

Final Report for the study- Carbon Governance at Sub- national Level in India

Prepared for
IGES

Suggested format for citation

T E R I. 2011

Carbon Governance at Sub-national Level in India

New Delhi: The Energy and Resources Institute.

For more information

Project Monitoring Cell

T E R I

Darbari Seth Block

IHC Complex, Lodhi Road

New Delhi – 110 003

India

Tel. 2468 2100 or 2468 2111

E-mail pmc@teri.res.in

Fax 2468 2144 or 2468 2145

Web www.teriin.org

India +91 • Delhi (0)11

Table of Contents

LIST OF TABLES	V
1 INTRODUCTION.....	1
1.1 Understanding the project.....	1
1.2 Objective of the project	1
1.3 Scope of the project.....	2
1.3.1 Coverage by Governance levels.....	2
1.3.2 Coverage by Sectors.....	2
1.4 Approach and Methodology	2
1.5 Report Outline	2
2 DEFINING CARBON GOVERNANCE.....	5
2.1 Defining 'Governance': findings from the literature.....	5
2.2 Governance of Carbon: Defining 'Carbon Governance'	6
2.3 Conclusions	8
3 STATUS OF 'CARBON GOVERNANCE' IN INDIA.....	9
3.1 Understanding India's Federal Structure.....	9
3.2 Understanding India's National Climate Policy	10
3.3 Carbon Governance in India.....	11
3.3.1 GHG Inventorization.....	12
3.3.1.1 National Communication (NATCOM)	12
3.3.1.1.1 The Process	12
3.3.1.1.2 Role of sub-national actors	15
3.3.1.1.3 Key challenges in Implementation	15
3.3.1.2 Other GHG inventorization initiatives	15
3.3.1.2.1 Indian Assessment of Climate Change Assessment (INCCA): GHG Inventory 2007	15
3.3.1.2.2 Other independent initiatives	16
3.3.2 Carbon Markets.....	19
3.3.2.1 Clean Development Mechanism (CDM).....	19
3.3.2.1.1 Process.....	19
3.3.2.1.2 Role of states in CDM.....	19
3.3.2.1.3 Key challenges in Implementation	20
3.3.2.2 Other domestic markets	20
3.2.3 National Action Plan on Climate Change	21
3.2.3.1 NAPCC and State-level initiatives	21
3.4 Summary of status of 'Carbon Governance' in India	27
4 CASE STUDY I: A CITY LEVEL CASE STUDY OF GANDHINAGAR	36
4.1 Rationale for the case study	36
4.1.1 Objective of the case study	36

4.1.2 Criteria for selection of the case study	36
4.2 Approach and methodology	36
4.3 Findings	37
4.3.1 Gandhinagar: Profile	37
4.3.2 Gandhinagar: Carbon Governance.....	37
4.4 Conclusion	40
5 CASE STUDY II: A PROJECT LEVEL CASE STUDY OF BACHAT LAMP YOJANA	42
5.1 Rationale for the case study	42
5.1.1 Objective of the case study	42
5.1.2 Criteria for selection of the case study	42
5.2 Approach and methodology	43
5.3 Findings	43
5.3.1 Bachat Lamp Yojna (BLY): Project Design.....	43
5.3.2 Estimation and Measurement/Monitoring of GHG reductions	46
5.3.3 Unique case of building capacities	48
5.3.4 Role of State	49
5.3.4.1 Case of Kerala	49
Annexures	51
Annex I: Questionnaire for Investors in the BLY study	51
Annex II: Questionnaire for DOE in the BLY study.....	52
Annex III: Questionnaire for Gandhinagar Case Study	53

List of Tables

Table 1: Key Tasks and Methodology adopted.....	3
Table 2: Institutional Framework of NATCOM process: associated actors, their roles and rationale	14
Table 3: GHG Estimates: some studies.....	17
Table 4: CDM in India: State nodal agencies.....	20
Table 5 : PAT scheme: role of actors.....	23
Table 6 : State-level action plan on climate change: an overview	24
Table 7 : Climate initiatives in Cities.....	26
Table 8 : Local level climate mitigation actions in India.....	27
Table 9 : Summary table for Carbon Governance in India: policies and programs	29
Table 10: Summary table for Carbon Governance in India: measuring & reporting	33
Table 11: Gandhinagar Solar City Project: Targets (Renewable Energy System (in residential and commercial sectors).....	37
Table 12: Gandhinagar Solar City Project: Targets (energy conservation)	39
Table 13 : CPA inclusions in BLY-PoA.....	43
Table 14: Institutional framework: roles and responsibilities of actors involved.....	45
Table 15 :BLY coverage in Kerala	49

List of Figures

Figure	1: The Governance Architecture	6
Figure	2: India's federal structure and its relevance to the sectors specific to mitigation	10
Figure	3: BLY: Implementation Process Cycle	45
Figure	4 :SSC-CPA Database components as per BLY scheme.	47
Figure	5: Institutional arrangement for data collection and archiving for the SSC-CPA .	48

List of Abbreviations

Asian Development Bank	ADB	Incandescent lamps	ICLs
Bachat Lamp Yojana	BLY	Jawaharlal Nehru National Urban Renewal Mission	JNNURM
Battery Operated Vehicles	BOVs	Kyoto Protocol	KP
Bureau of Energy Efficiency	BEE	Kerala State Electricity Board	KSEB
Clean Development Mechanism	CDM	Ministry of Environment and Forests	MoEF
CDM Executive Board	CDM-EB	Measuring, Reporting and Verification	MRV
CDM Programme Activities	CPAs	Ministry of New and Renewable Energy	MNRE
Certified Emissions Reductions	CERs	National Action Plan on Climate Change	NAPCC
Delhi Metro Rail Cooperation	DMRC	Project Management Cell	PMC
Designated Consumers	DCs	National Mission on Sustainable Habitat	NMSH
Designated National Authority	DNA	National Steering Committee	NSC
Designated Operation Entity	DoE	National Communication	NATCOM
Distribution Company	DISCOM	Partial Risk Guarantee Fund	PRGF
Energy Management Centre	EMC	Perform, Achieve and Trade	PAT
Energy Saving Certificates	ECerts	Power Exchange of India Limited	PXIL
Government of India	GoI	Programme of Activities	PoAs
Government of National Capital Territory of Delhi	GNCTD	Renewable Energy Purchase Obligation	RPO
Green House Gases	GHG	Renewable Energy Certificate	REC
Green India Mission	GIM	Sewage Treatment Plants	STPs

Gujarat International Finance Tech-City	GIFT	State Action Plans on Climate Change	SAPCCs
Gujarat Infrastructure Development Board	GIDB	State Designated Agencies	SDAs
Gujarat Power Corporation Limited	GPCL	Technical Advisory Committee	TAC
Gujarat State Transport Corporation	GSRTC	United Nations Framework Convention on Climate Change	UNFCCC
Gujarat Urban Development Company	GUDC	United Nations Economic and Social Commission for Asia and the Pacific	UNESCAP
Indian Energy Exchange	IEX	United Nations Development Programme	UNDP
Indian Network for Climate Change Assessment	INCCA	Venture Capital Fund for Energy Efficiency	VCFEE

1 Introduction

1.1 Understanding the project

This study is part of an ongoing larger study being undertaken by the Governance and Capacity Group (GC) of the Institute for Global Environmental Strategies (IGES) titled “Establishing New Market Mechanism through the Development of Methodological and Institutional Framework for MRV in Asian Developing Countries”. It aims to promote evaluation methods in developing countries¹ and to assist in developing systems to Measure, Report and Verify (MRV) Green House Gas (GHG) emissions reductions in developing countries. The outcome of the study is expected to lead to recommendations on the activities initiated by the Japanese government such as a bilateral crediting mechanism for post 2012. The India study will examine the methodological framework for the MRV of GHGs emission reduction activities and the present institutional and governance structure in the country in the context of MRV thereby giving the current status of carbon governance in India.

1.2 Objective of the project

The India study aims to conduct a study on ‘carbon governance’ in India with an overview of the status of ‘carbon governance’ at the national level and the subnational level. It aims to understand the present level of ‘carbon governance’; the level of engagement of subnational governments’ in ‘carbon governance’ activities and the present status of enabling environment facilitative of one of the key elements of carbon governance, which is, MRV of GHG emission reduction activities. Further analysis will be conducted to understand key barriers that hinder carbon governance at sub-national level in India (using a case study of a local government and also a mitigation project). The study suggests measures (including capacity building needs) that will be required to facilitate ‘carbon governance’ at all levels. The specific objectives of the India case study are as follows:

- Define ‘carbon governance’ and what it entails for governments at the national and sub national level
- Study ‘carbon governance’ at national level through GHG mitigation policies and measures at the national level
- Study ‘carbon governance’ at subnational level and level of engagement of subnational and local governments
- Study ‘carbon governance’ at project level and level of engagement of private sector

¹ The countries involved in this study are: India, China, Indonesia and Philippines. The study extends from May 2011 to March 2012.

1.3 Scope of the project

1.3.1 Coverage by Governance levels

The study will focus broadly on national level policies and measures leading to GHG emission reductions (especially in the context of national government policies being understood as reference level for subnational policies and measures) and specifically on subnational policies and measures including level of engagement of subnational actors in GHG emission reduction. The governance levels in India are divided into States, Cities, Districts and Municipalities, for the scope of this study we would limit ourselves to actions at the city level.

1.3.2 Coverage by Sectors

The study will focus on sectors relevant to urban planning and in this context focus on sectors as identified in IPCC Fourth Assessment Report, Working Group III (AR4 WGIII), that is, energy-energy supply, industry, transport, residential & commercial sectors; waste management and industry.

1.4 Approach and Methodology

For the purpose of this study we would use both primary and secondary research methods. The primary research methods would include both surveys and interviews. The secondary research methods would be derived from the literature survey through analysis of research papers (published and unpublished, as applicable) and policy documents from government websites.

As part of this study, TERI has already submitted two deliverables: a Work plan and an Interim report and this report constitutes the final deliverable which aims to cover the issues identified in the objectives above. Table 1 below outlines the key tasks and adopted methodology for various activities under the project.

1.5 Report Outline

This report consists of 5 chapters including an introductory chapter. Chapter 2 gives an overview of the conceptual framework of the study wherein carbon governance is defined. Chapter 3 gives the current status of carbon governance in India at national and sub-national level. Chapter 4 presents the findings of the case study at the city level. Chapter 5 gives an overview of carbon governance at project level through a case study analysis. The subsidiary information and research materials are appended in the annexure.

Table 1 Key Tasks and Methodology adopted

TASK		METHOD	OUTCOME
KEY TASK	ACTIVITIES		
Task 1: Conceptual Framework for the Study	Defining Governance	Literature review and expert consultation	Ensured the necessary conceptual understanding to undertake the study successfully
	Defining Carbon Governance		
Task 2: Mapping Carbon Governance in India: Status of Carbon Governance at national and sub-national level in India	Review of policies and measures at national level and mapping of the process of implementation	Literature review, Policy review, interviews with government officials at national and sub-national levels	Directly fed into the summary table and also lead to information useful for undertaking interviews
	Review of policies and measures at sub-national level and mapping the process of implementation including their level of engagement		Directly fed into the summary table and also lead to information useful for undertaking interviews
	Identification of a city and conducting local level case study to understand status of carbon governance and level of engagement of the local government	Literature review, Policy review, Field visit and interviews with government officials and other stakeholders in the city (includes questionnaire design and coordination)	Section of the report on the case study at of city level
Task 3: Mapping Carbon Governance at Project Level	Identification of a mitigation project and conducting the case study to understand status of carbon governance and level of engagement of the local government	Field visit and interviews with project owners, funders, government officials and other stakeholders for the project (includes questionnaire design and coordination)	Section of the report on case study at project level.

2 Defining Carbon Governance

2.1 Defining 'Governance': findings from the literature

The issue of 'Governance' has been discussed in different research areas and more specifically in the literature on 'development'. A World Bank discussion paper (1991)² defined governance as- the exercise of authority, control, management, power of government, and further broadened to include- the manner in which power is exercised in the management of a country's economic and social resources. Asian Development Bank (ADB)³ also refer governance to 'the way those with power use power', stressing on the process of governing. While World Bank and ADB definitions focus at national and sub-national acts of governance by the governing bodies, United Nations Development Programme (UNDP) recognises the role of mechanisms, institutions and processes by which citizens express their interests and exercise their legal rights and obligations. A UNDP policy paper in 1997⁴ also recognised the importance of institutions while defining governance as- the exercise of political, economic and administrative authority to manage a nation's affairs. It is the complex mechanisms, processes and institutions through which citizens and groups articulate their interests, exercise their legal rights and obligations, and mediate their differences. *From these definitions there are three key components of governance: (i) actors vested with power to govern (ii) the process-institutions and mechanisms through which the power is being exercised and (iii) outcome-decisions, rules and regulations.*

The concept of governance has evolved and is being studied in broad areas of international relations and is also being studied under the global climate change discourse. Finkelstein in his discussion on 'global governance' argues that global governance has been used in a myriad of meanings, which have the flexibility in terms of scope (general to specific), reach (bilateral, multilateral, regional or global), actors (both public and private) and processes (ad-hoc or institutionalized, formal or informal). While recognising there is no common agreed definition for 'global governance', Frank Biermann et al (2009)⁵, define the term as- the overarching system of public and private institutions that are valid or active in a given issue area of world politics. This system comprises organisations, regimes and other forms of principles, norms,

² World Bank, 1991. Managing Development: The Governance Dimension. accessed at August 21st, 2011
http://www.ds.worldbank.org/external/default/WDSContentServer/WDS/IB/2006/03/07/000090341_20060307104630/Rendered/PDF/34899.pdf

³ ADB, n.d., What is Governance?, Date of access 25th August, 2011
<http://www.adb.org/Documents/Reports/Governance/gov010.asp?p=gvrnance>

⁴ UNDP, 1997. Governance for sustainable human development. .Date of access September 1st, 2011
<http://mirror.undp.org/magnet/policy/>

⁵ Biermann F., Pattberg P. and Asselt HV, 2009. "The Fragmentation of Global Governance Architectures: A Framework for Analysis", *Global Environmental Politics*, Vol.9, pp.14-40

regulations, and decision-making procedures. Hence, governance applies to the collective process of decision-making and the process by which decisions are implemented (See: Hyman et al. n.d.)⁶. Similarly, United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) explains that governance entails the process of decision-making and the process by which decisions are implemented (or not implemented)⁷ and that good governance has 8 major characteristics, i.e. it is participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law. Hyman et al. further suggest that analysis of governance studies includes three components: (i) process, (ii) participation and (iii) accountability. *Therefore, for any governance study it is important to understand the process, the institutions, the actors, level of participation of actors and the overall accountability of the outcome of the process (which can be rules, law and regulations).*

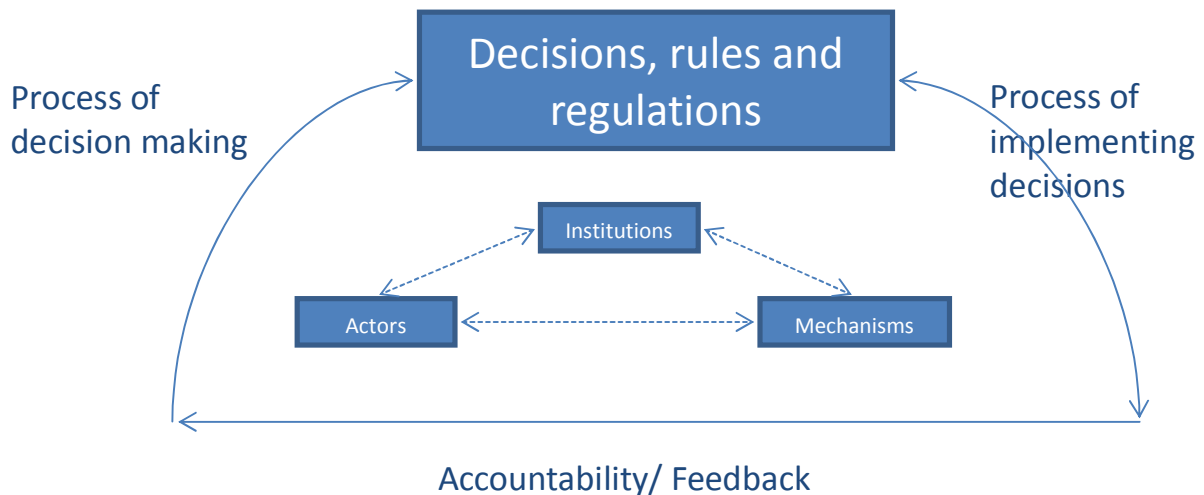


Figure 1: The Governance Architecture

2.2 Governance of Carbon: Defining 'Carbon Governance'

The 'Governance' discourse has now evolved to discuss the issues pertaining to environment and more precisely climate change. As the issue of climate change transcends national boundaries and historically there exists an inequitable share of responsibility among developed and developing nations, governance holds significance internationally. There is consensus in the international community that climate change is one of the most critical challenges faced by humanity today and requires an immediate, coherent, and coordinated global response. Such a

⁶ Hyman J. Erickson D. Baranick M. n.d., Presentation of the Governance Working Group at International Security Assistance Force (ISAF), Date of Access September 5th, 2011
<http://info.publicintelligence.net/ISAFgovernance.pdf>

⁷ UNESCAP, n.d. "What is Good Governance?" Date of Access September 5th, 2011
<http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp>

response would require a strong universally accepted governance structure to ensure adequate efforts by all Parties to limit their emissions. The governance structure so created should be robust encompassing all critical issues like emission reduction, technology, finance and adaptation needs. A core challenge in doing so is to arrive at multilateral arrangements that are acceptable to all Parties (Lewis and Diringer, 2007)⁸. It is deemed difficult given the economic and political interests of each Party. Climate change is thus a complex issue involving science, economics, and politics.

Biermann et al. (2009), however, argues that the core of climate governance is international architecture under the United Nations Framework Convention on Climate Change (UNFCCC) and the related Kyoto protocol. Climate governance thus covers both adaptation to climate impacts and climate change mitigation. Liverani (2009)⁹ refers to the institutional arrangements in place for mitigating greenhouse gas emissions as 'carbon governance'. Biermann (2010)¹⁰ further defines 'carbon governance' as the set of rules, policies, mechanisms, and institutions developed to manage & mitigate climate change and the process of the development of rules and rule making systems to coordinate national responses to climate change. He also suggests that recent years have also seen emergence of several other institutional arrangements operational at different levels including the scientific network, international partnerships, sub-national institutions where role of non-State actors such as business organizations, and non-governmental organizations have gained prominence. He further discusses the emerging trends and categorise them into three broad clusters: the emerging role of actors beyond the nation state; the emerging governance mechanisms beyond the intergovernmental regime; the increasing fragmentation of the overall governance architecture.

However, in the context of an effective climate regime it is important that good 'carbon governance' ensures three major criteria: objectivity, inclusiveness and accountability. This will ensure that there is clarity on the process and the goal, the role of institutions and actors in the process and in achieving the goal. In simpler terms, objectivity refers to setting up of measurable goals. Inclusiveness entails the process of setting goals and the role of actors in the process and in achieving the goals. Finally, accountability refers to the implication of the rules/targets/policies/action in achievement of the goal. **Thus, any form of carbon governance has to be objective, inclusive and accountable.**

⁸ Lewis J. Diringer E., 2007, "Policy based instruments in a post 2012 climate framework", Working paper by Pew Centre on Global Climate Change, Date of access October 12th, 2011
<http://www.c2es.org/docUploads/Policy-Based%20Commitments%20in%20a%20Post-2012%20Climate%20Framework.pdf>

⁹ Liverani A. 2009, "Carbon is the same everywhere, but Carbon Governance isn't" Blogpost in blogs.worldbank.org, Date of access September 5th, 2011
<http://blogs.worldbank.org/climatechange/blog/30>

¹⁰ Biermann F. 2010, "Beyond the intergovernmental regime: recent trends in global carbon governance", *Current Opinions in Environmental Sustainability*, Vol. 2, pp. 284-288

In the following sections, we study carbon governance in India and where possible comment on the objectivity, inclusiveness and accountability of the carbon governance framework. In doing so, we analyse the process/policies/plan for clarity of the roles and responsibilities, expected outcome and the approach to comment on the objectivity. Further, we analyse direct and indirect involvement of sub-national actors in the process/policies/plans to comment on the inclusiveness. And, we assume that if the process is highly objective, there is a strong feedback mechanism and hence high accountability.

2.3 Conclusions

'Carbon governance' essentially refers to the set of rules, policies, mechanisms, and institutions developed to manage & mitigate climate change and the process of the development of rules and rule making systems to coordinate national responses to mitigating climate change. There is only limited literature on various models of 'carbon governance' that are operating at different levels or scales in the fragmented regime; on various processes, institutions and actors involved; and the linkages of 'carbon governance' with other forms of 'governance'. The nature of this fragmented regime however could be cooperative or else. For it to be cooperative, governance studies need to understand the process, the institutions, the actors, level of participation of actors and overall accountability of the outcome of the process (which can be rules, law and regulations) for its objectivity, inclusiveness and accountability.

3 Status of 'Carbon Governance' in India

3.1 Understanding India's Federal Structure

India is a federal union—the responsibilities and areas of jurisdiction of the Centre and the State governments are demarcated through the Union List and the State List, respectively. In addition to the two Lists, there also exists a Concurrent List, which includes those items falling under the jurisdiction of both the governments. This distinction of responsibilities plays an important role in the context of environment federalism and carbon governance. For instance, sectors such as local governance and administration, water, industries, agriculture and transport come under the jurisdiction of individual states, while electricity, factories, forests, wildlife and socio-economic planning fall under the purview of both Centre and states¹¹.

As outlined in the scope of work, this study particularly focuses on sectors namely energy, industry, transport, urban development and waste management. Thus, with respect to the sectors relevant for this study, it is evident that the significance of carbon governance at the sub-national (state and local) level cannot be overemphasized, given the presence of these sectors in the State or Concurrent List. In other words, sub-national governments have a key role to play in matters pertaining directly to these sectors in general, and carbon governance in particular. Further, implementation of mitigation actions will also be in most of the cases at local level further highlighting the role of sub-national governments.

Prior to the National Action Plan on Climate Change (NAPCC) which is considered as a framework of climate policy in India, sub-national governments did not have policies and programs on climate change though many existing policies and programs had indirect implications for adaptation and mitigation. Further, while the emerging state level actions and plans prepared by the sub-national government are federally directed, the content of the State Action Plans on Climate Change (SAPCCs) is being shaped by the priorities identified by each state government. A common framework however was developed by the central government for preparation of the SAPCC. The framework emphasises an idea of harmonisation between national and state level actions, yet also recognises the importance of regional and even local objectives and concerns, through a participatory and inclusive policy making process. (MoEF, 2010)¹².

¹¹ Constitution, Seventh Schedule (Article 246), Date of access October 18th, 2011, [www.lawmin.nic.in/legislative/7thSch-AppV%20\(219-280\).doc](http://www.lawmin.nic.in/legislative/7thSch-AppV%20(219-280).doc)

¹²MoEF, 2010, Inception workshop for developing a common framework/approach for preparing SAPCCs, Date of access October 18th, 2011 <http://moef.nic.in/downloads/others/SAPCC-workshop-summary-2010.pdf>

There are thirty five (35) states and Union Territories in India with six hundred seven cities (607), five thousand one hundred sixty one towns (5161), and three hundred eight four (384) urban agglomerations. The following sections discuss the status of climate policy and more precisely carbon governance at different levels of India's federal structure.

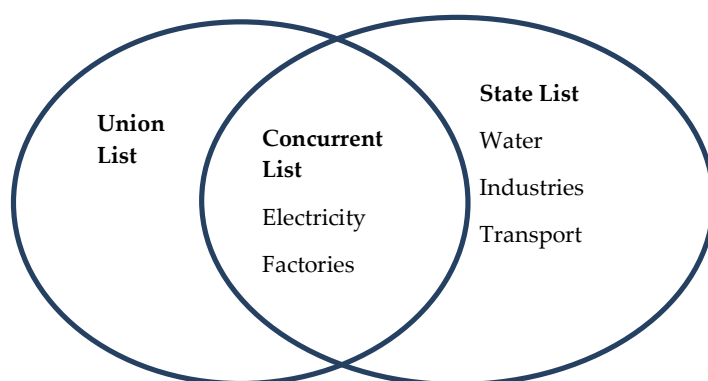


Figure 2: India's federal structure and its relevance to the sectors specific to mitigation

3.2 Understanding India's National Climate Policy

At the national and sub-national levels the climate policy landscape in India is becoming more active and more ambitious (Atteridge et al. 2012)¹³. The NAPCC is the prime policy document that outlines India's approach and plan to deal with climate change. The NAPCC states that India's policy response to climate change will primarily address the urgent and critical concerns of the country with co-benefits for addressing climate change through a directional shift in the development pathway, thereby assigning priority to the maintenance of high economic growth. While much of the focus is development and adaptation, there are actions which have direct bearing to mitigation of emissions for instance the National Mission on Energy Efficiency, National Solar Mission and the Green India Mission. Further, in response to international efforts, India came up with its voluntary commitment of reducing its energy intensity by 20-25% by 2020. To identify the development path that would enable accomplishment of this target a low carbon growth committee was set up under the planning commission. The development

¹³ Atteridge A., Srivastava M.K, Pahuja N, 2012, Climate Policy in India: What Shapes International, National and State Policy?, Volume 41, Issue 1 (2012), Page 68-77

priorities are also embedded in the interim report of the committee set up by the Government of India to help develop a low carbon strategy for inclusive growth, as an input to India's Twelfth Five Year Plan (GoI, 2011)¹⁴. The report recognises that policies for climate change mitigation differentially affect the objectives of development such as poverty alleviation, improvement in quality of life, distributional justice, job creation, competitiveness, industrial growth and improving the quality of local environments. It recommends that policy choices be based on the extent of additional burden imposed on, and the benefits that accrue to different consumers and sectors of the economy. While the section below briefly outlines the mitigation related approaches, policies and plans; the point to be noted further is the fact that development and economic growth still remains the priority for India.

3.3 Carbon Governance in India

The emerging landscape of 'carbon governance' can increasingly be looked at as signs of adopting a 'bottom-up' regime. There is limited literature specific to India that study carbon governance in India. Few studies discuss carbon governance with a focus on Clean Development Mechanism (CDM) and carbon market. Benecke (2009)¹⁵ gives an analytical exploration of Clean Development Mechanism (CDM) in India as a new mode of carbon governance while the author does not explicitly explain the definition of the term 'carbon governance'. Chapman (2011)¹⁶ further studies CDM in India as a multilevel structure of governance where international regime is linked and implementation is at the national level. In another working paper of the same series Chapman (2011)¹⁷ defines carbon governance as the regulatory structures and institutions that have evolved to support the carbon market. The author further states that various structures and patterns of 'carbon governance' are evolving worldwide in response to climate change challenge and key characteristics of 'carbon governance' include multilevel governance- interaction between international and national regimes, the interaction of the public and the private sector with the latter being as an important actor both sub-nationally and supra-nationally. According to Frank Biermann's definition, however, 'carbon governance' has a broader meaning. It entails:

¹⁴ Government of India (GoI), 2011, Interim report of the Expert Group on Low Carbon Strategies for Inclusive Growth, Planning Commission, Date of Access October 18th, 2011
http://planningcommission.nic.in/reports/genrep/Inter_Exp.pdf

¹⁵ Benecke G., 2009. "Varieties of Carbon Governance: Taking Stock of the Local Carbon Market in India", *The Journal of Environment & Development* Vol.18 (4), pp.346-370.

¹⁶ Chapman S M, 2011. "Assessing 'Good' Carbon Governance in India", University of Cambridge Good Carbon Governance .Working Paper No. 4., Date of Access October 18th, 2011,
<http://ssrn.com/abstract=1827164>

¹⁷ Chapman S M, 2011, "Introducing A Conceptual Framework for Assessing 'Good' Carbon Governance in National CDM Regimes" University of Cambridge Faculty of Law Research Paper No. 33/2011; University of Cambridge Good Carbon Governance Working Paper No. 1, Date of Access October 18th, 2011,
<http://ssrn.com/abstract=1827162>

- **Set of rules, policies, mechanism, and institutions** developed to manage & mitigate climate change
- **Process of the development of rules and rule making systems to coordinate** national responses to mitigating climate change

Further, as noted above, in the context of an effective climate regime it is important that good 'carbon governance' ensures three major criteria: objectivity, inclusiveness and accountability. In this regard it is important to study national policies and programmes besides, CDM and carbon market. Further, the process of development and coordination (implementation) of these policies and programs including the role of actors and institutions is critical. Also, for policies and measures to be objective and accountable, measuring and reporting becomes important. For the purposes of this study initiatives such as National Communication (NATCOM) and CDM under the UNFCCC regime; voluntary national initiatives such as NAPCC and its missions; voluntary state level initiatives such as the SAPCCs are being discussed in the context of 'carbon governance' in India.

3.3.1 GHG Inventorization

3.3.1.1 National Communication (NATCOM)

India had submitted its initial NATCOM in the year 2004 to the UNFCCC. The initial NATCOM gives a comprehensive greenhouse gas emission profile for the base year 1994 for sectors-energy and transformation, industrial processes, agriculture, land use, land use change & forestry (LULUCF), waste sector as per the revised IPCC guidelines (2006) that provide for Tier I, Tier II, and Tier III methodologies. India's second NATCOM is in the stages of finalisation. The entire process of NATCOM development is guided by Ministry of Environment and Forests (MoEF) where different government and non-governmental agencies including research institutes and think tanks are involved. While inventories of specific sectors were undertaken by specialised institutes capacity building of other institutes was undertaken through training, thematic and awareness workshops. The sections below give an overview of the NATCOM process, role of sub-national actors and also highlights key challenges in the process.

3.3.1.1.1 The Process

The NATCOM is the outcome of work of a multi-tiered institutional step-up with interactions with stakeholders at various levels. The institutional framework of NATCOM can be broadly divided into the following tiers: Nodal agency (Ministry of Environment and Forests (MoEF)); National Steering Committee (NSC) & Technical Advisory Committee (TAC) (chaired by the Secretary of MoEF); Project Management Cell (PMC); and a Network of Assessment Agencies which is network of institutions undertaking GHG inventorization activities. Further, the

network is categorised as primary institutions and secondary institutions along with an association with the concerned ministries and departments to facilitate flow of resources to the assessment agencies. The actors and organizations involved at each stage in the process have been elaborated in Table 2. Given the clarity of the roles and responsibilities, expected outcome and the approach it could be said that the NATCOM process scores high on objectivity.

Table 2: Institutional Framework of NATCOM process: associated actors, their roles and rationale

Bodies	Actors involved	Roles	Rationale
National Steering Committee (NSC)	All major stakeholders in the climate change process viz. Ministry of Coal, Ministry of Power, Ministry of Heavy Industries & Public Enterprises, Ministry of Road Transport & Highways, Ministry of Petroleum & Natural Gas, Ministry of Water Resources and Ministry of Agriculture.	Facilitating the NATCOM development by provision of resources. Overseeing and steering the process	Representation from all sectors that contribute to the majority of emissions and/or are directly impacted by climate change.
Technical Advisory Committee (TAC)	Technical experts with sectoral and climate change expertise	Assessing the scope and terms of reference of the assessments, Providing high-level quality assurance to the process, Facilitating linkage with technical experts internationally.	Adequate representation and say of scientific community in the development process
Project Management Cell (PMC)	Dedicated team of experts under a National Project Director	Managing the contractual relationships between the project and the assessment teams, Monitoring project activity, managed project payments, Arranging project meetings and workshops, Providing technical and logistics support to the assessments teams.	Sound implementation of the project
Network of Institutions	Network of institutions with sectoral expertise in data collection, monitoring and assessment	Carrying out assessments.	Tapping sectoral expertise Burden-sharing approach for timely and effective completion of the exercise

3.3.1.1.2 Role of sub-national actors

As discussed above in the institutional framework of the NATCOM process, while it involves multiple stakeholders there is no direct involvement of State/City level governments. The network of institutions however can involve different sub-national governments especially in the context of data availability, validation etc. An important link are however the regional institutions and organisations present in the network, which are the key participants usually in the GHG inventory workshops along with NSC, TAC and PMC. Therefore, role of sub-national actors in preparing NATCOM is limited and within sub-national actors, non-state actors like regional think-tanks, research institutes etc. are involved in different capacities. While there is no direct involvement of sub-national actors in the process, however, there is an indirect association of these actors and therefore the NATCOM process scores average on inclusiveness.

3.3.1.1.3 Key challenges in Implementation

In the presentations made by the PMC in the inception workshop for Second National Communication, the issues of capacity and availability of data are highlighted. According to the presentation, only two of the participating institutions were carrying out research in the climate change area before initial NATCOM. Therefore, workshops and consultative meetings were held, and extensive monitoring was done. Further, given the lack of capacity, there was no clarity on specific data needs in advance. Lack of specific datasets and parameters forced to use simplistic TIER I methodologies. During the second NATCOM, there was improvement in the understanding of the institutes which felt (during the consultations held with them) that financial resources was now a major challenge in adopting a higher TIER methodology as primary surveys/datasets need to be generated. However, in some sectors where support was available this was already done. As the process is highly objective, there is a strong feedback mechanism and hence the process ranks high on accountability.

3.3.1.2 Other GHG inventorization initiatives

3.3.1.2.1 Indian Assessment of Climate Change Assessment (INCCA): GHG Inventory 2007

The Indian Network for Climate Change Assessment (INCCA) is an initiative of the MoEF. INCCA is a network of institutions countrywide and is designed to undertake a range of activities in the area of climate change, e.g. science, impacts, vulnerability, mitigation and

adaptation¹⁸. Under the aegis of INCCA, Greenhouse Gas Emissions 2007, was released in 2010 and had contributions of more than 80 scientists from 17 institutions across India.

3.2.1.2.2 *Other independent initiatives*

Independent of the above state directed inventorization processes, some of the research institutions have also been deeply involved in studies related to GHG estimations. Some studies are tabulated in the following table.

¹⁸ Sharma S., Chauhan R., 2011, "Climate change research initiative: Indian Network for Climate Change Assessment", *Current Science*, Vol. 101(3), pp. 308-11

Table 3: GHG Estimates: some studies

Project	Scale	Sector	GHGs estimated	Year	Methodology	Remarks
Majumdar and Gajghate, 2011 ¹⁹	City (Nagpur)	Power, Industrial, Domestic and Transport	CO ₂ , CH ₄ , N ₂ O, SO ₂	2004	IPCC 2006	The paper gives a city level emission inventory for Nagpur the year 2004 in thermal power, industrial, transport and domestic sectors
Ramachandra T.V. and Shwetmala 2009 ²⁰	States	Transport	CO ₂ , CH ₄ , N ₂ O, SO ₂ , CO, PM, HC, NO _x NMVOC	2003-04	EF Approach	This paper focuses on the state-wise road transport emissions, using region specific mass emission factors for each type of vehicles. The country level emissions are calculated for railways, shipping and airway, based on fuel types.
Gupta 2009 ²¹	City (Delhi)	Waste	CH ₄	2007	Country specific EF approach	CH ₄ emissions as per seasonal emission factors calculated from data collected from the three landfills in Delhi, namely Ghazipur, Bhalswa and Okhla for all the seasons of the years.
Jha et.al 2008 ²²	City (Delhi)	Waste	CH ₄	2000	Country specific EF approach	CH ₄ emission inventory from landfills of Chennai were prepared for the year 2000. Three compounds studied CH ₄ , N ₂ O and CO ₂
Sharma and Pundhir 2008 ²³	City (Delhi)	Transport	CO ₂ , CO, NO _x , and VOCs	1990-2000	IPCC Tier I and Tier II and field measurements	The study reveals the emission changes for CO ₂ , CO, NO _x , and volatile organic compound from transport sector in Delhi from 1990-2000 for different category of vehicles.
ICLEI	City (Nagpur)	Assessment for all major sectors	CO ₂	2005-06		

¹⁹ Majumdar D., Gajghate D.G.2011, "Sectoral CO₂, CH₄, N₂O and SO₂ emissions from fossil fuel consumption in Nagpur City of Central India", *Atmospheric Environment*, vol.45, pp. 4170-4179

²⁰ T.V. Ramachandra and Shwetmala, 2009, "Emissions from India's transport sector: Statewise synthesis", *Atmospheric Environment*, vol. 43, pp. 5510-5517

²¹ Gupta P.K. 2009, "GHG emissions from waste sector (Country specific EF & data QA/QC)", Presented by CSIR, NPL, New Delhi, MoEF National workshop: Review of Implementation of work programme towards Indian Network of Climate Change Assessment, 14 October 2009, New Delhi

²² Jha A.K., Sharma C., Singh N., Ramesh R., Purvaja R and Gupta P.K. 2008, "Greenhouse gas emissions from municipal solid waste management in Indian mega-cities: A case study of Chennai landfill sites", *Chemosphere*, vol. 71, pp.750-758

²³ Sharma C., Pundir R. 2008, "Inventory of greenhouse gases and other pollutants from the transport sector: Delhi", *Iran. J. Environ. Health. Sci. Eng.*, 2008, Vol. 5, No. 2, pp. 117-124

Gurjar et.al ²⁴ 2004	City (Delhi)	Transport	CO ₂ , N ₂ O, CO,PM, NMVOC	CH ₄ , SO ₂ , NO _x ,	1990 and 2000	emission factor based approach	Emissions in megacity Delhi have been calculated using an emission factor based approach for the source categories e.g. power plants, transport, domestic sector, industrial processes, agriculture and waste treatment.
Garg et.al 2001 ²⁵	District	Combustion of fuels, industries and agriculture.	CO ₂ , N ₂ O	CH ₄ ,	1990	IPCC 1996	The study identifies the GHG intensity hotspots in India at a district level for major GHG emitting sources/sectors: combustion of fuels, industries and agriculture.

²⁴ Gurjar B.R., Aardenne J.A., Lelieveld J. and Mohan M. 2004, "Emission estimates and trends (1990–2000) for megacity Delhi and implications", *Atmospheric Environment*, vol. 38, pp. 5663–5681

²⁵ Amit Garg A., Bhattacharya S., Shukla P.R. and Dadhwal V.K. 2001, "Regional and sectoral assessment of greenhouse gas emissions in India", *Atmospheric Environment*, vol. 35, pp. 2679-2695

3.3.2 Carbon Markets

3.3.2.1 Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM) is one of the flexibility mechanisms under Kyoto Protocol (KP) which allows for developed countries to invest in emission reductions in developing countries, which provide a cost effective alternative, to meet their target under the KP. The CDM helps developing countries in achieving sustainable development by way of technology transfer and fund flows from developed countries to them. This meets the objective of Kyoto Protocol to promote sustainable development and also help in technology transfer from developed to developing countries. India is one of the leading developing countries with almost one fourth of the total CDM projects in the pipeline. As on January 2012, the country ranks only second to China with over 20% (769) of the projects registered globally and over 15.6% of the total global CER issuances that have happened so far. Major sectors include renewable energy (wind, hydro, bio-mass), waste management, industries-cogeneration and waste heat recovery, other industrial process, forestry, and transport (modal change & efficiency).

3.3.2.1.1 Process

The process of CDM is well defined internationally by the UNFCCC. At the domestic front, the MoEF is the Designated National Authority (DNA), which is the first screening point of the potential CDM projects. CDM projects are then validated by a Designated Operational Entity (DOE), which is an independent third party auditor. The projects are also webhosted at the UNFCCC websites for global stakeholder comments. Also, local stakeholder meetings are mandatory. The CDM-EB then considers the project for registration, review or rejection. A verification process is also carried by the DOE before every issuance of carbon credits. Given the clarity of the roles and responsibilities, expected outcome at each stage and the uniform approach that needs to be followed at each level, it could be said that the CDM process scores high on objectivity.

3.3.2.1.2 Role of states in CDM

CDM emerged in India as a market dominated carbon governance mechanism with the state actors playing the role of facilitators. At national level, there is project called 'Bachat Lamp Yojna', a programmatic CDM project where managing entity is the Bureau of Energy Efficiency (BEE)- an autonomous body under the Ministry of Power and the Delhi Metro projects registered by Delhi Metro Rail Cooperation (DMRC), an entity which has equal equity participation from Government Of India (GOI) and Government of National Capital Territory of Delhi (GNCTD). There are some projects in the pipeline with the different State

forest department for example Himachal Pradesh and Uttar Pradesh. Further, there are some CDM projects at the level of municipalities and urban local bodies, in the public private partnership mode such as the CDM project 'Methane Avoidance by Municipal Solid Waste Processing in the city of Chandigarh, India²⁶'. To enhance the uptake of CDM projects in India various states have set up or identified nodal agencies for CDM (See Table 4 for details). In most of the cases, the mandate of nodal agencies is to play the role of facilitator and initiate capacity building activities. There is direct and indirect involvement of sub-national actors in the CDM process therefore it scores high on inclusiveness.

Table 4: CDM in India: State nodal agencies

State	Agency
Gujarat	Clean Development Mechanism Cell, Forests and Environment Department
Rajasthan	Climate Change and CDM cell, State Pollution Control Board
Andhra Pradesh	Environmental Protection Training and Research Institute
West Bengal	West Bengal Renewable Energy Development Agency
Madhya Pradesh	Madhya Pradesh Pollution Control Board
Orissa	Orissa Renewable Energy Development Agency
Meghalaya	Meghalaya State Pollution Control Board
Karnataka	EMPRI
Punjab	Punjab Energy Development Agency
Rajasthan	Rajasthan Energy Development Agency
Maharashtra	Maharashtra Energy Development Agency

3.3.2.1.3 Key challenges in Implementation

In the beginning, capacity issues were the significant barriers to the CDM projects in India. However, the level of awareness was enhanced by national level workshops and training programs that involved actors at different levels. Currently, the challenges largely include high upfront cost, high transaction time etc. As the process is highly objective, there is a strong feedback mechanism and hence the process ranks high on accountability.

3.3.2.2 Other domestic markets

After the announcement of NAPCC, India has been planning on developing domestic carbon markets. The Renewable Energy Certificate (REC) mechanism and Perform, Achieve and Trade (PAT) scheme are two such evolving markets. Under the REC mechanism, each state will have a Renewable Energy Purchase Obligation (RPO) or a target for Renewable Energy (RE) mix. As the potential of RE and enabling environment for RE projects differ in

²⁶ CDM Project Reference number 521 accessed at http://cdm.unfccc.int/filestorage/1/O/4/IO480HNBLZNLK9S477CNUZ8VMK4M7I.1/PDD_Chandigarh_Final.pdf?t=QTd8bHowdndhfDCHRVjnLmGRW1p-mLkA2PXb

different states, some states might achieve beyond the target and some states might show a deficit. The mechanism would, thus, offer a trading of the excess generated RECs. The Perform Achieve and Trade (PAT) mechanism under the National Mission on Enhanced Energy Efficiency (NMEEE) has assigned designated consumers in nine sectors. These consumers are energy intensive industries. Each Designated Consumer will have a specific energy consumption reduction target. A trading mechanism will be in place for consumers who exceed their specific energy consumption reduction.

3.2.3 National Action Plan on Climate Change

The NAPCC therefore is the prime policy document that outlines India's approach and plan towards climate change. Amongst eight missions outlined, four missions can be attributed as primarily mitigation focused. These are Jawaharlal Nehru National Solar Mission (JNNSM), National Mission on Enhanced Energy Efficiency (NMEEE), National Mission on Sustainable Habitat (NMSH) and Green India Mission (GIM). Three of these missions, i.e. JNNSM, NMSH and NMSH have a focus on sectors relevant to this study. These three missions are highlighted in Box 1.

3.2.3.1 NAPCC and State-level initiatives

Frank Beirmann (2011) points out that global carbon governance is characterized by an increasing segmentation of different layers and clusters of rule-making and rule-implementing, fragmented both vertically between supranational, international, national and subnational layers of authority (multilevel governance) and horizontally between different parallel rule-making systems maintained by different groups of actors (multipolar governance). While national governments are involved in policy-making at national level and linking it with international climate regime sub-national government in fact implement policies in many cases. In this regard it is important to study sub-national policies and measures including its implementation mean to understand how 'carbon governance' is evolving at sub-national level in India. The same will be listed in following section to give an overview of the status of 'carbon governance' in India at sub-national level. There is an increased emphasis on involvement of the varied stakeholders in a multilevel governance pattern in the implementation of the national missions under the NAPCC for instance, each of the missions have a designated implementing agency at the national level, which further identifies/assigns a state nodal agency with roles/powers for implementation of the missions. The National Solar Mission, for instance, is being implemented by Ministry of New and Renewable Energy (MNRE). Based on the potential of the state to harness solar

power, the state nodal agencies are provided with the targets that then look after the implementation procedure in the state.

Box 1: Brief description of National Missions relevant for the sectors relevant to the study

National Solar Mission

Focus Sector: Energy-Supply

Objective: The national solar mission is India's flagship mission to promote the share of renewables in the electricity generation mix, leading to considerable emission reductions.

Target: The Mission has a 3-phase approach, envisaging deployment of 20,000 MW of solar generated power by 2022.

National Implementing Agency: Ministry of New and Renewable Energy

Key Features: JNNSM has a series of incentives- financial, fiscal and regulatory; which will increase the percentage of renewable energy in the generation mix.

National Mission on Enhanced Energy Efficiency

Focus Sector: Energy- demand side/Industry

Objective: The Mission aims at popularization of energy efficiency among industries through four initiatives.

Target: Expected avoided capacity addition of 19,000 MW, leading to a reduction of around 98.55 million tons CO₂eq annually.

National Implementing Agency: Bureau of Energy Efficiency (BEE), Ministry of Power

Key Features: The four initiatives under NMEEE are as follows: Perform Act and Trade (PAT) Scheme, Market Transformation for Energy Efficiency (MTEE), Energy Efficiency Financing Platform (EEFP) and Framework for Energy Efficient Economic Development (FEEED)

National Mission on Sustainable Habitat

Focus Sector: Buildings, waste, transport

Objective: Aims at ensuing sustainability in Indian cities in lieu of climate change through changes in city development plans.

National Implementing Agency: Ministry of Urban Development

Key Features: The Mission is to be implemented through appropriate changes in the legal and regulatory framework e.g. Building Byelaws, Development Control and Regulation etc.

Key Thrust Areas: energy efficiency in residential and commercial buildings, management of solid and liquid wastes, modal shift and transportation and urban planning.

The Perform, Achieve and Trade (PAT) scheme (institutional structure described in table 5 below) serves as a good example where a national agency works in tandem with a state agency, both coordinating with independent auditing bodies and market based bodies for implementation of the scheme in 9 designated consumers (energy intensive industries). Such a structure would lead to transparency in the process and quick diffusion of information from a national to local level, ensuring sound implementation.

Table 5 : PAT scheme: role of actors

Agency	Role	Responsibility	Authority
BEE working in tandem with State Designated Agencies (SDAs)	Compliance assurance through incentives and automatic penalties	Reduce conflict of Interest; Accredited independent 3rd party Energy auditors	Sets Compliance benchmarks; Resolve disputes through collaborative approach with petition process
BEE	Ensure publicly available data	Maintain centralized data administration; strong quality assurance	Level playing field; Issue of Energy Saving Certificates
Designated Consumers (DCs) etc.	Undertake energy efficiency measures;	Maintain compliance with set energy efficiency benchmark	--
Power Exchange, NCDEX, MCX	Maintain data of traded prices, traded volumes and trends.	Create efficient and transparent market for trading	safeguard market integrity and enhance transparency in operations
Accredited Auditors	--	Audit industry energy savings	Recommendation for the issue of ESCerts

The Prime Minister of India, Dr Manmohan Singh called upon the States to prepare State level Action Plans on Climate Change, consistent with the strategy outlined in National Action Plan on Climate Change, while addressing the Conference of State Environment Ministers in 2009²⁷. Accordingly, there has been an increased momentum at the sub-national level. Table 6 provides indicative listing of climate actions being planned at sub-national level.

²⁷ PM's address at the National Conference of Ministers of Environment & Forests. August 18, 2009. New Delhi. Accessed at <http://pmindia.nic.in/speech/content.asp?id=811>

Table 6 : State-level action plan on climate change: an overview

Status	Status of its' SAPCC
Chhattisgarh	Have started developing the SAPCC and have made a steering committee under the chief secretary.
Haryana	A climate change cell for the state under the supervision of Department of Environment, Govt. of Haryana has drafted SAPCC in coordination with concerned departments like Forest, Renewable Energy, Fisheries, Urban Development, Development and Panchayats, Public Health, Haryana State Pollution Control Board and Revenue Departments.
Delhi	Prepared the CCA (2009-2012).20 departments are implementing it. Need to know how to quantify the co-benefits of implementing the CCA
Goa	The SAPCC of the state has been prepared by the Department of Science, Technology & Environment. The main missions/objectives include Protection of coastal resources and livelihood of traditional inhabitants along the coast; Popularization and installation of renewable sources of energy devices, and making use of solar energy; Use and promotion energy conserving devices; Stress on maintenance of bio-diversity, preservation of and increasing the forest cover to keep the state green; Prioritizing eco-friendly techniques in waste management- especially in the urban Goa; Popularization of rainwater harvesting measures for effective groundwater recharge as well as domestic utility in post-monsoon season – a scheme by the Water Resource Department (WRD), Goa; Promoting sustainable agricultural practices to optimally utilize available land and bring it under green cover. Clearly, the state prioritises mitigation as its objective in its action plan and the missions are mostly in line with the National action plan on climate change.
Gujarat	State has its missions clearly defined in accordance with the missions of the NAPCC in action plan on climate change. Some mitigation measures include Solar Mission- Gujarat has its own solar policy since 2009), Promoting Gandhinagar as Solar and Carbon Neutral City in 2010-11; Mission for Enhanced Energy Efficiency- GUDC has commissioned the Largest Urban Energy Efficiency Programme (MEEP) in major municipalities, Industrial Energy Audit schemes being streamlined; Mission on Sustainable Habitat-First ever Methane recovery plant for power generation from Sewage in Surat, Construction of flyovers to reduce vehicular emissions due to traffic congestion, successful implementation of BRTS in Ahmedabad, Further planning in Surat and Rajkot; Water Mission-micro water harvesting structures are being constructed, participatory irrigation management is being carried out to ensure water efficiency.
Himachal Pradesh	Are developing a World Bank supported SAPCC. Have imposed a voluntary green tax on vehicle users.

Karnataka	The initial draft is being prepared in collaboration with The Energy and Resources Institute. There is a report on SAPCC of Karnataka, 'Rapid Assessment of Sectoral Actions Initiated' prepared by the EMPRI. The SAPCC is clearly charted according to the NAPCC and the aforementioned report is structured well. For each national mission, actions taken by the different state departments are listed clearly. Currently, 13 departments of the state are being responsive.
Madhya Pradesh	They are developing their SPACC (supported by GIZ) which will be submitted soon. State cabinet has approved a CDM agency to look into mitigation aspects.
Puducherry	Have released a draft SAPCC which has missions- Solar Mission, Mission on Enhanced Energy Efficiency, Water Mission, Mission on Sustainable Habitats, Mission on Strategic Knowledge on Climate Change, Mission on Green Puducherry and Sustainable Agriculture. Technical assistance sought from GTZ
Rajasthan	Has released a Climate Change Agenda in July 2010. Are developing the SAPCC, supported by GTZ and being developed by TERI
Sikkim	Are developing SAPCC with support from GTZ and have identified eight thrust areas, including- Forests, Wildlife, eco-tourism, Water resources, Energy efficiency, Agriculture and Horticulture and Animal Husbandry, Urban habitats, Communities vulnerable to climate change at gram panchayat level. They have also started a Glacier and Climate Change Commission.
Uttarakhand	Have submitted a draft SAPCC to the Centre, Adviser to the Prime Minister on Climate Change, have also released a document earlier on Crafting a State Action Plan on Climate Change thereby substantiating that the design of the SAPCC would focus on the following 6 sectors: Mountain Waters, Mountain Glaciers, Mountain Hazards, Mountain Bio-diversity, Food Security in Mountains, Out – Migration Issues. They have adopted the design of the SAPCC from the document 'Mountains and Climate Change, From Understanding to Action' made by the Swiss Agency for Development and Cooperation.
West Bengal	Already prepared a state's climate change action plan framework report in 2009 by the West Bengal Pollution Control Board. Now preparing the SAPCC- Have constituted a steering committee under the chief secretary of the state and will come out with the action plan soon. TERI is doing a V&A Assessment and will prepare a State Adaptation Action Plan

Further, some of the initiatives target cities and Local Governance Bodies for enhance climate actions. Some of the current initiatives are highlighted in table below.

Table 7 : Climate initiatives in Cities

Program	Participant cities	Brief note
Asian Cities Climate Change Resilience Network (ACCRN)	Surat, Indore, Gorakhpur	Catalyse attention, funding and action on building climate change resilience through active engagement and analysis for various cities.
Urban Climate Project	Coimbatore, Rajkot	Tapping opportunities of low-carbon development in Indian municipalities.
Application of Renewable Energy and Energy Efficiency in Urban Health Sector	Bhubaneswar	
Local Renewables Model Community Network	Coimbatore, Nagpur, Bhubaneswar	Promoting renewable energy use at city level
Urban Environmental Accord	Kota, Ahmedabad, Hyderabad, Delhi, Gwalior, Bhilai, Bhopal, Darbhanga, Jammu, Mysore, Calicut, Aligarh, Jamnagar, Lucknow, Kota	
Asian Cities Adapt	Kochi, Madurai, Howrah, Vishakhapatnam	
<p>Other initiatives:</p> <p>Vadodara Municipal Corporation: Climate Protection Policy, 3% reduction in overall conventional energy consumption from 2008 level by 2014.</p> <p>Rajkot Municipal Corporation amended its building bye laws making rain water recycling, recycling and reuse of waste water and use of solar assisted water heating system for the specified commercial and residential buildings.</p>		

Local climate initiatives in the cities include initiatives in the sectors like energy generation, transport, plantation, waste management, residential buildings etc. A summary of some of the initiatives is highlighted in table 8 below.

Table 8 : Local level climate mitigation actions in India

Area of policy	Policies and practices#
Climate change planning	Formulate energy status report & GHG inventory for Thane city. Formulate city level climate protection policy Local action plan to lower the carbon emission reduction Voluntary energy consumption reduction targets by cities, e.g. thane , Rajkot etc.
Household	Awareness campaigns in schools and communities for energy conservation. Municipal waste to energy projects
Industry	Energy audits for industrial clusters in the district. Financial incentives on installation of green infrastructure
Buildings	Usage of energy efficient/ solar lighting for indoor and municipal street lighting. Mandatory usage of solar water heating systems in municipal and commercial buildings. Rebate in property tax for existing residential buildings installing solar water heating systems. Introduction of green building concepts with mandatory rain water harvesting, waste water reuse and use of solar water heating systems.
Transport	Fuel efficient public transport vehicles Fuel switching to cleaner fuels Street lighting retrofitting, solar trees Incentives for usage of Battery Operated Vehicles (BOVs)
Urban greening	Plantation of native fauna

#compiled from presentations given by Vijaywada, Thane, Rajkot and Greater isakhapatnam municipalities in ICLEI workshop on city level climate change initiatives.

Source: ICLEI website

3.4 Summary of status of 'Carbon Governance' in India

Limited literature exists on carbon governance in India. Additionally, the focus of the existing studies has largely been on CDM and the carbon market. However, for developing a holistic understanding of carbon governance, it is important to understand the set of rules, policies, and institutions developed to manage & mitigate climate change and the processes of development of rules and rule making systems to coordinate national responses to mitigating climate change along with the existing mechanisms for mitigation like CDM. Emerging scientific literature also agrees on devising a broader meaning for 'carbon governance' (Biermann, 2011).

India is a federal union where the responsibilities and areas of jurisdiction of the Centre and the State governments are demarcated through the Union List and the State List, respectively along-with a Concurrent List. Sectors such as local governance and administration, water, industries, agriculture and transport come under the jurisdiction of individual states, whereas

electricity, factories, forests and socio-economic planning fall under the purview of both Centre and States. Further, implementation of mitigation actions will also be in most of the cases at local level further highlighting the role of sub-national governments. Therefore, sub-national governments have a key role to play in matters pertaining directly to these sectors in general, and carbon governance in particular.

At national level, Indian climate policy is guided by its NAPCC. Amongst eight missions outlined in NAPCC, four missions can be attributed as primarily mitigation focused which forms substantial component of carbon governance in India. Further, India's voluntary pledge of reducing its energy intensity by 20-25% adds to the goals to be achieved through these missions. The states are included in the process through development of state specific action plans, called State Action Plans on Climate Change (SAPCCs). While the emerging state level actions and plans prepared are federally directed, the content is being shaped by the priorities identified by each state government. The report elaborates policies designed at the national level, initiatives such as NATCOM and CDM under the UNFCCC regime and voluntary national initiatives such as NAPCC and its missions and voluntary state level initiatives such as the SAPCCs. These are discussed in the context of 'carbon governance' in India wherein institutional framework is studied for the involvement of actors (sub-national), their roles and rationale. An overview of sub-national actors including the SAPCCs and climate initiatives in cities has been discussed. It is found that local climate initiatives include initiatives in the sectors like residential (buildings, energy conservation appliances), energy generation (solar street lighting, solar water heating), transport (behavioural and modal shifts), plantation (urban greening), waste management (composting) etc. Table 9 gives summary of policies and programs to mitigate climate change in India at national, state and city level. This gives a comprehensive understanding of the status of carbon governance in India.

While set of rules and process of setting the rules and implementation are important, accountability or feedback systems are also critical. Table 10 summarises the existing frameworks at various levels in India to measure and report emissions.

Table 9: Summary table for Carbon Governance in India: policies and programs

Level Sector	National government	State governments	City governments
Energy And Energy Conservation	<p>Jawaharlal Nehru National Solar Mission (JNNSM): The JNNSM mission aims at generating 20,000 MW of solar power by 2022 and targets for 2000 MW of off-grid solar plants, and 20 million sq meters of solar collectors to be installed.</p>	<p>State Solar Policies: States like Gujarat (2009), Karnataka (2011) and Rajasthan (2011) have come up with their own solar policies, in line with JNNSM.</p> <p>Renewable Energy Policies: State specific Wind, Renewable Energy, Micro-hydel and Biomass policies have also been launched with competitive tariffs and state financing in several states like Andhra Pradesh, Gujarat, Karnataka, Rajasthan.</p>	<p>Solar Cities project: A total of 60 cities/towns are proposed to be developed as "Solar Cities" during the 11th Five Year Plan period. 14 cities, namely Agra, Gandhinagar, Kalyan-Dombvili, Thane, Moradabad, Rajkot, Nagpur, Kohima, Dehradun, Chandigarh, Faridabad, Gurgaon, Panaji, Imphal have been sanctioned funds under the project by the central government.</p>
	<p>National Clean Energy Fund (NCEF) has been established for funding research and innovative projects in clean energy technology. A clean energy cess would be charged on coal produced in India as well as applicable to imported coal.</p>	<p>State Energy Conservation Fund (SECF)²⁸: The scheme, announced in 2008, provides a 70 Crore fund through BEE to state governments for implementation of energy efficiency projects for the period of 2009-2012. However, states that have created a SECF will only be applicable to get the monetary support.</p>	--
	<p>Two Energy Exchanges namely The Indian Energy Exchange (IEX) and Power Exchange of India Limited (PXIL) are functional in the country at present. These are engaged in trading of renewable energy certificates.</p>	--	--

²⁸ By May 2010, Nine states viz. Nagaland, Haryana, Punjab, Rajasthan, Kerala, Andhra Pradesh, Tamil Nadu, Karnataka and Chhattisgarh have set up SECF

	<p>National Mission on Enhanced Energy Efficiency (NMEEE): NMEEE was implemented from 1st April 2010, with an intention to create a market for energy conservation worth Rs. 7400 crores. The mission aims to have an expected avoided capacity addition of 19,000MW, leading to a reduction of around 98.55 million tons Co2eq. annually.</p>	<p>State govts. are coming up with their own targets for implementation of NMEEE, through the state designated agencies (SDA). 32 states and UTs have SDAs till now²⁹. E.g. -Kerala has released its own draft mission for enhanced energy efficiency, with targets for domestic, industrial and commercial sectors³⁰. -Punjab SAPCC has an objective of 1000MW savings through EE by 2020³¹.</p>	<p>-Energy conservation in industrial clusters through regular energy audits. -Installation of energy efficient street lights (LEDs) in cities. -Demonstration projects for efficient water pumping in Punjab and Gujarat. -Energy audit compulsory in utilities and industries. - At a city level, Bhubaneswar, the capital city, is the first city in India to adopt a city level energy policy to promote conservation of energy and energy efficiency.</p>
	<p>Partial Risk Guarantee Fund (PRGF) and Venture Capital Fund for Energy Efficiency (VCFEE): These are two <i>fiscal instruments</i> under NMEEE, to ensure a decrease in risks associated with adoption/investment in energy efficient technologies. Rs.66.62 crores allocated for both the funds in 2010-11 - Implementation document is under preparation - These funds are expected to operationalize by March 2011</p>	<p>--</p>	<p>--</p>

²⁹ Information accessed from: http://www.powermin.nic.in/acts_notification/energy_conservation_act/introduction.htm

³⁰ Information accessed from: [http://www.keralaenergy.gov.in/EED/Kerala%20State%20Mission%20on%20Enhanced%20Energy%20Efficiency%20-%20Action%20Plan%202009%20\(Draft\).pdf](http://www.keralaenergy.gov.in/EED/Kerala%20State%20Mission%20on%20Enhanced%20Energy%20Efficiency%20-%20Action%20Plan%202009%20(Draft).pdf)

³¹Information accessed from: moef.nic.in/downloads/others/States-SAPCC-punjab.pdf

	<p>Bachat Lamp Yojana (BLY): BLY conceived as <i>CDM Programme of Activity (PoA)</i> has been registered by UNFCCC in June 2010. – 23 projects have been prepared & another 50 are under preparation – 20 million CFLs have been distributed under BLY scheme</p>	<p>-Kerala has distributed CFLs under BLY in the entire state. -Karnataka State has also launched the scheme and CFL distribution has started. -BLY is at different stages of implementation in many other states like Punjab, Haryana, Andhra Pradesh, Orissa, Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Uttarakhand, Rajasthan, Goa, West Bengal, Tamil Nadu and Delhi.³²</p>	<p>-Thiruvananthapuram Urban Circle, in state of Kerala, is the first project in India to get registered with the UNFCC under BLY on 6th May 2011³³.</p>
<p>Transport and its infrastructure</p>	<p>National Urban Transport Policy</p>	<p>--</p>	<p>Metro projects in Delhi and Bangalore BRTS in Surat, Indore, Mumbai, Ahmedabad, Jaipur, Pune and Delhi</p>
	<p>National biodiesel Purchase Policy 2005: The policy instrument mandates purchase of biodiesel by large public oil marketing companies to purchase biodiesel B100, and possible blending upto 5% which will scale upto 20% in subsequent phases.w</p>	<p>--</p>	<p>--</p>
<p>Residential and commercial buildings</p>	<p>National Mission on Sustainable Habitat (NMSH): The NMSH was recently approved as one of the eight National Missions under the Prime Minister's NAPCC. This will promote energy efficiency in residential and commercial sectors, promote water and waste management and improve urban transportation.</p>	<p>--</p>	<p>--</p>

³² Information accessed from: http://www.powermin.nic.in/acts_notification/energy_conservation_act/introduction.htm

³³ Information accessed from: <http://www.hindu.com/2011/05/13/stories/2011051365790600.htm>

Waste management	<p>Scheme for Accelerated Program on Energy Recovery from Urban Wastes: Aims to harness the available potential of MSW-to-energy by the year 2017. The scheme provides subsidies to new technologies for conversion of urban MSW into energy.</p>	<p>The scheme is implemented by Municipal Corporations, other Urban Local Bodies, Govt. Institutions and Private Developers having technical and managerial capabilities for implementing such projects.</p>	<p>8 projects for energy recovery from urban wastes have been set up under this scheme in cities of Hyderabad, Vijayawada, Lucknow, Ludhiana, Surat, Vijayawada, Chennai and Medak, with a cumulative capacity of 19.05 MW eq.³⁴</p>
		<p>CDM project are being developed for all STPs being developed at ULBs in Gujarat and Municipal Energy Efficiency Project (MEEP) in ULBs in Gujarat</p>	<p>Cohin, Raipur, Shimla, Varanasi and Nashik have been selected for receiving technical assistance from GIZ for improvement of Solid Waste Management under the JnNURM scheme and explore CDM potential.</p>
Industry	<p>PAT scheme³⁵ under NMEEE is a market based mechanism to enhance cost effectiveness of improvements in energy efficiency in energy-intensive large industries and facilities. It mandates 9 industries namely aluminium, railways, cement, iron and steel, chloralkali, thermal power plants, fertilizers, pulp and paper and textiles. The scheme assigns fixed energy efficiency targets to industrial units in these industries and those units that achieve energy efficiency in excess of their target are provided with Energy Saving Certificates (EScerts), which can be traded with units that underperform to meet their compliance targets.</p>	<p>Industrial Policy Gujarat 2009: Financial incentives for all the sectors to encourage greater compliance with the environmental norms and standards especially in areas of green infrastructure development (common waste management facilities, water recycling, carbon foot printing, energy efficiency), Creation of Eco industrial parks and transformation of existing industrial parks. Capacity development for key stakeholders. GIDC Industrial Policy Karnataka (2009-2011) incentivises rain water harvesting structures and ETBs.</p>	

³⁴ Information accessed from: <http://www.mnre.gov.in/energy-uwaste.htm>

³⁵ Tamil Nadu, Gujarat, Maharashtra and Rajasthan with 345 DCs have a 48 percent role under PAT. SDAs would play regulatory, facilitative and enforcement functions. Functions include: Preparing a check list in consultation with BEE to undertake inspection, enforcement of the prescribed norms and standards, issue and purchase of energy saving certificates, initiate action for the imposition of penalty.

Table 10: Summary table for Carbon Governance in India: measuring & reporting

Sector	Level								
	National government			State government			City government		
	GHG inventory	Emissions reporting	Emissions control	GHG inventory	Emissions reporting	Emissions control	GHG inventory	Emissions reporting	Emissions control
Energy Supply	Yes	The CEA reports 65 different types of data for plants over 1MW, 28 of which relate to GHG emissions, including generation, generation capacity, fuel consumption, losses, fuel supply, thermal efficiencies of power plants, plant-specific information on absolute (t CO ₂) and relative (CO ₂ /MWh) emissions The soon to release PAT scheme has designated 477 energy intensive units (in 9 sectors) to report energy efficiency attained.	No	No	No	No	No	No	No
and its infrastruc	Yes	Auto Fuel Policy in 2003 provides a roadmap for reduction	It addresses the issues of vehicular	No	No	The national policy is implemented	No	No	The national policy is implemented at state level as well.

		of GHGs from vehicles	emissions, vehicular technologies provision of cleaner auto fuels.			at state level as well.			
Residential and commercial buildings	No	Voluntary efforts exist such as rating systems by BEE (called ECBC, GRIHA (created by TERI) etc. Each has specific reporting requirements of energy usage (not emissions)	No	No	No	No	Certain city governments are participating mitigation programs by different agencies and global network of cities. Emission reporting is done by them.	Some municipal governmental have amended their building codes to incorporate energy efficiency and renewable energy measures but no emissions reporting as such required.	No
Industry (non-agricultural)	Yes	The soon to release PAT scheme has mandated 477 energy intensive units (in 9 sectors) to report energy efficiency attained.	No	No	No	No	No	No	No

Waste management	No	The Municipal Solid Wastes (Management and Handling) Rules provide emission standards for incinerators.	It mandates incinerators to install emission control devices to achieve the standards.	No	No	No	No	No	No
------------------	----	---	--	----	----	----	----	----	----

4 Case study I: A city level case study of Gandhinagar

4.1 Rationale for the case study

4.1.1 Objective of the case study

The objective of the case study was to map the sub-national government's policies and measures for low-carbon development in the sectors of energy supply, industry, transport, residential and commercial buildings, and waste management. Further analysis was undertaken to identify key barriers that hinder carbon governance at the sub-national level in India.

4.1.2 Criteria for selection of the case study

In the context of cities, there exist two major programmes in India, a) the Ministry of New and Renewable Energy (MNRE)'s program on Solar Cities: aimed at assisting the city in preparation of a master plan for increasing energy efficiency and renewable energy supply in the city, setting-up institutional arrangements for the implementation of the master plan, awareness generation and capacity building activities; and b) Jawaharlal Nehru National Urban Renewal Mission (JNNURM): aimed at fast tracking planned development of cities identified under the mission with a focus on efficiency in urban infrastructure and service delivery mechanisms, community participation, and accountability of urban local bodies. The cities identified under the two programs were considered. The individual cities were screened for actions undertaken under both programs. Gandhinagar, which had initiated activities under the solar city program in 2007 and had proposed targets till 2015, was identified as potential case study. As eligibility for JNNURM is based on a) population b) status of an Urban Local Body (ULB), Gandhinagar, which earlier was not a ULB, got inclusion in JNNURM recently, when it was given the status of a Municipal Corporation. Further a new hi-tech planned city, Gujarat International Finance Tech-City (GIFT), is being developed in parts of Gandhinagar (and Ahmedabad) which makes it an interesting case. Hence, the city was chosen for the case study.

4.2 Approach and methodology

The methodology constituted a mix of secondary and primary research. While government documents were used for secondary research, interactions with the government officials were used as primary research. The following section gives the findings from the analysis conducted during the case study.

4.3 Findings

4.3.1 Gandhinagar: Profile

Gandhinagar:	Capital of Gujarat
Area:	2000 sq. km.
Population:	13 lakh persons (according to 2001 census).
Urban population:	nearly 43% of the population lives in urban areas
Important Industry:	textile, agro-based & food processing industries, small-scale industry base (wood, minerals), tourism.

4.3.2 Gandhinagar: Carbon Governance

For Gandhinagar, the team examined the policies and programs; and the institutions coordinating them, with information related to MRV in five sectors: energy, industry, transport, residential & commercial buildings, waste management.

4.3.1.1 Sector: Energy

Most of the initiatives in this regard are undertaken under the MNRE's Solar City program with Gujarat Energy Development Authority (GEDA) as the nodal agency and Gujarat Power Corporation Limited (GPCL) as the project implementation agency in some cases. The Gandhinagar Solar City project was initiated in 2007 wherein targets for renewable energy (solar) and energy efficiency over an eight year period from 2007 through 2015. It is estimated that the overall initiatives under the solar city plan would translate in GHG Emission reductions (t CO₂) equivalent to 72080 (t CO₂) in 2009, 144640 (t CO₂) in 2012 and 237944 (t CO₂) in 2015. The details of the targets for promoting solar energy are outlined in Table 11. Further details of accomplished initiatives are listed in Box 2.

Table 11: Gandhinagar Solar City Project: Targets (Renewable Energy System (in residential and commercial sectors))

Description	Targets		
	Short term (till 2009)	Medium term (till 2012)	Long term (till 2015)
Solar Water Heating Systems	50%	75%	90%
Renewable-based power generation	5.16 MW	20.1 MW	47 MW

Box 2: GEDA's initiative to make Gandhinagar a Solar City

Solar power initiatives

2008-09

1. Two 10 kW Solar Photovoltaic/ wind-solar hybrid power plants at Udyog Bhavan and thirteen 10 kW Solar PV power plants at various blocks of the Sachivalaya.
- 65 Solar Photovoltaic street lights installed in gardens and parks
 - Solar Water Heating Systems installed on civil hospital (1000 liters per day), staff training college (5000 liters per day), circuit house (6000 liters per day) and (rest house) vishram grah (3000 liters per day)

2009-10

- Installation of Solar Photovoltaic Rooftop System and Solar Water Heating System on government bungalows

2010-11

- Installation of Solar Photovoltaic Power Plant at Pandit Deendayal Petroleum University
- 1 MW Solar Electricity Plant at Raisan, Gandhinagar



4.3.1.2 Sector: Residential and Commercial

Apart from renewable energy initiatives, the solar city plan also has initiatives with respect to energy conservation with focus on streets (public areas) and buildings. The details of the targets for promoting energy conservation are outlined in Table 12. Further details of accomplished initiatives are listed in Box 2. In addition there are initiatives for greening of the city with green belts being identified under the social forestry and Panchavati scheme. In the scheme, while the focus is on developing the public parks, cooperation is sought from residents by recognizing them as 'Green Guard Volunteers' and creating 'Neighbor Group' for maintenance. A variant of the program is the Smritivan which is plantation in memory of martyrs. Further, Kitchen gardens and city gardens are being promoted for composting.

Table 12: Gandhinagar Solar City Project: Targets (energy conservation)

Description	Targets		
	Short term (till 2009)	Medium term (till 2012)	Long term (till 2015)
Residential Sector	30%	35%	40%
Commercial Sector	15%	20%	25%
Municipal Sector	15%	15%	15%

Box 3: GEDA's initiative to make Gandhinagar a Solar City**Energy conservation measures**

- The district is being promoted as a model for energy efficiency demonstration.
- Reaching out to Schools for to generate awareness on renewable energy technologies through the Mobile Demonstration Unit.
- An Online Module and Web-based Portal has been launched for Registration and knowledge dissemination.
- Replacement of high wattage lamps with LEDs in Minister's Enclave
- Replacement of bulbs by CFLs in government offices, Minister's bungalows and MLA quarters
- Replacement of old pumps with energy efficient pumps at Charedi Water Works
- Phasing out of Incandescent Bulbs (GLS) and Ordinary Tubular Fluorescent Lamps (TFL). Replaced 3750 bulbs with CFLs and replaced 10,000 ordinary tube lights with T-5 tube lights.
- 590 Energy Efficient Street Lights as a Demonstration Project
- Demonstration project on Energy Efficient LED Lighting Systems for the Ministers Enclave, Gandhinagar.
- Monitoring the Transformer load – sopping the three 1000 KVA Transformers at for 3 months during the winter season.
- As part of the energy conservation programmes converting Amarpura village in Gandhinagar district as LED-based village

4.3.1.3 Sector: Transport

In the sector, many state level programs are being implemented/planned in the city. For example, the Gujarat Urban Development Company (GUDC) is planning the use of solar energy operated vehicles in the State Secretariat complex in the city, besides encouraging public transport such as buses. Further, as part of the Cleaner Fuel Technology initiative of

the Gujarat Infrastructure Development Board (GIDB), CNG and biodiesel fuelled vehicles are being introduced in Gandhinagar as demonstration projects in both public Transport (like buses, auto rickshaws) and private transport. For this purpose CNG filling stations has been set up in Gandhinagar. Also, Gujarat State Transport Corporation (GSRTC) is running CNG Buses between Ahmedabad and Gandhinagar. Along the same route, Metro rail Project is being planned to facilitate movement between Gandhinagar and Ahmedabad. The proposed GIFT city focuses on sustainable transport.

4.3.1.4 Sector: Waste Management

Under the Municipal Solid Waste Management Project, door-to-door waste collection is being practiced. Moreover, landfilling facilities have also been proposed in the city. The CDM cell is presently looking into bundling waste project of different cities including Gandhinagar. Scoping of the various Sewage Treatment Plants (STPs) is in progress. The proposed GIFT city has elaborate waste management plans including automated Waste Collection System through chutes.

4.3.1.5 Sector: Industry

The state of Gujarat has a detailed industrial policy which focuses on environment conservation. In Gandhinagar, some of initiatives include conducting a walk through Energy Audit in the SME sector as part of awareness generation campaign.

4.4 Conclusion

The proposed initiatives highlight the role of complementarity and coordination between the state government, local authorities and other institutions in achieving the desired targets. Additionally, the carbon governance structure is reasonably well-defined in the district, where particular agencies have been assigned specific duties with respect to each broad objective, resulting in a streamlined process with well-defined roles.

5 Case study II: A project level case study of Bachat Lamp Yojana

5.1 Rationale for the case study

5.1.1 Objective of the case study

The objective of this case study was to understand the design and implementation features of mitigation projects in India and the role and involvement of sub-national actors play in such activity. The information generated through this case study will help in designing guidelines for a new market mechanism through the development of methodological and institutional framework for MRV in Asian developing countries.

5.1.2 Criteria for selection of the case study

In order to meet the objectives as identified above, a list of criteria were developed to identify suitable projects that could be studied.

1. **Mitigation Projects:** The identified project should lead to emission reductions. Given that, India is one of the leading developing countries in terms of the number of CDM projects, wherein it has successfully registered 704 projects constituting about 21% of the total projects registered across the world³⁶, CDM project pipeline was considered as initial data-set to shortlist mitigation projects.
2. **Funding from external source:** Many of the CDM projects in India are unilaterally funded. Only those projects were shortlisted from the CDM pipe-line which had support from external sources.
3. **Scale of project and role of sub-national governments:** Further, given that the case study had to feed-in in designing a new mechanism of nature similar to Programmatic CDM, the dataset was further narrowed down to Programme of Activities (PoAs) in Indian pipeline. There were two projects, namely:
 - a. **Bachat Lamp Yojana (BLY):** BLY aims replacement of 400 million inefficient, incandescent light bulbs with energy-saving Compact Fluorescent Lamp (CFL) bulbs at a considerably reduced price to households all across India. The project, under the supervision of Bureau of Energy Efficiency (BEE) is envisaged to bring enormous carbon reduction, being the largest PoA ever submitted to the EB.

³⁶ Source: UNFCCC accessed at <http://cdm.unfccc.int/Statistics/Registration/NumOfRegisteredProjByHostPartiesPieChart.html>

- b. Chiller Energy Efficiency Programme:** A programmatic CDM project, promoted by KfW, Chiller Energy Efficiency Programme aims to replace 370 refrigeration systems with around 100 Tonnes of Refrigeration of energy efficient systems, ensuing around 40% energy savings.

Out of the two shortlisted projects, selection was based on three factors a) success of the mitigation project, objectively assessed as successful registration of the PoA and further inclusions of CDM Programme Activities (CPAs); b) role of governance bodies at national and sub-national scale in implementation of the project and c) response from the coordinator of the project to facilitate the case study. On the basis of these factors Bachat Lamp Yojna was shortlisted for the case study (See table below for success of CPA inclusions within the PoA).

Table 13 : CPA inclusions in BLY-PoA

State	Number of CPAs	Inclusion date
Punjab	7	30 th November, 2011
Goa	2	1 st September 2011
Delhi	5	30 th August 2011
Karnataka	7	6 th May 2011
Kerala	20	6 th May (19), 26 th April (1)
Andhra Pradesh	1	29 th April 2011

Source: UNFCCC CDM website³⁷

5.2 Approach and methodology

The approach and methodology constituted a mix of secondary and primary research. While outreach documents produced by BEE, presentations and project design documents available at the UNFCCC websites were used for secondary research, detailed interviews with the coordinating team at BEE and questionnaire surveys with the state level agencies and investors were also conducted. The following section gives the findings from the analysis conducted during the case study.

5.3 Findings

5.3.1 Bachat Lamp Yojna (BLY): Project Design

The Bachat Lamp Yojana is a scheme developed by the Bureau of Energy Efficiency (BEE) to promote energy efficient lighting in grid connected residential households in India. The scheme has been developed as a PoA under the CDM, where quality long life CFL is distributed to residential households in exchange of an incandescent lamp (ICL) and 15 Indian Rupees. The PoA acts like an umbrella scheme where individual projects or CPAs,

³⁷ Date of access: December 27th, 2011

http://cdm.unfccc.int/ProgrammeOfActivities/poa_db/CZ59J1XMR8K4ELUS6WY3BAoIVTGO2F/viewCPAs

designed identically, can be added to the PoA. BEE is the managing entity of the PoA and supports the development of CPAs in India through collaboration with different distribution companies and investors. The PoA managing entity (BEE) receives support from the Govt. of India and ODA funding from the Government of Germany under a bilateral technical assistance programme. The bilateral programme with Germany provides technical support like access to CDM consultancy and does not result in diversion of ODA and is separate from and not counted towards the financial obligation of Germany (UNFCCC).

In a typical CPA implementation process cycle, an Investor (who is empaneled with BEE³⁸) and Distribution Company (DISCOM) identify the project area. Thereafter, a tri-Partite agreement is signed between BEE, Investor and the DISCOM. As part of the agreement, the Investor covers the project cost of the CPA including the cost differential between ICLs and CFLs, through revenues earned from carbon credits generated through greenhouse gases (GHG) emission reductions achieved in their respective CPA areas. The Investor therefore has to initially take lead and secure the finance and sources the CFL. These CFLs are then distributed either at a dedicated distribution point (where consumers come with their ICLs) or through direct installation at respective households. Upto four CFLs are provided to each household as substitutes for ICLs with wattages of 100, 60 and 40 W. The household sign an agreement with the Investor to avoid resell the distributed CFLs. In the region selected for the CPA, around 600000-800000 CFLs can be distributed keeping the CDM limit of 60 GWh for small-scale CDM. The CPA-DD (CDM design document) is prepared simultaneously and submitted to BEE, who evaluates the project against a checklist (to standardise the process a template has been designed and included in the PDD). The UNFCCC accredited third party auditor, Designated Operation Entity (DoE) then validates the CPA and suggests for inclusion as CPA in the PoA. The CPA is then monitored as per the monitoring plan in the PDD (discussed in later section). The verification process can be initiated after inclusion (the duration may vary case by case). The CERs (certified emissions reductions) are then credited to the BEE who allocates the CERs according to their share in emissions reductions in a monitored period. Figure 2 highlights the various steps or sequence of events during an inclusion of a CPA and Table 13 summarises the roles and responsibilities of key actors in the entire process.

³⁸ BEE empanels CFL Investors on the basis of knowledge, capabilities and experience in developing CDM projects. The list of the empaneled investors is circulated to all states nodal agencies and distribution companies.

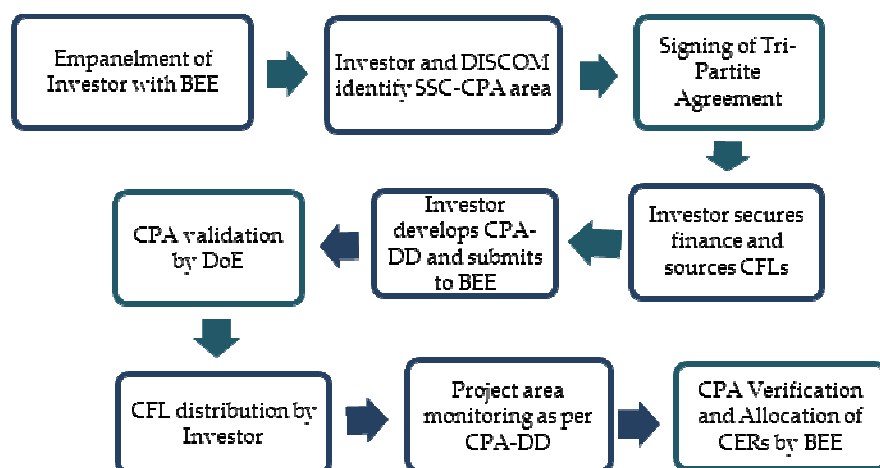


Figure 3: BLY: Implementation Process Cycle

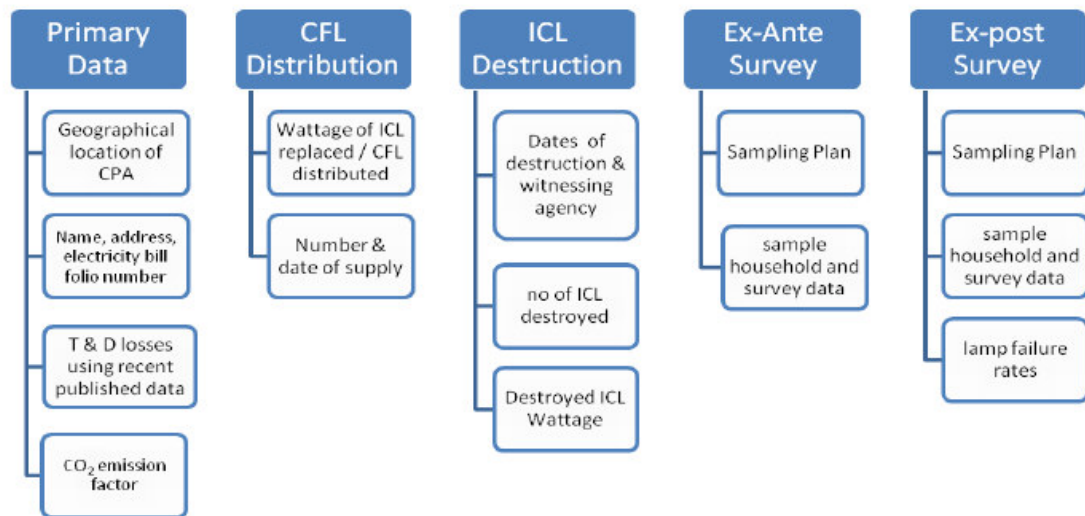
Table 14: Institutional framework: roles and responsibilities of actors involved

Bureau of Energy Efficiency	Distribution Companies (DISCOMs)	Empaneled Investor
Role: PoA Managing Entity	Role: Facilitator	Role: Implementer
<p>Responsibilities: Development & registration of the BLY-PoA with UNFCCC CDM Executive Board and involved with all official communications with CDM-EB, DNA, DOE thereafter.</p> <p>Evaluates the eligibility of project activities prior to their inclusion as CPA on the basis of criteria stipulated in the PoA-DD.</p> <p>Allocation of CERs to the CPA implementer according to their share in emissions reductions in a monitored period</p>	<p>Responsibilities: Define project geographic boundary e.g. circle, division etc.</p> <p>Provide required data to the implementer such as dataset on all grid connected residential households and their average annual electricity consumption for project area.</p> <p>Check implementation/development of other CDM projects in any part of the Project Area</p>	<p>Responsibilities: Distribution of quality long-life CFLs to grid-connected residential households in exchange of a ICLs and INR 15.</p> <p>Securing financing of initial investment for the cost differential.</p> <p>Conduct optional CPA area survey to estimate the energy saving potential and advance estimate of CFL wattages likely under the project.</p> <p>Preparing CPA-DD and submitting it to BEE for inclusion by a DOE under the UNFCCC. and carry out monitoring and / or survey of households.</p>

5.3.2 Estimation and Measurement/Monitoring of GHG reductions

Estimation of GHG reductions is done on the basis of approved small scale CDM methodology, AMS II.J., Demand-side activities for efficient lighting technologies. Apart from guidance on estimating the reductions, the methodology and therefore the PDD gives guidance on data & parameters that are to be reported in CPA-DD and data & parameters that are to be monitored along with source of data used (primary or secondary in nature), description of measurement methods and procedures, QA/QC procedures. The CPAs are required to follow these requirements.

As per the PDD, monitoring for the SSC-CPA is carried out at the level of, a) CFL distribution, b) Ex-ante and ex-post Monitoring Survey, and c) ICL destruction. At the distribution stage the investor is expected to establish and maintain a database with all relevant information (see figure 3). Ex-post monitoring survey is conducted to assess whether the installed CFL is in operation (to check leakage), the data is kept in the database management system by the investor. Further, to aid monitoring surveys, a BLY logo is marked on each CFL distributed in the program. To further facilitate the process, BEE is currently engaged in designing a standard template for survey procedures. The destruction of ICL is also monitored and documented. Before every verification it is ensured that the number of distributed CFLs is less than or equal to the number of returned and destroyed ICLs in the CPA area. While the on ground data keeping and monitoring is ensured by the investor, BEE has the responsibility of overall supervision. The following figure further highlights the database components of every CPA. Besides this, each CPA has to pass a check at three levels, namely: a) at the time of filling template by Investor, b) at the time of eligibility check by the BEE, c) at the time of consistency check by the DOE prior to UNFCCC upload, before inclusion under the PoA.



Source: PDD

Figure 4 :SSC-CPA Database components as per BLY scheme.

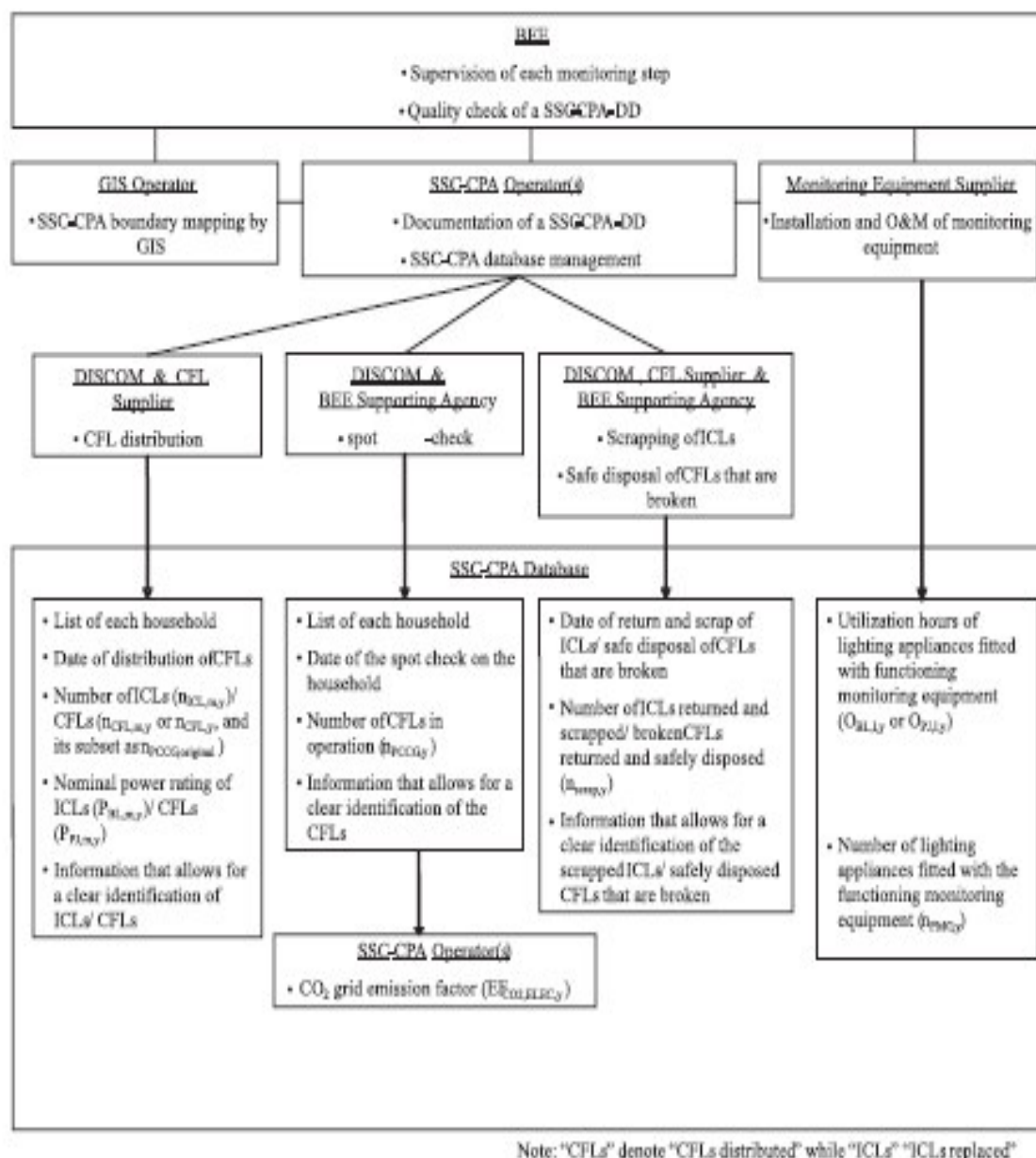


Figure 5: Institutional arrangement for data collection and archiving for the SSC-CPA

Source: BEE

5.3.3 Unique case of building capacities

In this unique case of building capacities, efforts were exerted during the project conceptualization itself to increase the ownership of all stakeholders including investors, consumers, sub-national actors etc. by identifying and involving them in workshops aimed at developing formal understanding of the project and its implementation requirements. A CDM consultant was hired by BEE to formulate the PoA-DD and CPA-DD templates. BEE also provides a user friendly emission reduction calculation sheet to investors to facilitate CPA-DD development. These common templates and other formats (See Annex) prepared

by the BEE facilitate understanding of the stakeholders further. Training programs and meetings are held with local agencies for them to develop an understanding of the requirements related to process, monitoring, data management etc. Further, awareness programmes are held for the consumers in order to increase awareness on small issues with large implications like installing CFLs in high hourly usage areas in a household (such as outdoors, common areas, living room area and kitchen) by publicising the co-benefits of the approach such as maximum energy savings and subsequently achievable cost savings. Also, involvement of political leaders like chief minister of the state during the launch of the scheme in an area was sighted as an important factor to increase the uptake of this program.

5.3.4 Role of State

States largely play the role of facilitators in the BLY scheme. Being a voluntary initiative, the support of state governments to BLY increases the degree of credibility of the scheme. The state and local governments role further increases the awareness of masses towards the scheme and facilitates quicker uptake by investors and distribution companies as well. The distribution companies also need to take permission from the state for engaging in the scheme. However, largely private players have participated in BLY, with only one state i.e. Kerala in which a public player has undertaken implementation. The cited barriers for states to enter the scheme include: Lack of intent of states to participate in the scheme, lack of funds with states and DISCOMS, lack of awareness about the scheme at the end-user level.

5.3.4.1 Case of Kerala

As an example of involvement of sub-national actors, case of Kerala is discussed here. Though, State nodal agencies have a role of facilitators, Kerala has gone a step ahead and implemented BLY scheme in 20 regions covering the northern, central and southern Kerala.

Table 15 :BLY coverage in Kerala³⁹

Area and no. of Project Circle	CFL distributed	% coverage
South [6]	35,28,478	82.56%
Central [7]	40,71,566	79.55%
North [10]	50,13,976	83.19%
Total [23]	1,26,14,020	81.81%

Kerala State Electricity Board (KSEB) had invited a bid for Bachat Lamp Yojana (BLY) in November, 2009. The response received from the end of investors was poor; however, the state was keen to move forward with the scheme considering that the domestic sector is the largest consumer of electricity during the peak load hours. Hence, KSEB cancelled the bid

³⁹ Narayanan.A.M., n.d., "CDM based CFL programme:BLY", Presentation by Narayanan A.M., Head-Energy Efficiency Division, Energy Management Centre -Kerala

and discussed with BEE to overcome the situation. Through discussions, it was decided to implement the scheme through the Energy Management Centre (EMC), an institutional setup created by the Kerala Government, aiming primarily to re-mould and instrumentalize energy sector as a catalyst in promoting a development process which is econo-ecologically sustainable. EMC was nominated as the investor for BLY, with funding arranged from different government sources. The programme was inaugurated in 15th March, 2010 by Kerala Chief Minister. The implementation began from the southern parts of state to central and northern regions. Committees were formed at Gram Panchayat level for ensuring smooth implementation of the project. Good media coverage post state intervention helped in gaining trust and interest of people in the scheme. The implementation was done through formation of regional distribution centres on specific dates which were widely published. With EMC as the main implementing body at the top, the municipalities and panchayats at the local level were involved for clearer demarcation of project boundary as well as for smooth implementation at local level. The distribution closed on with distribution of 1,26,14,020 CFLs in 6.3 million households with an average 81.81% coverage in the southern, central and northern regions of Kerala.

Annexures

Annex I: Questionnaire for Investors in the BLY study

Case Study on Implementation of Bachat Lamp Yojna as Part of a TERI Study On Carbon Governance at Sub-National Level in India

1. Please describe briefly your role and involvement in Bachat Lamp Yojna (BLY).
2. What were the key drivers (e.g. policy, investments) that motivate you to get involved in the scheme?
3. Please elaborate briefly on the steps you followed/plan to follow during the development of the project under the scheme.
4. How was the project site selected?
5. How do you plan to conduct the monitoring?
 - How many surveys would you be undertaking for the monitoring purposes? Any other methods being used to check the proper usage of CFLs?
 - What is/would be the frequency of undertaking these surveys?
 - Have you approached any other organization to undertake these surveys?
6. How has your experience been with the DISCOM in data provision?
7. Has BEE provided you any documents for smooth implementation of the project? If yes, what are those?
8. Has BEE provided any technical assistance/capacity development to you in undertaking the project? Please elaborate.
9. Please enlist the problems that you have faced/are facing in implementing the scheme?

Annex II: Questionnaire for DOE in the BLY study

Case Study on Implementation of Bachat Lamp Yojna as Part of a TERI Study On Carbon Governance at Sub-National Level in India

1. Please describe brief your role and involvement in the CDM project cycle of Bachat Lamp Yojna.
2. What in your opinions are the key drivers (eg. policy, investments) that will motivate investors to get involved in the scheme?
3. What in your opinion are the features of the scheme that would attract the buyers to buy credits earned under the scheme?
4. Please elaborate briefly on the steps you followed during project conceptualization under the scheme.
5. Do you think that monitoring plan for the PoA and CPAs ensures environmental integrity? Please elaborate how.
6. How do you plan to conduct the verification?
 - How many surveys would you be undertaking for the monitoring purposes? Any other methods being used to check the proper usage of CFLs?
 - What is the frequency of undertaking these surveys?
 - Has you approached any other organization to undertake these surveys?
7. BEE provides support in terms of capacity building such as availability of standard templates and documents for smooth implementation of the project. Were the DOE involved in this process of standardizing templates? How flexible are these templates?
8. Please enlist the challenges that you perceive in terms of monitoring and estimating emissions reductions.

Annex III: Questionnaire for Gandhinagar Case Study

PROJECT: Study of Carbon Governance at Subnational level (City level) in India

QUESTIONNAIRE

I. Mitigation Activities:

1. Please enlist the mitigation policies and actions are presently taking place in the city in the following sectors:

Sectors	Policies			Activities		
	<i>Policy</i>	<i>Is the policy Mandatory or optional</i>	<i>Whether it is a national policy or state's own policy?</i>	<i>GHG inventory</i>	<i>Emissions reporting (emitters to government)</i>	<i>Emissions control</i>
Transportation and its infrastructure						
Energy, energy supply and conservation						
Waste Management						
Residential and commercial buildings						
Industry						

2. Who are the key actors involved in mitigation action/policies, who supports it and what is the type of support?

Stages of policy development	Actors involved in development of policy, implementation of plans/programs/policies (departments, consultants, ministries, NGOs, research institutions etc.)	Support provider (plz tick)														
		Government						Private sector			International organizations			Others		
		State			Centre											
		Financial / Fiscal	Capacity building	Technology	Financial / Fiscal	Capacity building	Technology	Financial / Fiscal	Capacity building	Technology	Financial / Fiscal	Capacity building	Technology	Financial / Fiscal	Capacity building	Technology
Formulation of policies or mitigation plan																
Policy or plan implementation																
Monitoring																

1. What are the priority areas of the city in the following sectors (please provide numbering of 1-4 according to significance i.e. 4 most important and 1 least important)?

<i>Energy</i>		<i>Transportation</i>		<i>Waste Management</i>		<i>Industry</i>		<i>Buildings</i>	
Renewable energy		Greening of public transportation		Source Segregation/ PPP model		Industrial Energy Efficiency/energy audit		Renewable Energy usage	
Energy Efficiency		Transportation infrastructure		Waste to energy		Pollution control (GHGs)		Energy Efficiency	
Energy Conservation		Mass transportation/ modal shift (BRTS, metro etc.)		Scientific Landfill		Conducting GHG inventory, carbon foot-printing		Green buildings/ Model byelaws amendment	
Awareness		Awareness		Awareness		Eco-industrial parks/ CETPs/industrial waste-to-energy		Waste water treatment/ rain water harvesting	
Others (plz specify)		Others (plz specify)		Others (plz specify)		Others (plz specify)		Others (plz specify)	

2. Does Gandhinagar have a development plan? Is climate change mitigation (efforts to reduce emissions) a part of the plan?
3. What are the challenges that the government is facing with regards to implementation of mitigation activities?
4. What is the involvement of various stakeholders (ministries, departments, Local governance bodies, NGOs, academic institutions, research institutions) in mitigation activities?

II. GHG Inventory and Measurement, Reporting and Verification process:

1. Do you have a specific target to reduce GHG emissions? If yes, please specify what and how do you plan to achieve it?
2. Do you know how to calculate GHG emissions?
 - a. If yes, how are the calculations being done? Please describe.
 - b. What sectors do you consider in calculating GHGs?
 - c. If no, is there any plan to do it and in what stage the plan is now, who are involved in these plans?
3. What kind of data are you collecting in your city from:
 - a. Industries:
 - b. Buildings:
 - c. Transport:
 - d. Waste management:
4. Who is/are responsible for the data collection and calculation / analysis (if any)?
5. Have you participated in GHG inventory workshop(s) organized by government?
6. Do companies submit their process/emission data to you?
7. What is the involvement of your state government in development of National action plan on climate change/ state action plan on climate change?
8. What was your involvement in the preparation of India's 1st National Communication to UNFCCC?
9. Are you involved in the preparation of 2nd National Communication?
10. Do you monitor the implementation of policies and programs? Please explain how and who does so?

III. Clean Development Mechanism (CDM):

1. Has the state being involved in any carbon credit scheme (CDM/voluntary)? Please name the projects (if any).
2. What are the key areas of interest for CDM?
3. Do you provide any help/incentives to project developers for undertaking CDM?
4. Do you have any public CDM or CDM PoA projects?
 - a. If yes, what?
 - b. If no, do you plan to do so?
 - c. Which areas you envisage for these?

IV. Nationally Appropriate Mitigation Action/National Communication/NAPCCC:

1. Was the subnational/local govt. involved during formulation of NAPCCC/SAPCCC respectively?
2. Do you have an understanding of NAMAs? Have you been involved in any workshop regarding the same?
3. What was your role in those workshops?
4. Has there been any identification process on potential emission sources and their removal in city level?
5. What is the existing procedure in development of urban planning and or development plan, where do the targets and activities' concepts come from?