering from lower performance in years 2007-08, 2009-10) emerging from the recently revised estimates of

national income brought out by the Central Statistics Office (Table 3). Though investment rates for finance, insurance and real estate showed a decline in the XI Plan period, this was largely on account of the global financial downturn.

## 2.1.2 Financial Markets and Investment Climate

**India's financial sector is very mature and expanding rapidly.** It is comprised of commercial banks, insurance companies, non-banking financial companies, cooperatives, pension funds, mutual funds and other smaller financial entities. India's financial sector is dominated by commercial banks accounting for over 60% of the total assets of the financial system followed by the insurance sector.

The Indian banking sector was resilient in the immediate aftermath of the global financial crisis, but has since been impacted by the global and domestic economic slowdown in the last two years. During 2012-13, the deteriorating asset quality of the banking sector emerged as a major concern, with gross non-performing assets (NPAs) of banks

**Table 3: Investment rate (Gross Capital Formation based) during Five Year Plans: Sector wise (Gross Capital Formation as a % of GDPfc<sup>9</sup> at constant 2004-05 prices)**

Sector	IX PLAN (1997-02)	X PLAN (2002-07)	XI PLAN (2007-10)
Agriculture and allied sectors	11.53	13.85	18.67
Mining and quarrying	15.74	41.97	74.89
Manufacturing	56.96	67.55	79.98
Electricity, Gas and Water Supply	88.4	91.1	111.09
Construction	11.79	23.93	30.36
Trade, hotels and restaurants	10.89	13.9	16.52
Transport, storage and communication	31.89	27.05	29.38
Finance, Insurance and Real Estate	35.45	35.69	32.6
Administration and Other Services	26.17	36.36	44.48

Source: *Economic Survey*, 2014-15

<sup>9</sup> GDP at factor cost GDP (FC) is GDP at market prices (MP) minus indirect taxes plus subsidies.

registering a sharp increase (mostly in India, on account of policy and structural bottlenecks in the implementation of large scale projects). As a consequence of the slowdown and high levels of financial leverage, some industry and infrastructure sectors, (namely textiles, chemicals, iron and steel, food processing, construction, and telecommunications) are experiencing a rise in NPAs. However, improvement in performance in the financial sector was seen during 2013-14. This is further supported by the RBI in its Financial Stability Report which stated, “the banking stability indicator suggests that overall risks to the banking sector remained unchanged during the first half of 2014-15. In individual dimensions, though the liquidity position improved in the system, concerns remain on account of deterioration in asset quality along with weakened soundness. The profitability dimension of the indicator showed an improvement but it remained sluggish. The stress tests suggest that the asset quality of banks may improve in the near future under expected positive developments in the macroeconomic conditions and banks may also be able to meet expected losses with their existing levels of provisions. However, the asset quality of scheduled commercial banks may worsen from the current level if the macroeconomic conditions deteriorate drastically, and banks are likely to fall short in terms of having sufficient

provisions to meet expected losses under adverse macroeconomic risk scenarios” (RBI, 2014).

**Though India has been ranked 134th among 185 countries in the World Bank’s ‘Doing Business’ annual report, lower than its Brazil, Russia, India, China, and South Africa (BRICS) counterparts (largely on account of problems in securing land, inadequate infrastructure, power shortages, stringent labour laws, tax regulation, lack of governance and transparency and delayed approval processes), Foreign Direct Investments (FDI) in India have continued to increase,** which would suggest a favourable investment climate. Identifying the urgency to focus on improving the business environment, the RBI has taken numerous steps to ease “Doing Business” in India. It has also taken necessary governance measures by instating the State Level Coordination Committee (SLCC) mechanism under the initiative of the Financial Stability and Development Council (FSDC).

### 2.1.3 Social development

Despite its optimistic growth trends, India still remains a developing country (in terms of its GNI per capita). For 2013, India was ranked in the medium human development category<sup>10</sup> with countries like China, Indonesia, and South Africa, as shown in Table 4.

Table 4: India’s Position on Human Development Index (HDI), 2013

HDI rank	Country	HDI [Value] 2013	Life expectancy at birth [Years] 2013	Mean years of schooling [Years] 2012	Expected years of schooling [Years] 2012	Gross national income (GNI) per capita [2011 PPP \$] 2013
1	Norway	0.944	81.5	12.6	17.6	63,909
5	United States	0.914	78.9	12.9	16.5	52,308
6	Germany	0.911	80.7	12.9	16.3	43,049
14	United Kingdom	0.892	80.5	12.3	16.2	35,002
57	Russian Federation	0.778	68.0	11.7	14.0	22,617
73	Sri Lanka	0.750	74.3	10.8	13.6	9,250

10 Countries fall into four broad human development categories, each of which comprises 47 countries: Very High Human Development, High Human Development, Medium Human Development and Low Human Development

79	Brazil	0.744	73.9	7.2	15.2	14,275
91	China	0.719	75.3	7.5	12.9	11,477
118	South Africa	0.658	56.9	9.9	13.1	11,788
<b>135</b>	<b>India</b>	<b>0.586</b>	<b>66.4</b>	<b>4.4</b>	<b>12</b>	<b>5,150</b>
142	Bangladesh	0.558	70.7	5.1	10	2,713
146	Pakistan	0.537	66.6	4.7	7.7	4,652
	World	0.702	70.8	7.7	12	13,723

Source: (UNDP, 2014)

India's HDI value for 2013 was 0.586, positioning the country at 135 out of 187 countries and territories – the lowest among the BRICS countries, with Russia at 57, Brazil at 79, China at 91, and South Africa at 118, and slightly ahead of Bangladesh and Pakistan. Significantly, while China improved its ranking by ten places between 2008 and 2013, India's position improved by just one rank. Thus a lot remains to be done to bridge the gap. India's HDI is also below the average of countries in both the medium human development group (0.614) and in South Asia (0.588). Between 1980 and 2013, India's life expectancy at birth (LEB) increased by 11.0 years, mean years of schooling increased by 2.5 years, and expected years of schooling increased by 5.3 years; gross national income (GNI) per capita increased by approximately 306.2%. Compared to BRICS nations and neighbouring countries, India reports the least mean years of schooling and an LEB that is just above that of South Africa.

**These indices demonstrate the need for India to improve its social development. The high economic growth has not translated into social benefits. The country still has high incidence of poverty and large disparities in income.**

Thus, India needs significant socio-economic investments in health, education and sanitation. Finally, this socio-economic growth has to be sustainable and low carbon in nature to ensure that solving one problem (poverty and social-disparity) does not create another problem (climate and environmental degradation). Thus the role of low carbon growth is particularly important for India, and the finance needed to support this growth is equally important.

## 2.2 Tracking private climate finance flows is very complex

Assessing and tracking private climate flows in India encountered a number of issues and complexities. Before taking the finance flows identified in this study at face value, it is important to understand the limitations in the data. Although these issues were briefly discussed in the introduction, they are outlined in more detail in this section.

**There are no clear, and agreed, definitions of private and public climate finance** which often makes distinguishing between the finance from both sectors difficult. Often flows from both these sectors end up feeding into the same climate actions, but are not always easy to separate, especially if they are transferred through funds, joint ventures, and investors in the bond and stock markets (Illman, J. et al., 2014; Clapp, 2012). The convoluted route private finance can take can also make determining its source, nature and scope more difficult.

**Data confidentiality is an issue when tracking private finance.** The OECD, Overseas Development Institute (ODI) and others have highlighted this as a key issue since tracking private flows (and public flows to some extent) to the final destination often encounters commercial confidentiality restrictions; some finance may also flow indirectly to their final destination, via public or private intermediaries or for tax reasons (Clapp, 2012; Illman, J. et al., 2014).

**There are data gaps for certain sectors, often where private institutions readily undertake investments, but are not necessarily categorised as 'climate action'.** This is particularly the case for

EE investments – many FIs such as the International Finance Corporation (IFC) (international) or ICICI Bank (national) do not track lending for EE, as projects and are three main challenges for tracking EE investment: first, it is difficult to assess a baseline for EE, second, EE investments are integrated into larger transactions (e.g. new buildings) and are difficult to disaggregate, and third, these investments are decentralised and often take place at household or small enterprise level (Buchner, et al., 2014). Some of the data sets available did not have a date range for the investment, which made the analysis difficult.

**Defining the boundaries and scope of low-carbon and climate friendly investments**

**has also been difficult** as there is no common approach across all FIs. This makes ‘tagging’ and tracking the financial data to a particular sector difficult, as one FIs definition of EE could fit within the buildings sector and in another’s it could fit within industrial processes. There are a number of financial organisations who track private finance (both in terms of equity and debt) within India,

but for all the non-climate-related deals that take place across most sectors; sub sector tracking for climate-related projects is not undertaken/the data is not readily available (which is linked to the confidentiality issues mentioned above).

**2.2.1 Assessing private finance flows in India**

Given the complexity of defining and measuring private finance above, the first step is to define the climate-relevant sectors. We have used a sector taxonomy based on work previously undertaken by Climate Bonds and ODI, as outlined in Table 5. Using this sector breakdown a literature review and interviews with key stakeholders in the private finance sector were undertaken to scope out the flows. For a full list of stakeholder consulted please see Appendix 2.

The data sources used for this study were a combination of project-level and aggregate data from a variety of sources, see Table 6. Aggregating data from different sources presents some challenges, in particular the risk of double counting.

**Table 5: Climate-relevant sectors (and subsector breakdown)**

Buildings Technology	Efficient lighting, appliances, A/Cs, improved insulation, solar heating and cooling, alternatives of Fluorinated gases
Cleantech	Products or services that improve operational performance, productivity, or efficiency whole reducing costs, inputs, energy consumption, waste, or environmental pollution
Energy	Renewable Energy (wind, solar, biomass, hydro), Energy Efficiency, Fuel switch, CHP, CCS
Forestry	Afforestation & Reforestation, Forest management, reduced deforestation, Forestry product use for bioenergy
Industrial Applications	Energy Efficiency, Heat & power recovery, recycling, emission control
Transport	Vehicle efficiency, hybrid vehicles, biofuels, modal shift, planning
Waste Management	Technology – LF methane recovery, waste incineration and energy recovery, composting, recycling & waste minimisation

Source: (Climate Bonds, n.d.; Whitely, Granoff, Chiofalo, Halimanjaya, & Pickard, 2014).

Table 6: Sources of data

Sector	Source of finance	Data granularity
Renewable Energy	Bloomberg New Energy Finance	Project-level
	CDM <sup>11</sup>	Project-level
	USAID study, 2013	Project-level
	VCCEdge <sup>12</sup>	Aggregated data
Building Technology	World Bank	Aggregated data
Industrial Applications	Asian Development Bank (ADB)	Aggregated data
	Canara Bank	Aggregated data
	KfW	Aggregated data
	Japan International Cooperation Agency (JICA)	Aggregated data
	ICICI Bank	Aggregated data
	World Bank	Aggregated data
	State Bank of India	Aggregated data
	Union Bank of India	Aggregated data
	Yes Bank	Aggregated data
Transport	CDM	Project-level
	Infrastructure India plc.	Project-level
	World Bank	Aggregated data
	Government of India (public mixed with private support)	Project-level
Forestry	JICA	Project-level
Waste Management	BTS India Private Equity Fund Ltd and Venture East	Project-level
	NEA Indo US Ventures and Draper Fisher Jurveston	Project-level
	Standard Chartered IL & FS Asia Infrastructure Growth Fund	Project-level
	Lehman Bros	Project-level
	IDFC Private Equity	Project-level
	UTI ventures	Project-level
	India Equity Partners (IEP)	Project-level
	Forum Synergies	Project-level
Cleantech	VCCEdge	Aggregated data

11 Please note, there is the potential of double counting when adding the BNEF and CDM data together.

12 VCCEdge data was excluded from to the total renewable energy investment figure as there was a risk of double counting with the BNEF data. It has however been presented separately for information purposes.

We developed a typology of private finance sources given the broad range of institutions and type of flows (Box 2-1). Most forms of private finance in India have been leveraged by international and national public finance.

**Box 2-1: Different sources for private finance in India**

- **Multilateral Development Bank (MDB)** – accounts for credit lines that have mobilised domestic private sector investment in EE and renewable energy. These credit lines mobilise commercial financing from Indian FIs by providing funds to the institutions, which they can then on-lend to project developers or implementers. The credit lines usually provide funds at low interest rate to FIs, allowing the institutions to on-lend them at a higher interest rate, which may be still be lower than market rates. It also accounts for public finance that has been provided as ODA assistance and equity investments to leverage private finance.
- **Bilateral finance institutions (BFIs)** – accounts for credit lines that have mobilised domestic private sector investment in EE and renewable energy. These credit lines mobilises commercial financing from Indian FIs by providing funds to the institutions, which they can then on-lend to project developers or implementers. The credit lines usually provide funds at low interest rate to FIs, allowing the institutions to on-lend them at a higher interest rate, which may be still be lower than market rates. This finance source also accounts for finance that has been provided by BFIs to

list, and it is expected there are a number more funds.

- **International Credit Lines** – International credit lines have been key in supporting private sector finance in India; these have tended to be provided

leverage private finance in India, mainly via ODA loan assistance. KfW and JICA have been key providers of finance in India.

- **Local National Bank (LNB)** – accounts for private finance leveraged by public sector banks in India; examples include (but not limited to): State Bank of India, Central Bank of India or IDBI Bank.
- **Mixture of LNB and Local Private Banks (LPB)** – accounts for private finance from both national and private banks in India; where no clear distinction could be made to the source of the finance.
- **Local Private Finance Institution (Local PFI)** – accounts for private finance that has been provided by private banks (e.g. Yes Bank) and FIs (e.g. IDFC) in India.
- **Mixture of local and international private investors** – identifies where a project/scheme has received finance from both local and international private investors, and where the breakdown between each is not clear. This is the case mainly for CDM data.
- **Mixture of public and private** – accounts for investments by public FIs (e.g. IREDA) that have utilised both private and public sector finance, but the distinction between each was not provided.

Comparisons across time periods could not be undertaken, as often this information was not available; or if it was, the range was quite large which would distort the messages. For this reason no comparison has been made using date ranges<sup>13</sup>.

Other sources of information used in the study to capture private sector investment were:

- **Environmental Funds** – The list of India’s environmental and green funds have been sourced from VCCEdge, this is by no means an exhaustive

by MDBs or via bilateral institutions. It is important to note that the total amount provided through these channels should not be added to the sector; as this would lead to double counting of investments.

- **Low carbon and clean tech market estimates** – the flows identified were sourced from VCCEdge and identify the private equity finance into these sectors; this is not an exhaustive list. Other sources were identified, but due to data confidentiality were not available for use in this study.

<sup>13</sup> An excel spreadsheet has been prepared to track all the flows. This lists the specific year, or time period that finance was applicable to, where available, this information has been provided.

## 2.3 Private climate finance flows in India are predominantly in renewable energy, transport and energy efficiency

In this section we present the private finance flows identified in this study through publically available sources<sup>14</sup>. A mixture of local and international private finance was the largest flow of investment in India, totalling USD 16 billion since 2001<sup>15</sup>. Local private finance institutions were identified as the

second greatest contributor, providing USD 8.6 billion between 1999 and 2014. Table 7 provides a high level overview of the finance sources, the investment amounts and the date ranges of the flows. The categorisation of the financial sources devised in this study aims to take into account the range of different sources for private finance in India. This classification is used later in this section, when describing the sources of private finance for a particular sector (see Box 2-1 for further detail).

Table 7: Summary of the key private finance flows identified in India (by finance source)

Finance source / description	Total (USD million)	Date range for the flows (if available)
Multilateral and Bilateral banks/ agencies <sup>a</sup>	8,389	1991 – ongoing
Local National Banks (LNB) <sup>b</sup>	236	2004 – ongoing
Mixture LNB and Local Private Banks <sup>c</sup>	66	2007 – 2014
Local Private Finance Institutions (PFIs) <sup>d</sup>	8,632	1999 – 2014
Mixture of local and international private investors <sup>e</sup>	16,322	2001 – ongoing
Mixture of public and private finance <sup>f</sup>	50	2007 – 2014
Environmental and green funds <sup>g</sup>	221,827*	Total to date
Market size <sup>h</sup>		
– India Low Carbon Environmental Goods and Services (LCEGS) market	322,547	2011/12
– Environmental technologies market	9,000	Per year
Market potential <sup>i</sup>		
– Renewable Energy (Solar)	19,000	2013 – 2022
– Industrial Energy Efficiency	27	2018
– Waste management	13,620	2015

### Note:

The data presented in this table should not be totalled. The total figure provided for multilateral and bilateral private finance is a combination of credit lines and finance for individual projects.

### Sources of information:

a (JICA, 2012; IIP, 2012; CIF, 2011; ADB, 2011; USAID, 2008; KfW and SIDB, 2010; World Bank, n.d.; IFC, 2013); ADB, 2002; *Interviews*

b (IIP, 2012; USAID, 2013; USAID, 2013); *Interviews*

c (USAID, 2013)(USAID, 2013)

d (BNEF, 2014; USAID, 2013; USAID, 2013; BNEF, 2014; BILT, 2014; Netscribes, 2012; II plc, 2014; VCCEdge, n.d.; VCCircle, 2009; Hindu, 2013); *Interviews*;

e (UNFCCC, 2014) CDM *data download* f (GoI, 2008; USAID, 2013; USAID, 2013)

g (VCCEdge, n.d.) h (CCI, 2013)

i (CCI, 2013; BIS, 2013; NOVONOUS, 2014)

\* Total value of assets under management. Please note: the total listed here is not all directed toward climate-related projects, see the section below.

14 Where the data sources were publically available

15 We have excluded the finance source 'mixture of public and private finance' in this comparison, as it was not possible to determine the exact proportion of private finance from these sources

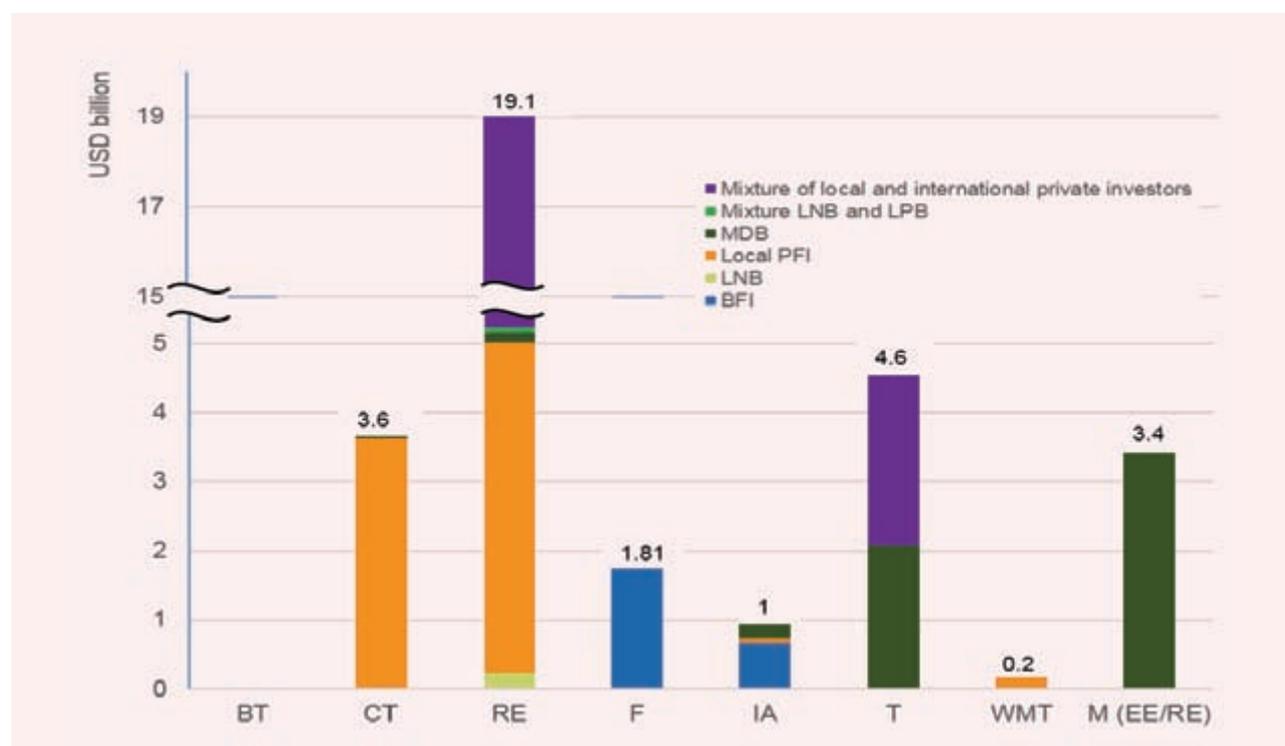
In addition to the sources outlined above, approximately USD 20 billion of mixed public and private finance was identified in the transport sector. This was primarily targeted at rail based metro networks, such as those in Delhi, Mumbai and Hyderabad (not limited to), and Bus Rapid Transit System (BRTS) developments. The total investment figure could not be included in overall transport investment, as the source of the finance

was from a mixture of public and private sources; no further breakdown was available to estimate the private finance share. (PCM, 2008).

Figure 4 and Table 8 provides an overview of the finance flows to each sector being considered in this study; it further breaks down the flows by the finance source.

**Figure 4: Around USD 34 billion has been invested in India to mobilise private climate finance, predominantly in renewable energy, energy efficiency and transport sectors**

Private finance flows by sector and finance source in India



**Key:**

BT: Building Technology; CT: Clean Tech; RE: Renewable Energy; F: Forestry; IA: Industrial Applications; T: Transport; WMT Waste Management Technology; M EE/RE: Mixed (EE/ RE)

**Notes:**

- The date range for each private finance flow varies between the finance sources identified, it was therefore not possible to track the flows by date. For the date ranges (where the information was available), see Table 7 above.
- EE investments were not always categorised as 'EE'. These have therefore been taken into account in the industry applications and building technology sectors.
- The mixed sector highlights private finance flows into multiple sectors with no clear breakdown as to how much finance was provided to each sector. The 'Mixed' finance listed above is attributed to the following sectors: EE in buildings, renewable energy and EE in industrial applications. The USD 3.4 billion figure is made up of 3 MDB credit lines: 1) USD 2 billion targeting EE in BT and IA, 2) USD 1.4 billion targeting RE and EE in IA, and 3) USD 0.005 million targeting EE and RE.

Table 8: Private finance by finance source and sector (USD billion)

Source of finance	BT	CT	RE	F	IA	T	WMT	M (EE/RE)	Total
BFI				1.8	0.7				<b>2.5</b>
MDB		0.0	0.2		0.3	2.1		3.4	<b>5.9</b>
LNB			0.2						<b>0.2</b>
Local PFI		3.6	4.8		0.1		0.2		<b>8.6</b>
Mixture LNB and LPB			0.1						<b>0.1</b>
Mixture of local & international private investors			13.8			2.5			<b>16.3</b>
Mixture of public and private finance			0.05						<b>0.05</b>
<b>Total</b>	<b>-</b>	<b>3.6</b>	<b>19.1</b>	<b>1.8</b>	<b>1.0</b>	<b>4.6</b>	<b>0.2</b>	<b>3.4</b>	<b>33.7</b>
<b>Key:</b>									
BT: Building Technology; CT: Clean Tech; RE: Renewable Energy; F: Forestry; IA: Industrial Applications; T: Transport; WMT Waste Management Technology; M EE/RE: Mixed (EE/ RE)									

The following sections provide a more detailed discussion on the figures presented in the figure above.

**2.3.1 Multilateral Development Banks (MDBs) and bilateral finance institutions (BFIs) have mobilised around USD 8.4 billion leading to leveraged private finance flows<sup>16</sup>**

**International credit lines continue to play a key role, contributing approximately USD 4.4 billion over the last ten years through private finance investments in focussed programmes towards clean technology, EE in the building technology, industrial applications and renewable energy sector<sup>17</sup>** Figure 5 outlines the credit lines for on-lending to Indian banks that are currently being implemented (or have been implemented) in India. MDBs and BFIs also use a variety of financial instruments (ODA loans, guarantees, equity based financing and insurance)

with the aim of leveraging private finance. These forms of instruments have accounted for approximately USD 4 billion in India.

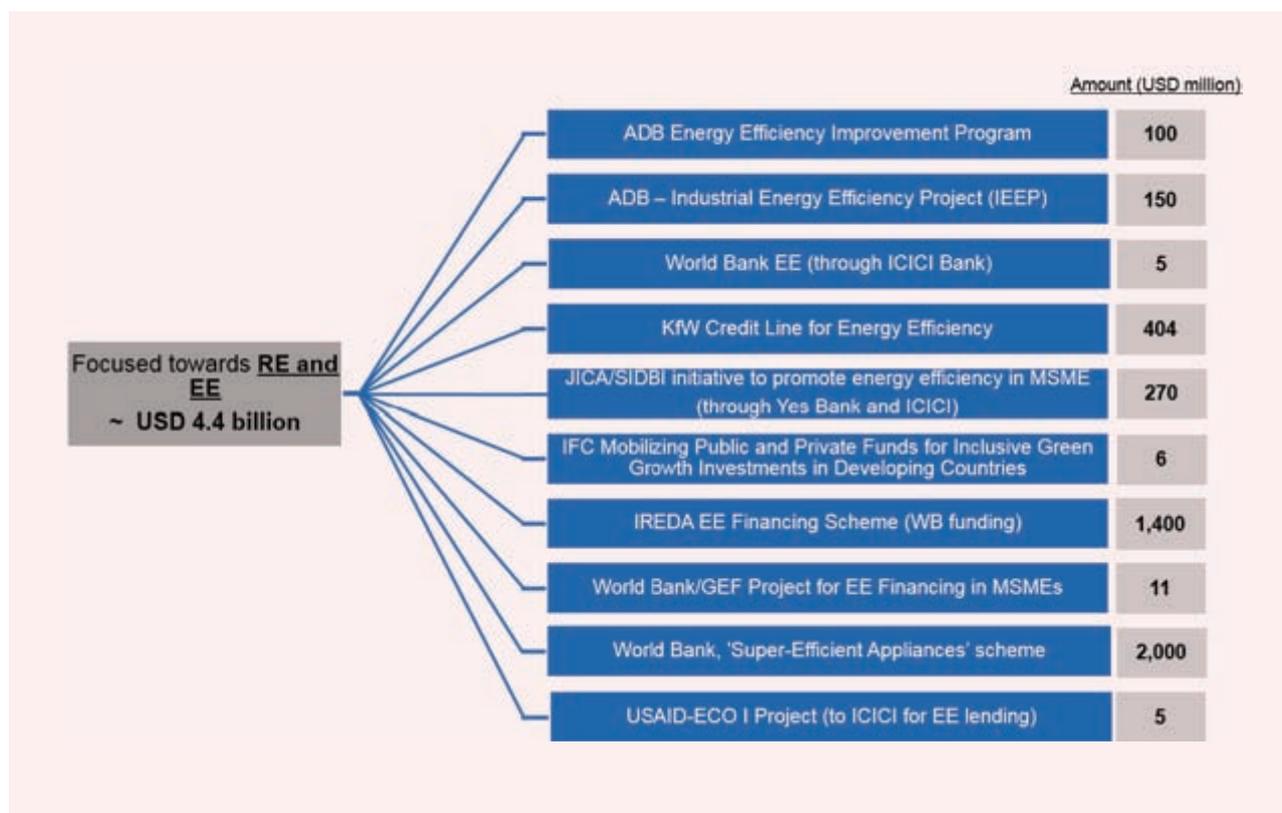
**2.3.2 Local Private Finance Institutions, along with Local National Banks and Local Private Banks have accounted for USD 9 billion of private finance in India**

**Since 2006, local private financial institutions (PFIs) have invested approximately USD 4.8 billion and USD 3.6 billion into renewable energy and clean technology respectively.** A further USD 200 million and USD 100 million was invested in waste management and industrial applications projects. These were all equity based investments. Local national banks have accounted for approximately USD 200 million; whilst a mixture of local national banks and local private bank finance has contributed approximately USD 100 million.

<sup>16</sup> This figure includes ODA loan assistance provided to private sector forestry projects.

<sup>17</sup> Please note that climate specific international credit lines for private sector is not systematically captured. It is therefore expected that this figure is an underrepresentation.

Figure 5: Internationally funded programmes in the RE and EE space (covering 1995– 2014)<sup>18</sup>



Source: (JICA, 2012; IIP, 2012; CIF, 2011; ADB, 2011; USAID, 2008; KfW and SIDB, 2010; World Bank, n.d.; IFC, 2013); ADB, 2002; Interviews

2.3.3 A mixture of local and international private investors have financed USD 16.3 billion worth of investment since 2001 and till 2019<sup>19</sup>

**Renewable energy investments accounted for USD 14 billion, whilst transport investments made up the remainder.** The mixture of international and local private finance in India mainly comprises of CDM projects; the total investment figures were provided as combined figures, hence why further breakdown has not been provided.

The CDM provides top-up, supplemental financing that makes low-emitting projects competitive against cheaper but more polluting alternatives. The projects are primarily financed by resources outside the CDM (UNFCCC, CDM Fact Sheet, 2014). Private finance through the CDM can therefore be considered as finance leveraged as a result of climate issues under Kyoto Protocol.

2.3.4 Private finance investment varies significantly across all sectors in India

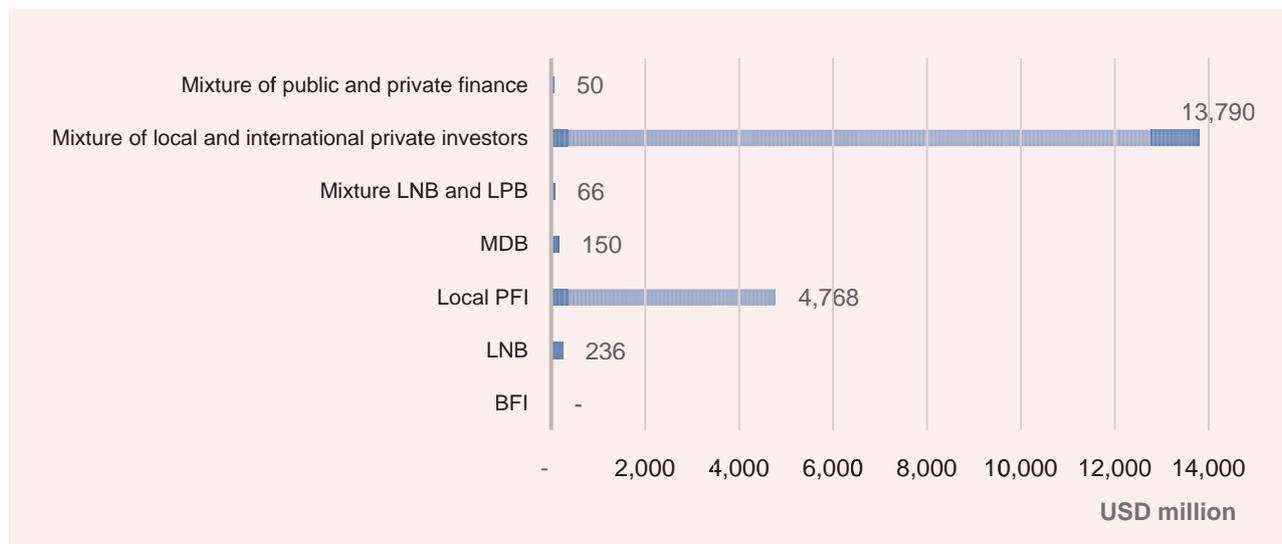
**India has seen approximately USD 19 billion of investment in the renewable energy sector since 1999**, with hydro projects accounting for approximately 57% of the share (USD 9 billion), and wind projects another 27% (USD 4.3 billion). A combination of financial sources and instruments were utilised, however the majority has been a mixture of local and international private investors financing initiatives in the form of debt (Figure 6).

VCCEdge has reported a total private equity deal value USD 1.2 billion since 2005 to date; this figure has not been included in the overall figure above, at the risk of double counting. A breakdown by subsector was unavailable.

18 Note: The list of credit lines presented in this report were identified from publically available data sources. It is likely that there are more credit lines available, but the data was not accessible

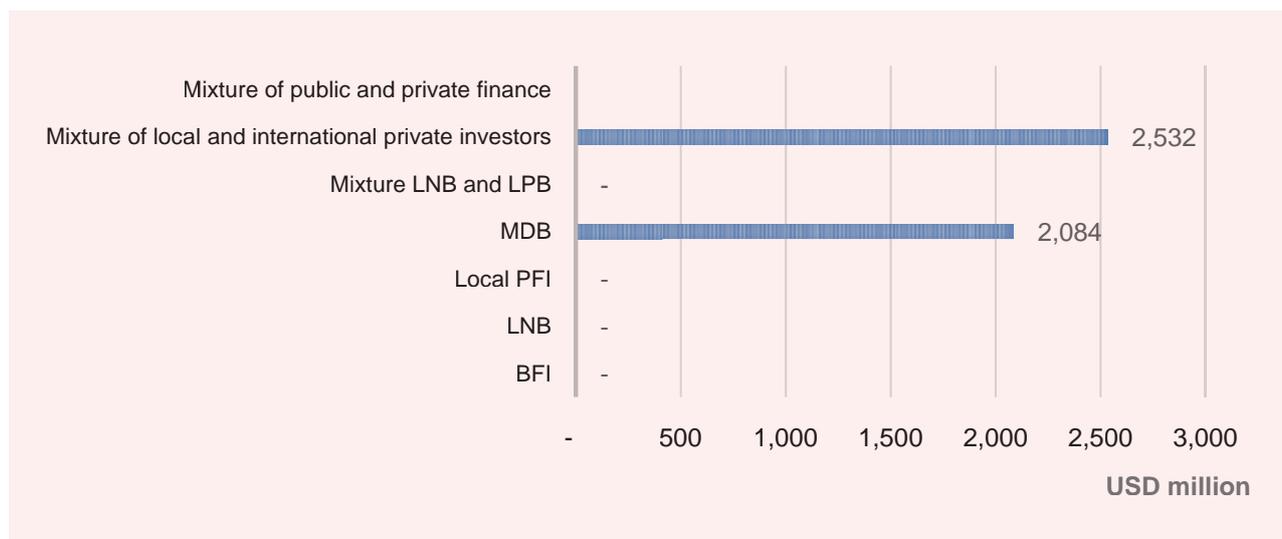
19 A select number of funds have committed funds up to 2019

Figure 6: Private sector renewable energy investments, in India (1991-2014)



**Note:** The estimates have been derived from a number of sources, please see Appendix 1 for further information on the data source breakdown. The total credit lines available from MDB's for RE investments have not been factored in to this calculation.

Figure 7: Private sector transport investments, in India (1994 - 2014)



**The transport sector has had an investment of approximately USD 4.6 billion;** supporting initiatives in modal shift from road to rail/long distance rail infrastructure; modal shift to public transport and road infrastructure planning and improvements (II plc, 2014; WB, 2014; CDM, 2014).

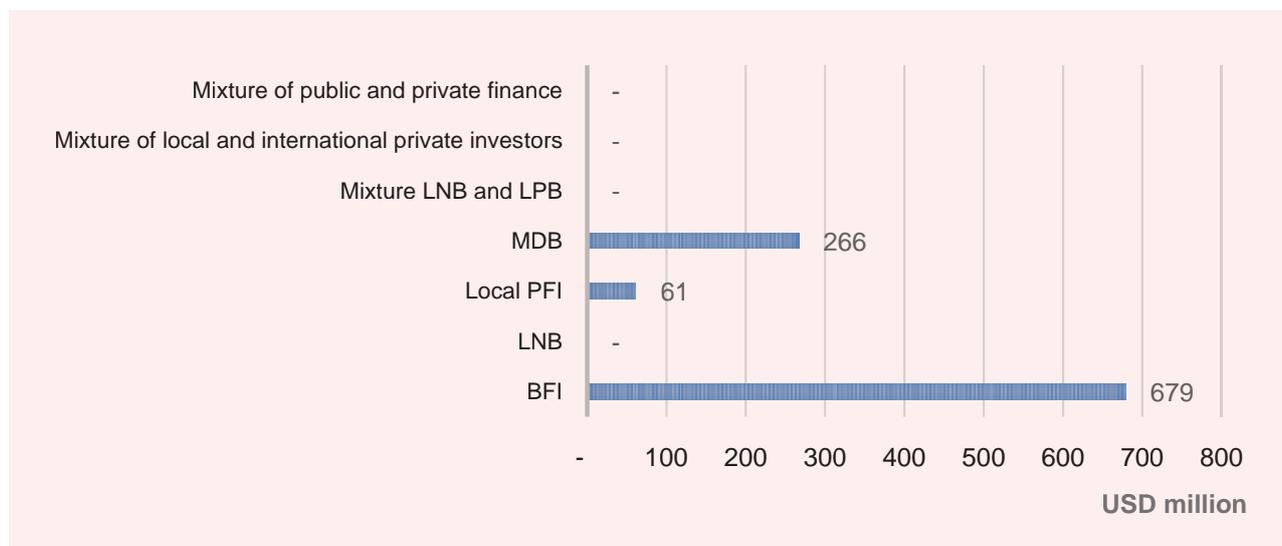
**EE investments<sup>20</sup> (within the building technology, the industry applications and part of the 'Mixed' category) have accounted**

**for approximately USD 3 billion of private finance in India since 1994.** The majority, 2 USD billion<sup>21</sup>, of finance has been provided by MDBs (World Bank and ADB) in the mixed EE category, as shown in Figure 8; followed by bilateral finance in the Industrial Applications category [please see the notes section beneath Figure 4 for a detailed breakdown].

<sup>20</sup> Please note, this figure is not in addition to the international credit lines mentioned above.

<sup>21</sup> The USD 2 billion EE figure is taken into account as part of the 'Mixed' sector category in Table 8 for a 'Building Technology and Industrial Applications' investment programme.

Figure 8: Private sector EE investments within the industry applications and building technology sectors, in India (1994 – 2014)



**Note:** Figure 8 does not take into account the EE financing from the ‘Mixed sector’, please refer to Figure 4 and Table 8 for further information.

**Private equity being invested in the cleantech sector since 2005 totalled USD 3.6 billion from 116 deals** (VCCEdge, n.d.); unfortunately a breakdown of this information was not available due to confidentiality and commercial reasons.

**Since 2006 approximately USD 174 million of private finance has been invested in the waste management sector.** This encompasses investment in waste services (municipal and industrial), waste to energy, e-waste management, solid waste processing and recycling. The private finance has predominantly arisen from local private finance flows, with some international private equity investments as well (Netscribes, 2012; VCCircle, 2009; Business Standard, 2014; Hindu, 2013).

**The forestry sector received USD 1.8 billion worth of investment from JICA since 1991 directed towards India’s National Afforestation Program.** This was provided in the form of ODA loan assistance, and therefore is not strictly private investment (JICA, 2012). Limited private financial investment information is available for the forestry sector, even though there are a number of private companies involved in raising forest plantations for producing wood raw material. There are some 40+ plantation companies in operation (FAO, 2009).

The main companies and organisations involved in paper manufacturing and undertaking initiatives

such as afforestation do not disclose the finance invested in these projects. Instead, they report on the area of land planted – as is the case with BILT and JK Paper that planted 7,403 hectares and 7,000 hectares respectively in 2014 (BILT, 2014; JK Paper Ltd., 2014).

### 2.3.5 Current and emerging trend of environmental and green funds

**The estimated total market value of all the financial assets under management (AUM) by the environmental and green funds in India is currently approximately USD 222 billion** (VCCEdge, n.d.; VCCircle, 2009). There are an increasing number of environmental and green funds in India, primarily investing renewable companies, technology providers and infrastructure companies. The majority of funds reviewed in this study were managed by venture capital firms.

It is important to note that these funds are not solely set to invest in climate-related projects; but climate-relevant sectors, as outlined above, are often a key investment category.

Table 9 provides a snap shot of the 5 largest funds in India and the funding sectors in which they invest. Of the list of 39 funds, only 14 publically disclosed their AUM; the top 5 funds therefore account for 98% of the estimated total value in India.

Table 9: Top five asset management funds in India

Fund Name	AUM (USD million) <sup>22</sup>	Sectors
Carlyle Investment Management LLC	199,000	Automobile and Ancillary industries, Aviation, Banking & Financial Services, Defence, Energy, Healthcare, <b>Infrastructure</b> , IT/ITES/BPO/KPO, Logistics, Media, <b>Real Estate</b> , <b>Renewable Energy</b> , Retail, Technology, Telecom
Paul Capital Partners	7,300	Biotechnology, Healthcare, Pharma, <b>Renewable Energy</b> , <b>Technology</b>
Baring Private Equity Asia	5,000	Banking & Financial Services, <b>Energy</b> , IT/ITES/BPO/KPO, Manufacturing, Media, <b>Renewable Energy</b> , Telecom
Battery Ventures	3,000	Banking & Financial Services, <b>Energy</b> , <b>Infrastructure</b> , IT/ITES/BPO/KPO, Media, <b>Renewable Energy</b> , Technology
Lightspeed Advisory Services India Pvt. Ltd.	2,000	IT/ITES/BPO/KPO, Media, <b>Renewable Energy</b> , <b>Technology</b> , Telecom

Source: (VCCEdge, n.d.)

### 2.3.6 The current and potential size of India's green market is substantial

**India's Low Carbon Environmental Goods and Services (LCEGS) market in 2011-12 was USD 323 billion.** It was ranked 4th in the world, behind USA, China and Japan respectively (BIS, 2013). Furthermore, in BNEF's Climate scope 2014 report, which evaluates climate-related investment on a country-by-country basis, India was ranked 4th out of the 55 countries reviewed and it had its best performance on Low Carbon Business and Clean Energy Value Chain parameters (BNEF, 2014).

**The Renewable Energy Market in India is anticipated to see investments worth USD 200 billion by 2022.** India has been able to achieve only 13% of its renewable energy potential (as of March 2014). The untapped market potential for overall renewable energy in India is 216,918 MW which shows huge growth potential for renewable energy (NOVONOUS, 2014); details of the barriers in accessing this potential are discussed in the next chapter. The planned USD 100 billion investment to develop India's solar market would increase the

capacity to approximately 175 GW by 2022 (CCI, 2013; RE INVEST, 2015; GoI, 2015).

**The environmental technologies market is currently estimated to be worth approximately USD 9 billion per year, and is expected to grow by 15% per year** (CCI, 2013). Growing environmental consciousness, increasing compliance and enforcement of environmental legislation, the availability of finance and rising domestic demand due to the rapid growth in urban population has led to the deployment of clean technologies in the country (ASA & Associates, 2013). In addition to this, it is estimated that the industrial EE market potential in 2018 will be around USD 27 million (CCI, 2013).

The water and waste management sectors have investment plans of USD 50 billion over the next five years. The Indian municipal solid waste (MSW) management market is expected to grow at a Compound Annual Growth Rate (CAGR) of 7% by 2025 while e-waste management market is expected to grow at a CAGR of 10.03% during the same period.

22 AUM: Assets under Management

## 3. Sustainable Corporate Behaviour

### Key messages:

- India is still at cross roads with regards to implementing environment and social safeguards(ESS) guidelines that balance development and climate change concerns. While public sector units and large corporates have taken steps to introduce ESS in their day to day business, Small and Medium Enterprises (SMEs) are still lagging behind.
- Most corporate organisations who disclose their ESS related practices are either following the IFC performance standards or have signed up to the Equator Principles. It was also identified that a number of corporate organisations have also signed up to the S&P

indices, and others are disclosing their ESS practices under the CDP India initiative.

- Investors across the world are increasingly aware of the environment and social risks of investments. More and more investors are expecting corporates accessing finance to adhere to stricter ESS guidelines.
- India needs to proactively bring about a change in improving ESS practices in FIs and businesses. SMEs in particular would require substantial capacity building/handholding to comply with international ESS guidelines. Compliance with ESS guidelines (for all organisation sizes) could greatly help to scale up climate finance in India.

The private sector is responsible for 86% of all investments worldwide. Over 90% of the population in developing countries receive their income from the private sector. Thus, to engage the private sector into climate change activities as part of the solution to climate change seems only natural. Businesses across the world have realised that they are able to benefit from the commercial opportunities and safeguard themselves from the risks of climate change, only if they factor it into their business decisions. The investment community is demanding more transparency on climate change exposure, sensitivity and responsiveness factors. Even though policy signals are important, the private sector can also show its ambition and initiative by incorporating good sustainable corporate governance into its operational practices. This would involve climate friendly business decisions and actions to enhance their own reputation, reduce risks, expand market share through expanded business lines, and have more

access to international finance. In the following section we bring out the international best practices and some Indian initiatives showcasing sustainable corporate behaviour and the awareness levels of the private sector to climate concerns.

### 3.1 International best practice in sustainable corporate behaviour

**International schemes on sustainable corporate behaviour are in line with UNFCCC schemes or include strong disclosure on corporate social responsibility and environment and social standards.** Some of the main voluntary schemes that have been in practice, and are being followed by private businesses all across the globe are described in Table 10. All of these have come about with a strong intent of either showcasing solidarity with the UNFCCC mechanisms (e.g. Gold Standard and Voluntary Carbon Standard set higher standards and benchmarks over and above the CDM) or

to provide disclosures on strong governance in relation to corporate social responsibility,

environment and social standards as in the case of GRI.

**Table 10: Examples of voluntary schemes to encourage sustainable corporate behaviour**

Schemes	Description
Global Reporting Initiative (GRI)	The Global Reporting Initiative is an international, multi-stakeholder effort to create a common framework for voluntary reporting of the economic, environmental, and social impact of organisation-level activity. Its mission is to improve the comparability and credibility of sustainability reporting worldwide.
Global compact	Launched in 1999 by the United Nations, the Global Compact is a coalition of large businesses, trade unions and environmental and human rights groups, brought together to share a dialogue on corporate social responsibility.
Climate, Community and Biodiversity Standards (CCBS)	<p>The Climate, Community and Biodiversity Standards (CCBS) evaluate land-based carbon mitigation projects from the early stages of development through implementation. The CCBS foster the integration of best-practice and multiple-benefit approaches into project design and implementation. The Standards</p> <ul style="list-style-type: none"> <li>• Identify projects that simultaneously address climate change, support local communities and conserve biodiversity;</li> <li>• Promote excellence and innovation in project design and implementation; and</li> <li>• Mitigate risk for investors and offset buyers and increase funding opportunities for project developers.</li> </ul>
The Verified Carbon Standard (VCS)	<p>The VCS is a robust, global standard for voluntary carbon offset projects. Formerly known as The Voluntary Carbon Standard, it was founded in 2006 by The Climate Group, the International Emissions Trading Association, the World Economic Forum, and later joined by the World Business Council for Sustainable Development.</p> <p>The VCS programme ensures all carbon credits are real, measurable, additional, permanent, independently verified, unique and traceable. All approved projects are registered in the VCS' online registry, ensuring a transparent chain of custody, from issuance through to retirement. In November 2008, the standard integrated guidelines on Agriculture, Forestry and other land-use projects.</p>
Gold Standard	<p>The Gold Standard Foundation is a non-profit organisation which operates a carbon standard certification scheme for both Kyoto based CDM and Voluntary market credits. The Gold Standard trademark represents premium quality carbon credits which have actively contributed to sustainable development.</p> <p>Only renewable energy and end-use efficiency projects can register for Gold Standard and all certified credits have undergone rigorous third party validation and verification. All approved projects must be registered in the Gold Standard online registry, ensuring a transparent chain of custody, from issuance through to retirement.</p>

The Climate Action Reserve (CAR)	<p>The Climate Action Reserve (successor to the California Climate Action Registry) was launched in 2008 to provide integrity and transparency to the US carbon market. It issues carbon credits – known as Climate Reserve Tonnes - and tracks the transactions in a publicly accessible system.</p> <p>The Reserve’s standards ensure that GHG reductions generated by projects are real, permanent verifiable, enforceable and additional. All approved projects must be registered in the CAR online registry, ensuring a transparent chain of custody, from issuance through to retirement.</p>
Carbon Disclosure Project (CDP)	The Carbon Disclosure Project (CDP) – CDP is an organisation that works with approximately 3,000 of the world’s largest known shareholders and corporations disclosing their greenhouse gas emissions.

Environmental and social performance due diligence is one of the key needs of leading banks, funding institutions and capital providers. Equator Principles, UN Principles on Responsible Investment (UNPRI), IFC Performance Standards and the Climate Principle are a few of the most popular ESS evaluation standards in the world. India is also moving strategically in the direction of adopting these principles; however there seems to be a long way to go to involve large number of industries and businesses in the small and medium enterprise sector. By 2013, approximately USD 1400 trillion of assets were under management and UNPRI had more than 35 large FIs as signatories.

### 3.2 Experience of Indian businesses and FIs in integrating climate concerns.

**The Indian business environment is slowly changing its stand from being reactive to government push to proactively undertaking steps to integrate climate concerns into their business.** To date Indian businesses and FIs have been following certain voluntary and mandatory guidelines; some of the important milestones are as below:

- 1956: The Companies Act of 1956 governed companies in India to include sections on reporting on various aspects of company operation including information on conservation of energy under Section 217<sup>23</sup>.

- 1986: The Environment Protection Act was instated and mandates each company to submit an annual environmental audit report comprehensively covering water and raw material consumption, to the State Pollution Control Board (SPCB).
- 2009: India’s Ministry of Corporate Affairs issued voluntary guidelines for Corporate Social Responsibility (CSR) to encourage Indian corporations to adopt sustainable environmental policies, undertake activities for economic and social development of communities across the country. It also encourages companies to disseminate information in annual reports on their CSR policy, activities undertaken, and progress to their investors (and other key stakeholders).
- 2011: Indian Institute of Corporate Affairs published the National Voluntary Guidelines for creating a conducive policy environment for responsible business and responsible investment in India.
- 2012: The Companies Bill 2012 made it mandatory to have a CSR policy for companies with a net worth of more than Rs 500 crore, or a turnover of Rs 1,000 crore. The voluntary policy was made a law with designated directors to look into it. It also stipulated 100 listed companies report on their responsibilities, and the environmental and social initiatives taken by the business.

23 [http://www.mca.gov.in/Ministry/pdf/Companies\\_Act\\_1956\\_13jun2011.pdf](http://www.mca.gov.in/Ministry/pdf/Companies_Act_1956_13jun2011.pdf)

- 2013: The Companies Act 2013 mandated companies to spend 2% of their profits on CSR activities.

- 2014: The Securities and Exchanges Board of India (SEBI) mandates greater voting data transparency with the inclusion of one female director for fifty companies.

Two broad strategies that Indian businesses followed were:

- Large corporates and listed companies got involved with existing rating and standards to account for climate risks e.g. Standard & Poor's Bombay Stock Exchange Carbonex and Greenex. In 2012, Standard and Poor Bombay Stock Exchange (S&P BSE) launched two new indices: S&P BSE Greenex and S&P BSE Carbonex 16.

- The S&P BSE Greenex lists the top 25 companies among S&P BSE 100, in terms of their quantitative and objective performance indicators on EE.

- S&P BSE Carbonex is a version of S&P BSE 100 on the basis of businesses commitment to mitigating climate change. It has maximum representation from the Finance sector (over 27%); Oil and Gas companies constitute around 11%, while there is moderate representation from the metals sector. The listing assessment for the index focuses on climate change initiatives of companies across four aspects – monitoring, reporting and disclosure, strategy/governance,

performance/achievement and ecosystem action. Even though the index's evaluation criteria is publically available, there is a mismatch in the extent of proactive behaviour displayed and what is expected out these sectors. More emphasis and knowledge sharing of these objectives could probably prompt various sectoral associations to initiate collaborative efforts and drive enthusiasm across member companies.

- Certain Indian corporates and Indian FIs have developed and implemented ESS guidelines based on one of the seven standards below

- GIZ Environment Social Governance guidelines/Framework
- IFC Sustainability Framework
- Equator Principles
- World Bank's Operational and safeguard policies
- ADB Safeguard policy
- UNEPFI
- National Voluntary Guidelines on Social, Environmental and Economic Responsibilities of Business

The IFC Standards and Equator Principles have been the most favourable standards that businesses and FIs have adhered to in India. Further information on these standards is given in the boxes below.

**Box 3-1: The 2012 IFC Performance Standards**

Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts

Performance Standard 2: Labour and Working Conditions

Performance Standard 3: Resource Efficiency and Pollution Prevention

Performance Standard 4: Community Health, Safety, and Security

Performance Standard 5: Land Acquisition and Involuntary Resettlement

Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

Performance Standard 7: Indigenous Peoples

Performance Standard 8: Cultural Heritage

Source: (IFC, 2012)

### Box 3-2: Equator Principles

- Credit risk management framework for determining, assessing and managing environment and social risk in financing projects
- Voluntary guidelines, adopted by FIs, applicable for following products:
  - Project finance – capital costs exceeding USD10 million
  - Project related corporate loan – single project; 2 year tenor; minimum loan amount of USD 100 million, EPFI contribution USD 50 million
- Bridge loan – tenor of less than 2 years to be refinanced by a project finance or project related corporate loan
- Project finance advisory services – capital costs exceeding USD10 million
- Equator Principles is not applicable to refinanced cases and equity transactions
- Currently 80 FIs (including IDFC) across 35 countries are EP signatories
- Equator Principles are based on IFC Performance Standards and sectoral Environment, Health and Safety (EHS) Guidelines

Source: (Equator Principles Association, 2011)

Some of the notable institutions that already have their ESS in place are: IL&FS, IDFC, SIDBI and Yes Bank, the case study in the Box 3-3 provides further detail.

### Box 3-3: Yes Bank and Green Infra Ltd. ESS policies

Yes Bank has a robust ESS policy which uses indicators to map the parameters for a project that approaches the bank for financing. The comprehensive checklist is based on IFC's performance standards and EHS guidelines. With this information, the risk professional within the bank undertakes checks on ground before approving a loan to a project. Further information required by the bank, as part of the loan agreement include: Detailed Project Reports (DPRs), environment impact assessment

reports, details on land acquisition and Rehabilitation and Resettlement (in addition to various environmental and social clearances).

Green Infra Ltd., a leading Independent Power Producer (IPP) of renewable energy, has incorporated ESS guidelines based on the Equator Principles. It has a checklist on EHS, Occupational Health and Safety Management<sup>24</sup> and other important governing aspects on environment and social impacts on all their investments.

Source: Finding from the interviews conducted as part of the study

<sup>24</sup> BS OHSAS 18001 is a framework for an occupational health and safety management system. It ensures organisations have policies, procedures and controls in place to achieve the best possible working conditions, aligned to internationally recognise best practice.

## 4. Private Sector Potential for the Financing and Implementation of National Climate Change Mitigation Strategies

### Key messages:

- India's mature financial sector and enterprising corporate and industrial sector has great potential to scale up low carbon investments. However, there are several barriers that have constrained the private sector realising its full potential. Sector specific barriers include:

- **RE:** unclear national and regional policies and under-priced electricity tariffs for conventional energy are two key barriers restricting RE uptake.

- **EE:** limited availability of non-recourse finance, FIs lack capacity to understand EE technologies and the lack of bankable projects. Often FIs do not track EE financing as separate projects.

- **Waste Management:** limited availability of data and awareness, the irregularity of payments for almost all waste management and recycling projects.

- **Transport:** fuel price subsidies create market distortions and oppose the goals of sustainable transport. Institutional barriers are the major obstacles preventing private sector participation and financing for sustainable transport projects.

- The extent of each type of barrier varies by the particular low carbon sector. It is worth highlighting that although the RE sector faces a number of barriers, these are not as severe as the barriers faced in the other sectors. This is largely due to greater policy, regulatory

and strategic level support for the RE sector compared to other sectors.

- From the private sector perspective, Indian Banks have enough liquidity but they are apprehensive of financing new areas/sectors/technologies. Currently, their risk tenure is between 8-10 years; there is a need for longer tenure loans with lower interest rates, and more risk guarantees for low carbon sectors.

- External debt is very hard to flow to India due to obstacles in the current policy framework in India.

- There is also limited understanding of climate risks in private sector investments. Knowledge of climate change risks is still very nascent amongst the private sector; hence engagement in climate change has been limited to GHG accounting, and there has been no use of robust climate risk screening tools for the private sector.

- Despite these barriers there is ample potential for the India private sector to scale up private climate finance. A mix of new financing mechanisms, efficient tax structures, platforms for exchanging information (particularly success stories), awareness building for inclusion of ESS standards into investment decision of Indian FIs, and most importantly, aggressive role of the public sector to provide clear policy frameworks can go a long way in removing the barriers to exploit the full potential of India's private sector.

In this chapter, we first present an overview of the main barriers faced by the private sector in scaling up climate investments. The main barriers to

investment have been categorised as institutional, financial, technical and behavioural for the main climate-related sectors considered as part of this

study (as outlined in section 2.2.1). The chapter also looks at effectiveness of two flagship national strategies: National Mission on Enhanced Energy Efficiency and the National Solar Mission to scale up private finance. The chapter concludes by summarising the findings from the stakeholder consultation demonstrating future potential and good practices to scale up private finance.

#### 4.1 The private sector in India faces significant institutional, financial, technical and behavioural barriers

Several barriers exist in the low carbon space in India, which have deterred private financiers to enter the market. The barriers can be categorised into those: at policy level, relating to institutional structures, financial in nature, as well as those related to technology and behavioural aspects. The barriers have been identified through discussions with financiers, project developers and industry associations undertaken as part of this study. It was noted that the barriers for renewable energy sector are less severe than those in the other sectors; this

is largely due to greater policy, regulatory and strategic level support given to the RE sector in the country compared to other sectors. An example of this can be seen in the wind sector, which grew at a large pace following a tax incentive provided by the government with regards to accelerated depreciation. As the technology matured and the policies related to open access within states eased and tariffs were introduced in most of the states, the IPPs (backed by the likes Goldman Sachs, Morgan Stanley and Indian conglomerates like IL&FS, IDFC, and HERO) developed wind parks with an intention to quickly reach scale and are expecting exit through Initial Public Offerings (IPOs). This scale of activity has not been experienced by other sectors.

A summary of the overall institutional and policy, financial and economic, technical, and knowledge and behavioural barriers are provided in Table 11 and discussed in sections 4.1.1 to 4.1.4. These barriers have mainly been drawn from stakeholder consultations. The sector specific barriers are given in section 4.2, which are based on desk research and interviews.

Table 11: Main barriers for scaling up private finance

Institutional/ political	Financial / economic	Technical/Knowledge	Behavioural/social
<p>No RBI mandate to account for EE financing by banks</p> <p>Lack of policy clarity on investment in Low Carbon Strategy (LCS)</p> <p>There is no clear public initiative to engage with the private sector on LCS</p> <p>Policy and regulatory barriers need to be removed by bringing in stringent implementation and enforcement of penalties for RE</p> <p>Lack of engagement with private sector when designing mitigation strategies (e.g. PRGF, VCFEE) has led to early stage implementation issues</p>	<p>Lack of bankability of low carbon projects</p> <p>Over reliance/ preference for asset financing compared to project finance, hence it is not attracting equity</p> <p>Financiers do not compromise on financials of a project</p> <p>Banks possess ample liquidity, but are apprehensive of entering new areas and providing long term debt (due to the high risk)</p> <p>Small size of EE projects, high transaction costs is deterring financiers</p>	<p>Limited understanding of climate risks in private sector investments</p> <p>Investment in low carbon sectors from FIs perspective is senior management driven. There is a lack of understanding at the project appraisal level (esp. for biomass and hydro)</p> <p>FIs lack knowledge of technologies and business models, even for mature waste to energy technologies</p> <p>Many ESCOs not even aware about project financing available from FIs (such as Tata Cleantech Capital Limited, TCCL),</p>	<p>Almost all private and public banks do not account for EE financing separately (unlike MDBs)</p> <p>Low perception of corporate governance standards</p> <p>Money borrowed on commercial terms is less likely to be used for EE</p> <p>Lack of forums for sharing knowledge and best practice (e.g. insurers do not engage with lenders)</p> <p>Public sector does not trust private sector in some sectors</p>

<p>Changing policy landscape forces the private sector to adopt the strategy of “wait and watch”; only few players enter the market to gain “first mover advantage”</p>	<p>Lack of availability of the right funds at the right cost</p> <p>Understanding of the asset class by the financing institutions for solar rooftop</p> <p>Private equity concerned with exits, so prefer lending against equity infusion options</p> <p>In waste to energy projects, unclear revenue model and tipping fees are an issue</p> <p>New start-ups face significant challenges to attract investors</p>	<p>most received balance sheet financing</p> <p>Pipeline of bankable EE projects is small; FIs do not see this as an opportunity</p> <p>Distributed generation technologies have not attracted private finance due to Development Finance Institution (DFIs) reporting requirement and technology incompatibilities</p> <p>Project developers and financial intermediaries find international donor’s eligibility and reporting requirements very onerous</p>	<p>Very few Indian FIs signatories to Equator Principles, most see Environment and Social Safeguards (ESS) as onerous</p>
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#### 4.1.1 Lack of policy clarity and engagement with private sector on climate change policy framework are the main institutional and policy barriers

**GoI has provided regulatory mechanisms and economic incentives for engaging the private sector but actual deployment has been slow.**

There is an increasing focus on private climate finance in India, primarily in renewable energy generation due to incentives like Feed in Tariff (FiTs), fiscal incentives, generation based incentives etc. These incentives bring about further benefits for projects due to their transparent and fast approval processes. The National Solar Mission under the NAPCC is one example; it has attracted huge interest from private sector due to the appropriate incentives, quick approval, and access to international capital.

**There has been major private sector investment in the RE sector, but government incentives to attract private investment in other climate-related sectors has been limited.** In Section 1.3, we discussed the importance of public sector interventions to provide right economic signals,

and reduce or share risks, in order to catalyse private investment. Table 12 outlines some of the key policies, implementing legislation, and mandatory requirements to reduce GHG emission intensity in critical sectors of the Indian economy. The policies include: mandatory and non-mandatory policies, standards, and measures that have been implemented to support the goals of the National Action Plan on Climate Change (NAPCC). There is strong skew toward RE and EE policies compared to other sectors. As mentioned previously, RE investments have benefited from the strong regulatory backing from the Electricity Act 2003; mature technologies combined with tax incentives such as accelerated depreciation has further fuelled RE investments. As result there has been major participation of the private sector in renewable energy generation, especially in wind and solar energy. Recently introduced market based mechanisms such as PAT and Renewable Energy Certificates (REC) are expected to further attract private sector climate finance. These programmes are at an early stage of implementation and have witnessed limited private sector participation due to enforcement issues.

Table 12: Summary of existing policies

Sector	Policy type	Policy name	Enforcement
GHG policies	GHG – technology requirements	IGCC and supercritical power plants	Mandatory
	GHG – trading	e.g. EU Emission Trading Scheme	
	GHG – emission limits	Source performance standards for utilities	
Energy supply policies	Energy policy	National Electricity Policy, National Tariff Policy, National Rural Electrification Policy	Framework
	Energy policy	Integrated energy policy	Framework
	Energy policy	National Solar Mission (RE Targets)	Framework
	Energy policy	Washing of coal	Mandatory
	RE: feed-in tariffs	RE tariff regulations, Generation based incentives for wind power	Mandatory
	RE: supply requirements	Renewable Portfolio Standards	Mandatory
	RE: purchase requirements	Renewable Energy Certificate Trading Scheme	Mandatory
	RE: other financial incentives	Capital subsidy for Biomass and Small Hydro/Accelerated depreciation	Mandatory
	RE: investment tax incentives	Business Energy Investment Tax Credit	
	RE: supply tax incentives	Renewable Electricity Production Tax Credit	
Energy efficiency policies and programmes	Industrial EE programmes	1. National Mission for Enhanced Energy Efficiency (NMEEE) - (a) Market Transformation for Energy Efficiency (MTEE), (b) Energy Efficiency Financing Platform (EEFP), (c) Perform, Achieve, and Trade (PAT) Mechanism for Energy Efficiency 2. National Mission on Sustainable Habitat (NMSH) SME Program	Mandatory
	Energy Conservation Act 2001	Design & Implementation of national and state level EE programmes for all sectors	Mandatory
	EE: technology requirements	IGCC and supercritical power plants	Mandatory
	Energy taxes	National Clean Energy Fund – coal, lignite, peat	Mandatory
	EE: standards & targets	Sectoral EE benchmarks	
	EE: enduse	White certificate trading	
	EE: other financial incentives	Support scheme, innovation fund	

Energy efficiency policies and programmes	Building codes	Energy Conservation Building Code	Mandatory <sup>25</sup>
	EE standards and labels	Standards and Labelling Program	Mandatory <sup>26</sup>
	Other efficiency programmes	Bachat Lamp Yojana, State Energy Conservation Fund	Framework
Other sectors	Industry	Industrial pollution standards and management	Mandatory
	Transport	National Policy on Biofuels, Fuel Economy Standards for passenger cars	Mandatory
	Agriculture, forestry, and other land use	Agricultural Demand-Side Management, National Mission for Sustainable Agriculture, National Mission for a Green India	Framework

**Note:** Red coloured banding denotes no precedence in India

**There is limited engagement with the private sector for designing climate change plans and strategies in India.** The private sector has had limited engagement with the GoI in climate change decision making, and in coordinating a national financing strategy that encourages private sector

investment in climate-related activities (Table 13). There is limited representation of the private sector in any of the committees formed by GoI. At most, there are some theme/project/programme based consultations by the government where private sector actors can share their views.

Table 13: Limited engagement between public and private sector climate change policy framework

National climate initiative	Engagement with private sector			
	Design	Design Impact assessment	Leveraging finance	Representation planning or coordination committees
Prime Minister's Council on Climate Change	None	None	None	Some representation from industry and financial sector
National Action Plan on Climate Change (NAPCC)	None	None	Need for private sector financing; however, India does not have a coherent national climate finance strategy  Some financial mechanisms backed by the public sector have been introduced to leverage private sector funding	Overall engagement is limited, but implementation of the Mission involves the private sector

<sup>25</sup> Mandatory for commercial buildings in eight states.

<sup>26</sup> Policy is mandatory for four appliances: frost-free refrigerators, air conditioners, distribution transformers, and fluorescent tube lights

State Action Plan on Climate Change (SAPCC)	Yes, involved in drafting of the SAPCSS through stakeholder consultation and workshops	None	Need has been identified but not prioritised; funding strategy and sources have not been developed	None
Indian Network for Climate Change Assessment (INCCA)	Private research institutions were consulted	None	None	None
Indian Electricity Act 2003	Yes	None	Opened the market for private finance in RE sector	Overall engagement is limited, but implementation of the projects under the Act involves the private sector
National Environment Policy (2006)	None	None	None	None
12th Five Year Plan on Climate Change	Some stakeholder consultation	None	Recognises a strong need for private sector investments	None
Jawaharlal Nehru National Urban Renewable Mission (JNNURM)	None	None	Public-private partnerships for implementation e.g. low floor clean buses	None
Energy Conservation Act (EC 2001)	None	None	None	Bureau of Energy Efficiency involved the private sector in implementation programmes through stakeholder consultations and induction in steering and technical committees
Standards and Labelling Programme	Yes, quite extensively for design, testing and data	Yes, market assessment was undertaken	None	Some representation in technical and steering committees
The Energy Conservation Building Codes (ECBC)	Yes, quite extensively	Impact assessment through donor agencies	None	Architects were involved in technical and steering committees

Smart Cities Initiatives	Yes, quite extensively for developing plans	Some assessments have been undertaken by the private sector	Currently being discussed	Yes, private sector has been involved and participation in high level government meetings
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4.1.2 There are numerous financial and economic barriers but the short-term nature of the local debt market, high credit risk and lack of insurance particularly stand out

**Private sector investment is restrained as the debt market is usually characterised by short-term loans with high interest rates, which raises the cost of capital quite significantly.**

Indian Banks have enough liquidity but they are apprehensive of entering into new business sectors. Currently, their risk tenure is around 8-10 years, but there is a need for longer tenure loans with lower interest rates and more risk guarantees. There is also a need to develop innovative market-based financing mechanisms in the form of infrastructure debt funds, green bonds and mainstreaming of EE in banking to promote greater private sector investments.

**There is greater reliance on asset financing using balance sheet assets which deters equity funding.** Asset based financing is not attractive for investment in climate infrastructure. Project financing based on projected cash flows and involving equity investors, banks or other lending institutions that provide loans to the operation is more suitable as it securitises the cash flow.

**Indian insurance companies are not permitted by the Insurance Regulatory and Development Authority (IRDA) of India to develop advanced insurance solutions such as performance guarantees.** Corporate clients see the need for performance guarantees and can obtain cover from outside India. Indian insurance companies' lack the expertise and are dependent on foreign partners to provide risk cover. However in some cases international insurance providers are deterred from covering India (e.g. ERGO provides performance guarantees in Germany but not in India). Further more, guarantees are only given to manufacturers not corporates or project developers.

There is a certification process and due diligence

exercise that needs to be undertaken by the insurance company experts. Currently, Indian insurance companies are not interacting with banks and international donors in India.

**It is difficult for external debt to flow to India.** External funders have to comply with complicated remittances policies and the external commercial borrowing guidelines are very strict.

**Distribution companies do not pay power generating companies on time affecting their credit risk.** Distribution companies take several months to pay the power generating company; the company therefore becomes an NPA on the banks' books. This deters banks from lending to power generating companies due to the high risk on return for these investments.

**Due to lack of strong policy framework and voluntary requirements, companies are more likely to borrow for production and growth.**

There are finance lines for companies/projects to borrow, in particular for EE improvements. The decision has to be made by the company – if they are borrowing money on commercial terms they are more likely to direct this investment towards production and company growth, over investing in EE, as the return is not likely to be as high. There is also a lack of stringent implementation requirements, and enforcement of penalties for key environmental and climate policies.

4.1.3 There are numerous technical and knowledge barriers leading to a lack of bankable pipeline of projects

**There is limited understanding of climate risks in private sector investments.** Knowledge of climate change risks is still very nascent amongst the private sector. Private sector engagement in climate change has been limited to GHG accounting, and there has been no (or minimum) uptake of robust climate risk screening tools by the private sector. Climate change concerns are rarely

taken up by the Indian private sector – and if so it is limited to CSR. There is limited understanding of climate change risk tools, though a few funds have started accounting for GHG emissions. The GoI has taken few steps to sensitise the private sector on the impact of their emissions contributions or on environmental risk.

**Technical knowledge of low carbon sectors to increase financing has mostly been driven from senior management level; project officers appraising the project do not have the requisite knowledge of low carbon sectors.** The FIs have slowly built their knowledge and understanding of financing RE over the years, mainly for wind and solar sector. The competence is rather lacking for hydro and biomass at present. This is true for at least 70-80% of project financiers in the country. Though FIs can outsource and obtain technical knowledge, some basic level of understanding is still lacking, especially for EE projects. Technical understanding to finance water and waste projects is also lacking, particularly in terms of which kind of business models are likely to work. For example, for a waste project a revenue model based on money from power generated (waste to energy component) could be used in addition to the revenue from selling off the by-products. However, FIs lack knowledge or understanding of these kind of revenue models and the market for these by-products, which eventually deters financing.

**Significant scale-up of capacity and removal of barriers is still required to create a strong pipeline of investible projects.** Bankable projects are increasingly being developed but mainly in the RE sector. These have largely been driven by private sector mainly due to favourable RE policy (Generation Based Incentives, and tax holidays), size of the market, “ease of doing business”, investment incentives and the reduced amount of red tape. Developing a strong pipeline of bankable projects in the EE sector is still a big challenge. International donors and Indian financiers have indicated that they do not see a regular pipeline of bankable projects ready for implementation. Several barriers such as high transaction costs, small project size, the limited understanding of EE technologies amongst FIs have hindered the process.

**Financing EE projects is more risky due to the small size of the projects and dispersed nature of the technologies.** Indian FIs (such as TCCL

and ILFS) do not currently have the organisational bandwidth to cater for the project sizes the Energy Service Company/ Energy Savings Company (ESCO) market generates. They are keen on pursuing EE, if the potential return is ensured and the opportunity size is made clear to the investing entities. However, for the time being they do not see a pipeline of ‘bankable’ EE projects. The number of bankable EE projects is quite small, or FIs are not aware of these even if they are available. The kind projects in the pipeline from Energy Efficiency Services Ltd. (EESL) are all municipal projects, which are not attractive to the private sector.

**Project developers and financial intermediaries find eligibility criteria and reporting requirements of donors to be extremely onerous.** International donors have tedious access, reporting requirements and lengthy project application timescales, which disincentives Indian project developers. Hence, those prefer using local banks that continue to provide the finance with less reporting requirements. International FIs such as the IFC have sometimes very different yardsticks in determining what a successful project is and what is not, therefore hindering financing.

**4.1.4 Limited fora to engage with the private sector and non-compliance with environment and social safeguards are the main behavioural barriers**

**FIs often view compliance with ESS standards as onerous to follow, and do not add value to the monitoring process.** Public banks in India are not obliged to adhere with the Equator Principles. There are few private sector institutions, such as IDFC and PTC Financial who are signatories of the framework (Section 3.2), but mainly because it is a key requirement from large international institutions (such as the IFC) to allocate the funds. The lack of a common approach across all FIs in India can be misleading to project developer; it creates confusion to the level of information that needs to be reported by the recipients. Although some banks (such as ICICI Bank) do have environmental screening, it is not as extensive as MDBs. Rejecting a project purely on environmental grounds is often seen as a loss of business for the bank. In the absence of any minimum requirement in India, banks are not willing to turn down bankable projects even if they do not meet ESS standards.

**The limited open forums for the private sector to engage with the government in developing policy for the country is a barrier for project financiers, and developers.** There has been no clear initiative from the public sector to engage with the private sector in the low carbon space, in particular in the drafting of national mitigation strategies.

Conversely, International FIs have engaged actively with the private sector in developing their large programmes and facilities, for example the World Bank and IFC sought active inputs from the private sector in developing their Partial Risk Sharing Facility for Energy Efficiency and Bhubaneswar Street lighting initiative, respectively.

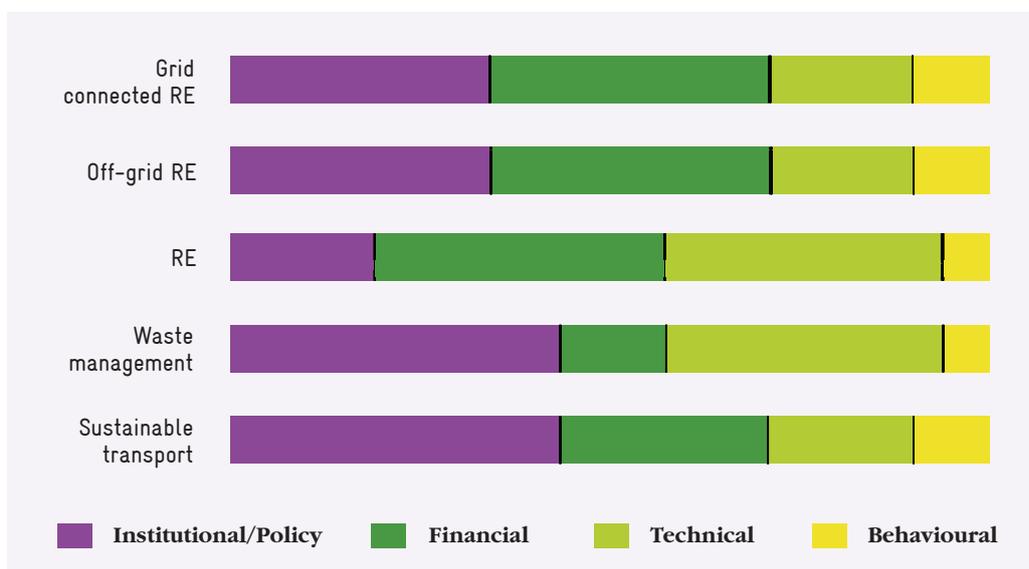
**Finally, there is a lack of trust in the private sector to undertake investments in certain sectors of the public sector.** Thus the leveraging does not occur to the extent it should, as there is a lack of initiative to combine public-private sector funds.

#### 4.2 Sector specific barriers for project developers and financiers

As highlighted earlier, several barriers related to institutional, policy, financial, technical and behavioural aspects of the project and project developers have been deterring the private financiers to enter aggressively into the low carbon market. While the nature of these barriers (in terms of being political and institutional, technical, financial or behavioural in nature) has been common to all low carbon sectors, the extent of these affecting the specific sector has varied.

Figure 9, below depicts the relative size of these barriers affecting private sector financing in the RE, EE, waste management and sustainable transport sectors.

**Figure 9: Type of barriers affecting low carbon private financing in India, sector wise**



While institutional and policy level barriers are most prominent for the RE sector, financial and technical barriers are the greatest hindrance for EE in India. Waste management sector is most affected by institutional/political and technical barriers and institutional/political barriers are the greatest obstacle for sustainable transport development. Further details on each of sector barriers are provided in the following sections.

##### 4.2.1 Institutional and political barriers are the most significant for Renewable Energy

Renewable energy has been a focus of government policies and incentives, at national and state level. For grid-connected renewable energy, private financing instruments, such as debt, equity, mezzanine, and partial risk guarantees are being used in India. However, a number of barriers still exist for optimum scaling up of private sector investment, especially for off-grid RE systems. A summary of the main barriers are given in Table 14.

Table 14: Main barriers for RE sector investment

Renewable Energy	
Institutional and political barriers	Feed-in-Tariffs (FiTs) designed by certain State Electricity Regulation Commissions (SERCs) have been unable to attract investments; need for adoption of more robust processes and methodologies for determining FiTs
	Lack of Renewable Purchase Obligation(RPO) enforcement has led to weak markets for RECs and loss of creditability of similar market based instruments; other RPOs related issues include: irregular cash flows for generators, irrational floor process for solar RECs, lack of price certainty post 2017
	Constraints in trading and managing liquidity for RECs
	Small hydro projects require many government approvals and long development cycles, leading to escalation in costs
	Third party power sales by RE projects are charged open access levy, which includes a cross subsidy surcharge and an electricity duty, making third party sales more expensive
	Long gestation period for release of capital subsidy for off grid projects
	Weak policy and regulatory environment need to bring in stringent implementation and enforcement of penalties
	Very little level of engagement of RE developers in matters relating to RE policy, or any public driven programme or even a financing instrument
	External debt is very hard to come to India; external funders have to understand the Indian policies and the external commercial borrowing guidelines are very strict for external debt
Financial/economic	Poor financial health of many distribution companies has a high risk of off taker default and delayed payments for RE projects
	Banks perceive relatively new technologies riskier, especially Concentrated Solar Power (CSP) and biomass. Unfamiliarity with the technology and poor performance of earlier projects. Banks are facing an asset liability mismatch, because long tenure debt is required for lending to RE projects. Banks are also reaching their lending limits for RE, which is considered a part of the power sector.
	Poor state of evacuation networks posing evacuation risks; high in states such as Tamil Nadu and Rajasthan and low in Gujarat
	Lack of tax efficient structures for RE projects
	Private equity is tapering off as there are limited exit options for existing investors
	Small ticket size of rural off grid projects
	Limited penetration of FIs in rural areas

Technical	High fuel risk for biomass projects as these compete with other alternative uses of the fuel, which needs to be procured from a variety of producers
	Lack of successful, scalable and replicable business models for rural off grid
	Threat from extension of grid to rural off grid projects
	Small size of ESCOs developing commercial off grid projects, leads to high transaction costs
	Developers lack the knowledge on kind of financing that can be availed especially from international sources
Behavioural	Community risk to RE projects; land acquisition is increasingly becoming a challenge for RE projects
	Funding and financing for renewable energy installation has cumbersome application procedures which often discourages potential investors
	Limited understanding of off grid projects among financiers and investors

Project Developer
  Financiers
  Both

The under-priced electricity tariffs for conventional energy are also indirectly affecting the financing of renewable energy. While calculating the electricity tariffs for conventional energy the indirect subsidy on freight and coal are never calculated, and hence conventional electricity costs are always more attractive and affordable than renewable energy. Furthermore, funding and financing for renewable energy installation has cumbersome application procedures which often discourages potential investors. Funding applications for the capital intensive equipment and installation processes should be simplified to a single application window and disbursal with very low rates of interests to encourage investment. The GoI's Ministry of New and Renewable Energy (MNRE) does offer a substantial amount as subsidies to encourage investment, this has led to the formation of a subsidy mind set amongst project developers and technology providers. Once the subsidy is withdrawn, most investors prefer to "wait and see" until subsidy is re-announced.

In the area of off-grid energy, financing of RE projects is currently driven more by "social impact investors" than "financial investors". Most off-grid RE projects are small in size and fail to attract the attention of FIs. There are also several risks associated with off-grid projects, such as unpredictable power consumption patterns,

low creditworthiness of off-takers and a lack of scalable business models. Due to these risks, off grid financing is driven more by impact investors, as they consider social impacts as key to making investment decisions, do not need quick exits and have lower return expectations.

These barriers are exacerbated by unclear policies to promote Renewable Energy Technologies (RETs). For example, the nodal agencies in each state are forced to follow the rigid guidelines to allow the equipment approved by the Bureau of Indian Standards (BIS). Each nodal agency not only handles the subsidy disbursal, but also the approval process, only recognising manufacturers whose products "conform" to BIS standards, and thus are eligible for subsidy. This is leading to significant barriers for the entry of new and emerging technologies. In the name of "standardisation" and "registration" innovation has been totally crippled and unless supplied by government or not for profit agencies, it is almost impossible to find off-grid RETs making inroads to poor household in rural India.

#### 4.2.2 Financial and technical barriers are the greatest hindrance for Energy Efficiency in India

There is a vast potential and need for EE investment in India. A number of national and state policies have been put in place (see section 4.3.1 for

description of the NMEEE). However, the rate of investment in EE technologies and projects is lagging far short of its potential. This is due to a number of well-documented technical, institutional, and financial barriers (Table 15).

A key barrier for EE sector in the country has been lack of non-recourse finance<sup>27</sup> for EE projects. A large number of FIs do not perceive EE measures as a separate project. Thus, they are unwilling to provide loans without any lien on assets of the parent entity. This makes it difficult for the

Table 15: Main barriers for EE investments

Energy Efficiency (Industrial Applications and Building Technologies)	
Institutional/political	Lack of communication between project developers and bankers
	Institutional frailty/capacity of public bodies and uneven enforcement of Energy Saving Performance Contracts
	Voluntary nature of IEE schemes and ineffective enforcement
	No structured approach to engage with the government, government is not asking the insurance sector to develop green products
Financial/economic	Access to external finance: high interest rates, weak balance sheets and lack of collateral
	Lack of access to internal capital
	Small to medium scale projects with relatively high project development and transaction costs
	Lack of capacity in finance sector for IEE projects; difficulty in evaluating financial returns of IEE projects
	High initial cost of energy efficient products; life cycle cost not properly accounted for
	Many ESCOs are not even aware that there is project financing available from FIs (such as TCCL) as most of them have only received balance sheet financing
Technical	Bundling of projects seems far-fetched for the sector still
	Geographical distance of alternative materials to plants and lack in infrastructure
	Lack of reliable baseline energy data, including credible energy audits
	Limited technological and financial capabilities to adopt PAT or new IEE technologies
	Limited availability of ESCO funding for EE projects
	No domestically applicable M&V protocols available in India;IPMVP protocols not directly relevant for India
Behavioural	Perception of risk by bankers
	Perception of risk by industrial managers
	Jugaad innovation

Project Developer
  Financiers
  Both

27 A loan where the lending bank is only entitled to repayment from the profits of the project the loan is funding, not from other assets of the borrower.

implementing organisation to raise finance for such projects, as most organisations utilise their borrowing limits for their core businesses.

EE projects have a relatively high proportion of “soft costs” that banks/FIs are reluctant to finance. One of the biggest hurdles in financing EE projects is their competition with other investments (conventional energy and other) for finance. Entrenched industries have an advantage, as loan officers are more familiar with conventional energy projects.

Banks and FIs have limited knowledge and awareness about EE project characteristics. This makes it difficult to evaluate financial returns from EE projects. This hinders the availability of both debt and equity finance for EE projects. On the other hand, EE project developers are often unaware of the project packaging and presentation requirements of the financial community, thus leading to inefficient communications between the EE project developers and FIs.

The ESCO industry in India is still at a nascent stage and lacks financial strength. ESCOs have limited capacity with respect to technical, business, and project and risk management skills. This greatly limits the adoption of the ESCO mode of financing.

In an environment of crippling energy shortages and brownouts, most entrepreneurs are focused on building new generation capacity (either grid-based or captive), and there is not enough capital or entrepreneurial talent pursuing EE investment opportunities. For example, when faced with

4-8 hours of non-availability of power, energy users would prefer to invest in captive generation rather than in energy efficient technologies.

The financial feasibility of EE projects has to be assessed by analysing how increased productivity and energy savings improve company cash flow. Lenders often do not have the capacity to apply suitable appraisal methodologies.

Lenders have procedural requirements for new clients and usually prefer to lend to existing customers. Enlisting and signing up new customers is a significant barrier and reduces the pool of potential EE project investments.

The municipal sector in India typically has equipment that is more than twenty years old; substantial energy savings can be realised if this equipment is replaced with the latest EE technologies. However, there are severe constraints on capital availability in municipalities, and as a result the investments often do not materialise.<sup>28</sup>

#### 4.2.3 The Waste Management sector is most affected by institutional/political and technical barriers

Waste management services also face significant technical, institutional, and financial barriers (Table 16). They are expensive to set up (associated with high sunk costs) and are consumed on a massive scale. In India it is becoming increasingly difficult to meet the growing demand for Waste Management Services, fuelled by the growing population and economy.

Table 16: Main barriers for waste sector investments

Waste Management	
Institutional/political	No clear policy on role on state bodies and other stakeholders in waste management in working with municipal corporations for waste management
	No clarity on infrastructure support provided by state government for setting up waste management projects
	Documented case studies on good practices and bad practices of public private partnerships (PPP) models applied in waste management
	Awareness campaign and collection process are not aligned; even if awareness is generated there is no infrastructure support for collection and segregation

Financial/ economic	Lack of bankable projects
	Lack of understanding of waste sector projects to FIs
	In most municipal projects, major funding is needed for staff salaries, which is often not very well received by funders
Technical	International development financing institutions such as IFC apprehensive of financing waste to energy projects in India, due to lack of market experience and social environmental impacts associated with these projects
	Lack of viable business/revenue models
	Lack of market for by-products or lack of understanding of market of these by-products by financiers
	No standard practices in place for encouraging general public in supporting waste management initiatives; lack of infrastructure support.
Behavioural	Environmental and social impacts make waste management projects unviable for financiers
	Traditional habits of waste disposal by waste generators

Project Developer
  Financiers
  Both

Most civic bodies are yet to take initiatives to comply with the MSW (Management and Handling) Rules citing financial constraints. However, some options are available to overcome the financial barrier and to ensure sustainable implementation of the MSW (Management and Handling) Rules (GoI, 2000). These options include Private Public Partnerships, funding through JNNURM/ other funds and additional revenue through the CDM etc. However, the above options have not been successful in scaling up financing in the waste sector in India.

Lack of data and awareness impacts every aspect of India's waste management industry in general. Other than the National Environmental and Engineering Research Institute's (NEERI) survey performed in 2008 reviewing the waste composition and generation in 59 cities, there is no other reliable data available. Owing to the lack of reliable data about quantity, composition, calorific value and seasonal variations of MSW, municipalities are struggling to come up with a structured and a well-moderated response to their own needs. Lack of data decreases the clarity in tender requirements put forth by municipalities and leads to miscalculations on the part of private parties (NEERI, 2008).

The project's documents are often do not have sufficient detail or are not clearly written. They do not consider local requirements. In most cases

they are copied from existing documents from other projects. This is mainly due to the lack of consultants and professionals who have expertise in preparing bankable projects. This leads to the stipulation of unreasonable eligibility criteria, one-sided agreements or the projects become unsuitable for financing, by the way they end being designed.

Many waste management and recycling projects have failed because of irregular payments from municipalities, which puts enormous pressure on the liquid cash reserves of private stakeholders who have to continue providing services and paying their employees.

The waste management industry in India is young and growing, with a significant influx of new players from other sectors. They all face similar financing challenges while developing projects, but do not have mechanisms to jointly communicate their issues to decision makers.

The financing institutions do not feel confident in financing waste management projects in India.

#### 4.2.4 Institutional/ political barriers are the greatest obstruction to sustainable Transport development

There are similar barriers in India that prevent the scaling up of best practices and replication of successful transport sector projects.

Table 17: Main barriers for transport sector investments

Transport	
Institutional/political	Lack of effective coordination between local (and national) government departments
	Lack of public transport outside the large Metropolitan cities
	Lack of standards and/or regulation for transport other 4Ws LDVs
	Lack of incentives to domestic financiers to invest in sustainable transport
	Inadequate enforcement of vehicle efficiency or fuel efficiency standards
	National dependence on imported fossil fuels
Financial/economic	Financial investment required in the transport sector
	Lack of intermodal terminals for freight transport
	Low uptake of electric/hybrid vehicles
Technical	Slow freight transport time by rail and shipping, making it less attractive to commercial users
	Lack of passenger information systems on public transport, institutional and regulatory hurdles
	Lack of information/technical knowledge coordination
Behavioural	Poor quality of public transport; lack of services/ infrequent running time/ badly managed
	Decreasing uptake of rail transport for the transportation of freight
	Lack of behaviour change by road users to give priority to public transport
	Lack of inland waterway use
	Lack of awareness and information regarding fuel efficient technologies and vehicles

Project Developer
  Financiers
  Both

With respect to financing and the availability of resources for sustainable transport, two key barriers are: (i) the presence of fuel price subsidies that create market distortions and are at odds with the goals of sustainable transport, and (ii) the institutional barriers that prevent private sector participation in the transport sector.

The market for transport is heavily distorted leading to overinvestment in unsustainable transport. The negative impacts of motorized transport, including environmental degradation, noise and air pollution, as well as public health are not internalised in the price of vehicles or fuel. Fuel itself is often heavily subsidised, as an attractive populist policy, leading to poor evaluation of the economic cost of investing in roads compared to sustainable transport.

Eliminating fuel subsidies could have a significant impact on climate change by encouraging more rational use of scarce resources and by shifting individuals to more sustainable forms of transportation. President Dr. Jim Yong Kim of the

World Bank has pointed out that ending harmful fuel subsidies globally could lead to a 5% decline in carbon emissions by 2020 (EMBARQ, 2013).

Further barriers to transport related private financing, related to asset management regulations include: limited capability to successfully structure and manage public private partnerships (PPPs), and high transaction costs. Although there is the potential to attract capital from the private sector for transport projects, transport facilities are essentially public goods, and privatisation often faces opposition from decision makers, politicians, and citizens who are wary about transferring public assets to private ownership. The concerns arise from the potential for conflicts, corruption, and vested interests (MGI, 2013), and the risks thereof, since the legal, enforcement and regulatory systems in many developing countries are not always robust. Research done by EMBARQ India for the Indian Ministry of Urban Development found that fragmented jurisdictions, multiple government

authorities, complex procedural requirements, and lack of capacity are cited as key deterrents to private sector participation in the infrastructure sector (EMBARQ, 2013).

### 4.3 The effectiveness of national strategies at engaging and leverage private finance

We looked at the experience of two national missions under the NAPCC to scale up private finance.

#### 4.3.1 The National Mission on Enhanced Energy Efficiency

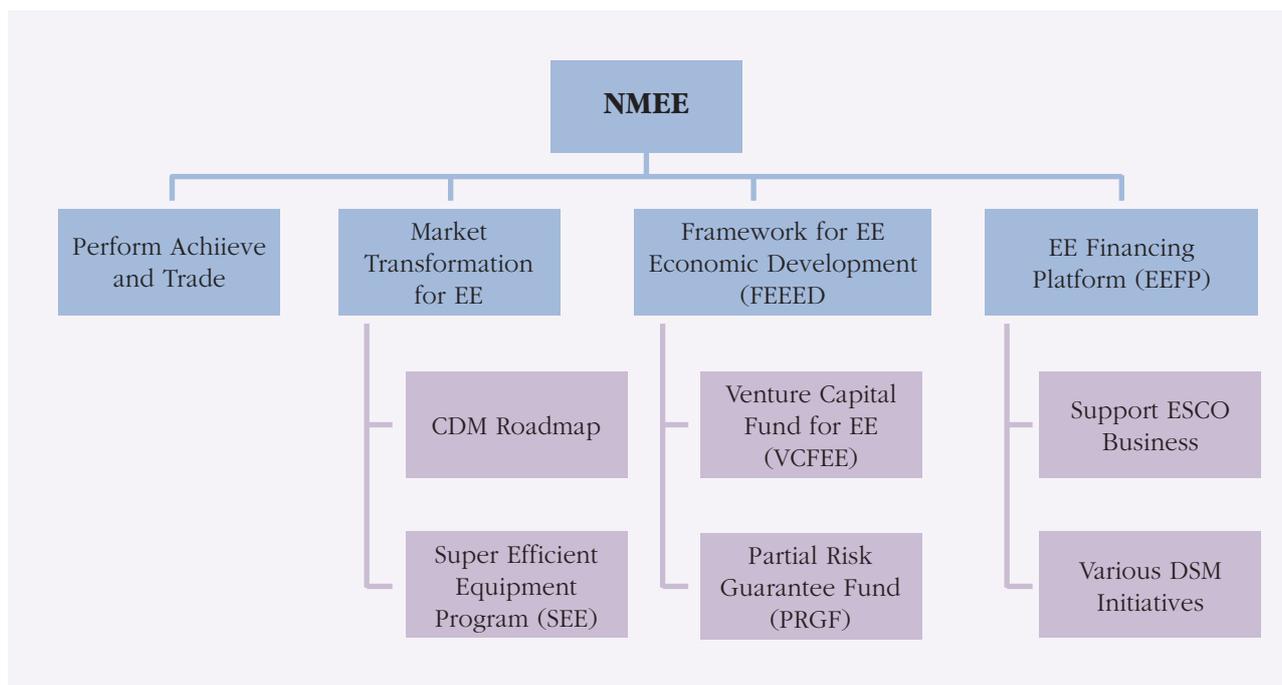
**The National Mission on Enhanced Energy Efficiency (NMEEE) promotes innovative policy and regulatory regimes, financing mechanisms, and business models to promote EE in the economy.**

It seeks to not only create markets for EE, but also to sustain them in a transparent and time bound manner. The Bureau of Energy Efficiency (BEE), designated as the legal entity for executing initiatives under NMEEE, has been engaging in public-private partnerships to implement various EE programmes. NMEEE has put in place four new initiatives to enhance EE in the country. Each of these initiatives has in turn introduced programmes

and mechanisms for facilitating EE implementation. A key thrust of the NMEEE has been encouraging the role of private sector (industry) and private financing institutions to invest in EE. The four initiatives under NMEEE include: Perform, Achieve and Trade (PAT), Market Transformation for EE (MTEE), Framework for EE Economic Development (FEEED) and EE Financing Platform (EEFP). These four initiatives are presented in Figure 10.

- **Perform Achieve and Trade (PAT):** A market based mechanism to facilitate EE improvements in large energy intensive industries and facilities, by issuing energy saving certificates that can be traded.
- **Market Transformation for Energy Efficiency (MTEE):** Accelerating the shift to energy efficient appliances and equipment's in designated sectors through innovative measures that make such products more affordable.
- **Framework for Energy Efficient Economic Development (FEEED):** Developing fiscal instruments to promote EE, FEEED aims at accelerating EE market by creating a sound and robust financial mechanism in the market for security and comfort for the lender in the form of providing risk guarantee and equity capital. It also aims to promote energy efficient in public procurement, industry especially SME sector and proliferate the ESCO project financing.

Figure 10: NMEEE Initiatives



- **Energy Efficiency Financing Platform (EEFP):**

Creating mechanisms to finance demand side management programmes in all sectors of the economy by capturing future energy savings, EEFP will provide instruments like bankable detailed project reports and other risk mitigation measures to enhance comfort for lenders towards aggregated EE projects.

NMEEE was designed to initiate the participation of private sector and finance in the EE industry. GoI and its subsidiaries (i.e. BEE & EESL) are optimistic about the role of private sector in financing EE projects in India. Opportunities to leverage the fund are designed in the mission and new institutional structures/regulatory regimes have been set up. Most of the schemes like PAT are market based and involve private financing.

**The EEFP and FEEED program is primarily designed to encourage private sector investor and finance in the various programmes of EE in India by developing project pipeline and new instruments.**

These efforts are designed to mature the ESCO market in the EE market by providing guarantees to ESCO projects to exemplify their viability and thus leverage private money. The provision of viability gap funding facilities will also ensure equity flows into ESCO projects. Furthermore, by standardising ESCO performance contracts, and providing training/ capacity building support to financiers to build their capacity to appraise EE projects. BEE has signed a Memorandum of Understanding with different FIs (SIDBI, PTC, HSBC, and Tata Capital) in an effort to bring in mainstream financing of EE projects. Two main funding mechanisms that have been developed under the FEEED initiative the Partial Risk Guarantee Fund (PRGF) and the Venture Capital Fund for Energy Efficiency (VCFEE).

- **Partial Risk Guarantee Fund (PRGF):** PRGF is a risk sharing mechanism which offers to commercial banks to partially cover their risks against loans sanctioned for EE projects to cover up risk

perceptions associated with the lending for new technologies and new business models<sup>29</sup>.

- **Venture Capital Fund for Energy Efficiency (VCFEE):** VCFEE is financial support mechanism provided by the government provides an equity base for EE projects. This helps ESCOs in providing capital availability and secures lending from FIs.

Both these mechanisms are not yet operational, the design phase however has been completed. As part of the designing of these programmes, BEE had consulted several public and private sector FIs to seek feedback and also to ensure their participation once the funds are launched.

**The Perform Achieve and Trade (PAT) scheme was developed for large industries (later it will include other industries and SMEs) as there is a significant potential for EE in this sector; in 2007 60% of India's GHG missions was from this sector.**

One of the key initiatives under the NMEEE has been the PAT scheme, guided by the aim of creating a domestic trading platform for energy savings achieved (energy saving certificates, ESCerts). Under this scheme, Designated Consumers (DCs) have been given the specific energy consumption (SEC) targets to be met over the period of three years.

On 30 March 2012 the GoI notified the PAT scheme, mentioning a total of 478 DCs that will be included under the PAT scheme from eight industrial sectors. The most number of DCs are from the power sector (144) followed by the textile sector (90) and the cement sector (85). The first cycle of the PAT scheme was announced as FY2012-13 to FY2014-15, it started on the 1 April 2012.

The implementation of the PAT scheme has been facing various barriers relating to developing a baseline, creating emissions trading exchanges etc. The exact success of the scheme is yet to be established once it completes its first phase later in 2015.

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29 On the line of the PRGF of BEE, World Bank is soon to launch a Partial Risk Sharing Facility (PRSF) which has been developed similar to PRGF but aims mid-tier large industries and large commercial establishments for EE investment. The structure is same as PRGF but has a different guarantee scale (INR 1500 Lacs as opposed to INR 300 lacs for PRGF). It utilizes the Clean Technology Fund resources and will be one of the first CTF projects to be implemented in India.

Table 18: The NMEEE mission has been successful in engaging the private sector to an extent by addressing main barriers with some degree of success

Type	Description	Rating based on stakeholder feedback
Institutional and Political	Committees have been set up to support introduction and functioning of mechanisms such as PAT, PRGFEE and VCFEE. The committees have been mostly public sector representations, there is little representation from private FIs.	++
	Created a framework for implementation of PAT	
	New programmes e.g. MTEE's Super-Efficient Equipment Programme (SEEP) have been initiated	
	Under the NMEEE, Demand Side Management Cells for implementing utility demand side management programmes have been set up at Distribution Companies. BEE has developed a program for building the capacity of these cells through training and capacity building.	
	Energy Efficiency Services Ltd. (EESL) has been created as a corporate entity to provide market leadership under EEFP	
	Assignment of state nodal agencies for implementation of the Mission at the state level	
Financial and Economic	FEEED funding mechanism – PRGF and VCFEE. These have been designed and soon to be implemented to build the confidence of the private financing institutions for investing in EE projects.	+
	MTEE uses CDM for leveraging funds: The Programme of Activities (PoA) to leverage CDM for agriculture and municipal sectors was developed	
Technical	Preparing bankable project DPRs, to build capacities of ESCOs to seek financing from FIs.	-
	Standardizing ESCO performance contracts, to assist ease of understanding of such contracts by project implementers and also financiers	
	Developing performance measurement and verification tools. India's does not have any domestically produced monitoring and verification protocols. These are as such being prepared under the mission.	
Behavioural	Building capacity in ESCOs, to prepare bankable project DPRs	+
	Training the financiers on appraising EE projects, and to remove the barrier of lack of knowledge and understanding of EE technologies and the technical, economic and financial characteristics of such projects.	
	Providing DSM training to utilities, to enable them to undertake DSM programmes	

### 4.3.2 National Solar Mission

**The national solar mission (NSM) has been very successful in attracting private sector investment by creating new financing, implementation and regulatory structures.**

The NSM is considered to be India's response to the challenges of energy security and climate change. The Mission aims to achieve grid parity for solar electricity through research & development, domestic production, large scale deployment, and long term and predictable policy that encourages private sector participation in the solar business. The Mission aims to install 20,000 megawatts (MW) of grid-connected solar power and 2,000 MW of off-grid solar power projects by 2022. The Mission encourages both solar photovoltaic (PV) and solar thermal technologies, and promotes solar energy in diverse applications like lighting and cooking. Its

implementation is based on a three phased strategy, with specific targets for deploying solar power cross application segments, depicted in Table 19 below.

The MNRE is overseeing/implementing the mission, with the Indian Renewable Energy Development Agency (IREDA) supporting on renewable energy financing and the National Thermal Power Company (NTPC) and its National Vidyut Vyapar Nigam (NVVN) facilitating Power Purchase Agreements (PPAs). The Solar Energy Corporation of India (SECI) has further been set up by MNRE to facilitate smooth implementation of the NSM. In order to drive research and development, and man power development, the Solar Energy Centre (since converted to an autonomous National Solar Energy Institute) was scaled up (along with a number of national centres which were supported in various institutes across the country).

Table 19: NSM Phased Targets

India's National Solar Mission 2010-2022			
Solar technology	Phase I (2010-2013)	Phase II (2013-2017)	Phase III (2017-2022)
Grid connected/rooftop	1,000-2,000 MW	4,000-10,000 MW	20,000 MW
Off grid solar applications	200 MW	1,000 MW	2,000 MW
Solar hot water collectors	7 million square miles	15 million square miles	20 million square miles
Solar lanterns/ lighting systems	n/a	n/a	20 million systems

Source: (NRDC, 2011)

#### **Box 4-1: Examples of State Solar Policies Promoting Solar Generation**

Gujarat: The state of Gujarat has been at the forefront of solar development in India. It was the first state to declare a solar policy in 2009. It has also initiated the development of solar parks, with the provision of publically developed associated infrastructure, leaving the private sector to focus only on solar project development. Gujarat has also taken the lead in developing a grid-connected solar rooftop

program based on gross metering with the roll out of the 5 MW Gandhinagar solar rooftop program in 2011. The Gujarat Solar Policy received excellent response and the state currently has the highest share of solar power installed capacity under the state policies due to:

- The state being the first state to award projects under its policy even before any allocation were made under the NSM;

- Projects allocation as based on the favourable FiT instead of competitive bidding;
- Availability of wasteland and government support in acquiring this land;
- Gujarat being one of the few states with profitable distribution companies; and
- Provision of transmission evacuation facility.

Rajasthan: Rajasthan Solar Policy (2011) aims to develop the state as global hub of solar power with around 10-12 GW of capacity, to be developed over the next 10-12 years. The allocation of generation projects of 100 MW capacity in Phase I of the state policy was completed recently; projects were selected through a competitive bidding process (along similar lines to those under the NSM).

Tamil Nadu: The Tamil Nadu Solar Policy (2012) has targeted a total of 3,000 MW by 2015. Of this, 500 MW is proposed to be achieved through the Solar Purchase Obligations on consumers who receive power from distribution companies at 11 kV. Around 1,000 MW of grid connected capacity addition is proposed through the competitive bidding process while another 350 MW would be generated through the solar roof top projects.

Karnataka: The Karnataka State Solar Power Policy (2011) has set the target of achieving 126 MW of solar power upto 2013-14, to meet the RPO imposed by the regulator, of 0.25% till 2013-14 from solar sources. A tariff based competitive bidding process was undertaken for the selection of developers.

Source: (ESMAP, 2013)

**From a low base in 2010, the total grid-connected solar photovoltaic (PV) capacity base of the country had reached 2,079 megawatt (MW) by the end of September 2013 mainly driven by private investment.**

The first phase of the NSM is over, and the programme is now in its second phase. NSM Phase I (2010-13) implementation witnessed appreciable scaling up of solar capacities in India within a short span of three years. Several proactive steps by the GoI in the phase I of the mission led to its success. These steps included: offering a bundling of solar power with unallocated coal based power through the NTPC, NVVN, implementing RPOs for solar power, instituting a payment security scheme (PSS) and undertaking measures for promoting local manufacture of solar power. NSM also triggered

a number state solar policies that has led to rapid augmentation of solar capacity in India (Box 4-1). The launch of the NSM provided an opportunity for states such as Rajasthan to procure solar power to meet their solar RPO compliance.

The NSM was also successful in steering financing both from public and private sources. Several private sectors came forward and financed projects under the Missions. The majority of the debt financing under the phase I was undertaken by export credit agencies, multilateral FIs, and some non-banking FIs. The leading lenders for phase I of the NSM are outlined in Table 20. Though several scheduled commercial banks (SCBs) participated in the NSM projects phase I, none made it on the leading lenders table, as the cumulative share (of all SCBs) was less than 25%.

Table 20: Financial ecosystem for National Solar Mission's projects

	Institutional example	Role of the institutions
Strategic Level	<b>Indian Public Sector (non-bank) Financial Intermediaries:</b> Reserve Bank of India; IREDA; Life Insurance Corporation etc.	Priority sector lending, Concessional loans, Long-term debt, Securitization
	<b>Non-Financial Supporting Institutions:</b> Solar Energy Corporation India, Indian Banks' Association, Solar Energy Centre, BEE, C-WET	Channelling funds, Information provision, Skills, R&D, Component certification
	<b>Multilateral Funding Channels:</b> International Finance Corporation, Asian Development Bank, World Bank, Clean Technology Fund, potentially Green Climate Fund	Payment guarantees, Capacity building (esp. due diligence), R&D
Project Level	<b>Indian Banks:</b> Axis Bank, Bank of Baroda, ICICI, IDBI, Indian Overseas Bank, State Bank of India, State Bank of Patiala, Union Bank of India, Vijaya Bank, Yes Bank	Debt financing, Non-recourse project finance, Innovative finance (e.g. IDFs)
	<b>Non-Bank FIs:</b> IDFC, Infrastructure Debt Funds (IIFC, L&T Infra), Rural Electrification Corporation Limited	Project finance, Support for market upscaling, Refinancing, Bridge financing
	<b>International Financial Investors:</b> Goldman Sachs, Apollo Management	Private Equity, Non-recourse finance
	<b>Overseas Funding:</b> KfW (Germany), Ex-Im Bank (U.S.), OPIC (U.S.), IFC, Multilateral Funding Channels	Concessional finance, Long-term debt, Bridge financing
	<b>Other:</b> Venture Capital, Private Equity (domestic and overseas), Corporate Debt, Public Markets, Other early-stage investors	Market entry support, Market upscaling, R&D
Ancillary Mechanism & Measures	<b>Fiscal support:</b> SECI, NVVN/NTPC (bundling, short-term PPAs and PSAs), CERC (FiT), MNRE (Payment Guarantee Scheme)	Lowering costs, Incentivizing investment, Increasing market confidence
	<b>Market Mechanisms:</b> Carbon Markets (CDM and voluntary market), Renewable Energy Certificates	Additional revenue support to incentivize investment
	<b>Infrastructural Support:</b> KfW, Asian Development Bank, JICA, PFC	Evacuation Infrastructure, Grid Integration/stability (e.g. Green Corridor)
	<b>Other:</b> Bilateral Funding, Private Companies, Educational Institutions, National Skill Development Corporation, National Institute of Solar Energy (formerly SEC)	R&R&D, Skills development and training

Source:(NRDC, 2014)

A long list of financial mechanisms have been developed as part of the NSM. A brief summary of these mechanisms are provided below:

**Key financial mechanisms for the NSM Phase-I:**

**Feed-in Tariffs (FiTs):** Both batches of Phase I of the Mission employed a reverse auction bidding process managed by NVVN. This brought down the

cost of solar electricity substantially than the tariff determined by the Central Electricity Regulatory Commission (CERC). Outside of the Mission, the State Electricity Regulatory Commissions (SERCs) declared FiTs for state projects. (PACE-D, 2013)

**Long-Term Power Purchase Agreement**

**(PPAs):** Under Phase I of the Mission, solar power

developers received long-term (often 25 years) PPAs at preferential tariffs. This provided a strong incentive for developers, but a heavy burden to energy distribution companies that were obligated to purchase power at the FiT rate. Though the government-mandated initial retail rates for selling are low, necessary reforms like differential rates for different consumption levels are gradually being taken up.(PACE-D, 2013)

**Power bundling** of renewable with conventional power: During Phase I, generators sold electricity produced from both solar and conventional resources at a 1:1 ration at a blended rate. This bundling reduced the average levelised cost of energy (LCOE) compared to a LCOE based solely on solar generation. Under this program, NRVN purchased 1 GW of solar power, bundled it with electricity generated from NRVN's own coal-fired plants, and sold the bundled power at a rate below Rs. 5 per kWh.(MNRE, 2013).

**Renewable Purchase Obligation (RPOs):** The creation of mandatory regulations specifying RPOs for SERC was a primary policy intended to drive demand for grid connected renewable energy. However, failure of SERCs & State Electricity Boards (SEBs) to enforce RPOs led to dismal performance from the RPOs. This scheme of RPO is continued in Phase II as well. (ESMAP, 2013)

**Renewable Energy Certificates (RECs):** These market-based instruments, representing megawatts of renewable power that entities can purchase to meet their RPO obligations, have not been effective. Solar REC activity picked up in 2013, but the lack of long-term price signals and RPO enforcement maintains REC market uncertainty. The REC mechanism continues into Phase 2.(ESMAP, 2013)

**Multilateral and Bilateral Financing:** Low-cost international financing, as discussed above, was a major funding source for Phase I projects, particularly from German-based KfW and the American entities EXIM Bank and OPIC. OPIC funding, for example, supports investment from U.S. companies in the Indian market by insuring up to USD 250 million (Rs 1,505 crore) in total solar project value. During Phase I of the NSM, involvement of foreign investors had the effect of increasing project credibility, and domestic banks looked upon international lenders for technical expertise and experience in due diligence for solar

projects. With some international funding sources reaching country exposure limits or exploring other developing markets, domestic lenders will need to step in to provide the funding required to reach targets for the next phase of the NSM.(NRDC, 2014)

**Clean Development Mechanism (CDM):** Grid-connected solar projects in India have registered under the CDM of the Kyoto Protocol, allowing developers to receive funding through carbon markets. At least 100 MW of projects have registered under the CDM, mostly in Gujarat, and India's largest solar energy project, in Rajasthan, has been approved for the CDM trading program (NRDC, 2014).

**Self-Financing:** Self-financing by big industry players initially helped purchase many Phase I projects that could not access affordable financing from other sources. In most cases, once the project reached maturity, developers were able to get domestic financing due to the reduced implementation risk. Relying on company equity will not be enough for Phase II to achieve its scaled-up targets.(NRDC, 2014)

**Accelerated Depreciation (AD):** Inspired by India's wind energy policies, Gujarat employed an AD scheme, providing a tax benefit to project developers to offset profits of earlier tax periods. Under the Gujarat policy, project developers could depreciate 80% of their capital assets in the first year. However, a shortcoming of AD is that power developers, as independent power producers, often have low or no taxable profits in the early years, which limits the tax benefit that can be claimed. In mid-2014 MNRE announced plans to reintroduce higher AD percentages for wind generators given the drop in wind capacity in 2012-13 (PACE-D, 2013).

**Renewable Energy Infrastructure Development Fund (REID):** Rajasthan developed a REID fund that provides financing for transmission lines and other infrastructure related to renewable energy deployment. Some developers estimate that last-mile infrastructure can add 5 to 10% to total project costs. This fiscal support can increase the number of projects developed and accelerate commissioning (NRDC, 2011).

**Charge Exemptions:** In Andhra Pradesh, solar power generators are exempt from wheeling and

transmission charges on electricity sold within the state. Similarly, Tamil Nadu exempts solar power projects from wheeling and banking charges. The exemption increases the project's viability by reducing operations and maintenance costs.

**Subsidies:** Chhattisgarh provides subsidies on interest and capital investment to solar energy developers as well as exemptions from electricity and stamp duties through March 2017. (MNRE, 2013b).

**Key financial mechanisms that are introduced or adopted in Phase II of the National Solar Mission include:**

- **Viability Gap Funding:** The VGF scheme was intended to support infrastructure investments through PPPs. The VGF target capital grants to facilitate certain infrastructure projects that the government determined were necessary but were not commercially viable without government intervention to “meet the funding gap. Reverse auctions will be held during Phase II to select the lowest VGF bids needed to fund potential projects. (MNRE, 2013)

- **Feed-in Tariffs:** Government support of FiTs is critical to the success of solar power in India. Approximately 67% of the LCOE for solar power in India is supported by FiTs. In Phase II, CERC will issue FiTs for solar power for each fiscal year. (MNRE, 2013)

- **Credit Guarantees:** The Ministry of Finance recently approved a program that would provide a guarantee of up to 20% of the debt financing of projects in the power sector, including projects in renewable energy. The guarantees allow projects to attain a higher credit rating, thus broadening the investor pool to include pension funds and insurance companies and lower rates. (NRDC, 2014)

- **Priority Sector Lending:** Including renewable energy in priority sector lending has been widely discussed as a means to increase the amount of funding available for solar power projects. The

recent prioritization of off-grid solar by the Reserve Bank of India (RBI) and of solar water heaters by several major banks' loan programmes are working example of this mechanism's deployment to spur clean energy expansion.

- **Social Venture Capital Funds:** Non-profit venture capital funds, such as Acumen, that evaluate businesses based on their social or environmental performance in addition to financial performance, and invest charitable donations have had some early success in India's energy market.

A number of key observations can be made from the NSM financial arrangements. From the lender's perspective public financing support was seen as critical to; (i) bring down the cost of electricity; and (ii) address structural barriers and risks impeding the flow of commercial finance to the sector. Viability Gap Funding (VGF), from the lenders point of view was seen as attractive in lowering the cost of electricity and thus improving the project economics and risk prospection among lenders. Appropriate structuring of the VGF and linking it to loan repayments, were seen as necessary to avoid misuse. While generation based incentives, were seen as an attractive option as the generation risk remainder with the lender. SCBs were particularly concerned with generation risk since solar PV technology was new under the Indian conditions, and thus had limited ground operating data. Also, asset liability mismatch and non-availability of long term debt is acknowledged by lenders as a barrier. Stricter enforcement of RPOs were also identified as an essential action to steer the market further.

From developer's perspective, VGF was not a remedy as it fails to address systematic issues, and instead makes projects dependent on government budgetary support, which increases the financial risk. Interest subsidy and long tenure loans are better suited for projects, and it was also identified that PPAs should be made uniform and robust to ensure they are comprehensive and bankable.

Table 21: The broad range of mission incentives/instruments designed to promote solar mission and investment have been very successful in scaling up private climate finance

Type	Description	Rating based on stakeholder feedback
Policy instruments	FITs, RECs, RPOs, Power bundling	++
	Accelerated depreciation benefit	
Fiscal/financial/economic instruments	AD benefit, CDM, MDB financing, bank guarantees	+
	Renewable Energy Infrastructure Development Fund (REID), off-grid fund, viability gap funding, credit guarantees, charge exemptions	
	Generation based incentives, Manufacturing incentives, Off grid incentives	
Institutional mechanisms	Project financing by IREDA and also by PFC	++
	Creation and Up gradation of Solar Energy Centre for R&D and setting up Solar Energy Corporation of India (SECI) for facilitating financing, training and capacity building, enhancing technical know-how on solar	
	Supporting a number of Centres for R&D in different institutes	
Behavioural	Bilateral/Multilateral cooperation funding for skills and capacity building, exposure to best practices	+

#### 4.4 Potential for Indian private sector in scaling up climate finance

A number of countries are recognising that the private sector will play a fundamental role in financing large scale investments required, to meet the country's climate objectives. India has also acknowledged the importance of scaling up private finance to implement key national strategies on climate change. With the exception of investments in wind and solar energy, private sector investments are not flowing to priority areas for mitigation action in India. The stakeholder interviews highlighted that there are instances of current good practices and the ambition of private sector to scale up investments into these areas, but to do so, there are a number of obstacles that need to be overcome.

##### 4.4.1 Regulatory reforms and incentives are required to provide long term certainty and reduce investment risks

**The role of the public sector to provide clear policy framework and mitigate some of the risks are crucial to remove some of the barriers for private climate finance.** It was highlighted that if financing is made available at market rates with longer terms, many of the financing barriers for low carbon investment could be overcome. The public sector has a key role to make this happen by choosing between providing a short-term bridge to project financing or co-financing with the private sector with longer tenures. The main objective of public sector finance should be to crowd-in private finance, especially in the sectors that the private sector is wary of investing. For example, public

sector needs to create shared infrastructure in off-grid solar and tariff re-structuring to further facilitate RE investments.

**Private sector participation is expected to increase in the near future once major enabling programmes and financing mechanisms are launched under the NAPCC missions.**

It is expected that programmes such as PRGF and Viability Gap Fund, the Energy Efficiency Mission and Green India Mission can attract large private sector investment. However these schemes are still under development. It will therefore take time before they can be assessed for their effectiveness.

Success of the NSM in deploying substantial grid connected power capacity within 3-4 years, and significant investment of around INR 150 billion from the private sector has led to higher targets for the Solar Mission. The Mission has been successful not only in terms of capacity addition but also in closure of the projects both financially and technically within the stipulated period. The technological transformation has been adopted by institutions implementing the projects including the private sector. The GoI has set a target of 100 GW (five times the original target) for the NSM to be achieved by 2020. This will help to attain energy security, improve energy access and enhanced employment opportunities in the country. However, it would require higher capital investments estimated to be around INR 6000 billion, mainly from the private sector.

The banks which have come forward for financing solar projects include: Bank of Baroda, Axis Bank, ICICI Bank, the State Bank of India, IDBI Bank and Yes Bank. The non-banking financial organisations which are open to solar financing are: L&T Infrastructure Finance Company (subsidiary of L&T Financing Holdings), Power Finance Corporation (PFC), Mahindra Finance, IDFC, IL&FS, SBI Capital Markets and IREDA. In the Indian solar market, the US EXIM bank has been the most active Export Credit Agency (Bridge to India, 2013).

#### 4.4.2 Indian FIs need to develop new or scale up existing financing instruments, especially long term debt finance and risk guarantee instruments

**There are some good lessons to be learnt from private financing instruments currently being**

**used in India (e.g. debt, equity and partial risk guarantees) to finance grid connected solar power projects.** Debt based financing is better than equity whose cost, in real terms, is higher than the cost of debt. However, the key to keeping the cost of debt low is to lower the interest rates. Another important aspect of debt financing is the provision of loans with longer tenures. Debt funding by financial organisations often require guarantees (at least partially) due to the unfamiliarity of these new technologies.

**Providing performance and risk guarantees are “the need of the hour”, without which large scale and long term investments for climate mitigation are not likely to happen.** There are funds available and appetite from Indian FIs to provide loan guarantees. A realistic short-term option for project developers to tap into low cost climate finance is to bring in quality projects in RE and EE sectors and access low cost capital by using government or donor backed guarantee structures (e.g. USAID, WB and BEE). There was consensus among all stakeholders that risk and performance guarantees funds and re-financing from World Bank, National Development Banks and BEE can significantly leverage the market for EE by covering risks of default. The World Bank PRSF has USD 18 million of Global Environment Facility money and USD 25 million of Clean Technology Fund money. It will be one of the first CTF projects to kick off in the country. The World Bank has estimated a project pipeline of USD 108 million to be supported by the PRSF; most of the projects would be developed by EESL and SIDBI.

The Ministry of Finance has recently approved a program that has a provision of providing a guarantee of up to 20% of the debt financing projects in the power sector including renewable energy projects. RBI has also prioritised off-grid solar for enhancing fund availability for the sector. Recently ADB has pledged support of USD 100 million to help India’s private sector solar power developer for underpinning the country’s long term goal.

Moreover, there is demand for performance guarantee from Indian corporates. FICCI/CII have made statements that cover should be allowed by the IRDA; the General Insurance Council and IRDA are currently in discussion on this issue.

The government should consider providing more support to project developers and manufacturers for climate-related insurance cover. For instance, government provides subsidies to farmers to buy crop insurance and pays part of the premium for health insurance in rural areas. Similar products can be provided for climate projects, provided the problems of red tape and general inertial can be overcome.

**New financing structures that encourage more equity and long term debt at lower interest rates are already being developed by FIs but need to be scaled up** (see cases below in Box 4-2).

There is a need for a quasi-equity structure from banks that encourage a move from asset financing to project financing. This should be complemented with new financial insurance products for risk guarantees. For infrastructure projects, it is important to map tenure of debt funding to the concessions from Government, private sector and donors (e.g. for a 25 year investment horizon,

private sector covers 12 years of the debt and then rest is shared between government and donor). TATA clean tech capital, based on their experience to date, have highlighted that green financing does not have to compromise on financial parameters. With clean tech finance, TATA capital has started project financing, based on cash flow. Prior to this they relied on infrastructure finance on balance sheets. TATA Clean Tech was backed by IFC as they had a stake in the company.

To promote investment opportunities and attract new financial mechanisms for India's expanding renewable energy market MNRE organised the RE-INVEST, a forum of financing and investment at international level (private sector focus) in February 2015. It is expected that clear rules regarding climate finance, development funding and export credit finance options from international sources will emerge to access low interest rates for solar and other renewable energy projects.

**Box 4-2: Case studies – Nereus Capital and Aspiration Energy**

**Nereus Capital uses a tax efficient structure to fund its projects**

Nereus is looking at investing USD 25 million in a Waste Heat Recovery project, USD 35 million in 2 solar PV projects and USD 100 million in a pipeline of solar PV projects.

It has registered itself as an Alternative Investment Fund (AIF) under the Security Exchanges Board of India (SEBI) Guidelines. The fund also uses the Double Taxation Avoidance Treaties wherever applicable. Nereus does not use the debt available in India due to the various covenants that need to be in place to avail the same. Hence Nereus funds both Equity and Debt through various financial instruments such as Optionally Convertible Debentures and Compulsorily Convertible Debentures.

**Aspiration Energy have been installing rooftop solar systems through innovative third party ownership model**

Aspiration Energy sets up rooftop solar for thermal energy in industries or industry clusters in Tamil Nadu and has approximately 20 installations totalling to 2.5 MW.

The profit making industry leases the rooftop to aspiration energy. Aspiration energy sells the system to the owner through a contract where the industry seeks depreciation and passes on the benefit to Aspiration as a first installment of the system. Subsequently, for every kWh of energy sold Aspiration Energy raises monthly invoices against which the industry pays.

Aspiration energy obtains loans from banks leasing institutions and funds at interest rates slightly lower than market rates, and services loans through the cash flows of the business model. Once the asset class was understood some of the clean tech funds have set aside a pool of capital for Aspiration Energy to access at considerably lower interest rates with longer repayment period.

Source: Finding from the interviews conducted as part of the study

4.4.3 In India only large private FIs and project developers have strong corporate social governance standards; compliance with environmental and social safeguard (ESS) measures is generally low

**Some of the large FIs such as TATA clean tech and Infrastructure Leasing & Financial Services Limited (ILFS) have strong corporate climate change strategies or governance structures.**

These organisations have strong corporate governance, project appraisal and feasibility criteria, project design and measurement standards and reporting and verification (MRV) standards. ILFS for example does not distinguish between its sustainable procedures for implementing projects using own funds or international funding. Better demonstration and examples of good corporate governance can change the risk perception of Indian corporates towards the international financial community.

**Greater recognition and inclusion of ESS into investment decisions will help Indian FIs and project developers to access international climate finance** (refer to sector 3.2 for Indian experience on integrating climate concerns in investment decisions). Increasing numbers of private equity players are demanding that projects are ESS compliant. Indian FIs have some form of environmental screening but it is not as extensive

as MDBs. TCCL's RE projects easily meet the ESS guidelines as most of their private equity clients are already familiar with environmental and social principles of investment. For there to be effective change across all Indian banks, there has to be a policy in place by the Government to ensure there is a level playing field for all banks investing in the low carbon space. If not, banks will be reluctant to apply ESS principles to screen projects as there is no requirement to do so.

**There is potential and capacity to adopt better climate-related governance in banks and FIs in India.** Many banks/FIs are already lending for and investing in EE and RE projects (as well as other climate-related sectors), but do not necessarily classify it as "climate finance", as there is no legal obligation to do so (this is particularly the case for EE investments, as these types of projects are classed as a modernisation/expansion). There is also no commonly agreed definition of climate sectors, and guidance to ensure a common approach is undertaken by FIs.

FIs that do track climate-related investments, undertake the exercise largely on their own initiative and not because of regulatory reasons.

If the RBI were to request or mandate banks/FIs to report on climate-related investments, this would drive those lending/investing to track finance at a more granular level.

## 5. Role of International Climate Funds to Catalyse Private Finance in India

In this chapter we present the catalytic role of international public climate finance to mobilise private sector investments. One of the most successful mechanisms under the UNFCCC, where international public finance helped to catalyse private finance is the CDM. It has been estimated that CDM has leveraged close to USD 400 billion of finance<sup>30</sup> in developing countries. India has been

the beneficiary of approximately 30% of the capital, and has more than 2,500 projects registered under the mechanism. Aside from the known success of CDM, in this section we discuss how international credit lines have helped in leveraging private finance in India, and the potential role of the Green Climate Fund (GCF) and internationally funded NAMAs to generate additional private climate finance.

### Key messages:

- International finance has played a major role in the past decade to push climate change related mitigation and adaptation related activities in India. The lessons learnt from internationally funded pilots/programmes and credit lines (in financing, implementation, operation and maintenance) and have been utilised in the national programmes currently being executed. International finance today is more needed than ever for achieving India's ambitious climate and development goals.
  - **RE:** The Private sector has been pivotal in accelerating the RE investment in India. Corporate organisations and companies have scaled up investment backed by domestic and international strategic investors. However, a mass portfolio to access public finance (domestic as well as international) through Initial Public Offerings (IPOs) has not yet been reached.
  - **EE:** International credit lines have played a key role in addressing capital and capacity constraints for scaling up EE investments. However, strategic investors and IPOs again have stayed away from this sector due to barriers that have been described in Section 4. SMEs need to ready themselves in line with international financing guidelines, in order to

access, and scale up investments. Business models that could be aggregated pan India with minimal MRV structures could lead to more international finance flowing into the sector.

- **Waste to Energy and Forestry:** There are a significant number of barriers to overcome in order to scale up finance in this sector due to the lack of policy, regulations and stringent targets. NAMA financing through programmatic NAMAs are needed to address institutional, technical and financial barriers in this sector.

- The NAMA mechanism offers a way for international financial support to enable emissions reductions at a sector-wide scale, and offers the ability to mainstream climate into development finance. Better understanding of sector specific barriers and potential would help dedicated public international NAMA financing to strategically leverage domestic private sector investments. International climate finance should aim to move from policy to programme NAMAs in India to leverage private finance.
- GCF requirements are stringent and the private sector needs to ready itself now, in order to adhere to strong fiduciary standards and ESS guidelines to access funds. Capacity building could play an important role in helping FIs and Indian private sector to access finance.

30 CDM in Crisis – What is at Stake? A Project Developer's perspective on the past, present and future of the Clean Development Mechanism (CDM), Climate Bridge, November 2012

## 5.1 International credit lines have played a key role in scaling up private sector EE financing in India

As shown in Figure 5 (Section 2.3.1) bilateral donors and multilateral institutions have supported the creation of innovative financing options for EE projects in India. International donor backed dedicated credit lines have been particularly important in India to mobilise domestic private sector investment in EE.

A dedicated international credit line for EE projects mobilises commercial financing from Indian FIs by providing funds to the institutions, which they can then on-lend to project developers or implementers. The credit lines usually provide funds at low interest rate to FIs, allowing the institutions to on-lend them at a higher interest rate, which may be still be lower than market rates. There is an

agreement between the public (international donor) and private partners (lending FI) which identifies the types of projects eligible for financing with the credit line. The agreement also specifies the requirements for the FIs to co-finance the projects to increase the total size of the loan available. The credit line generally also includes technical assistance to the participating FIs to enhance their technical capacity. This is often key to scaling up EE lending by: strengthening the participating FI's capacity to identify investment opportunities through bankable projects, identify and manage project risks and reduce transaction costs associated with EE projects for project developers and FIs.

India has been a recipient of several of EE focussed credit lines in the past and still forthcoming. A snapshot of the key objectives of EE focussed international credit lines for public and private FIs in India are provided Table 22.

Table 22: Snapshot of EE focussed credit lines in India

Program title	Agencies involved	Objective of the credit lines
JICA SIDBI Financing Scheme for Energy Saving Projects in MSME <sup>31</sup> Sector, two phases  <b>1st Phase: ended in 2011</b> <b>2nd Phase: 2012-2015</b>	Sponsoring Agency: JICA  Lending FI: SIDBI	<ul style="list-style-type: none"> <li>• To encourage MSME units to undertake energy saving investments in plants and machinery</li> <li>• Developed a list of EE equipment eligible under the scheme</li> </ul> <p>Provided training and technical assistance to loan officers and MSMEs; and assistance in processing of loans</p>
IREDA EE Financing Scheme <b>2004-2006</b>	Sponsoring Agency: World Bank  Lending FI: IREDA	<ul style="list-style-type: none"> <li>• Provided equipment financing and project financing loans for municipalities and commercial enterprises, and loans for RE and EE manufacturing for the industrial sector</li> <li>• Financed up to 80% of project costs, or up to 75% of equipment costs, at an interest rate ranging from 5 to 12%, with a three-year moratorium and up to a 12-year loan term</li> </ul>
ADB-Industrial EE Project (IEEP)  <b>1994-2000</b>	Sponsoring Agency: ADB  Lending FI: Industrial Development Bank of India	<ul style="list-style-type: none"> <li>• A loan to the Industrial Development Bank of India (IDBI) for on-lending to support investments in EE and related environmental improvement measures by energy-intensive industries.</li> <li>• The IEEP focused on increasing the economic and technical efficiency of energy use</li> </ul>

31 MSME – Micro, Small and Medium Enterprises

USAID-ECO I Project <b>2002-2004</b>	Sponsoring Agency: USAID  Lending FI: ICICI Bank	<ul style="list-style-type: none"> <li>• The objective of the financing was to provide loans for EE projects in industrial, commercial and municipal facilities</li> <li>• Finance was given for up to 50% of project costs at commercial interest rates</li> </ul> <p>Project was targeted to increase the exposure of commercial banks and improve their project appraisal skills</p>
World Bank Credit Line <b>Since 2003</b>	Sponsoring Agency: World Bank  Lending FI: ICICI Bank	<ul style="list-style-type: none"> <li>• Financed a range of products, including EE equipment, thermal EE (e.g., industrial boilers, waste heat recovery, and industrial cogeneration), and electrical products (e.g., heating ventilation and air-conditioning, lighting, water pumping, and street lighting)</li> </ul> <p>The energy savings from the projects range from 15 to 30% compared to baseline</p>
KfW Credit Line for EE <b>2011-2013</b>	Sponsoring Agency: KfW  Lending FI: SIDBI	<ul style="list-style-type: none"> <li>• Financed EE improvements in the MSME sector in order to overcome the lack of capital for investing in EE</li> <li>• TA activities under the credit line included preparing guidelines and procedures for loan processing</li> </ul> <p>TA also provided to loan officers to develop an assessment tool, and a tool for monitoring results</p>

These credit lines have been important instruments to catalyse private sector investments in the EE sector in India. Even though each credit line has its own strengths and weaknesses, some general observations are summarised below:

- The credit lines were generally effective in overcoming the issues related to insufficient availability of up-front capital for EE projects.
- Credit lines accompanied by a robust technical assistance (TA) component, such as the JICA-SIDBI credit line, helped to overcome sector specific barriers. For example, the TA helped to build the capacity of FIs loan officers to appraise EE projects, by preparing guidelines and procedures for loan processing. More specifically, as part of the JICA-SIDBI credit line, the awareness campaigns and focused group meetings conducted in 28 major industrial clusters provided an important means of communicating the benefits of the project to the intended MSMEs.
- TAs, often helped in institutional strengthening of the recipient FIs for EE projects.
- A robust and dynamic energy saving equipment list (prepared as part of KfW and JICA credit lines), greatly reduced the administrative and procedural delays for disbursing the loan to the beneficiary.
- Many projects supported through these credit lines were also financed on commercial terms by Indian FIs, thus demonstrating that investments for improving EE can result in cost savings for Indian industries. This was particularly observed in the ADB-Industrial EE Project.
- Donor credit lines with more stringent requirements were not utilised by FIs and project developers. This has been observed in the KfW credit lines, where the requirement for meeting the minimum emission reductions (30 tons per million INR invested) was a key barrier to finance projects. The borrowers and loan officers had difficulties in evaluating the eligibility of proposed EE projects with respect to this onerous requirement.

## 5.2 International finance flows could play an important role for distributed and decentralised renewable energy generation in India

India has ambitious plans to harness the potential for solar energy and has recently announced the target of 100GW (out of the 175 GW of renewable energy targets announced (Budget 2015-16)) of installed capacity of solar by 2022. Assuming USD 1 million/MW of capital requirement, an investment of close to USD 200 billion is needed to deploy this level of capacity. In addition to the NSM calls for bidding, the states have gone ahead and announced their own bidding, having brought out policies and regulations to attract investors in implementing solar energy projects. As of today, nearing five years from the launch of NSM, India has only approximately 2.5 GW of installed solar capacity.

The MNRE in recent times has been encouraging industry bodies to rapidly scale up their investments in the sector and has been meeting Public Sector Units/CEO's of IPP's to identify opportunities to meet the 100 GW target for solar energy. Most of

and capital remains invested into the project for a long run. The GoI is also in the process of amending certain taxation rules to mainstream investments into India without regulatory hassles.

Distributed and decentralised generation in India is another area where international climate finance could play a very important role (see Box 5-1). The strategy document of MNRE suggests approximately 1,100 MW of rural electrification projects using solar mini grids are needed. The recently amended Electricity Act, provides regulatory support to distributed generation and makes it mandatory for distribution companies to implement decentralised energy systems where they are not able to supply electricity.

There have been various kinds of business models that have emerged in recent times, some of which have got traction from the investor community, but have not scaled up to realise their full potential. Recently, OMC Power, a company focusing on decentralised energy solutions for rural telecom towers. International climate finance could help such companies scale up rapidly.

### **Box 5-1: A Distributed Energy Generation Company accessing funds from MDB/Local FIs and Private Fund**

Mera Gao Power builds, owns and operates low cost, energy efficient solar based micro-grids in Uttar Pradesh. As of September, 2013, the firm has constructed lighting utilities in over 500 villages in the Sitapur district, Uttar Pradesh and currently serves 13,000 households. Mera Gao

Power is a for-profit organisation and received a grant of USD 300,000 from USAID. In addition to this, the two founders have brought in seed capital of USD 30,000. The company also uses MNRE's 30% subsidy for rural solar off-grid projects. They also received a subsequent grant from National Geographic, TERI and the Climate Group, totalling USD 150,000.

Source: Finding from the interviews conducted as part of the study

the IPP's have accepted certain voluntary targets (totalling to approximately 80 GW) and are in the process of drawing a techno-economic feasibility and financing plans in order to reach these goals.

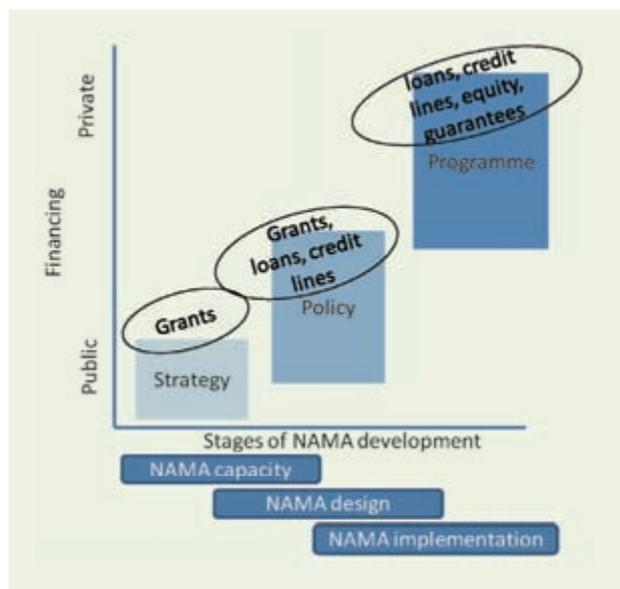
Given there is so much interest in grid connected solar in India, we may assume the private sector will reach out to local and international funds for investment needs. It is a known fact that the investment returns from the renewable energy sector are best suited for "yield co" models where the investors are provided with annual returns

## 5.3 International NAMA finance can help in creating the right policy environment to scale up private investment

The NAMA mechanism offers a way for international financial support to enable emissions reductions across all sectors, and offers the ability to mainstream climate into development finance. NAMAs offer a framework to achieve broad-based climate actions in developing countries that contribute to meeting these countries' greenhouse gas mitigation targets while realising priority

development objectives. Implementation of NAMAs require substantial financial support for capacity building, preparation and project proposal. By linking financial support with effective government policies and sustainable development outcomes, the NAMA mechanism offers a way for international financial support to enable emissions reductions at a sector-wide scale, and offers the ability to mainstream climate into development finance.

Figure 11: Framework for NAMA financing vs. stage of development



**Better understanding of sector specific barriers and potential would help dedicated public international NAMA financing to strategically leverage domestic private sector investments.**

Section 4.1 indicated a number of barriers for scaling private finance in India. Distributed and decentralised generation in RE, waste to energy and forestry are sectors where more policy, technical and financial support are required. A key gap in these non-main stream sectors is the lack of strong pipeline of investible projects, limited private sector engagement on climate finance issues and the lack of performance guarantees. International climate finance can provide the different forms finance and support required along the NAMA programme and project life cycle trajectory – requiring a blend public and private capital, from international and national sources. NAMA finance ultimately seeks to attract investment towards priority national low carbon development goals from the larger and more restricted funding sources, including from bilateral and multi-lateral development institutions, National

Development Banks and the private sector (both commercial debt and private equity). It is important to consider suitability of existing and potential financing mechanisms for funding different types of NAMAs (Figure 11).

**International climate finance should aim to move from policy to programme NAMAs in India to leverage private finance.**

India needs to prioritise large scale sector programmes to ensure low carbon and climate resilient growth. This investment can be supported by ‘Programme NAMAs’ that combine government incentives and financial mechanisms to overcome barriers and risks, catalyse private investments and improve the profitability for private investors. A key issue in India is the intertwined problem of the lack of low cost technologies and the lack of regulation or enforcement in the application of these technologies. One example is the consequent avoidance of organic matter in landfills by better enforcement of waste segregation, composting and co-processing in cement plants. All of which would arguably require substantial efforts of technology transfer and capacity building measures in order to help enhance specific private sector investments in the concerned industries. This is all the more important given the rapid growth of cement production expected in the country and with limited supply of coal as a fuel.

Hence, dedicated public international financing can be used to develop programme NAMAs for technology transfer and capacity building. Effectively leveraging private sector investments in the process. Better regulation and enforcement of the application of technologies (can be supported by complementary policy NAMA) would also mobilise private sector investments due to greater uptake.

The amount of financial support already disbursed for climate change mitigation related activities in India indicates that substantial experience in structuring international support and diverting national funds for mitigation actions already exists for RE and EE programmes. The challenge is to target international flows more strategically to scale up and replicate existing best practices across all sectors. In India, it will be important to test the feasibility of different financing instruments for project and policy NAMAs to attract private finance. Some examples include:

- Risk cover for domestic private sector in NAMA host countries where local cover does not exist, thus encouraging project financing;
- Support to national non-market based instruments e.g. guarantee schemes, loans;
- Bridging “first loss” financing gaps with the aim to increase the tenure of the loan; and
- Developing technology standards (forcing investments).

#### 5.4 International public finance can assist private sector in India to access funds from the GCF

The private sector can directly access funds from the GCF to implement projects or act as investors. In order to do so, the private sector requires additional capacity building and knowledge of accessing climate finance to comprehensively and cohesively address both the mitigation and adaptation goals of India.

**Accessing Climate Finance:** The main theme of GCF modalities and requirements in accessing climate finance are; i) having strong fiduciary capacities in relation to financial governance and ii) strong social and environmental safeguards/management systems in place.

- **Strong Fiduciary Capacities:** The financial governance structure amongst the private sector is skewed at various levels and depends mostly on the size of the private sector companies. Apart from the outliers, it could be fairly assumed that the larger the corporates, stronger their fiduciary capacities. Small and medium sized enterprises even to date do not possess strong financial governance processes and procedures and lack fiduciary capabilities. In order to reduce any sort of irregularities in such cases, RBI has set up governance bodies at state levels. Clearly, only large corporates having strong fiduciary capacities could access climate finance and as a result, only limited capital could be accessed. In order to access more capital to address the burgeoning needs of the India, SMEs also need to be involved and raising their fiduciary capabilities

and standards is a must, and this requires strong hand holding and capacity building. Organisations like GIZ, World Bank and others could hand hold some of the SMEs in strengthen in their fiduciary capacities and showcase through some pilots.

- **Social and Environment Management**

**Systems:** India has always been at the cross roads of development and maintaining ESS policies and regulations. It has also been a bane that Indian policies and regulations have always been reactive rather than pro-active in nature. This trend does reflect even in the social and environment management space. Though the Indian government through the pollution control boards both at central and state levels governs and manages some of the environmental standards, the enforcement has been missing largely at various levels. Indian companies are averse to having additional social and environment governance structures and view this as an additional cost. The Standard and Poor’s ESS India index indicates that the top listed companies have the capabilities of weathering difficult situations and could weather even financial crises by having strong ESS<sup>32</sup>. The Federation of Indian Chamber of Commerce and Industry along with United Nations Environment Programme has also been promoting an inquiry into Sustainable Finance Policy for India (the interim report has been recently published) and is trying to bring in companies to adopt Equator Principles or IFC Performance Standards for accessing climate finance but institutional capacity building in this regard remains a task.

- **Implementing and Delivery Guidance/**

**Assistance:** The private sector in India has varied capabilities with regards to implementing and delivering climate change projects. The skills India has built over the past decade is also varied from highly skilled manpower to unskilled manual labour. The skill requirement/availability is highly dependent on the sector as well as the development or evolution of the sector in question. As an example, the renewable energy sector in India has seen a surge of highly developed skilled

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32 Global Journal of Management and Business Studies. ISSN 2248-9878 Volume 3, Number 10 (2013), pp. 1205-1212© Research India Publications, <http://www.ripublication.com/gjmbs.htm> Standard & Poor’s Environmental, Social and Governance (ESG) India Index- during and Post Global Financial Crisis Ruhee Singh, Research Student, Indian Institute of Foreign Trade, New Delhi-16, India.

manpower, more so, the sector itself demands high skill in implementing, operating and maintaining the projects; whereas sectors such as waste to energy probably would need more unskilled manual labour for collection and highly skilled manpower for operation and maintenance of expensive technology. However as discussed earlier the capacity building requirement is factually based on the evolution of the sector. The private sector in the renewable energy space is at a stage where it could manage designing, implementing, operating and maintaining its assets whereas more emphasis needs to be given on capacity building in sectors such as sustainable transport, waste and forestry techniques. Project management and co-ordination, especially where various stakeholders are involved is also required. Access to climate finance could lead to various public private partnerships and this in turn could lead to huge consortiums, especially with regards to climate resilient cities or smart and sustainable cities initiatives. International best practices in this regard is the “need of the day”. India does not have a city governance structure in place when compared to most developed countries. Capacity building in city governance structures would definitely lead to effective delivery of projects concerning cities.

The International FIs could also help the Indian FIs in creating structures for blending and combining financial resources from public funds and private finance for climate change mitigation and adaptation projects. The need for capacity building in financial structuring and blending of resources is also felt and is a priority need for the country.

## **5.5 Assist the private sector to improve MRV structures**

As discussed in various forums, both nationally and internationally, India is yet to decide whether

it needs to agree to ex-ante emission reviews. This forms the building blocks of the MRV structures for India going ahead. Historically, CDM has been the key UNFCCC mechanism to reduce emissions and India has been one of the key beneficiaries of the mechanism, MRV have been a key aspect of the mechanism itself. Since India has adopted the MRV for CDM, it should have no issues in enhancing its MRV structures overall. The private sector that has experience in MRV when it came to CDM, could take a lead in this regard to enhance MRV effectiveness and showcase readiness to accept climate finance. Also one more important subject of discussion is the MRV of financial flows and performance. This also needs to be a part of the total MRV considerations of India and again through good corporate governance and financial structures, the private sector could take the lead.

International climate finance and GCF could set up guidance teams in order to help countries in order to maintain MRV structure in relation to both finances as well as emission reductions. The GCF could alternatively have a dedicated due diligence team that employs the guidance structure for MRV to assess proposals. It could be made mandatory that only those proposals having good MRV structures in place could be eligible to access international climate finance or funds from GCF.

With the lack of higher fiduciary standards, no ESS standards and low MRV structures in place, it still remains to be seen how India and the private sector can position itself to access international climate finance and funds from GCF.

## 6. Conclusion and Next Steps

The study is one of the first in India to look at the current and potential role of the private sector in scaling up climate investments. The findings cover climate finance flows, role of public policy to scale up climate finance, main barriers for project developers and financiers, the potential for private sector in India to scale up climate finance and the catalytic role of international public finance.

Chapter 2 looked at the scale and level of private finance climate investment in India. We found that local and international private finance were the largest source of investments in India, totalling USD 16 billion since 2001. MDBs have accounted for approximately USD 8 billion. By sector, renewable energy received the greatest investment, totalling USD 19 billion. EE investments (within the industry applications and building technology sectors) have accounted for approximately USD 3 billion of private finance in India since 1994.

Chapter 3 looked at the need for Indian corporates, investors and financiers to improve their corporate social responsibility. Investors across the world have become aware of the environment and social risks and expect the institutions/corporates accessing finance to adhere to stricter ESS guidelines. Only limited international finance can be accessed by India since only large corporates (and only a fraction of SMEs) have the capacity, and manpower to adhere to internationally recognised ESS standards.

Chapter 4 focussed on the key barriers that have constrained the private sector in scaling up private finance. The extent of each type of barrier varies by the particular low carbon sector. It is worth highlighting that although the RE sector faces a number of barriers, these are not as severe as the barriers faced in the other sectors. This is

largely due to greater policy and strategic level support being given to the RE sector in the country compared to other sectors (also exemplified through the successful implementation of the National Solar Mission so far).

Although the GoI has provided regulatory mechanisms and economic incentives for engaging the private sector in the low carbon areas in the country, the actual deployment of these mechanisms and incentives has been slow. There has been little engagement with the private sector in designing climate change plans, with a limited number of platforms created for facilitating such an engagement.

The private sector potential in financing low carbon growth in India is undeniable. There are numerous best practice examples of new financing mechanisms and frameworks, platforms for exchanging information (particularly success stories) and awareness building for inclusion of ESS/SEM standards into investment decision of Indian FIs. The supportive role of the public sector to provide clear policy frameworks as demonstrated by the NSM and NMEEE if replicated across other sectors can go a long way in removing the barriers and scaling up this potential.

Chapter 5 recognised the key role played by international public finance in the past decade to push climate change related mitigation and adaptation related activities in India. Going forward international public finance is even more important to ensure domestic public and private FIs and project developers are able to access funds from a variety of sources. International public finance, through GCF modalities and NAMA support, are particularly crucial to address barriers in waste, forestry and transport sector, where national regulations are not as well developed.

## 6.1 Next steps

A logical next step would be to address the investment gaps, risks and barriers identified in the study to scale up private finance. As such, there will be a mixture of:

- Scaling up existing tools and frameworks (existing practices that are sound but where more application and take-up is needed);
- Adapting existing tools to improve their up-take and effectiveness; and
- Piloting and initiating new tools (including examples of best practice that could be applied to other sectors, and new approaches that have yet to be tested).

A challenge for the next step will be that while barriers and investment needs are well understood, and there are some early stage good policy practices that can be drawn on, there is yet to be consensus regarding the best approach to address each risk, barrier and gap for scaling up private finance.

**One approach that could be taken is to identify the “most important” investment gaps, risks or barriers, based on a set of criteria, which could include (for example):**

- Scale of GHG mitigation potential that is constricted by the gap, risk or barrier;
- Scale of and vulnerability to climate change impacts represented by the gap, risk or barrier;
- Feasibility that the gap, risk or barrier can be successfully addressed via public intervention and private sector solutions; or
- Likelihood that gap, risk or barrier will not be addressed unless there is public sector intervention.

Once the most important gaps, risks or barriers are identified the next step would be to identify the potential solutions. The nature of each gap, risk and barrier, will drive the type of analysis required for coming up with solutions. For example, we found that India needs more innovative financing instruments with longer tenures and low interest

rates. In addition there is a need for greater project based financing compared to asset financing backed by risk guarantees. Essentially, multiple instruments have to be identified which would require the following:

**• Multiple instruments need to be simultaneously applied to address various aspects of the gap, risk or barrier**

– In this case, the multiple instruments and their distinct roles should be clearly defined identified, as well as any overlaps and synergies;

**• Further testing or piloting of instruments may be required to address certain gaps, risks or barriers**

– In this case, the instrument to be further tested or piloted should be described, drawing on any examples where they have already been applied or are in the formative stages of development;

**• Multiple instruments could be applied and the selection of the most appropriate instrument will depend on the various pros/cons of the instruments available**

– In this case, a set of criteria should be developed and applied to select the most appropriate instrument;

**• Multiple instruments could be applied and the selection will vary depending on circumstances such as the sector in which investment is being targeted**

– In this case, the range of instruments best suited for addressing the gap, risk or barrier should be identified, and the circumstances in which one may be more suitable than the other.

The reason for taking this type of approach is to match the type of activity sought to be supported with the specific instrument that is best suited to address that need.

Finally, a comparison of barriers and potential solutions with India’s peer group countries would help to target and prioritise efforts to reduce the risk, gap or barrier.

## References

- ADB. (2011). *Proposed Guarantee Facility: Solar Power Generation (India)*. Retrieved from <http://www.adb.org/sites/default/files/project-document/61800/44941-01-ind-rrp.pdf>
- ASA & Associates. (2013). *A brief report on cleantech - prospects and potential in India*. Retrieved from <http://www.asa.in/pdfs/surveys-reports/Cleantech-Prospects-and-Potential-in-India.pdf>
- BILT. (2014). *Annual Report 2013/14*.
- BIS. (2013). *Low Carbon Environmental Goods and Services (LCEGS), Report for 2011/12*. Department for Business Innovation and Skills, UK. Retrieved from [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/224068/bis-13-p143-low-carbon-and-environmental-goods-and-services-report-2011-12.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224068/bis-13-p143-low-carbon-and-environmental-goods-and-services-report-2011-12.pdf)
- BNEF. (2014). *Climatescope: Mapping the Global Frontiers for Clean Energy Investment*. Retrieved from <http://global-climatescope.org/en/download/reports/climatescope-2014-report-en.pdf>
- BNEF. (2014). India - Renewable Energy - Asset finance deals.
- Bridge to India. (2013). *India Solar Compass*. Retrieved from [http://www.bridgetoindia.com/wp-content/themes/newbridge/pdf/BRIDGE%20TO%20INDIA\\_%20India%20solar%20compass\\_October%202013.pdf](http://www.bridgetoindia.com/wp-content/themes/newbridge/pdf/BRIDGE%20TO%20INDIA_%20India%20solar%20compass_October%202013.pdf)
- Buchner, B., Stadelmann, M., Wilkinson, J., Mazza, F., Rosenberg, A., & Abramskiehn, D. (2014). *The Global Landscape of Climate Finance 2014*. Climate Policy Initiative. Retrieved from <http://climatepolicyinitiative.org/wp-content/uploads/2014/11/The-Global-Landscape-of-Climate-Finance-2014.pdf>
- Business Standard. (2014). *e-waste management firm Attero raises Rs 100 cr*. Retrieved from [http://www.business-standard.com/article/companies/e-waste-management-firm-attero-raises-rs-100-cr-114082800520\\_1.html](http://www.business-standard.com/article/companies/e-waste-management-firm-attero-raises-rs-100-cr-114082800520_1.html)
- CCI. (2013). *A brief report on cleantech - prospects and potential in India*. Retrieved from <http://www.cci.in/pdfs/surveys-reports/Cleantech-Prospects-and-Potential-in-India.pdf>
- CDM. (2014). *CDM, India*. Retrieved from <http://cdm.unfccc.int/Projects/projsearch.html>
- CIF. (2011). *CTF Investment Plan for India*. Retrieved from [https://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/CTF\\_India\\_investment\\_plan\\_101411.pdf](https://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/CTF_India_investment_plan_101411.pdf)
- Clapp, C. E.-M. (2012). *Tracking climate finance: What*. Retrieved from <http://norden.diva-portal.org/smash/get/diva2:702970/FULLTEXT01.pdf>
- Climate Bonds. (n.d.). *Climate Bonds Taxonomy*. Retrieved from <http://www.climatebonds.net/standards/taxonomy>
- EMBARQ. (2013). *Financing Needs for Sustainable Transport Systems for the 21st Century*. Retrieved from <http://embarqindiahub.org/sites/default/files/Financing%20Needs%20for%20Sustainable%20Transport%20Systems%20in%20the%2021st%20Century%20-%20Holger%20Dalkmann%20-%20EST%20Asia%20Forum%20-%202012-April-2013.pdf>
- Equator Principles Association. (2011). *Equator Principles*. Retrieved from <http://www.equator-principles.com/>
- ESMAP. (2013). *Paving the way for a transformational future: Lessons from Jawaharlal Nehru National Solar Mission Phase I*. Retrieved from <https://www.esmap.org/sites/esmap.org/files/ESMAP-World%20Bank%20Publication%20-%20Paving%20the%20Way%20for%20a%20Transformational%20Future%20-%20Lessons%20from%20JNNSM%20Phase%20I.pdf>
- FAO. (2009). *India Forestry Outlook Study*. Retrieved from <http://www.fao.org/docrep/014/am251e/am251e00.pdf>
- GoI. (2000). *The Municipal Solid Wastes (Management and Handling) Rules*. Retrieved from <http://www.moef.nic.in/legis/hsm/mswmhr.html>

- GoI. (2008). *Pimpri Chinchwad Municipal Corporation*. Retrieved from <https://www.pcmcindia.gov.in/sutp/>
- GoI. (2014). *Economy Survey 2014-15*. Retrieved from <http://indiabudget.nic.in/survey.asp>
- GoI. (2015). *India Budget 2015/16*.
- Hindu, T. (2013). *Work on waste-to-energy plant begins at Venkatamangalam*. Retrieved from <http://www.thehindu.com/news/cities/chennai/work-on-wastetoenergy-plant-begins-at-venkatamangalam/article4667616.ece>
- IFC. (2012). *IFC Performance Standards on Environmental and Social Sustainability*. Retrieved from [http://www.ifc.org/wps/wcm/connect/c8f524004a73daeca09afd998895a12/IFC\\_Performance\\_Standards.pdf?MOD=AJPERES](http://www.ifc.org/wps/wcm/connect/c8f524004a73daeca09afd998895a12/IFC_Performance_Standards.pdf?MOD=AJPERES)
- IFC. (2013). *Mobilizing Public and Private Funds for Inclusive Green Growth Investment in Developing Countries*. Retrieved from <http://www.ifc.org/wps/wcm/connect/85f8e50041d450158bf88f00ca2aa08/Mobilizing+Public+and+Private+Finance+for+Inclusive+Green+Growth+Investment+in+Developing+Countries.pdf?MOD=AJPERES>
- II plc. (2014). *Current Portfolio*. Retrieved from Infrastructure India plc.: <http://www.iiplc.com/portfolio/>
- IIP. (2012). *Financing Industrial Energy Efficiency In India: Lessons Learned And Directions For The Future*. Retrieved from <http://www.iipnetwork.org/IIP-IndiaFinancing%20Landscape.pdf>
- Illman, J. et al. (2014). *Practical Methods for Assessing Private Climate Finance Flows*. Nordic Council of Ministers. Retrieved from <http://norden.diva-portal.org/smash/get/diva2:702970/FULLTEXT01.pdf>
- IMF. (2014). *The World Economic Outlook: Legacies, Clouds and Uncertainties*. Retrieved from <http://www.imf.org/external/pubs/ft/weo/2014/02/pdf/text.pdf>
- JICA. (2012). *JICA assisted Forestry Projects in India*. Retrieved from [http://www.jica.go.jp/india/english/office/others/c8h0vm00004cesxi-att/brochure\\_01.pdf](http://www.jica.go.jp/india/english/office/others/c8h0vm00004cesxi-att/brochure_01.pdf)
- JK Paper Ltd. (2014). *JK Paper & Environment*. Retrieved from [http://www.jkpaper.com/index.php?option=com\\_content&view=article&id=32&Itemid=33](http://www.jkpaper.com/index.php?option=com_content&view=article&id=32&Itemid=33)
- KfW and SIDB. (2010). *Operating guidelines for KfW energy efficiency line of credit – assistance for energy efficiency projects*.
- MGI. (2013). *Infrastructure productivity: How to save \$1 trillion a year*. Retrieved from [http://www.mckinsey.com/~media/McKinsey/dotcom/Insights%20and%20pubs/MGI/Research/Urbanization/Infrastructure%20productivity/MGI\\_Infrastructure\\_Full\\_report\\_Jan2013.ashx](http://www.mckinsey.com/~media/McKinsey/dotcom/Insights%20and%20pubs/MGI/Research/Urbanization/Infrastructure%20productivity/MGI_Infrastructure_Full_report_Jan2013.ashx)
- MNRE. (2013). *Jawabarlal Nehru National Solar Mission Phase 2 Policy Document*. New Delhi: The Ministry of New & Renewable Energy.
- MNRE. (2013b). *Salient Feature: Solar Polices*. New Delhi: The Ministry of New & Renewable Energy.
- NEERI. (2008). *Assessment of the status of municipal solid waste management in metro cities*.
- Netscribes. (2012). *Market Research India - Waste Management Market in India 2009*. Retrieved from <http://www.slideshare.net/ResearchOnIndia/market-research-india-waste-management-market-in-india-2009>
- NOVONOUS. (2014). *Renewable Energy Market in India 2014 - 2022*.
- NRDC. (2011). *Laying the foundation for a bright future: India's National Solar Mission*. New Delhi: Council on Energy, Environment & Water.
- NRDC. (2014). *Reenergizing India's Solar Energy Market through financing*. New Delhi: Council on Energy, Environment & Water.
- PACE-D. (2013). *Financing Renewable Energy in India*. PAVE-D Technical Assistance Program.
- PCM. (2008). *Sustainable Transport Project*. Retrieved from Pimpri Chinchwad Municipal Corporation: <https://www.pcmcindia.gov.in/sutp/>
- Planning Commission of India. (2014). *Final Report of the Expert Group on Low Carbon Strategies for Inclusive Growth*.

- RBI. (2013). *Financial Stability Report 2013*. Retrieved from <http://www.rbi.org.in/scripts/PublicationReportDetails.aspx?UrlPage=&ID=725>
- RBI. (2014). *Financial Stability Report 2014*. Retrieved from <http://www.rbi.org.in/scripts/FSReports.aspx>
- RE INVEST. (2015).
- UNDP. (2014). *Human Development Index and its components*. Retrieved from UNDP: Human Development Reports: <http://hdr.undp.org/en/content/table-1-human-development-index-and-its-components>
- UNFCCC. (2014). *CDM Fact Sheet*. Retrieved from <http://newsroom.unfccc.int/media/159267/cdm-leveraging-private-finance-and-delivering-results.pdf>
- UNFCCC. (2014). *CDM Project Search (Filter by India)*. Retrieved from <https://cdm.unfccc.int/Projects/projsearch.html>
- UNFCCC. (n.d.). *Definition and reporting system of Climate Finance*. Retrieved from [http://unfccc.int/files/cooperation\\_support/financial\\_mechanism/long-term\\_finance/application/pdf/climate\\_finance.pdf](http://unfccc.int/files/cooperation_support/financial_mechanism/long-term_finance/application/pdf/climate_finance.pdf)
- USAID. (2008). *Financing energy efficiency in India*. Retrieved from [http://www.asiapacificpartnership.org/pdf/Projects/Cross-Cutting-Other/PSU/CCO-07-03\\_Financing\\_Energy\\_Efficiency\\_in\\_India\\_Nov\\_2008.pdf](http://www.asiapacificpartnership.org/pdf/Projects/Cross-Cutting-Other/PSU/CCO-07-03_Financing_Energy_Efficiency_in_India_Nov_2008.pdf)
- USAID. (2013). *Financing Energy Efficiency in India*. Retrieved from <http://www.pace-d.com/wp-content/uploads/2013/08/EE-REPORT.pdf>
- USAID. (2013). *Financing Renewable Energy in India*. Retrieved from <http://www.pace-d.com/wp-content/uploads/2013/10/RE-Finance-Report.pdf>
- VCCEdge. (n.d.). Retrieved from [http://www.vccedge.com/index\\_new.php](http://www.vccedge.com/index_new.php)
- VCCircle. (2009). *India Equity Partners Leads Rs150Cr Round in A2Z*. Retrieved from <http://www.vccircle.com/news/infrastructure/2009/10/20/india-equity-partners-leads-rs150cr-round-a2z>
- WB. (2014). *Projects and Operations, India*. Retrieved from The World Bank: [http://www.worldbank.org/projects/search?lang=en&searchTerm=&countrycode\\_exact=IN](http://www.worldbank.org/projects/search?lang=en&searchTerm=&countrycode_exact=IN)
- Whitely, S., Granoff, I., Chiofalo, E., Halimanjaya, A., & Pickard, S. (2014). *Private finance: mapping incentives and investment in Sub-Saharan Africa (Discussion Paper)*. Retrieved from <http://africanclimatefinancehub.net/climatereadiness/images/privateclimate.pdf>
- World Bank. (n.d.). *Projects & Operations*. Retrieved from <http://www.worldbank.org/projects>

# Acronyms and Abbreviations

AD	Accelerated Depreciation	GHG	Greenhouse Gas
ADB	Asian Development Bank	GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
AUM	Assets Under Management		
BEE	Bureau of Energy Efficiency	GNI	Gross National Income
BIS	Bureau of Indian Standards	GoI	Government of India
BNEF	Bloomberg New Energy Finance	GRI	Global Reporting Initiative
BRICS	Brazil, Russia, India, China, and South Africa	HDI	Human Development Index
		IEA	International Energy Agency
CAGR	Compound Annual Growth Rate	IEE	Industrial Energy Efficiency
CCBS	Climate, Community and Biodiversity	IEP	India Equity Partners
CDM	Clean Development Mechanism	IFC	International Finance Corporation
CDP	Carbon Disclosure Project	II plc	Infrastructure India plc.
CIF	Climate Investment Fund	IL&FS	Infrastructure Leasing & Financial Services
CSP	Concentrated Solar Power		
CSR	Corporate Social Responsibility	ILFS	Infrastructure Leasing & Financial Services Limited
DC	Designated Consumers		
DFI	Development Finance Institution	INCCA	Indian Network for Climate Change Assessment
DPRs	Detailed Project Reports	INDCs	Intended Nationally Determined Contributions
EE	Energy Efficiency		
EEFP	Energy Efficiency Financing Platform	IPCCC	Intergovernmental Panel on Climate Change
EESL	Energy Efficiency Services Limited		
EHS	Environment, Health and Safety	IPMVP	International Performance Measurement and Verification Protocol
ESCO	Energy Service Company/ Energy Savings Company	IPP	Independent Power Producer
ESS	Environment and Social Safeguards	IRDA	Insurance Regulatory and Development Authority
ETS	Emission Trading Systems		
FAO	Food and Agriculture Organization	IREDA	Indian Renewable Energy Development Agency
FDI	Foreign Direct Investment		
FEEED	Framework for Energy Efficient Economic Development	JICA	Japan International Cooperation Agency
FIs	Financial Institutions	JNNSM	Jawaharlal Nehru National Solar Mission
FiT	Feed-in-Tariff	JNNURM	Jawaharlal Nehru National Urban Renewal Mission
FSDC	Financial Stability and Development Council		
GCF	Green Climate Fund	LCEGS	Low Carbon Environmental Goods and Services
GDP	Gross Domestic Product	LCOE	Levelised Cost of Energy

LCS	Low Carbon Strategy	PRGF	Partial Risk Guarantee Fund
LEDs	Low Emission Development Strategies	PV	Solar Photovoltaic
LNB	Local National Banks	RBI	Reserve Bank of India
Local PFIs	Local Private Finance Institutions	RE	Renewable Energy
LPB	Local Private Banks	REC	Renewable Energy Certificate
MCF	Multilateral Climate Fund	REID	Renewable Energy Infrastructure Development Fund
MDB	Multilateral Development Bank	RETs	Renewable Energy Technologies
MNRE	Ministry of New and Renewable Energy	RPO	Renewable Purchase Obligation
MRV	Measurement, Reporting and Verification	Rs	Indian rupees
MSW	Municipal Solid Waste	S&P BSE	Standard and Poor Bombay Stock Exchange
MTEE	Market Transformation for Energy Efficiency	SAPCC	State Action Plan on Climate Change
NAMAs	Nationally Appropriate Mitigation Action	SCBs	Scheduled Commercial Banks
NAPCC	National Action Plan on Climate Change	SEBI	Securities and Exchanges Board of India
NEERI	National Environmental and Engineering Research Institute	SECI	Solar Energy Corporation of India
NMEEE	National Mission for Enhanced Energy Efficiency	SIDB	Small Industries Development Bank of India
NMSH	National Mission on Sustainable Habitat	SIDBI	Small Industries Development Bank of India
NPA	Non-Performing Asset	SLCC	State Level Coordination Committee
NSW	National Solar Mission	SME	Small and Medium Enterprise
NTPC	National Thermal Power Company	SPCB	State Pollution Control Board
NVVN	National Vidyut Vyapar Nigam	TA	Technical assistance
ODA	Overseas Development Assistance	TCCL	Tata Cleantech Capital Limited
ODI	Overseas Development Institute	UNFCCC	United Nations Framework Convention on Climate Change
OECD	Organisation for Economic Co-operation and Development	USD	United States dollars
PAT	Energy Efficiency Financing Platform	VCFEE	Venture Capital Fund for Energy Efficiency
PCMC	Pimpri Chinchwad Municipal Corporation	VGf	Viability Gap Funding
PFC	Power Finance Corporation	WB	World Bank
PPA	Power Purchase Agreements	WPI	Wholesale Price Index
		WTO	World Trade Organization

# Appendix 1 – Private Finance Flow: Methodology

For the purpose of this study, we have defined ‘private climate investments’ as finance supporting emission reductions, and enabling environment projects that is derived from private sources – both international and nationally. We have therefore only taken into account investments for climate mitigation in India.

## Sector data

The private finance investment figures were determined through undertaking both desk based

literature reviews/research, and supported through undertaking stakeholder interviews. For a full list of stakeholder consulted please see Appendix 2, Table A2. The data sources used for this study were a combination project-level and aggregate data from a variety of sources, see Table A1. Aggregating data from different sources presents some challenges, in particular the risk of double counting.

Table A1: Sources of data

Sector	Source of finance	Data granularity
Renewable Energy	Bloomberg New Energy Finance	Project-level
	CDM <sup>33</sup>	Project-level
	USAID study, 2013	Project-level
	VCCEdge <sup>34</sup>	Aggregated data
Building Technology	World Bank	Aggregated data
Industrial Applications	Asian Development Bank (ADB)	Aggregated data
	Canara Bank	Aggregated data
	KfW	Aggregated data
	Japan International Cooperation Agency (JICA)	Aggregated data
	ICICI Bank	Aggregated data
	World Bank	Aggregated data
	State Bank of India	Aggregated data
	Union Bank of India	Aggregated data
	Yes Bank	Aggregated data
Transport	CDM	Project-level
	Infrastructure India plc.	Project-level
	World Bank	Aggregated data
	Government of India (public mixed with private support)	Project-level
Forestry	JICA	Project-level

<sup>33</sup> Please note, there is the potential of double counting when adding the BNEF and CDM data together.

<sup>34</sup> VCCEdge data was excluded from to the total renewable energy investment figure as there was a risk of double counting with the BNEF data. It has however been presented separately for information purposes.

Waste Management	BTS India Private Equity Fund Ltd and Venture East	Project-level
	NEA Indo US Ventures and Draper Fisher Jurveston	Project-level
	Standard Chartered IL & FS Asia Infrastructure Growth Fund	Project-level
	Lehman Bros	Project-level
	IDFC Private Equity	Project-level
	UTI ventures	Project-level
	India Equity Partners (IEP)	Project-level
	Forum Synergies	Project-level
Cleantech	VCCEdge	Aggregated data

Public finance identified in this study has been excluded in the calculations of the total figures; they are still presented in the ‘private finance flows’ spreadsheet, for information purposes only.

Each private finance investment (or aggregate investment) identified was categorised depending on the finance source, for this study, we used the following types to differentiate the finance:

Table A2: Sources of data

- **Multilateral Development Bank (MDB)** – accounts for credit lines that have mobilised domestic private sector investment in EE and renewable energy. These credit lines mobilises commercial financing from Indian FIs by providing funds to the institutions, which they can then on-lend to project developers or implementers. The credit lines usually provide funds at low interest rate to FIs, allowing the institutions to on-lend them at a higher interest rate, which may be still be lower than market rates. It also accounts for public finance that has been provided as ODA assistance and equity investments to leverage private finance.
- **Bilateral finance institutions (BFIs)** – accounts for credit lines that have mobilised domestic private sector investment in EE and renewable energy. These credit lines mobilises commercial financing from Indian FIs by providing funds to the institutions, which they can then on-lend to project developers or implementers. The credit lines usually provide funds at low interest rate to FIs, allowing the institutions to on-lend them at a higher interest rate, which may be still be lower than market rates. This finance source also accounts for finance that has been provided by BFIs to leverage private finance in India, mainly via

ODA loan assistance. JICA and KfW have been key providers of finance in India.

- **Local National Bank (LNB)** – accounts for private finance leveraged by public sector banks in India; examples include (but not limited to): State Bank of India, Central Bank of India or IDBI Bank.

- **Mixture of LNB and Local Private Banks (LPB)** – accounts for private finance from both national and private banks in India; where no clear distinction could be made to the source of the finance.

- **Local Private Finance Institution (Local PFI)** – accounts for private finance that has been provided by private banks (e.g. Yes Bank) and FIs (e.g. IDFC) in India.

- **Mixture of local and international private investors** – identifies where a project/scheme has received finance from both local and international private investors, and where the breakdown between each is not clear. This is the case mainly for CDM data.

- **Mixture of public and private** – accounts for investments by public FIs (e.g. IREDA) that have utilised both private and public sector finance, but the distinction between each was not provided.

Comparisons across time periods could not be undertaken, as often this information was not available; or if it was, the range was quite large which would distort the messages. For this reason no comparison has been made using date ranges. The private finance flows spreadsheet, collated through this study, lists the specific year, or time period that finance was applicable to, where available, this information has been provided.

### **Environmental Funds**

The list of India's environmental and green funds have been sourced from VCCEdge, this is by no means an exhaustive list, and it is expected there

are a number more funds – however information of these were not readily available to the study team.

### **International Credit Lines**

International credit lines have been key in supporting private sector finance in India; these have tended to be provided by MDBs or via bilateral institutions.

It is important to note that the total amount provided through these channels should not be added to the sector, as this would lead to double counting of investments.

## Appendix 2 – List of Stakeholders and Interview Template

### Stakeholders consulted as part of the study

The following table lists the stakeholders who kindly participated during the study.

Organisation/Institution	Stakeholder type
Aspiration Energy	Project Developer
EESL	Super ESCO
Energy & Extractives, The World Bank Group	MDB
HDFCERGO GIC Ltd.	Insurance Company
ICICI Bank	Project Financer
IFC South Asia	Project Financier
IL&FS Financial	Project Financier
Mera Gao Power	Project Developer
Ministry of Finance, Government of India	Government
Nereus capital	Private Equity
SBI	Commercial Bank
Sycom	Waste Project Developer and Consultant
Tata Clean Tech Capital	Project Financer
Wellspun Energy	Project Developer
Climate Change Group, World Bank	MDB
Azure Power	Project Developer

A key aspect of the study was the extensive consultations undertaken with relevant stakeholders primarily private financial institutions, MDBs and project developers across the sectors of renewable energy, energy efficiency, waste management, forestry and transport. Focussed one to one interviews were undertaken with each stakeholder, with the objective to understand the barriers and future potential to scale up climate investments across sectors. Stakeholder specific questions were developed for each interviews. The set of questions was shared with each stakeholder, via email, prior to the interview, to outline the objectives of the study and allowing each participant to prepare responses.

Two sets of interview templates were prepared for the interviewees, one was tailored for those is financial institutions, and the other for project developers. The templates for both are provided below.

### Interview Template for Financial Institutions:

#### Scoping Study on the role of private finance in climate finance in India

Funded by: **IKI/BMUB and implemented by GIZ**

Project Partners: **Ricardo-AEA and International Institute for Energy Conservation (IIEC)**

**About the Study:** The study has the overall objective of exploring how climate change concerns affect private investment decisions in India, it aims to assess the investments in various sectors of mitigation-related projects and seek an understanding which best practices among private finance institutions could be scaled up, with particular consideration on: project selection, disbursement, monitoring and reporting. A particular focus is set on the national mitigation

schemes, such as the budget allocations for National Action Plan for Climate Change or the State Action Plan for Climate Change and potentially internationally funded Nationally Appropriate Mitigation Actions (NAMAs), and how they can function as a vehicle to generate additional private climate finance.

The main purpose of the study is to develop a kind of matrix linking private finance actors with investment types across various mitigation sectors and activities with the aim of capturing best practice to scale up climate finance.

The study aims to review:

- The ability of private finance institutions to attract private and public climate finance (both domestic and international)
- The role of private finance institutions to support or complement emerging national climate finance institutional frameworks
- The potential for integration of national sustainable development strategies into public-private partnership mandates (e.g. NAMAS, other GHG mitigation concepts, technology transfer targets, etc.)
- Examine how climate change/sustainable development considerations have been integrated in the investment decisions.

The study entails direct interactions with concerned stakeholders in the India private climate finance space to seek hands on views and inputs on India's climate finance potential and way forward.

### **Specific questions to the private financing institutions include:**

1. Do financiers take a separate account of financing undertaken for low carbon sectors such as for EE, RE, water, waste, etc.? Is it possible to get information on size of flows and trends, type of activity and sector, finance instruments used?
2. At what level of organization is investment in low carbon sectors being discussed in financial institutions? Board level, senior management or loan/proposal appraisal officers? Is it only a high level topic or has it passed to project appraisal officers?
3. What is the perception regarding potential international support and funds, such as the GCF

Private Sector Window and the UN Secretary-General new initiatives and partnerships to mobilize climate finance (see attached)? Are investors even aware of possible access to such? How are decisions on investment priorities and programmes in a particular country undertaken by FIs? Criteria & indicator (macro and micro)?

4. Is there a strong enough project pipeline for investors who have capital that they are willing to invest in climate related-activities? If not why and what could be done?
5. Does your organisation/company/institution belong to a knowledge-sharing platform/initiative/ best practice that aims to increase knowledge on climate change and/or investment for climate-related activities?
6. Do you think there is good level of private sector involvement in designing and implementing climate mitigation actions at the national/state level? If not, why? Are the industry associations such as FICCI/ CII doing their part in engaging all private players in policy making? What are your opinions on the opportunities to influence strategic policy decisions?
7. Have PAT and REC been effective to mobilise private sector investment in India? What are the main issues? Any suggestions to improve effectiveness to mobilise private finance?
8. What barriers does India face in mobilising private sector investment for climate-related activities by sector? What's are the barriers particularly faced by institutional investors for financing low carbon sectors? What kind regulatory or legal environment would instigate institutional investors to these sectors?
9. What internal processes and standards are currently being used for sustainable investment? Does your organisation/company/institution follow international guidelines for sustainable investment (e.g. Equator Principles)? If not, why? Do you think Indian FIs will adopt such voluntary guidelines OR regulatory mandate (RBI guidelines) is necessary?
10. What are the set of skills required to improve investment decisions for climate activities? Are any training provided for this currently? What kind of training that would be expected to overcome this requirement?

## Interview Template for Project Developers

### Scoping Study on the role of private finance in climate finance in India

Funded by: **IKI/BMUB and implemented by GIZ**

Project Partners: **Ricardo-AEA and International Institute for Energy Conservation (IIEC)**

**About the Study:** The study has the overall objective of exploring how climate change concerns affect private investment decisions in India, it aims to assess the investments in various sectors of mitigation-related projects and seek an understanding which best practices among private finance institutions could be scaled up, with particular consideration on: project selection, disbursement, monitoring and reporting. A particular focus is set on the national mitigation schemes, such as the budget allocations for National Action Plan for Climate Change or the State Action Plan for Climate Change and potentially internationally funded Nationally Appropriate Mitigation Actions (NAMAs), and how they can function as a vehicle to generate additional private climate finance.

The main purpose of the study is to develop a kind of matrix linking private finance actors with investment types across various mitigation sectors and activities with the aim of capturing best practice to scale up climate finance.

The study aims to review:

- The ability of private finance institutions to attract private and public climate finance (both domestic and international)
- The role of private finance institutions to support or complement emerging national climate finance institutional frameworks
- The potential for integration of national sustainable development strategies into public-private partnership mandates (e.g. NAMAS, other GHG mitigation concepts, technology transfer targets, etc.)
- Examine how climate change/sustainable development considerations have been integrated in the investment decisions.

The study entails direct interactions with concerned stakeholders in the India private climate finance space to seek hands on views and inputs on India's climate finance potential and way forward.

### Specific questions to the project developers include:

1. What types of financial actors (financial or strategic investors, DFI's/MDBs, NGO's with grants, local banks) are project developers attempting to attract to investment from? What are the key benefits/drawbacks to project developers/beneficiaries with each type of financial actor (in brief)?
2. What types of financial instruments (e.g. loans, grants, equity, debt, etc.) are used by project developers to access finance?
3. At what level of organization is investment in low carbon sectors being discussed in financial institutions? Is it only a high level topic or has it passed to project appraisal officers?
4. Is there potential for increased private sector investment, in sectors such as Waste, Transport, Forestry sector, etc.
5. To what extent have initiatives like PAT and REC increased private sector investment in India?
6. Who are the key private actors or organisations who should be involved with public sector? What opportunity do you see for the private sector under the NAPCC flagship Missions? Which areas are most promising for private investment?
7. Please describe (or confirm) what barriers does India face in mobilising private sector investment for climate-related activities? Barriers by sector and technology, financiers and developers?
8. Do project developers find it easy to access funds from public or private sources for climate projects?
9. Are the barriers identified for RE and energy efficiency sector also applicable to other sectors? What are the barriers faced by investors - retrospective taxation related concerns/AIF and SEI related concerns/ Repatriation hurdles if any? What are the barriers particularly faced by institutional investors for financing low carbon sectors? What kind regulatory or legal environment would instigate institutional investors to these sectors? Which sectors have interested the institutional investors so far?
10. Is there a strong enough project pipeline for investors who have capital that they are willing to invest in climate related-activities?





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