Existing Rules / Regulations / Policies of Climate Change Adaptation in Industrial Parks - National & International scenario

November, 2016

Table of Contents

List of Abbreviations

AP	Andhra Pradesh
APIIC	Andhra Pradesh Industrial Infrastructure Corporation
APPCB	Andhra Pradesh Pollution Control Board
APIDE	Andhra Pradesh Infrastructure Enabling Act
BAU	Business as Usual
CETP	Common Effluent Treatment Plant
CII	CONFEDERATION OF Indian Industry
CPCB	Central Pollution Control Board
CCA	Climate Change Adaptation
CRZ	Coastal Regulation Zone
CO_2	Carbon dioxide
DRM	Disaster Risk Management
e.g.	For example
EIA	Environmental Impact Assessment
EPTRI	Environment Protection Training and Research Institute
EPA	Environmental Protection Agency
EU	European Union
EURAC	European Academy of Bozen/Bolzano (research centre)
FICCI	Federation of Indian Chambers of Commerce and Industry
GDP	Gross Domestic Product
GHG	Green House Gas(es)
GIDC	Gujarat Industrial Development Corporation

GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
GoI	Government of India
IALA	Industrial Area Local Authority
Ibid.	In the same place (as the preceding reference)
ICRM	Integrated Climate Risk Assessment
i.e.	That is to say
IPCC	Intergovernmental Panel on Climate Change
IRDA	Insurance Regulatory and Development Authority
IT	Information Technology
N/A	Not Applicable, Not Available or No Answer
NAPCC	National Action Plan on Climate Change
NDMA	National Disaster Management Authority
MoEF&CC	Ministry of the Environment, Forests & Climate Change
OECD	Organisation for Economic Cooperation and Development
RE	Renewable Energy
REC	Renewable Energy Certificate
RPO	Renewable Energy Purchase Obligation
SAPCC	State Action Plan on Climate Change
SDMP	State Disaster Management Plan
TSIIC	Telangana State Industrial Infrastructure Corporation Ltd.
UNISDR	United Nations Office for Disaster Risk Reduction
USA	United States of America
UK	United Kingdom

Introduction to the Policy Literature matrix of Rules / Regulations /Policies of CCA in IPs:

The Ministry of Commerce and Industry (GoI), the Departments of Industries and Commerce of the then Govt. of Andhra Pradesh and APIIC along with GIZ took a decision in the year 2013 to take up the project of "Adaptation to Climate Change in Industrial Areas in India" to address the challenges of climate change with a focus on Andhra Pradesh and Telangana.

Andhra Pradesh Industrial Infrastructure Corporation Limited (APIIC), an undertaking of Government of Andhra Pradesh, is a premier organization, vested with the objective and responsibility of building and holding land banks, developing Industrial Parks/Estates and Special Economic Zones by providing necessary Industrial infrastructure. Over 201 Industrial Parks have been established throughout the State in eight (8) industrial zones covering an extent of 57, 836 Acres. These industrial parks are prone to various types of extreme climate events such as Cyclones, Drought, Floods, Heat Waves, etc.,

Telangana State Industrial Infrastructure Corporation Limited (TSIIC), an undertaking of Government of Telangana State, is a premier organization in the state, vested with the objective of providing Industrial infrastructure through development of Industrial Parks and Special Economic Zones. Over 131 Industrial Parks have been established throughout the State of Telangana covered under 6 zones of the TSIIC. Telangana state is threatened by disasters like floods, drought, heat waves,

This document of literature matrix of CCA policies and regulations is a part of set of documents is prepared by collecting various CCA Polices/ Rules/ Regulations measures for Industrial Parks existed at global, national and state level in view of various disasters like cyclones, floods, lightening, drought and heat waves. The following sections of **document 7 / part 5 of document** gives the details of these rules/regulations for selection of industrial sites, implementation of IP resilient measures, water and energy management, Zero Waste Management, Obtaining GRIHA certification, Health & Safety, Insurance etc., are elaborated / explained in this document in detail

TSIIC/APIIC, in cooperation and with support from GIZ-INTEGRATIN has developed a set of documents targeting adaptation to climate change of existing and upcoming industrial areas in Telangana States / Andhra Pradesh, India. The following table gives an overview on the various documents and their scope.

Table1: Documents for adaptation to climate change in industrial areas in [Telangana State / Andhra Pradesh]

	Document	Scope
1	Policy for Climate Change Adaptation in Industrial Areas	The policy is setting the frame for TSIIC's/APIIC's strategy to promote and implement adaptation of existing and upcoming industrial areas in TS/AP to make the State's industry and economy more climate resilient.
2	Guideline for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change	The guideline provides orientation and develops a standard approach and methodology on how to plan for adaptation and increasing resilience of existing and upcoming industrial areas.
3	Manual for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change	Part 1 of the manual includes the tools required to execute a climate risk analysis for existing and upcoming industrial areas. The results of the risk analysis provide a sound baseline to further plan and implement concrete adaptation measures, both in terms of infrastructure and operation, management and maintenance of the industrial parks.
4	Manual for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change – Part 2: Tools for planning adaptation and resilience measures	Part 2 of the manual includes the tools required to translate the results of the risk analysis in concrete adaptation measures. According to the prevailing climate hazards in the state the tools focus on adaptation to heavy rainfalls and related impacts, and to heat waves and droughts and related impacts.
5	Manual for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change – Part 3: Best practice examples	Part 3 of the manual presents a collection of national and international best practice examples and lessons learnt on adaptation of industrial areas, urban areas and infrastructures to the impacts of climate change.
6	Manual for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change – Part 4: Financing of plans and measures	Part 4 of the manual includes a collection of financing instruments and best practices for financing of adaptation measures in existing and upcoming industrial parks.

7	**Manual for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change – Part 5: Legislative, regulatory and operational framework**	**Part 5 of the manual providers an overview on the existing polices, legislation, rules and standards relevant for assessing risks and planning of adaptation in measures. In addition, this part gives an overview on relevant actors and stakeholders and provides orientation on how the planning steps described in the guideline document are embedded in existing planning and working processes of TSIIC / APIIC.**
8	Manual for Adaptation and increasing Resilience of Industrial Parks to the Impacts of Climate Change – Part 6: Baseline studies in TS and AP	Part 6 of the manual presents the results of a pilot risk analysis and baseline study executed in selected industrial areas TS / AP.
9	Training modules on execution of a climate risk analysis for existing and upcoming industrial parks and their adaptation to the impacts of climate change	To successfully implement the guidelines and even more important the respective adaptation measures in planning and refurbishment of industrial parks, TSIIC / APIIC has to develop the respective capacities in planning and operational departments. Furthermore, external capacities have to be supported and developed to be able to provide the required services to the infrastructure corporations and to individual industries and companies, particularly to (M)SMEs.

Literature matrix of Rules / Regulations / Policies of CCA in Industrial Parks / Areas:

For:		Scope	Title of publication	Authors, Organisation	Date	Download Address	Best Policy
1	**Location, Site layout of IP**						
1.1	**Site Selection**	**1.1.1 Pertaining to Andhra Pradesh and Telangana**	Vizag-Chennai Industrial Corridor-Conceptual Development Plan	Asian Development Bank	2015	https://www.apindustries.gov.in/APIndus/Data/Vizag-Chennai%20Industrial%20Corridor_Full%20Report.pdf	X
		1.1.2 Pertaining to other Indian states and national policies	Delhi Mumbai Industrial Corridor Project(DMIC) assessment Karnataka Industrial Policy Department of Industries and Commerce,	Centre for Science and Environment Government of Karnataka	2013 2014	http://cseindia.org/userfiles/DMIC-amitabh.pdf http://www.indiaenvironmentportal.org.in/files/file/Karnataka%20Industrial%202014-19%20Policy%20draft.pdf	X

		1.1.3 Pertaining to Developing Countries	OECD review of Innovation Policy of China	OECD and Ministry of Science and Technology, China	2007	http://www.oecd.org/sti/inno/39177453.pdf	
			Designing Economic Zones for Effective Investment Promotion	MENA-OECD- Working Group report	2010	http://www.oecd.org/mena/investment/44866506.pdf	
			Industrial Estates- Principles and Practices	United Nations Industrial Development Organisation	1997	https://www.unido.org/fileadmin/user_media/Publications/Pub_free/Industrial_estates_principles_and_practice.pdf	X
		1.1.4 Pertaining to Developed Countries	Industrial/Business Park Standards	Nebraska Department of Economic Development	2001	http://www.neded.org/files/businessdevelopment/library/ruralregion.pdf	
			Sustainable Manufacturing and Eco-Innovation	OECD synthesis report on Eco-Innovation	2009	http://www.oecd.org/innovation/inno/43423689.pdf	
			Towards Best Practice Guidelines for the Development of Economic Zones	A Contribution to the Ministerial Conference by Working Group 1 Marrakech	2009	http://www.oecd.org/mena/investment/44866585.pdf	X
1.2	**Climate Resilient Planning of New and Existing Industrial Parks (Retrofitting,**	**1.2.1 Pertaining to Andhra Pradesh**	NA				

	Zoning, Avoiding Heat Islands, Erosion, etc.,)	**and Telangana**					
		1.2.2 Pertaining to other Indian states and national policies	Contribution of GCPC-Envis for India's Nationally Determined Contribution Working Towards Climate Justice	Gujarat Clean Production Centers (GCPC)-Envis	2015	http://www.gcpcenvis.nic.in/PDF/CONTRIBUTION%20OF%20GCPC-ENVIS%20GUJARAT%20FOR%20IINDC%20WORKING%20TOWARDS%20CLIMATE%20JUSTCE.pdf	X
			Eco Industrial Development in Vapi Industrial Estate (Gujarat)	GIZ India	2015	http://www.landuseindia.in/live/hrdpmp/hrdpmaster/hrdpasem/content/e18092/e21298/e25159/e41393/e48187/eventReport48202/Eco-industrialdevelopmentinVapi_presentation.pdf	
			Karnataka Industrial Policy	Department of Industries and Commerce, Government of Karnataka	2014	http://www.indiaenvironmentportal.org.in/files/file/Karnataka%20Industrial%202014-19%20Policy%20draft.pdf	
			Towards a Policy for Climate Resilient Infrastructure and Services in Coastal Cities	TERI	2015	http://www.teriin.org/policybrief/files/june15/index.html#p=1	

		1.2.3 Pertaining to Developing Countries	Promoting climate resilient industry Climate resilient urban infrastructure in China –Insights into the buildings sector Development of Eco-Efficient Industrial Parks in China: A review	United Nations Industrial Development Organisation Jun LI, Researcher IDDR Hubert Thieriot and Dave Sawyer (IISD)	2015 2009 2015	https://www.unido.org/fileadmin/user_media_upgrade/What_we_do/Topics/Energy_access/01._UNIDO_Promoting_Climate_Resilient_Industry.pdf http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1256566800920/6505269-1268260567624/Li.pdf https://www.iisd.org/sites/default/files/publications/development-eco-efficient-industrial-parks-china-review-en.pdf	X
		1.2.4 Pertaining to Developed Countries	Adapting infrastructure to climate change- An EU strategy on adaptation to climate change Climate Resilient Infrastructure: Planning for a Changing Climate Climate-Resilient Industrial Development Paths: Design Principles and Alternative Models	Communisation from the commission to the EU Parliament, the European Economic and Social Committee and the committee of the regions Report of the Secretary of State, Ministry of Environment, Food, and Rural Affairs, Government of UK Lyuba Zarsky, Tufts University, USA.	2013 2011 2010	http://ec.europa.eu/clima/policies/adaptation/what/docs/swd_2013_137_en.pdf https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69269/climate-resilient-infrastructure-full.pdf	X

						http://pubs.iied.org/pdfs/G02722.pdf	
1.3	**Training of planners**	**1.3.1 Pertaining to Andhra Pradesh and Telangana**	Telangana State Industrial Policy Guidelines of Industrial Area Local Authority within Industrial Parks	Government of Telangana Government of Telangana, TSIIC	2014 -	http://tsiic.telangana.gov.in/pdf/Industrial-Framework-2014-Version-1.pdf http://tsiic.telangana.gov.in/about-iala/ http://tsiic.telangana.gov.in/iala-guidelines/	X
		1.3.2 Pertaining to other Indian states and national policies	**Tamil Nadu Industrial Policy** **Maharashtra Industrial Policy** **Karnataka Industrial Policy**	**Industries Department Government of Tamil Nadu** Government of Maharashtra Department of Industries and Commerce, Government of Karnataka	**2007** **2013** **2014**	http://www.tidco.com/images/industrialpolicy_e_2007.pdf http://www.indiaenvironmentportal.org.in/files/file/Industrial%20Policy%20of%20Maharashtra%202013.pdf http://www.indiaenvironmentportal.org.in/files/file/Karnataka%20Industrial%202014-19%20Policy%20draft.pdf	X

		1.3.3 Pertaining to Developing Countries	Eco-Industrial Park Handbook for Asian Developing Countries (chapter 4: Planning and Development)	Ernst Lowe	2001	http://www.indigodev.com/documents/ADBHBCh4PlngDev.doc	X
		1.3.4 Pertaining to Developed Countries	Environmental Management for Industrial Estates Information and Training Resources Eco-Industrial Park Development: A Guide for North America	Prepared for United Nations Environment Programme Division of Technology, Industry and Economics by Colin Francis and Suren Erkman(Institute for the Communication and Analysis of Science & Technology) Andreas W Koeing	2001 2009	http://www.unep.fr/shared/publications/pdf/3035-EnvironManag-IndusEstates.pdf https://www.planning.org/divisions/environment/guidebook/pdf/part1.pdf	X
1.4	**Green Industrial Policy Frameworks**	**1.4.1 Pertaining to Andhra Pradesh**	Andhra Pradesh Industrial Policy Andhra Pradesh Industrial Parks Policy 2015-2020	Industries & Commerce Department, Government of Andhra Pradesh Industries & Commerce Department, Government of Andhra Pradesh	2015 2015	https://www.apindustries.gov.in/APIndus/Data/GO/G.O%20for%20Industrial%20Development%20Policy%202015-2020.pdf	X

		and Telangana	Telangana State Industrial Policy TSIIC Industrial Parks Allotment Regulations 2012	Government of Telangana Telangana State Industrial Infrastructure Corporation Ltd	2014 2012	https://www.apindustries.gov.in/APIndus/Data/Industry1/Industrial%20Parks%20Policy%202015-20_%209th%20June%202015.pdf http://tsiic.telangana.gov.in/pdf/Industrial-Framework-2014-Version-1.pdf http://tsiic.telangana.gov.in/pdf/Allotment-Regulations.pdf	
		1.4.2 Pertaining to other Indian States	Gujarat Industrial Policy 2015 Tamil Nadu Industrial Policy Guidelines of the State Industries Promotion Corporation of Tamilnadu Ltd (SIPCOT) Maharashtra Industrial Policy Policy pertaining to SEZ – SEZ Act 2005	Ministry of Industry and Mines, Gujarat State government Industries Department, Government of Tamil Nadu Industries Department, Government of Tamil Nadu Government of Maharashtra Government of India	2015 2014 2014 2013 2005	http://re.indiaenvironmentportal.org.in/files/file/gujarat%20industrial%20policy%202015.pdf http://ficci.com/SEdocument/20304/TN_Industrial_Policy_2014.pdf http://www.sipcot.com/s_schema.html http://www.indiaenvironmentportal.org.in/files/file/Industrial%20Policy%20of%20Maharashtra%202013.pdf	

			SEZ Rules 2006 Scheme for Industrial Parks in Gujarat Industrial Policy 2015 Assessing Green Industrial Policy: The India experience Pathway to Eco Industrial Development in India Concepts and Cases	Government of India Ministry of Industry and Mines, Gujarat State government Karthik Ganesan, Poulami Choudhury, Rajeev Palakshappa, Rishabh Jain, Sanyukta Raje (Council on Energy, Environment and Water(CEEW) and International Institute for Sustainable Development (IISD)) GIZ	2006 2015 2014 2012	http://apsez.co.in/Download/SEZ/SEZAct05.pdf http://apsez.co.in/Download/SEZ/SEZ%20Rules%202006.pdf http://re.indiaenvironmentportal.org.in/files/file/gujarat%20industrial%20policy%202015.pdf https://www.iisd.org/gsi/sites/default/files/rens_gip_india.pdf http://www.igep.in/live/hrdpmp/hrdpmaster/igep/content/e48745/e50194/e50195/121004_Pathway_EID_ISOX3uncoated-1.pdf	X
		1.4.3 Pertaining to Developing	Eco-Industrial Park Handbook for Asian Developing Countries (chapter 7: Planning and Development)	Ernst Lowe	2001	http;//www.indigodev.com/documents/ADBHBCh7Policy.doc	X

		Coun-tries					
		1.4.4 Pertain-ing to Devel-oped Coun-tries	Industrial Parks and Climate Change	Report Prepared by the Cardinal Group in Canada	2011	http://www.cardi-nalgroup.ca/cein/epark.pd	
2.	**Infrastructure in IP**						
	Implementa-tion of Zero Waste Man-agement (solid and Hazardous) and waste water treat-ment in In-dustrial Parks	**2.1.1 Policies and Regula-tions from Andhra Pra-desh and Tel-angana**	Industrial Promotion – Incentives for the establishment of Industrial Enterprises in Andhra Pradesh Operational Guidelines for implementation – Orders - Is-sued.	Industries and Mines Department, Government of Andhra Pradesh	2015	https://www.apindus-tries.gov.in/APIn-dus/Data/GO/Opera-tional%20Guide-lines%20for%20IIPP%202015-20.PDF	X
		2.1.2 Policies pertain-ing to other states in India	Gujarat Industrial Policy 2015 Scheme for Assistance for Envi-ronment Protection Measures in industrial estates	Government of Gujarat	2008	http://www.indextb.com/docu-ments/102014-922884-G.pdf	X

		Policies and Regulations from other Developing Countries	Discussion papers on Sustainable development of Industrial Parks	Robert Holländer University of Leipzig, WU Chunyou Dalian University of Technology, DUAN Ning Chinese Research Academy of Environmental Sciences, Beijing	2009	http://www.wifa.uni-leipzig.de/fileadmin/user_upload/AP/UL-WiFa_AP81_Hollaender_Wu_Duan.pdf	X
		Policies and Regulations from Developed Countries	Resource Manual On Infrastructure for Eco-Industrial Development	Leonard Mitchell, USC Center for Economic Development, University of Southern California	2002	http://www.usc.edu/schools/price/research/NCEID/Infrastructure.pdf	X
3	**Buildings in IP**						
	IGBC / GRIHA Certified Industrial Buildings	Policies and Regulations from Andhra Pradesh	NA (see section 6.9)				

		and Telangana					
		Policies and Regulations from India	Indian Green Building Council (IGBC/LEED Certification) Green Rating for Integrated Habitat Assessment	CII TERI	2003 2001	https://igbc.in/igbc/redirectHtml.htm?redVal=showResourcesnosign http://www.grihaindia.org/index.php?option=com_content&view=article&id=87&t=Green_Rating_for_Integrated_Habitat_Assessment	X
		Policies and Regulations from other Developing Countries	Energy Efficient Building Codes and Equipment Standards	China Clean Energy Program, the National Reform and Development Commission (NRDC)	2015	http://www.chinacleanenergy.org/gbproject1.asp	X
		Policies and Regulations from	Leadership in Energy and Environmental Design (LEED Energy Star	US Green Building Council (USGBC)	-	http://www.usgbc.org	X

		Devel-oped Coun-tries	Building Research Establishment Environmental Assessment Method (BREEAM)	US Environmental Protection Agency BRE Global Ltd	- -	http://www.energystar.gov/in-dex.cfm?c=about.ab_index http://www.breeam.org	
4	**Industrial processes**						
4.1	**Reducing ex-posure to flooding and cyclones**	**4.1.1 Pertain-ing to Andhra Pra-desh and Tel-angana**	Climate Resilient Infrastructure Services: Case Study Brief Visha-khapatnam	TERI	2014	http://www.teriin.org/event-docs/files/Case-Study-Vishakha-patnam.pdf	X
		4.1.2 Pertain-ing to other Indian states and na-tional policies	Planning Climate Resilient Coastal Cities: Learnings from Panaji and Visakhapatnam, India	TERI Working Paper	2014	www.teriin.org/event-docs/files/Working-Paper-**cli-mate-resilient**.pdf	X
		4.1.3 Pertain-ing to Devel-oping	Flood Risk Management in the People's Republic of China	Yoshiaki Kobayashi and John W. Porter, Asian Development Bank	2012	http://www.adb.org/sites/de-fault/files/publica-tion/29717/flood-risk-manage-ment-prc.pdf	X

		Countries	Flood Risk Management: A Strategic Approach	P. Sayers, Y. L.i, G. Galloway, E. Penning-Rowsell, F. Shen, K. Wen, Y. Chen, and T. Le Quesne	2013	http://www.adb.org/sites/default/files/publication/30246/flood-risk-management.pdf	
		4.1.4 Pertaining to Developed Countries	Coastal Climate Resiliency: Retrofitting Buildings for Flood Risk Building resilience in Boston: Best Practices for Climate Change Adaptation and Resilience for Existing Buildings Modern Built Environment Knowledge Transfer Network: Guidance for making the case for climate change adaptation in the built Environment Value Chain Climate Resilience: A Guide to managing Climate in Companies and Communities	New York City Planning Department Newman, J., M. Springer, T. Sheehan, J. Gravelin, L. Trouche, S. Slaughter, and A. Wilson- Prepared for the Boston Green Ribbon Commission Climate Preparedness Working Group Climate Ready Partnership for Resilience and Environmental Preparedness (PREP)	2013 2013 2013 2015	http://www.nyc.gov/html/dcp/pdf/retrofitting/retrofitting_complete.pdf http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf . https://connect.innovateuk.org/documents/3239554/6021573/Climate%20Change%20Adaptation%20Business%20Case%20Guidance.	X

						http://www.bsr.org/reports/PREP-Value-Chain-Climate-Resilience_copy.pdf	
4.2	**Water management: Increase water efficiency, water recycling, Use of grey water**	**4.2.1 Pertaining to Andhra Pradesh and Telangana**	Andhra Pradesh Infrastructure Development Enabling Act 2001 Andhra Pradesh State Water Policy Andhra Pradesh Pollution Control Board Standards Andhra Pradesh Pollution Control Board Water Quality Standards TSIIC Industrial Parks Allotment Regulations 2012	Government of Andhra Pradesh Irrigation & CAD Department- Government of Andhra Pradesh Andhra Pradesh Pollution Control Board Andhra Pradesh Pollution Control Board Government of Telangana	2001 2008 - - 2012	http://www.apidc.gov.in/Infraact.pdf http://www.cseindia.org/userfiles/AndhraPradeshStateWaterPolicy.pdf http://www.appcb.ap.nic.in/EnvStandards/category.htm http://www.appcb.ap.nic.in/water%20quality/water_data/Standards.doc http://tsiic.telangana.gov.in/pdf/Allotment-Regulations.pdf	X

		4.2.2 Pertaining to other Indian states and national policies	Karnataka State Water Policy Maharashtra State Water Policy Water (Prevention and Control of Pollution) Act, 1974 Water (Prevention and Control of Pollution) Cess Act, 1977	Karnataka Water Resources Department Government of Maharashtra Government of India Government of India	2002 2011 1974 1977	http://waterresources.kar.nic.in/state_water_policy-2002.htm **http://www.cseindia.org/userfiles/maharashtraSWP.pdf** http://www.moef.nic.in/legis/water/wat1.html http://envfor.nic.in/legis/water/water7.html	X
		4.2.3 Pertaining to Developing Countries	China's Water Resource Management Challenge	Global Water Partnership	2015	http://www.gwp.org/Global/ToolBox/Publications/Technical%20Focus%20Papers/TFP-China_2015.pdf	X

		4.2.4 Pertaining to Developed Countries	US Water Policy: Trends and Future Direction Water Policy in The UK: The Challenges	Adam Reimer Stephen Toole (Royal Geographic Society and IBG)	2012 2012	http://www.nardep.info/uploads/WaterPolicy_Reimer.pdf https://www.rgs.org/NR/rdonlyres/4D9A57E4-A053-47DC-9A76-BDBEF0EA0F5C/0/RGSIBGPolicyDocumentWater_732pp.pdf	X
4.3	**Use of RE and decentralised power supply**	**4.3.1 Pertaining to Andhra Pradesh and Telangana**	APERC Renewable Energy Purchase Obligation Andhra Pradesh Solar Power Policy Telangana Solar Power Policy Andhra Pradesh Wind Power Policy	APERC Government of Andhra Pradesh Government of Telangana Energy Infrastructure and Investment Department, Government of Andhra Pradesh	2012 2012 2015 2015	http://www.ireeed.gov.in/policyfiles/306-166_AP98R02210312_REC-Regulation_March2012.pdf. www.ireeed.gov.in/**policy**files/436-AP%20**SOLAR_POWER_POLICY**.pdf http://mnre.gov.in/file-manager/UserFiles/state-power-policies/Telangana-Solar-Power%20Policy.pdf. www.ireeed.gov.in/**policy**files/437-AP%20**WIND_POWER_POLICY**.pdf	X

		4.3.2 Pertaining to other Indian states and national policies	Tamil Nadu Solar Energy Policy 2012- Government of Tamil Nadu RE-Energizing Maharashtra: An Assessment of Renewable Energy Policies, Challenges and Opportunities Karnataka Energy Efficiency and Conservation Policy 2015-19	The Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) Policy Brief Prepared By Indian Institute of Technology Bombay Government of Karnataka and Karnataka renewable Energy Development Board (KREDL)	2012 2014 2014	http://mnre.gov.in/file-manager/UserFiles/guidelines_sbd_tariff_gridconnected_res/Tamilnadu%20Solar%20Energy%20Policy%202012.pdf http://www.climateparl.net/cpcontent/Publications/CP%20English%20Policy%20Brief%20for%20Maharashtra.pdf http://kredlinfo.in/scrollfiles/Energy%20Conservation%20Policy%202014-19.pdf	X
		4.3.3 Pertaining to Developing Countries	Energy for Sustainable Development: Policy Options for Africa UNIDO and Renewable Energy: Greening the Industrial Agenda	UN-ENERGY/Africa United Nations Industrial Development Organisation(UNIDO)	2007 2009	https://www.iaea.org/OurWork/ST/NE/Pess/assets/un-energy_africa_pub.pdf https://www.unido.org/fileadmin/user_media/Publications/Pub_free/UNIDO_and_renewable_energy.pdf	X

		4.3.4 Pertaining to Developed Countries	Policy Considerations for Deploying Renewables	International Energy Agency (IEA)	2011	https://www.iea.org/publications/freepublications/publication/Renew_Policies.pdf	X
4.4	**Optimising resource efficiency (Audits, implementation)**	**4.4.1 Pertaining to Andhra Pradesh and Telangana**	Green Accounting System for the State of Andhra Pradesh in the report on Resource Efficiency in Development Cooperation	GIZ	2012	http://www.foes.de/pdf/2012-03-27_Resource%20Efficiency_GIZ.pdf	X
		4.4.2 Pertaining to other Indian states and national policies	Projects of the Resource Optimization Initiative	Resource Optimization Initiative-Bengaluru		http://www.roionline.org/ongoing_projects.htm	
		4.4.3 Pertaining to Developing	Sustainable Development of Industrial Parks	Robert Holländer, WU Chunyou, DUAN Ning	2009	http://www.wifa.uni-leipzig.de/fileadmin/user_upload/AP/UL-WiFa_AP81_Hollaender_Wu_Duan.pdf	X

		Countries					
		4.4.4 Pertaining to Developed Countries	Measuring Material Flows and Resource Productivity-OECD Guide Eco-Efficient Leadership for Improved Economic and Environmental Performance. Geneva.	OECD World Business Council on Sustainable Development (WBCSD)	2008 2000	http://www.oecd.org/environment/indicators-modelling-outlooks/MFA-Guide.pdf http://oldwww.wbcsd.org/DocRoot/DlFM-cUZj32ZOMj5xNMXq/eeleadership.pdf	X
4.5	**Implementation of Zero Waste Cleaner technologies**	**4.5.1Policies from Andhra Pradesh and Telangana**	Andhra Pradesh Pollution Control Board and Standards Telangana State Pollution Control Board and recommended Standards Inventorisation and Characterisation of Hazardous Waste Categories in Andhra Pradesh and Telangana	Andhra Pradesh Pollution Control Board Telangana Pollution Control Board Centre for Environment and Development, Thiruvananthapuram, Green Origin Ventures Pvt. Ltd., Hyderabad GKW Consult GmbH (Lahmeyer)	- 2014	http://www.appcb.ap.nic.in/Env-Standards/category.htm http://tspcb.cgg.gov.in/Pages/Envstandards.aspx http://tspcb.cgg.gov.in/Shared%20Documents/3-TS-Main%20text.pdf	

			Municipal Solid Wastes (Management and Handling) Rules, 2000 Municipal Administration and Urban Development Department – Municipal Solid Waste Management -Constitution of Andhra Pradesh Integrated Solid Waste Management Board –Orders-Issued. Report on the action plan for Municipal Solid Waste Management of Telangana State	Telangana State Pollution Control Board Government of Andhra Pradesh Municipal Administration and Urban Development Department, Telangana Secretariat	2000 2006 2014	http://tspcb.cgg.gov.in/GOs/Municipal%20Solid%20Waste%20Rules.pdf http://appcb.ap.nic.in/main/Telangana%20State%20Action%20Plan%20of%20MSW%20prepared%20by%20MA&UD%20Dept..pdf http://appcb.ap.nic.in/main/Telangana%20State%20Action%20Plan%20of%20MSW%20prepared%20by%20MA&UD%20Dept..pdf	X
		4.5.2 Pertaining to other Indian	Municipal Solid Waste (Management and Handling) Rules	Ministry of Environment and Forests, Government of India	2013	http://www.moef.nic.in/sites/default/files/SWM%20Rules%202020 15%20-Vetted%201%20-%20final.pdf	

		states and national policies	Capacity Building for Industrial Pollution Management Project for India	Appalarajugari and Harinath Sesha; as a part of the World Bank, MoEF&CC, APPCB and WBPCB project.	2015	http://www.worldbank.org/projects/P091031/india-capacity-buildng-industrial-pollution-management?lang=en	
			Tamil Nadu Industrial Policy	Government of Tamil Nadu	2014	http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/SAR/2015/08/24/090224b083090c16/4_0/Rendered/PDF/Restructuring0Paper.pdf	
			Municipal Administration and Water Supply Department, Tamil Nadu (2014) Operative Guidelines for Septage Management for Local Bodies of Tamil Nadu.	Government of Tamil Nadu	2014	**http://ficci.com/SEdocument/20304/TN_Industrial_Policy_2014.pdf**	X
			Vision Tamil Nadu 2023	Government of Tamil Nadu	2014	http://cma.tn.gov.in/cma/en-in/Downloads/GO%20%28MS%29%20106_0004.pdf	
			Karnataka State Policy on Integrated Solid Waste Management	Government of Karnataka	2006	http://tnidb.tn.gov.in/forms/TN%20VISION%202023%28PHASE%202%29.pdf	

						http://www.kuidfc.com/website/webpage.nsf/6dfb1eea694920ff65256e2c00360da2/d7bb3f53b081d57b652571bf001977c1/$FILE/SWM-Manual%20on%20State%20Policy.pdf	
		4.5.3 Pertaining to other Developing countries	Waste Management in China: Issues and Recommendations Guidelines for National Waste Management Strategies: From Challenges to Opportunities	Urban Development Working Papers East Asia Infrastructure Department World Bank United Nations Institute for Training and Research, UNEP	2005 2013	http://siteresources.worldbank.org/INTEAPREGTOPURBDEV/Resources/China-Waste-Management1.pdf http://www.unep.org/ietc/Portals/136/Publications/Waste%20Management/UNEP%20NWMS%20English.pdf	X
		4.5.4 Pertaining to other Developed	Eco-industrial Development in Japan	Morikawa, Mari (Indigo Development Center)	2000	**http://www.indigodev.com/IndigoEco-Japan.doc**	X

		countries					
4.6	**Health & safety at workplace**	**4.6.1 Pertaining to Andhra Pradesh and Telangana**	Website on Occupational and Health Safety implementation in the state of Andhra Pradesh	Directorate of General Factory Advice Service and Labour Institutes	1998	http://dgfasli.nic.in/publication/reports/andhra/chapter7.htm	X
		4.6.2 Pertaining to other Indian states and national policies	The Factories Act, 1948 Report of the Working Group on Occupational Safety and Health for the Twelfth Five Year plan (2012 TO 2017)	Government of India Government of India, Ministry of Labour and Employment	1948 2011	http://www.ap.gov.in/Acts%20Policies/THE%20FACTORIES%20ACT-1948.pdf http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wg_occup_safety.pdf	X
		4.6.3 Pertaining to Developing Countries	Occupational Safety and Health in Brazil: Risks and Policies National Profile Report on Occupational Safety and Health in China	John Mendeloff (RAND Labor and Population) International Labour Organisation (ILO)	2015 2012	https://www.rand.org/content/dam/rand/pubs/working_papers/WR1100/WR1105/RAND_WR1105.pdf http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/policy/wcms_186991.pdf	 X

		4.6.4 Pertaining to Developed Countries	**EU Occupational Safety and Health (OSH) Strategic Framework 2014-2020**	Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions	2014	http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0332	X
5	**Market, supply chain, finance and insurance**						
5.1	**Diversifying suppliers to reduce dependency**	**5.1.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		5.1.2 Pertaining to other Indian states and national policies	NA				

		5.1.3 Pertaining to Developing Countries	Supply Chain Vulnerability in Developing Markets: A Research Note Climate change, private sector and value chains: Constraints and adaptation strategies	Lawrence J. Marks and Michael A. Mayo, Department of Marketing, Kent State University, USA Working paper developed by Alberto Lemma, Marie-Agnes Jounjean and Emily Dako (PRISE- Pathways to Resilience in Semi-arid Economies project).	2015 2015	http://www.jgbm.org/page/9%20Lawrence%20J.%20Marks%20.pdf http://prise.odi.org/wp-content/uploads/2015/06/Climate-change-private-sector-and-value-chains.pdf	X
		5.1.4 Pertaining to Developed Countries	Building Supply Chain Resilience: a Review of Challenges and Strategies	International Transport Forum	2014	http://www.international-transportforum.org/jtrc/DiscussionPapers/DP201406.pdf	X
5.2	**Shading of storage facilities, reduce flooding exposure**	**5.2.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		5.2.2 Pertaining to	NA				

		other Indian states and national policies					
		5.2.3 Pertaining to Developing Countries	Insuring Flood Risk in Asia's High-Growth Markets Flood Risk Management in the People's Republic of China Learning to Live with Flood Risk	Geneva Association Asian Development Bank	2015 2012	https://www.genevaassociation.org/media/925830/ga2015-insuring-flood-risk-in-asias-high-growth-markets.pdf http://www.adb.org/sites/default/files/publication/29717/flood-risk-management-prc.pdf	X
		5.2.4 Pertaining to Developed Countries	Reducing Flood Effects in Critical Facilities Best Practices on Flood Prevention, Protection and Mitigation Flooding of Industrial Facilities – Vulnerability reduction in practice	FEMA, USA United Nations and Economic Commission for Europe (UN/ECE) Guidelines on Sustainable flood prevention	2013 2015 2012	http://www.fema.gov/media-library-data/1381404651877-881a2cf70a90ac63b9c067100ffccace/SandyRA2CriticalFacilities_508_FINAL2.pdf http://ec.europa.eu/environment/water/flood_risk/pdf/flooding_bestpractice.pdf	X

				Agnes Vallee, Bastien A eltranger, Christophe Duval.		https://hal.archives-ouvertes.fr/ineris-00973563/document	
5.3	**Development of resilient products, options for Change of Routes, transportation, etc.,**	**5.3.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		5.3.2 Pertaining to other Indian states and national policies	NA				
		5.3.3 Pertaining to Developing Countries	Business and Climate Change adaptation: Toward resilient Companies and Communities	A Caring for Climate Report by the United Nations Global Compact and United Nations environment programme in cooperation with the CEO Water Mandate	2012	http://www.iccr.org/sites/default/files/resources_attachments/businessandclimatechangeadaptation.pdf	X

		5.3.4 Pertaining to Developed Countries	Climate Change Adaptation Plan Insights into Climate Change Adaptation by UK Companies Business and Climate Change adaptation: Toward resilient Companies and Communities Adaptation to Climate Change: Issues for Business Summary Report	US Army Corps of Engineers (USACE) Carbon Disclosure Project for Department (CDP) UN Global Compact and UN Environment Programme Forfa's	2015 2012 2012 2010	http://corpsclimate.us/docs/USACE_Adaptation_Plan_12-NOV-2015_lores.pdf https://www.cdp.net/CDPResults/insights-into-climate-change-adaptation-by-uk-companies.pdf http://caringforclimate.org/wp-content/uploads/Business_and_Climate_Change_Adaptation.pdf http://www.itic.ie/wp-content/uploads/2015/05/Adaptation_to_Climate_Change_Summary_Report_ONLINE_FINAL.pdf	X
5.4	**Use of Insurances against disasters**	**5.4.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		5.4.2 Pertaining to	Managing disaster risk exposure in India an opportunity for better risk management and growth	Vankayalapati Padmavathi	2012	http://www.cii.co.uk/knowledge/resources/articles/managing-disaster-risk-exposures/22768	

		other Indian states and national policies					
			Compensation and Insurance	Dr Usha Ramanathan. Published in published in S. Parasuraman & P.V. Unnikrishnan eds., India Disasters Report: Towards a Policy Initiative (New Delhi: Oxford University Press, 2000)	2000	http://www.ielrc.org/content/a0001.pdf	
		5.4.3 Pertaining to Developing Countries	Insurance against Losses from Natural Disasters in Developing Countries Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions	Joanne Linnerooth-Bayer and Reinhard Mechler Background paper for United Nations World Economic and Social Survey (WESS) The World Bank	2008 2011	http://www.un.org/en/development/desa/policy/wess/wess_bg_papers/bp_wess2008_mechler.pdf https://www.gfdrr.org/sites/gfdrr.org/files/DRFI_WRC_Paper_FINAL_April11.pdf	
		5.4.4 Pertaining to Developed Countries	Adaptation to Climate Change: International Policy Options Climate change adaptation in industry and business: A framework	Ian Burton (University of Toronto), Elliot Diringer (Pew Center on Global Climate Change), Joel Smith (Stratus Consulting Inc.) Jason West and David Brereton (Griffith University, University of	2006 2013	http://www.c2es.org/docUploads/PEW_Adaptation.pdf	

			for best practice in financial risk assessment, governance and disclosure	Queensland). Published by the National Climate Adaptation Research Facility, Australia		http://www98.griffith.edu.au/dspace/bitstream/handle/10072/54579/88671_1.pdf?sequence=1	
6	**Policies, Regulations for IP**						
6.1	**CCA policies, regulations, vulnerability assessment**	**6.1.1 Pertaining to Andhra Pradesh and Telangana**	Andhra Pradesh SAPCC	Environment Protection Training and Research Institute (EPTRI)	2011	http://www.nicra-icar.in/nicrarevised/images/State%20Action%20Plan/AP-SAPCC.pdf	
		6.1.2 Pertaining to other Indian states and national policies	National Action Plan on Climate Change	Government of India	2008	http://www.moef.nic.in/downloads/home/pg. 01-52.pdf	
			Maharashtra SAPCC	State Action Plan Committee and TERI	2014	http://www.moef.gov.in/sites/default/files/Maharashtra%20Climate%20Change%20Final%20Report.pdf	
			Tamil Nadu SAPCC	State Action Plan Committee and GIZ	2014	http://www.moef.gov.in/sites/default/files/Tamilnadu%20Final%20report.pdf	
			Gujarat SAPCC	State Action Plan Committee, TERI & GIZ	2014	http://www.moef.gov.in/sites/default/files/Gujarat-SAPCC.pdf	X
			From Margins to Mainstream? State Climate Change Planning in India as a 'Door Opener' to a sustainable future (review of	Navroz K. Dubash and Anu Jogesh (CPR Climate Initiative)	2014	http://state-climate-plans.cprindia.org/uploads/2/3/7/5/23756750/dubash_	

			SAPCCs of Himachal Pradesh, Karnataka, Madhya Pradesh, Odisha, Sikkim)			and_jogesh_margins_to_mainstream_state_climate_plans_as_a_door_opener_for_a_sustainable_future_feb_2014.pdf	
		6.1.3 Pertaining to Developing Countries	Adaptation to Climate Change: International Policy Options	Ian Burton (University of Toronto), Elliot Diringer (Pew Center on Global Climate Change), Joel Smith (Stratus Consulting Inc.)	2006	http://www.c2es.org/docUploads/PEW_Adaptation.pdf	X
		6.1.4 Pertaining to Developed Countries	Climate Change Adaptation Plan Adapting to the impacts of climate change Adaptation to climate change and industrial vulnerability	US Army Corps of Engineers (USACE) OECD report Benjamin Garnaud and Celine Ferret, IDDRI	2015 2015 2010	http://corpsclimate.us/docs/USACE_Adaptation_Plan_12-NOV-2015_lores.pdf http://www.oecd.org/environment/cc/Adapting-to-the-impacts-of-climate-change-2015-Policy-Perspectives-27.10.15%20WEB.pdf http://www.iddri.org/Publications/Adaptation-to-climate-change-and-industrial-vulnerability	X

6.2	**Set-up and use of Rehabilitation budgets**	**6.2.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		6.2.2 Pertaining to other Indian states and national policies	NA				
		6.2.3 Pertaining to Developing Countries	NA				

		6.2.4 Pertaining to Developed Countries	NA				
6.3	**Emergency plans, disaster preparedness**	**6.3.1 Pertaining to Andhra Pradesh and Telangana**	NA see section 6.3,2				
		6.3.2 Pertaining to other Indian states and national policies	National Disaster Management Authority Guidelines for Chemical and Industrial Disaster	NDMA	2015	http://ndma.gov.in/en/learn-about-disasters/man-made-disaster/chemical-disaster.html	X

			Disaster Prevention, Preparedness and Management and Linkages with Climate Change Adaptation	Anand Patwardhan, Meeta Ajit (Technology Information, Forecasting and Assessment Council,)	2007	http://www.unisdr.org/files/13995_13995Paper10IndiaDisasterPrevention.pdf	X
			Gujarat SDM act 2013 Gujarat State disaster management plan volume 2 and volume 3	Gujarat SDMA Gujarat SDMA	2013 2015	http://www.gsdma.org/policies-acts/gsdm-act.aspx http://www.gsdma.org/documents/Gujarat_State_Disaster_Management_Plan-2015_Volume-1.pdf http://www.gsdma.org/documents/Gujarat_State_Disaster_Management_Plan_2015_Volume-2.pdf	
			Draft of Maharashtra SDMP	Disaster Management Unit Relief and Rehabilitation Department, Government of Maharashtra	2015	http://gadchiroli.nic.in/pdffiles/state-disaster.pdf	
			Draft of Karnataka SDMP	Karnataka SDMA and Revenue Department (Disaster Management), Government of Karnataka	2007	ftp://ftp.solutionexchange.net.in/public/drm/cr/res04041101.pdf	
			Kerala SDMP	Kerala SDMA	2009	http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Kerala%20State%20Disas-	

						ter%20Management%20Policy_Government%20of%20Kerala_2009.pdf	
			Madhya Pradesh SDMP	Madhya Pradesh SDMA		http://www.home.mp.gov.in/Disaster%20Management%20Draft%20Policy1.pdf	
			Rajasthan SDMP	Government of Rajasthan Disaster Management & Relief Department	2014	http://www.dmrelief.rajasthan.gov.in/documents/sdmp-eng.pdf	
		6.3.3 Pertaining to Developing Countries	The Chinese Disaster Management Mechanism	Integrated Disaster Risk Management of China	2007	http://www.oecd.org/finance/insurance/38120232.pdf	X
		6.3.4 Pertaining to Developed Countries	Integrating practices, tools and systems for climate risk assessment and management and strategies for disaster risk reduction into national policies and programmes	UNFCCC technical paper	2008	http://unfccc.int/resource/docs/2008/tp/04.pdf	X
6.4	**Standards and regulations that in-**	**6.4.1 Pertaining to Andhra**	NA				

	tegrate climate change considerations, land use polices	**Pradesh and Telangana**					
		6.4.2 Pertaining to other Indian states and national policies	NA				
		6.4.3 Pertaining to Developing Countries	NA				
		6.4.4 Pertaining to Developed Countries	Linking Land Policy with Climate Change: A Multi-dimensional Landscape Approach to Territorial Development with a Focus on the Europe and Central Asia (ECA) Region	Malcolm D. Childress, Paul Siegel and Mika Törhönen (Land Administration and Policy Specialists, World Bank)	2014	http://www.worldbank.org/content/dam/Worldbank/document/eca/central-asia/Climate-Change-Landscapes-and-Policy-in-ECA_ENG.pdf	
			Land use planning tools for local adaptation to climate change	R.A. Richardson, Climate Change Impacts and Adaptation Division,	2012		X

				Natural Resources Canada and José Otero, School of Urban Planning, McGill University		http://publications.gc.ca/collections/collection_2013/rncan-nrcan/M4-106-2012-eng.pdf	
6.5	**Public Private Risk Reduction Initiatives, joint warning systems**	**6.5.1 Pertaining to Andhra Pradesh and Telangana**	Andhra Pradesh Infrastructure Development Enabling Act 2001	Government of Andhra Pradesh	2001	http://www.apidc.gov.in/Infraact.pdf	
		6.5.2 Pertaining to other Indian states and national policies	**Tamil Nadu Coastal Disaster Risk Production Project (CDRRP)**	Tamil Nadu State Disaster Management Authority	2014	http://www.tn.gov.in/tsunami/PDF/CDRRP.pdf	
		6.5.3 Pertaining to Developing Countries	The Development of a Public Partnership Framework and Action Plan for Disaster Risk Reduction (DDR) in Asia	United Nations International Strategy for Disaster Reduction Secretariat (UNISDR)	2009	http://www.unisdr.org/files/12080_TheDevelopmentofPublicPartnershipFr.pdf	X
			Public Private Partnership in Disaster Reduction in a Developing Country: Findings From West Sumatra, Indonesia	Jonatan A. Lassa (Institute of Resource Governance and Social Change, Kupang)	2013	http://www.irgsc.org/pubs/wp/IRGSCWP004public-private-partnership.pdf	

			Private Sector Activities in Disaster Risk Reduction: Good Practices and Lessons Learned	United Nations International Strategy for Disaster Reduction Secretariat (UNISDR)	2008	http://www.unisdr.org/2006/ppew/PPP-bestpractices.pdf	
		6.5.4 Pertaining to Developed Countries	Private Sector Activities in Disaster Risk Reduction: Good Practices and Lessons Learned Working together to reduce disaster risk	United Nations International Strategy for Disaster Reduction Secretariat (UNISDR) United Nations International Strategy for Disaster Reduction Secretariat (UNISDR) and PwC	2008 2015	http://www.unisdr.org/2006/ppew/PPP-bestpractices.pdf https://www.pwc.com/gx/en/governance-risk-compliance-consulting-services/resilience/publications/pdfs/pwc-unisdr-report.pdf	X
6.6	**CCA included in Environmental Impact Assessments Procedures**	**6.6.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		6.6.2 Pertaining to other	NA				

		Indian states and national policies					
		6.6.3 Pertaining to Developing Countries	NA				
		6.6.4 Pertaining to Developed Countries	Incorporating Climate Change Impacts and Adaptation in Environmental Impact Assessment: Opportunities and Challenges Challenges to Integrate Climate Change Considerations in Environmental Impact Assessment	Shardul Agrawala, Arnoldo Matus Kramer,Guillaume Prudent, Richard and Marcus Sainsbury (OECD) Prasad Modak and Namrata Ginoya- Environmental Management Centre (EMC) LLP	2010 2013	http://www.oecd-ilibrary.org/docserver/download/5km959r3jcmw.pdf?expires=1452078563&id=id&accname=guest&checksum=600E455F915943931AA414FE178CB61D http://www.iaia.org/conferences/iaia13/proceedings/Final%20papers%20review%20process%2013/Challenges%20to%20Integrate%20Climate%20Change%20Considerations%20in%20Environmen-	X

						tal%20Impact%20Assess-ment.pdf?AspxAutoDetectCook-ieSupport=1	
6.7	**Upgrading policies for planning of IP, include CC Risks and Hazards**	**6.7.1 Pertain-ing to Andhra Pra-desh and Tel-angana**	ACCCRN City Projects: Asian Cit-ies Climate Change Resilience Network	ACCRN, Rockefeller Foundation, Asia	2012	http://hatyaicityclimate.org/up-load/forum/ACCCRNCitiesPro-jectCatalogueHatyai.pdf	X
		6.7.2 Pertain-ing to other Indian states and na-tional policies	Mainstreaming climate change adaptation in Indian cities Industrial Sitting in Multi-Hazard Environment: Application of GIS and MIS Assessing Green Industrial Pol-icy: The India experience Disaster Risk Management and the Role of the Corporate Sector-The Indian Perspective	Divya Sharma(TERI) and Sanjay Tomar (GTZ) SS Nair and AK Gupta Karthik Ganesan, Poulami Choudhury, Rajeev Palakshappa, Rishabh Jain, Sanyukta Raje (Council on Energy, Environment and Water(CEEW) and International Institute for Sustainable Develop-ment (IISD)) Confederation of Indian Industry and NDMA	2010 2010 2014 2014	http://eau.sagepub.com/con-tent/22/2/451.short http://www.fh-koeln-studienin-fos.de/live/hrdpmp/hrdpmas-ter/idrm/con-tent/e6547/e32367/e32713/e328 25/e32774/infoboxCon-tent32775/anilSreeGeoinfMulti-hazIJGID.pdf https://www.iisd.org/gsi/sites/de-fault/files/rens_gip_india.pdf	X

						http://www.tn.gov.in/tsunami/digitallibrary/ebooks-web/05%20Disaster_%20Risk_%20Management%20&%20_The%20_Role.pdf	
		6.7.3 Pertaining to Developing Countries	Climate Resilience and the Role of the Private Sector in Thailand	The Rockfeller Foundation, BSR	2015	http://www.bsr.org/reports/BSR_Climate_Resilience_Role_Private_Sector_Thailand_2015.pdf	
		6.7.4 Pertaining to Developed Countries	Opportunities and risks of climate change Strategic Environmental Compliance and Performance Review: Industrial Estates	Swiss Re Department of Environment and Climate Change (New South Wales, Australia)	2011 2008	http://stephenschneider.stanford.edu/Publications/PDF_Papers/SwissReClimateChange.pdf http://www.epa.nsw.gov.au/resources/licensing/08444indest.pdf	X
6.8	**Introducing Incentives to the CCA implementation agencies / organizations**	**6.8.1 Pertaining to Andhra Pradesh**	Andhra Pradesh Industrial Policy and Industrial Parks Andhra Pradesh SEZ guidelines	Industries & Commerce Department, Government of Andhra Pradesh Government of India	2015 2007	https://www.apindustries.gov.in/APIndus/Data/GO/G.O%20for%20Industrial%20Development%20Policy%202015-2020.pdf http://apsez.co.in/incentives.html	X

		and Telangana	Telangana State Industrial Policy and Industrial Parks Incentives for setting up of New Industrial Enterprises in Telangana State– T-IDEA (Telangana State Industrial Development and Entrepreneur Advancement) Incentive Scheme 201	Government of Telangana Industries & Commerce Department, Government of Telangana	2014 2014	http://tsiic.telangana.gov.in/pdf/Industrial-Framework-2014-Version-1.pdf http://tsiic.telangana.gov.in/pdf/2014INDS_MS28.pdf	X
		6.8.2 Pertaining to other Indian states and national policies	Tamil Nadu Industrial Policy Special Package of incentives for Industrial Development of Southern Districts in Tamil Nadu-Assessing Green Industrial Policy: The India experience Maharashtra Industrial Policy 2013 Karnataka Industrial Policy	Government of Tamil Nadu Order of Government of Tamil Nadu Maharashtra Industrial Development Corporation Government of Karnataka	2014 2014 2013 2014	http://ficci.com/SEdocument/20304/TN_Industrial_Policy_2014.pdf http://www.investinginta-milnadu.com/tamilnadu/doc/special_package_of_incentives_for_industrial_development_%28G.O%20180%29.pdf http://www.indiaenvironmentportal.org.in/files/file/Industrial%20Policy%20of%20Maharashtra%202013.pdf http://www.indiaenvironmentportal.org.in/files/KarnatakaIndustrialPolicy2009-14English.pdf	X

		6.8.3 Pertaining to Developing Countries	Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation	OECD	2009	http://www.oecd.org/env/cc/42551540.pdf	X
		6.8.4 Pertaining to Developed Countries	Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation	OECD	2009	http://www.oecd.org/env/cc/42551540.pdf	X
6.9	**Different financing models for CCA**	**6.9.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		6.9.2 Pertaining to other Indian states	NA				

		and national policies					
		6.9.3 Pertaining to Developing Countries	Financing options for renewable energy and Energy efficiency Adapting to Climate Change: A Guide for the Financial Services Industry	Sustainable Energy Regulation and Policymaking for Africa Tiffany Finley, Associate, Advisory Services; Ryan Schuchard, Manager, Climate and Energy (BSR)	2009 2015	https://www.unido.org/fileadmin/media/documents/pdf/EEU_Training_Package/Module19.pdf http://www.bsr.org/reports/BSR_Climate_Adaptation_Issue_Brief_Financial_Services.pdf	X
		6.9.4 Pertaining to Developed Countries	Toolkit to Enhance Adaptation Finance Climate Change and India: Adaptation GAP	Organisation for Economic Co-operation and Development (OECD) and Global Environment Facility (GEF) Amit Garg, Vimal Mishra, Hem H. Dholakia (IIM Ahemadabad)	2015 2015	http://www.oecd.org/env/cc/Toolkit%20to%20Enhance%20Access%20to%20Adaptation%20Finance.pdf http://www.iimahd.ernet.in/assets/snippets/workingpaperpdf/10071603592015-11-01.pdf	X
7	**Capacity Development and Awareness of Industries**						
7.1	**Mass Awareness Campaigns involving communities like IEID**	**7.1.1 Pertaining to Andhra Pradesh**	APIIC Industrial Environment Improvement Drive	APIIC and GIZ	2014	http://www.igep.in/live/hrdpmp/hrdpmaster/igep/content/e48745/e49028/e56114/e56199/2.Mr.G.DurgaPrasad.pdf	

		and Telangana				http://www.apiic.in/wp-content/uploads/2014/07/IEID-Activities-across-Zones-in-15days-from-5th-June.pdf	
		7.1.2 Pertaining to other Indian states and national policies	Project Update Document	Indian environmental Society	2015	http://www.iesglobal.org/pdf/project_updates.pdf	
		7.1.3 Pertaining to Developing Countries	Environment Hong Kong 2006: Community Awareness	Environmental Protection Department	2006	http://www.epd.gov.hk/epd/misc/ehk06/textonly/english/aware/	
		7.1.4 Pertaining to Developed Countries	Encouraging Environmental Management in Industry	Science Technology Industry: Business and Industry Policy Forum Series	2014	http://www.oecd.org/sti/ind/2090553.pdf	

7.2	**Capacity Development for Park Managers and Industrial associations**	**7.2.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		7.2.2 Pertaining to other Indian states and national policies	Scheme for capacity building, strengthening of database and advocacy by Industry/Enterprise Associations and for holding Seminars/Symposiums/Workshops by the Associations Micro, Small and Medium Industries Policy MSME Umbrella Programme: Public Support Scheme	GOVERNMENT OF INDIA MINISTRY OF MICRO, MALL & MEDIUM ENTERPRISES (MSME) OFFICE OF THE DEVELOPMENT COMMISSIONER (MSME) (STATISTICS & DATABANK DIVISION) Micro, Small & Medium Enterprises Department, Government of Tamil Nadu Federation of Indian Micro and Small & Medium Enterprises (FISME) Anil Bhardwaj, Secretary General, FISME Samuel Chakraborty Deputy Director, FISME	2010 2008 2015	http://dcmsme.gov.in/faq/capacity_building.pdf http://www.investinginta-milnadu.com/tamilnadu/doc/policy/Tamil_Nadu_MSME_Policy_2008.pdf https://www.giz.de/en/downloads/giz2013-en-trainer-manual-public-support-schemes.pdf	X

		7.2.3 Pertaining to Developing Countries	UNIDO Green Industry Policies for supporting Green Industry	United Nations Industrial Development Organisation	2011	https://www.unido.org/fileadmin/user_media/Services/Green_Industry/web_policies_green_industry.pdf	X
		7.2.4 Pertaining to Developed Countries	Draft Programme on Innovation, Higher Education and Research for Development (IHERD)- Centres of Excellence as a Tool for Capacity Building	Tomas Hellström Professor of Innovation, Entrepreneurship and Knowledge Creation, Lund University	2014	http://www.oecd.org/sti/Draft_OECD%20synthesis%20report_final.pdf	X
8	**Interaction with Communities around IP**						
8.1	**Joint initiatives, early warning systems,**	**8.1.1 Pertaining to Andhra Pradesh and Telangana**	NA				
		8.1.2 Pertaining to other	Human Resource And Capacity Development Plan for Disaster Management and Risk Reduction in India	Government of India, NIDMA	2013	http://www.preventionweb.net/files/32007_hrpancd532013.pdf	X

		Indian states and national policies					
		8.1.3 Pertaining to Developing Countries	Global early warning systems for natural hazards: systematic and people-centred	Reid Basher (Philsoophical Transactions of the Royal Society)	2006	http://www.unisdr.org/2006/ppew/info-resources/docs/RSTA20061819p.pdf	X
		8.1.4 Pertaining to Developed Countries	Draft report on Early Warning Systems: State-of-Art analysis and Future Directions	Veronica Grasso, Ashbindu Singh United Nations Environment Programme (UNEP)	2012	https://na.unep.net/geas/docs/early_warning_system_report.pdf	X
8.2	**Joint water and waste management,**	**8.2.1 Pertaining to Andhra Pradesh and Telangana**	NA				

		8.2.2 Pertaining to other Indian states and national policies	Tamil Nadu Vision 2023	Government of Tamil Nadu	2014	http://tnidb.tn.gov.in/forms/TN%20VISION%202023%28PHASE%202%29.pdf	X
		8.2.3 Pertaining to Developing Countries	Public-Private Partnerships for Urban Water Utilities: A Review of Experiences in Developing Countries	Phillip Main (report submitted to the World Bank)	2009	https://openknowledge.worldbank.org/bitstream/handle/10986/2703/530170PUB0Tren101Official0Use0Only1.pdf?sequence=6	X
		8.2.4 Pertaining to Developed Countries	Website of the World bank on Public Private Partnership Information resource Centre	World Bank	2016	http://ppp.worldbank.org/public-private-partnership/sector/water-sanitation	

2. Summary of Policies and regulations for CCA and related topics in Industrial Areas:

1. Location, Site layout of IP

1.1 Site selection and Location of IP

Industrial parks is covered under the ambit of the various Industrial Policies of different state governments. Here we highlight the regions where different states have called for the development of existing industrial parks or the creation of green field industrial parks and clusters. Most of these form a part of regions called Special Economic Zones (SEZ), where industry is provided with incentives in the form of concessional rates on land, reduced taxation rates, etc., The SEZ act of 2005 and the SEZ rules of 2006 apply to these regions for a range of legislation from the demarcation of regions and sites as SEZs, the setting up of the SEZ authority, and the jurisdiction of the central and state governments with respect to the SEZ. They prescribe rules for the setting up of an SEZ unit.

1.1.1 Policies pertaining to Andhra Pradesh and Telangana: An Asian Development Bank report on the Vizag-Chennai Industrial Corridor provides an assessment of the policy framework and conceptual plan behind the setting up of such an industrial corridor. The study "identifies the nodes to be taken up for industrial development; industries for future development, including MSMEs; an infrastructure strategy; and a set of priority projects, particularly last-mile connectivity projects, to unlock the near-term potential of the corridor. The study also recommends a set of policies to streamline the regulatory process for setting up and operating businesses efficiently." As a part of site selection they have identified port cities and coastal infrastructure networks to be proximate to the industries set up within this corridor. The Key issue it identifies is the question of site selection and land acquisition and the need for a comprehensive special investment region with its own set of regulatory authorities and institutions. With respect to Climate change there is no specific threat identified except that infrastructure in these coastal corridors needs to be maintained and repaired when faced with threats from natural and extreme circumstances. This aspect is covered in section 5.

1.1.2 Policies pertaining to other states and national policies: The Delhi Mumbai Corridor (DMIC) is the biggest planned industrial corridor in the country and covers already heavily industrialised states. A CSE report on the challenges in the DMIC region highlights certain concerns which are relatable to site selection- these include the need to fix a method for allotting land use and priorities of land use wherever land is acquired for the DMIC. It also includes the addressable of challenges such as ground water resource availability for the industrial region and its impact on local population. It does so for all the seven nodes which are being developed in the DMIC Phase 1.

Karnataka Industrial Policy 2014:The state industrial policy proposes streamlining land acquisition process through inclusive development such as identifying and utilising government waste lands in different parts of the State for employment generating industrial activities; inventorising surplus and unused land available with PSUs, State Govt., Urban Local Bodies

and suitable private land to create a Land Bank; as well as to speed up the process of land acquisition for the purpose of industries by drafting a clear cut land acquisition policy in the future

1.1.3 Policies Pertaining to Developing Countries: OECD review of Innovation Policy of China, the UNIDO review of policies and practices for Industrial estates, and the MENA-OECD review of the investment programme for the development of Economic Zones in MENA countries, all emphasise that the setting up Industrial parks in terms of location is determined by government policies and the incentives provided to private sector to establish industries in such locations. The general recommendations here include introducing policies for the development of more aggregated industrial agglomerations or sectors in the shape of Special economic zones and industrial parks, with necessary infrastructure.

1.1.4 Policies Pertaining to Developed Countries: International policies on site selection of Industrial parks primarily pay importance to the presence of economic factors such as the presence of economies of scale and clustering of industries in a location and the presence of necessary infrastructure. OECD reports on eco-innovation manufacturing sites, Industrial parks and other such policy reviews underplay rules and regulations of site selection. In the sense that what is of importance is not the climate aspects of site selection as much as the need to follow existing rules, policies, and regulatory procedures for site selection. While this includes environmental considerations such as EIA, and other such concerns it does not consider explicitly the role of climate and site selection. The EU Environmental Technology Action Plan (ETAP), which defines eco-innovation as “the production, assimilation or exploitation of a novelty in products, production processes, services or in management and business methods, which aims, throughout its lifecycle, to prevent or substantially reduce environmental risk, pollution and other negative impacts of resource use (including energy)”. A report on industrial parks and their location in semi urban and rural regions such as Nebraska states that important considerations are as follows: a preference for more compact park sizes of 50-150 acres, presence of a labour market, reduced operating costs, and the presence of infrastructure and real estate.

Reference

Andhra Pradesh Industrial Policy and Industrial Parks by Industries & Commerce Department, Government of Andhra Pradesh pg.1, pg.5
The Andhra Pradesh Infrastructure Development Enabling Act 2001- pg.6-8
Karnataka State Industrial Policy 2014-19: pg.13, annexures 1-5- pg.23 onwards,
SEZ Act 2005- pg.7-10, SEZ Rules 2006
OECD review of Innovation Policy of China 2007 pg.43-49
Designing Economic Zones for Effective Investment Promotion 2010-10-16
Industrial/Business Park Standards by Nebraska Department of Economic Development 2001- pg.4-10
Sustainable Manufacturing and Eco-Innovation- OECD synthesis report on Eco-Innovation 2009- pg.13

1.2 Climate Resilient Planning of New and Existing Industrial Parks (Retrofitting, Zoning, Avoiding Heat Islands, Erosion, etc.,)

1.2.1 Pertaining to Andhra Pradesh and Telangana

1.2.2 Pertaining to Other Indian States: Various state industrial policies emphasise the need for planning new and existing Industrial Parks including specifying measures for retrofitting old industrial parks with new technologies. The most prominent of these are studies on redevelopment of Industrial Parks in Gujarat: There are a few policy documents on the development of industrial parks and retrofitting industrial estates in Gujarat. Of note is the policy Document on the proposal made by the Gujarat Clean Production Centre to develop Eco Industrial parks in Gujarat, Initiatives for Retrofitting Existing Industrial Estate to Eco Industrial Parks, CETP Improvement in Gujarat and other such initiatives. A study mandated by the Gujarat state government was prepared by CEPT University for the development of the Industrial Estate at Naroda. This report itself is not available in the public domain but it is gathered that it contains technical recommendations on architecture and planning, as well as retrofitting new technologies and creating institutional mechanisms for promoting sustainable management of water, energy and waste. A TERI policy brief on climate resilient infrastructure and services in Coastal cities highlights the need to integrate assessment of land use planning and adaptation of infrastructure for a broader policy view on climate change resilience. Through various case studies and policy analysis of barriers to the building of climate resilience in coastal areas, it emphasises that the presence of uncertainty of climate impacts must necessitate spending on retrofitting and updating infrastructure. While recommending so it also cautions that due to this uncertainty figuring out costs of such adaptation and retrofitting are also uncertain and could turn out to be unaffordable to many industries and infrastructure projects.

1.2.3 Pertaining to Developing Countries: UNIDO report on Climate Resilient Industrial Planning, defines climate resilient industrial development as “continued efforts to mitigate changes in the climate while at the same time prepare industry to adapt to its impacts.” It further adds that Climate resilient industrial planning itself is not a clear cut issue that can be defined by policy because “apart from those related to extreme weather events, the impacts of climate variation in industry are not always obvious.” A paper on Climate resilient urban infrastructure in China–Insights into the buildings sector by researchers at IDDRI states that one of the challenges for climate resilient industrial planning is that “retrofitting existing buildings is very costly and is related long-term decision. At the present the investment decision is mainly oriented by short-term objectives of meeting the mass market’s demand and maximising the profits of developers without necessarily taking the long-term consequences into account.”

1.2.4 Pertaining to Developed Countries: EU communication on Adaptation of Infrastructure to Climate change, identifies major threats to buildings and infrastructure and highlights climate resilience with respect to industry must pay attention to adapting to issues such as “(1) extreme precipitation, which can be expected European wide, e.g. leading to water intrusion, damage to foundations and basements, destruction of buildings and infrastructure, overflowing sewers, land- and mud-slides, flooding, etc., (2) extreme summer heat events, especially but not only in South Europe, e.g. leading to material fatigue and accelerated aging, decreased comfort and potentially severe health implications, high energy use for cooling, etc., (3) exposure of constructions to heavy snowfall; (4) rising sea levels that increase the risk of flooding. In addition, soil subsidence risks are likely to increase, depending on the stability of building structures and their foundations.” It further emphasises the need for an assessment of local climate impacts and assessments of system-wide vulnerability checks for interconnected installations to ensure avoiding of present and future negative externalities. Post achieving this assessment it stressed for the presence of resilient infrastructure and retrofitting of existing infrastructure within industries. A UK ministry report on Climate Change resilience and adaptation defines climate residence for industry as the creation of “an infrastructure network that is resilient to today’s natural hazards and prepared for the future changing climate”. Here again the emphasis is on the role of economic regulators in facilitating adaptation and the policies required for managing losses and risks faced. In line with these larger policy briefs a Global Development and Environment Institute (Tufts University, USA) working paper highlights that

Climate resilience design principles must be characterised by the following features- "1) they are pro-active; 2) they promote industrial diversification; 3) they focus on mobilizing investment in environmentally sustainable industries and infrastructure, including low-carbon and renewable energy; 4) they are highly responsive to local geo-physical conditions and are based on principles of adaptive management; and 5) they are designed, implemented and governed via accountable partnerships involving government, business, and community actors."

With respect to retrofitting a few policy initiatives from the Unites States and the United Kingdom are important to review. The New York Planning Department in a report on climate resiliency in coastal fronts provides regulations for the construction of infrastructure and buildings in the coastal zone. A report for the Boston Green Ribbon Commission Climate Preparedness Working Group identifies guidelines and opportunities for retrofitting existing buildings and infrastructure in terms of preparing it for being resilient to flooding, heat and wind related hazards. A report centred around policies in the UK, titled Modern Built Environment Knowledge Transfer Network 201This report provides guidance to planners, developers, and designers working in the built environment sector in the UK on how to: i) develop and communicate the business case for climate change adaption, and ii) realise developments which are resilient to the effects of a changing climate. It is applicable to both new development and retrofits, and for building and landscaping projects

Reference

Contribution of GCPC-Envis for India's Nationally Determined Contribution Working Towards Climate Justice by Gujarat Clean Production Centers (GCPC)-Envis
Climate change adaptation plan for industrial estates of Gujarat: Naroda industrial estate by Ashwani Kumar (Centre for Environmental Planning and Technology, Ahemdabad)
Eco Industrial Development in Vapi Industrial Estate (Gujarat)by GIZ- pg.47-57
Promoting climate resilient Industry by UNIDO-pg.9
Towards a Policy for Climate Resilient Infrastructure and Services in Coastal Cities by TERI-pg.2
Climate resilient urban infrastructure in China –Insights into the buildings sector –pg.4
Climate-Resilient Industrial Development Paths: Design Principles and Alternative Models-pg. 2,23
Adapting infrastructure to climate change- An EU strategy on adaptation to climate change 2013-pg.3, 15.
Climate Resilient Infrastructure: Preparing for a Changing Climate- Ministry of Environment, Food and Rural Affairs UK-pg.35;40
Building resilience in Boston: Best Practices for Climate Change Adaptation and Resilience for Existing Buildings
Modern Built Environment Knowledge Transfer Network, 2013. Guidance for making the case for climate change adaptation in the built Environment 2013

1.3 Training of planners

The industrial State policies of various State governments seek to enhance the skill sets of its population and develop personnel who can be employed in managerial positions at Industrial Zones, Industrial Parks, and SEZs. WE highlight below such recommendations from various state Industrial policies

1.3.1 Pertaining to Andhra Pradesh and Telangana: Government of Andhra Pradesh based on its Industrial Policy has set up "Andhra Pradesh State Skill Development Corporation (APSSDC) on lines of the National Skill Development Corporation (NSDC), a not-for-profit company under the Companies Act, 2013. APSSDC will provide funding to build scalable, for-

profit vocational training initiatives. It will also enable support systems such as quality assurance, information systems and train the trainer academies either directly or through partnerships. State will identify required quantum of skilled manpower, map industry specific skill sets and provide courses at different levels of education – matriculation and above. Training institutions at divisional level shall be setup through PPP approach to facilitate industry wide initiatives aimed at enhancing the employability of unskilled/semi-skilled labour. Special emphasis will be laid on skilling first generation entrepreneurs, women, minorities, SC/ST and backward class entrepreneurs. Industries will be incentivized to participate actively in development of skilled manpower.

Industries will be involved in drafting training curriculum to make it sector-specific, industry responsive and market driven. Institutional arrangements in the form of Industry-Academia for a will be encouraged".Telangana Industrial policy and the Guidelines of Industrial Area Local Authority within Industrial Parks- TSIIC, suggests that the government will take up appropriate skill development programmes so that technically qualified youth can find employment in the industry. It further states that the Industrial Area Societies will be encouraged to participate in design and implementing skill development programs. In order to enable effective maintenance of civic services in Industrial Parks, the Government has empowered APIIC Industrial Parks with Local Authority status duly amending the Acts under section 147 of APPR Act 1994, u/s 389-B of AP Municipalities Act, 1965 and u/s 679-F of Hyderabad Municipal Corporation Act, 1955 in the year 1994. The IALA functions as a Municipal Corporation with a condition that 35% or 50% of the property tax collected is remitted to the parent local body. Its objective is to promote "Local Self-Governance" of the Industrial Areas, TSIIC has evolved the concept of Industrial Areas Service Societies involving the tax payers community in the notified Industrial Areas in the Management/Maintenance of Industrial Areas. The Service Societies registered under the Telangana Public Societies Registration Act, 1350F and the Societies Registration Act, 1860 and AP Societies Registration Act, 2001 have been nominated by TSIIC as its Nodal Agencies to assist in collection of Property taxes and maintenance of civic Services in the Industrial Areas. They participate in all decisions which concern them in order to coordinate the functioning of the IALA, in different development activities within the IALA area and also to bring transparency in the working of the IALAs. It calls for the creation of the following authorities and specifies their responsibilities: Nodal Officer, Zonal Manager, Executive officer, creation of a service society with the presence of a works committee; resource committee; human resource committee and environment committee.

1.3.2 Pertaining to India and Other states: In order to maintain HR competence of Tamil Nadu, the Tamil Nadu Industrial Policy 2014, calls for a Human Resources and Skills Initiative. The objective of this initiative is to make available sufficient manpower of right quality and competencies. A State-Level HR Skill Development Task Force will be set up. An Industrial Training Quality Improvement Project would be initiated to invest substantially in the ITI/ITC infrastructure development and capabilities. Karnataka Industrial Policy on skill development states that an emphasis will be given for development of skilled manpower for the use of industry and trade. Focus will be given on skill up -gradation in the emerging skill sets while phasing out redundant skills. This will be done by promoting private sector investments for skill development through a market driven approach. It will also put efforts to inculcate entrepreneurial qualities amongst youth, with a special focus on women entrepreneurs. More thrust will be given to motivate youth belonging to under privileged sections of the society. Further in order to motivate the prospective entrepreneurs, Guidance Cell in the DICs will be strengthened. This cell will help entrepreneurs both at entry and implementation level. The Government of Maharashtra has formed a State Committee for Skill Development Initiative under the department of Higher and Technical Education, a Skill development Enhancement Cell (SDEC) and plans to strengthen the Maharashtra Centre for Entrepreneurship Development (MCED)

1.3.3 Pertaining to Developing Countries: The Eco-Industrial Park Handbook for Asian Developing Countries in its fourth chapter specifies the role of training planners and developers to improve the functioning of an Industrial Park. In particular it introduces the concept of (pg. 15-18) a 'learning organization'. The management of the Industrial park should have the following attributes according to this view- it will be composed of three teams: the core development team, the professional design team, and the larger body of community stakeholders. It also provides a layout for the kind of professionals required and how an access needs to be created to these professionals from the level of architects, engineers and planning consultants to those with expertise in zoning regulations and consulting experiences.

1.3.4 Pertaining to Developed Countries: A UNEP report on training of planners in Industrial Estates provides a complete set of guidelines, policy briefs and case studies for what constitutes training and capacity building of managers within Industrial estates and is applicable to Industrial Parks as it emphasises environmental management techniques for managers and planners including- pollution control designing, incorporating industrial systems approach to waste management, and introducing retrofits and assessments for sustainable development and promotion of clean energy within these industrial estates. A report titled Eco Industrial Park Development- A Guideline for North America incorporates the role of training planners and management within Industrial parks at each stage of the development of Industrial Parks. It specifies that planners and managers of these parks must be trained in Participatory planning approaches to better comprehend the differences between the goals of different stakeholders, the need to involve stakeholders including local communities, and clearly identifying management functions in terms of the planning process, operation of the park, and its monitoring and assessment. It places special emphasis on the need to train planners and managers with skills to collect and analyse data about the industrial park.

Reference

Andhra Pradesh Industrial Policy 2014-pg.6, 15
Guidelines of Industrial Area Local Authority within Industrial Parks- TSIIC
Karnataka Industrial Development Policy 2014-2019 pg.11.12
Tamil Nadu Industrial Policy 2014 pg.18
Karnataka Industrial Policy 2014 pg.9,11,16
Maharashtra Industrial Policy 2014 pg.13
Eco-Industrial Park Handbook for Asian Developing Countries- Chapter 4 Planning and Development pg.15-18
Environmental Management for Industrial Estates- Information and Training Resources- UNEP report.
Eco-Industrial Park Development A Guide for North America (24-27)

1.4 Green Industrial Policy Frameworks

This review looks at the larger policy of setting up eco-industrial parks in India as well as policy documents regarding the setup of such parks in other countries The larger policies for Industrial parks in India are generally covered under the ambit of the various Industrial Policies of different state governments. Here we highlight the regions where different states have called for the development of existing industrial parks or the creation of green field industrial parks and clusters. Most of these form a part of regions called Special Economic Zones (SEZ), where industry is provided with incentives in the form of concessional rates on land, reduced taxation rates, etc., The SEZ act of 2005 and the SEZ rules of 2006 apply to these regions for a range of legislation from the demarcation of regions and sites as SEZs, the setting up of the SEZ authority, and the jurisdiction of the central and state governments with respect to the SEZ. They prescribe rules for the setting up of an SEZ unit.

1.4.1 Pertaining to Andhra Pradesh and Telanagana: Andhra Pradesh Industrial Policy year 2015 is aimed at developing sector specific industrial parks such as Food Processing Parks, Textile Parks, Electronic Complexes etc., to provide fillip to thrust sectors within the Visakhapatnam-Chennai Industrial Corridor and Chennai Bengaluru Industrial Corridor. The Andhra Pradesh Infrastructure Development Enabling Act 2001 specifies that the selection of a suitable Private Developer for Industrial Park would be according to the Swiss Challenge approach for selection of Private Developer. Government of Andhra Pradesh's Industrial Parks Policy 2015-20 rules for eligibility include that the investment in the proposed IP should be a minimum of 200 crore. Size of the proposed Industrial Park should be a minimum of 100 acres, having minimum 10 industrial/service units with no single unit occupying more than 40% of the total allocable area for industrial use. A minimum of 33% of total land area should be dedicated to green cover and water conservation. Telangana State Industrial Policy on Industrial Parks:: is the creation of Industrial clusters and parks through the institution of land banks. Parcels of lands assessed for different industry will be consolidated in the form of a land bank operated by the Telangana State Industrial Infrastructure Corporation (TSIIC). And based on this identification specific Industrial Parks will be set up by entrepreneurs whereas the required infrastructure for some specific parks will be built by TSIIC- roads, etc., The districts where these industrial parks will be largely set up are- Ranga reddy, Mahboob nagar, Medak and Warangal districts. It seeks to develop industrial corridors along the following regions: Hyderabad-Warangal, Hyderabad-Nagpur, Hyderabad-Bengaluru, Hyderabad-Nalgonda, and Hyderabad-Khammam. The TSIIC allotment regulations of 2012 stipulate that the demarcation of an industrial park would be done through the TSIIC, Government of Telangana and a committee for allotment set up by the act. The act prescribes the lay out and area regulations for the Industrial Park. In terms of setting up of prices for developing industrial parks it states that prices would be fixed based on the recommendations of the price fixation and infrastructure committee. The Andhra Pradesh Industrial Policy on Industrial Parks: calls for the establishment of the following features within industrial parks a) Waste water treatment: Constructing effluent treatment plant and sewage treatment plant and using recycled water for industrial purpose b) estab;ishment of Green Buildings: Buildings which obtain green rating under the Indian Green Building Council (IGBC/LEED Certification) or Green Rating for Integrated Habitat Assessment (GRIHA) systems. c) Use of renewable source of power (erecting captive sun, wind and biomass plants etc.,). d) Installing Continuous Emission Monitoring System (CEMS) for red category industries. The information should be disseminated continuously to APPCB. e) Adopting rain water harvesting; restoring water bodies by de-stilting defunct water bodies. It includes guidelines for retrofitting old industrial parks with the following features- waste water treatment, Green Buildings, use of renewable source of power, with improved emission and pollution monitoring systems, adoption of rain water harvesting and de-stilting defunct water bodies. Telangana Industrial Policy identifies 14 sectors where it seeks to develop industrial clustering along the lines of forming Industrial Parks. It provides a range of policy directives that facilitate the setting up of Industrial Parks and also options from the clearances o setting up Industrial parks to the set up of industrial land banks, infrastructure development, industrial water, power, and setting up of CETPs.

1.4.2 Pertaining to India and other states: The State of Gujarat and its policies for creation of Industrial parks consists of detailed recommendations, schemes and economic incentives mandated by the Gujarat government or recommended by private research institutions for the promotion of industrial parks in Gujarat. Gujarat Industrial Policy 2015: In terms of location of industrial clusters and parks the state industrial policy seeks to establish Special Investment Regions (SIR) along the Delhi-Mumbai Corridor which includes the Chemical and Petrochemical Investment Region (PCPIR) at Dahej and Halol-Savli,Knowledge corridor at Gandhinagar, the Ahemadabad-Dholera Special investment region and the Gujarat Finance Tech city (GIFT) and integrated townships. It seeks to facilitate large scale projects including infrastructural projects within these regions. It includes recommendations for land use and land allocation.

There is also a specific scheme targeted at the development of common environment infrastructure for industrial areas which incorporate the concerns of CETP, Recycling, managing water, monitoring systems, waste management. Eco Industrial Development in India is a policy document prepared by GIZ which provides a framework for the development of eco industrial parks in India. It consists of recommendations and case studies of issues pertaining to the selection of new industrial parks and the transformation of existing industrial parks. Its recommendations look at the industrial park in terms of installing technologies and capabilities to handle infrastructure, waste management (including hazardous waste) and effluent treatment. In terms of management it calls for the creation of mechanisms such as better information system management, stakeholder participation and disaster management. By doing so it defines the planning of an eco-industrial park as one which not only seeks the reduction of pollution and resource consumption but also a planning process which seeks to make efficient resource allocation, build suitable infrastructure, and which gathers public acceptance. An overview of Green Industrial Policies in India by CEEW (pg.87) suggests that the larger issue with India's manufacturing and traditional industrial policy continues to plague the development of green industrial parks in the present. This problem is that just policies (traditional or green industrial policies) do not address 1) the need to increase the productivity and competitive strength of the manufacturing sector as a whole 2) the absence of backward integration of ancillary industries to increase the supply side and production capabilities of industries3) the failure to generate much-needed employment and 4) the inability to establish significant domestic R&D spending on these industries. As the report says (pg.12), "India. At no point in the last 20 years did manufacturing contribute more than 16 per cent of GDP (RBI, 2013). What ails the manufacturing sector at large also affects the ability of RE-related manufacturing to take off in a meaningful way Policies cannot persistently be seen as supporting either the evolving notion of "green" or just the classic industrial policy goals… an efficient domestic manufacturing base will push the envelope of possibilities when it comes to achieving green goals through affordable technologies, while enjoying popular support of the public on account of the economic and environmental benefits"

Tamil Nadu Industrial Policy 2014: The industrial policy of the state also seeks to create and develop industrial sectors in the form of 1) Special Investment Regions in north south and coastal districts 2) Petroleum, Chemicals and Petrochemicals Investment Regions (PCPIR) in Cuddalore, Nagapattinam districts, and one PCPIR in the southern coastal district 3) A manufacturing hub for Heavy Engineering products and components in Thiruvallur District. It also seeks to promote at least one or more new industrial parks in all the districts of Tamil Nadu through SIPCOT, TIDCO, SIDCO or through private sector and establish new industrial parks in 9 Southern of Pudukkottai, Theni, Dindigul, Sivagangai, Ramanathapuram, Virudhunagar, Tirunelveli, Thoothukudi and Kanniyakumari. It also gives a special thrust to the development of Automobile and Auto components Sector, Renewable Energy Equipment manufacturing Industries, Aerospace industry and Bio-technology and Pharmaceuticals Sector within these industrial parks. To ensure a good impact with the available limited resources, SIPCOT has created Industrial Complexes and Parks, strategically located in Nineteen places and Twelve Districts, which occupy a place of pride in the State's industrial map. Comprehensive plans for the development of sriperembudur area, Apparel Park , Irungattukottai Textile Processing Park, Cuddalore, Footwear Component Park , Irungattukottai, Industrial corridor of excellence:- Chennai - Sriperumbudur - Ranipet - Hosur Madurai - Thoothukudi - Coimbatore – Salem

Maharashtra Industrial Policy 2013: It looks to set up the following industrial sites- Mega Industrial Park at Sinnar-Nashik, Dhule and Shendra Bidkin-Aurangabad;; Dighi Industrial Park at Raigad; MultiModal Logistics Park at Talegaon-Pune; 1000 MW gas based power plants at Vile Bhagad-Raigad and Indapur-Pune; Exhibition cum convention centre at Additional Shendra-Aurangabad; and Create secondary growth corridors along national and state highways,

to bring industrially underdeveloped areas of the state namely Vidarbha, Marathwada and Konkan functionally closer to growth centers like Mumbai and Pune

1.4.3 Policies Pertaining to Developing Countries: The Eco-Industrial Park Handbook for Asian Developing Countries in its seventh chapter provides a critical analysis of the implementation of schemes pertaining to industrial parks in Asia. In particular it comments on three related issues of Industrial Park development- to pay close attention to the change in policy and regulations on the part of managers and park developers, linking environmental protection more strongly to policy based in resource efficiency, especially through by-product utilization, and what it terms as the "value" of place-based policy (a site and location specific policy that is integrated with national and sector-based policies under which most industrial development parks fall).In particular another area which is highlighted in the report is the pitfalls of excessive deregulation and privatisation with the case study of policies in California and its relevance to the Asian scenario. It also emphasises the need for incentives and hazard waste management policies for industrial parks and the development of research partnerships.

1.4.4 Policies Pertaining to Developed Countries: A policy report on Industrial Parks and Climate Change by the Cardinal Group in Canada states that the objective of industrial parks in the context of climate change should be to identify and implement (pg.3) "opportunities to reduce risks associated with climate change that will also improve the financial "bottom line" of companies. "It identifies eight strategic concerns for tenants within an industrial park which must be incorporated to meet the above objective- Site selection, renewable energy facilities, energy conserving building infrastructure, efficient housing designs, landscaping for reduced CO2 emissions, presence of infrastructure and operations for handling infrastructure risks, efficient and green modes of transportation and information to planners and managers.

Reference

Andhra Pradesh Industrial Policy and Industrial Parks by Industries & Commerce Department, Government of Andhra Pradesh pg.1, pg.5
The Andhra Pradesh Infrastructure Development Enabling Act 2001- pg.6-8
Telangana State Industrial Policy and Industrial Parks by Government of Telangana-pg.12-15, 19-21
TSIIC Industrial Parks Allotment Regulations 2012- pg.4,6,8-10
Gujarat Industrial Policy 2015 by Ministry of Industry and Mines, Gujarat State government-pg.15-19
Tamil Nadu State Industrial Policy developed by the Industries department, Government of Tamil Nadu pg.10.16-17
Maharashtra Industrial Policy 2013
Karnataka State Industrial Policy 2014-19: pg. 13, annexures 1-5- pg. 23 onwards,
SEZ Act 2005- pg.7-10, SEZ Rules 2006
Andhra Pradesh Industrial Policy and Industrial Parks by the Industries & Commerce Department, Government of Andhra Pradesh
Telangana State Industrial Policy and Industrial Parks by the Government of Telangana
Gujarat Industrial Policy 2015 by the Ministry of Industry and Mines, Gujarat State government
Pathway to Eco Industrial Development in India Concepts and Cases by GIZ
Assessing Green Industrial Policy: The India experience by Karthik Ganesan, Poulami Choudhury, Rajeev Palakshappa, Rishabh Jain, Sanyukta Raje (Council on Energy, Environment and Water(CEEW) and International Institute for Sustainable Development (IISD))- pg.1-10, 85-91
Industrial Parks and Climate Change- Cardinal Group, Canada- pg.3-6
The Eco-Industrial Park Handbook for Asian Developing Countries pg.1,6-8

2. Infrastructure in IP

2.1.1 Pertaining to Andhra Pradesh and Telangana: A GR of the Industry and Commerce department of the Government of Andhra Pradesh (2015) calls for industrial promotion and incentives for the establishment of industrial enterprises within Andhra Pradesh as a part of it Industrial Development Policy (2015-2020). The Industrial Promotion GR envisages the creation of cleaner and waste reducing infrastructure such as waste water treatment plants, green buildings with GRIHA and LEED certification, use and establishment of renewable energy within the parks, emission monitoring system, rain water harvesting, and other environment management project. It details out various infrastructure within Industrial Parks and announces different incentive schemes in order to facilitate their implementation.

2.1.2 Pertaining to National Policies and Other States: A Government Resolution (GR) passed by the Gujarat Government provides in accordance with the Gujarat Industrial Policy 2015, schemes for providing assistance to industries to set up and implement Environmental Protection Measures within their facilities. This GR pertains to the setting up of environmental protection measures and cleaner technologies in the case of industrial estates and industrial parks as envisaged by the Industrial policy document of the state. In this regards it identifies the type of technologies and their implementation such as: the implementation of cleaner production technologies, utilisation of less resource consuming technologies, and other waste management and pollution control equipments. It also covers under its ambit infrastructure in such industrial estates that would reduce waste generation and reutilise it. It then goes on to identify the various nodal state government bodies through which incentives and assistance can be provided to SMEs and MSMEs to establish such infrastructure within an industrial estate or park.

2.1.3 Pertaining to Developing countries: A resource Manual On Infrastructure for Eco-Industrial Development developed by the University of California speaks of the establishment of Wastewater treatment plants (WWTP's) . The setting up of such plants provides various opportunities to the Industrial park and would require according to this manual a commitment towards maintaining the following standards- handle high influent volumes (i.e., large flows into the WWTP); Improve effluent quality (i.e., cleaner water out of the WWTP); Reduce demands on freshwater resources; and Create economic development in the vicinity of the WWTP. The Hinton Eco-Industrial Park Eco-Industrial District Zone & EIP Development Guidelines (pg.17-18) specifies that in terms of management of water the following should be the top priorities of Industrial Parks- Water, Storm water and Wastewater Systems, Integrated water infrastructure systems, and Storm water Efficiency. According ot the guidelines "the intent of this section of the guidelines is to minimize consumption of potable water, and to facilitate the reclamation and re-use of storm water and treated wastewater. Cascading systems use water repeatedly, matching quality of the water supply to the needs of the industrial process." The end goal through the establishment of these systems would be to improve upon opportunities for re-circulating water, including collected storm water or high quality wastewater within industrial operations and between businesses.

2.1.4 Pertaining to Developed Countries: With regards to the treatment of waste the resource Manual On Infrastructure for Eco-Industrial Development developed by the University of California states that Industrial Parks must lay in place special policies for Hazardous Material Management which would include Hazardous chemicals, heavy metals, and contaminated materials or equipment. It emphasises that strategies are required for reducing these wastes and whenever possible for "establishing a shared collection system or even recruiting a treatment facility to operate inside the park" so as to utilise such waste in other manufacturing

and production processes. It also stresses the need for incorporating “regulatory officials, trade associations and even local non-governmental organizations” to design such systems within an industrial park.

References

G.R. Gujarat Industrial Policy 2015 Scheme for Assistance for Environment Protection Measures
Resource Manual On Infrastructure for Eco-Industrial Development (pg.17-18)
Hinton Eco-Industrial Park Eco-Industrial District Zone & EIP Development Guidelines (pg.6-18, 29-32)

University of California Eco Industrial Park Development

3. Buildings in IP

3.1 IGBC / GRIHA Certified Industrial Buildings

3.1.1 Pertaining to Andhra Pradesh and Telangana: There are no building design codes developed by the states and regulatory bodies present within the state of Telangana and Andhra Pradesh. However their Industrial Policies refer to the presence of IGBC and GRIHA certified buildings as being important for availing subsidies and grants to set up Industrial Parks (see section 6.9.1).

3.1.2 Pertaining to India: The Indian Green Building Council (IGBC), part of the Confederation of Indian Industry (CII) was formed in the year 2001. According to the IGBC Green Factory rating system, different levels of green building certification are awarded based on the total credits earned. Ratings are provided for the incorporation of ‘green features’ under the following categories: Site Selection and Planning; Water Conservation; Energy Conservation; Materials Conservation; Indoor Environmental Quality and Occupational Health; Innovation & Design Process. GRIHA rating system for Buildings: It consists of 34 criteria categorized under various sections such as Site Selection and Site Planning, Conservation and Efficient Utilization of Resources, Building Operation and Maintenance, and Innovation points. Eight of these 34 criteria are mandatory, four are partly mandatory, while the rest are optional. Each criterion has a number of points assigned to it. It means that a project intending to meet the criterion would qualify for the points. Different levels of certification (one star to five stars) are awarded based on the number of points earned. The minimum points required for certification is 50. Some of these criterion include: Enhance outdoor lighting system efficiency; Plan utilities efficiently and optimize on-site circulation efficiency; Provide minimum level of sanitation/safety facilities for construction workers; Reduce air pollution during construction; Reduce landscape water demand; Renewable energy utilization; Renewable energy based hot water system; Waste water treatment, Water recycle and reuse (including rainwater), Reduction in waste during construction, Efficient Waste segregation, Storage and disposal of wastes, Resource recovery from waste; Energy audit and validation.

3.1.3 Pertaining to Developing countries: Under the China Clean Energy Program, the National Reform and Development Commission (NRDC) specifies mandatory standards for energy efficient buildings and equipment. It consists of a concrete set of energy standards for public buildings and commercial buildings. The NRDC also promotes voluntary market-pull programs in green buildings that go beyond these minimum standards.

3.1.4 Pertaining to Developed Countries: LEED, which stands for Leadership in Energy and Environmental Design, is an increasingly popular building assessment and design tool developed by the US Green Building Council (USGBC) and the most widely applied within the US.

The LEED Green Building Assessment tool is an assessment tool, which is used in practice by professionals to as a design to LEED is designed for rating new and existing commercial, institutional, and high-rise residential buildings. Energy Star is a US government led program for building an energy performance rating developed by the U.S. Environmental Protection Agency. It includes evaluation of management strategy in order to measure energy performance, set goals, tracking savings, and reward improvements, etc., Building Research Establishment Environmental Assessment Method (BREEAM) is regarded by the UK's construction and property sectors as the measure of best practice in environmental design and management and includes regulations for the design of buildings in terms of the following considerations: management (overall management policy, commissioning site management and procedural issues); energy use (operational energy and carbon dioxide (CO2) issues; health and well-being (indoor and external issues affecting health and wellbeing); pollution (air and water pollution issues); transport (transport-related CO2 and location-related factors) land use (greenfield and brownfield sites); ecology (ecological value conservation and enhancement of the site); materials (environmental implication of building materials, including lifecycle impacts); water (consumption and water efficiency).

References

Indian Green Building Council (IGBC/LEED Certification) by CII
Green Rating for Integrated Habitat Assessment by TERI
Energy Efficient Building Codes and Equipment Standards by the China Clean Energy Program, the National Reform and Development Commission (NRDC)
Leadership in Energy and Environmental Design (LEED) by the US Green Building Council (USGBC)
Energy Star
Building Research Establishment Environmental Assessment Method (BREEAM)

4. Industrial Processes

4.1 Reducing exposure to flooding and cyclones

4.1.1 Pertaining to Andhra Pradesh and Telangana & 4.1.2 Pertaining to other states and National policies: A Working paper report by TERI titled, “Planning Climate Resilient Coastal Cities: Learnings from Panaji and Visakhapatnam” looks at issues pertaining to resilience of infrastructure to climate change. In particular, based on a vulnerability analysis of the cities of Vishakapatnam and Panaji, it makes an assessment of the potential impacts of sea level rise on infrastructure in these coastal cities. The report consists of two key aspects. The first is the identification of critical infrastructure and the second is the development of a methodology for Climate Vulnerability Analysis. IN terms of critical infrastructure it identifies water supply, sewerage and drainage, solid waste management, transport, social infrastructure, ecologically sensitive areas, energy and communications, and disaster management. Vishakapatnam which is also an industrial hub and where industries have been affected by various natural disasters requires such vulnerability assessments. Although this exercise pertains to sea level rise and infrastructure impact the framework of creating a spatial data base and conducting vulnerability assessment of infrastructure can be carried forward. The other important issue that this study flags is that of spatial data bases and the absence of adequate database sets for such exercises.

Subsequently there is a separate cases study report prepared by TERI detailing the situation of Vishakapatnam. On similar lines to the previous working paper report, this case study highlights the need for a primary profiling of infrastructure locations, the development of climate knowledge, and vulnerability assessment of the city and its critical infrastructure facilities. The report further contains detail GIS maps of the coastal location of sewage treatment plants, waste water recycling industry, flood prone areas, important electricity utility companies, and other important industrial infrastructure located on the coast.

4.1.2 Pertaining to Developing Countries: Reports on Flood risk assessment and mapping strategies published with respect to China and Developing countries in general emphasise the role of flood risk mapping and its benefits for economic development including that of industry. This is important as a part of climate adaptation and risk mitigation strategies that can be employed by industry. The Asian Development Report with reference to China for instance devotes great attention to the vulnerability to industry and populations based on location proximity to river basins and management of river basin land topology- (pg.59) “Continuing upper catchment development, land clearing, and sediment deposit ion in river channels, coupled with rapid development of cities and land adjacent to the middle and lower reaches of rivers, has eroded protection levels of the people, industry, and commerce adjacent to the rivers, requiring regular revision and updating of flood protection works.” A UNESCO international experts report on Flood risk mapping highlights tools for flood risk mapping which can be beneficial to infrastructure development in general. The specific tools recommended included- a list of support approaches for uncertainty and decision making. This is important because it also identifies the need for integrating Flood Risk Mapping with spatial planning- especially with respect to the relation between the location of industries and centres of commerce with flood risk zones.

4.1.3 Pertaining to Developed Countries: With respect to industrial planning for flood risks and climate hazards policy initiatives from the Unites States and the United Kingdom are one of the most important to review. The New York Planning Department in a report on climate resiliency of coastal fronts provides regulations for the construction of infrastructure and buildings in the coastal zone. A report for the Boston Green Ribbon Commission Climate Preparedness Working Group identifies guidelines and opportunities for retrofitting existing buildings and infrastructure in terms of preparing it for being resilient to flooding, heat and wind related hazards. A report centred around policies in the UK, titled Modern Built Environment Knowledge Transfer Network 201This report provides guidance to planners, developers, and designers working in the built environment sector in the UK on how to: i) develop and communicate the business case for climate change adaption, and ii) realise developments which are resilient to the effects of a changing climate. It is applicable to both new development and retrofits, and for building and landscaping projects. In the case of all three- New York, Boston and UK, the most identifiable forms of mapping hazards are flood risk mapping, and modelling potential threats and risks from Extreme Events.

Reference

Flood Risk Management in the People’s Republic of China- Asian Development Bank
Flood Risk Management: A Strategic Approach- Report prepared by international experts led by the World Wide Fund for Nature (WWF) and a policy team within the General Institute of Water Resources and Hydropower Planning and Design (GIWP), Ministry of Water Resources, China- pg.128
Coastal Climate Resiliency: Retrofitting Buildings for Flood Risk- New York City Planning Department 2013
Building resilience in Boston: Best Practices for Climate Change Adaptation and Resilience for Existing Buildings 2013

Modern Built Environment Knowledge Transfer Network, 2013. Guidance for making the case for climate change adaptation in the built Environment 2013
Planning Climate Resilient Coastal Cities: Learnings from Panaji and Visakhapatnam, India by TERI

4.2 Water management: Increase water efficiency, water recycling, Use of grey water

4.2.1 Policies from Andhra Pradesh and Telangana: The water use policy of the Andhra Pradesh Government identifies the need to maintain and sustain ecological balance by enforcing the recycling of industrial effluents and wastewater for secondary uses. It also ascribes a prioritisation of water usage as follows: Drinking water, Irrigation, Hydro-power, Ecology, Agro-industries and non-agricultural industries, Navigation and other uses Special Focus Areas. It also calls for "the deployment of modern computer hardware and software, development of a modern knowledge base (using GIS, Remote Sensing, and MIS tools), interactive decision support systems and other analytical tools, modern data and voice communication systems, improved use of the internet, improved information flow arrangements, effective targeted research, and knowledge partnerships." There are also guidelines provided by the Andhra Pradesh Pollution Control Board which provides a detail list of pollution limits and standards for different categories of industries and units operating within the State of Andhra Pradesh. These include specification for industries and industrial units such as Aluminium, cement, brick kiln, thermal power plants, steel, petrochemicals, paint, iron and steel foundries, glass factories, etc., It also prescribes water quality standards that have to be maintained by industrial units if effluents are released onto water bodies. The water quality standards prescribes the levels for specific substance to be found in water systems, their desirable Limit and methods required to test these standards.

The Government of Telangana has earmarked 10% of water from all existing and new irrigation sources for industrial use. Water pipelines will be laid as a part of infrastructure creation for each industrial park by TSIIC. The TSIIC Industrial Parks Allotment Regulations of 2012 stipulate that the Layout of each industrial park may include a waste disposal management facility and that the industrial units are responsible for waste management based on regulations of the Andhra Pradesh Pollution control Board regulations. The TSIIC may depending upon the size and aggregation of similar projects set up CETP. The Telangana State Government will also encourage development of CETP through a Joint Venture/PPP model, since it is possible to operate and maintain a CETP on commercial lines.

4.2.2 Policies at National level and from Other States: The main framework for industrial use of water stems from the Water (Prevention and Control of Pollution) Act of 1974 and the Water (Prevention and Control of Pollution) Cess Act, 1977. Both policies lay down guidelines in terms of the prioritisation of water use according to the purposes of drinking, agriculture and industry. They also specify standards of water pollution. The onus is on the water pollution control board to monitor and assess, while the liability in terms of pollution and compensation lies with individual industries found to be polluting water sources. In the case of the Tamil Nadu Industrial Policy of 2014 there is present an action plan for the promotion of desalination plants and waste water treatment and recycling plants: Developers of Industrial parks/ SEZs/ Industry clusters, etc., will be provided incentives to set up desalination plants/ waste water treatment and recycling plants. The industries will be encouraged to adopt measures for rainwater harvesting system to recharge the aquifers in the industrial area. With respect to water management, industry and environmental standards the Karnataka state Water policy stipulates the following- "Catchments of the storages supplying water to urban centres will be protected from

environmental degradation and industrial pollution. Steps shall be taken to ensure that effluents are treated to acceptable level standards before discharging them in natural streams. The efficiency of utilization of water will be improved and awareness about water as a scarce resource fostered. Rainwater harvesting and water conservation will be encouraged. Conservation consciousness will be promoted through education, regulation incentives and disincentives." The Maharashtra State Water Policy of 2003 stipulates riles for the research and implementation of modern technology in water recycling. It states that the reuse of water and effluent treatment should be promoted by the State Government. In particular it seeks to improve technological capacity and management for the introduction of new technology, water harvesting, and maintenance of water resources through effluent treatment.

4.2.3 Policies pertaining to Developing Countries: The report on China's Water Resource Management Challenge prepared by GWP identifies that there has been the following set of changes in China's water policy with respect to Industrial Utilisation, recycling of water and grey water use: from water supply management to water-demand management; Planning economic development as a priority to environmental protection; Cleaning up polluted water to prevention; Planning disorder to rational order; Over-exploiting water resources to improving efficient use; a 'silo' based water administration to an integrated approach with clear accountability. In terms of water management, it looks at recycling as a key aspect. However, one of the overriding aspect of this policy is to maintain the standards of water quality. This has to be achieved by way of: Controlling industrial water pollution; reducing all major pollutants; increasing water sewage treatment in cities; improving the water environment of major river basins; and preventing eutrophication of rivers and lakes

4.2.4 Policies pertaining to Developed Countries: A policy brief titled US Water Policy: Trends and Future Direction describes the major federal laws governing water. It identifies that water policy in the USA reflects to major concerns supply and quality. It warns against establishing industry and habitation in a water scarce region. It also emphasises the need to implement following set of policies: Water loss management policies to repair water transport infrastructure and reduce losses; Water reuse and recycling programs to improve use efficiency in domestic and urban settings; Market mechanisms to incentivize use efficiency and conservation; Cooperative water management to improve collection and transport at the regional level; Conjunctive land use and water; A report on the challenges of the UK water policy emphasises that the main challenge in terms of Water use is to reduce and efficiently allocate water between domestic demand and improve upon the use of grey water through recycling. Further the UK water policies are dominated by private firms which process water, recycle it and also supply water for domestic consumption. The UK water policy further tries to integrate water management by paying attention to other relevant issues such as the physical flow of water, water quality maintenance, land use planning, environmental demands and impacts, socio-political forces shaping water use, inter relationship between food energy and water, and the impacts of adaptation to Climate Change. The challenge of maintaining water quality (pg.9-10) is of significant relevance in terms of how different legislations are viewed to achieve this broader framework of water management.

Reference

Andhra Pradesh State Water Policy Act- Pg.3, 6,8,10
TSIIC Industrial Parks Allotment Regulations 2012
Tamil Nadu Industrial Policy 2014-pg.12,24,29
Karnataka State Water Policy 2002
Maharashtra Water Policy 2003 pg.12,13
China's Water Resource Management Challenge (pg.20
US Water Policy: Trends and Future Direction (pg.5-7)
Water Policy in The UK: The Challenges (pg.9-10)

4.3 Use of RE and decentralised power supply

4.3.1 Policies from Andhra Pradesh and Telangana: APERC Renewable Energy Purchase Obligation mandates that every distribution licensee, open access consumer, consumer owning a captive generating plant shall purchase from renewable energy sources, at the generic tariff rates determined by the Commission, for purchase of electricity from different types of renewable energy sources, a quantum of not less than 5% of its consumption of energy, during each of the years from 2012-13 to 2016-17 Provided that a minimum of 0.25 percentage point out of the 5% Renewable Power Purchase Obligation (RPPO) above specified, shall be procured from generation based on solar as renewable energy sources. Andhra Pradesh Solar Policy seeks to augment the production of Solar power by introducing various incentives for Solar Energy producers. In order to encourage the immediate production of Solar Power to reduce the present gap in demand and supply position of power and provide industries with a possibility to utilise the power produced through solar power, following incentives will be extended to those solar power Developers who commission their solar plant by June 2014. These incentives will be in force for a period of seven years from the date of implementation including exemption from wheeling and transmission Charges; cross Subsidy charges; electricity duty; VAT refund; and stamp duty. The Andhra Pradesh Wind Power Policy states that its objective is to achieve the installation of 4000MW capacity addition through wind power between 2015 and 2020. It seeks to promote wind power developers, captive wind power generators, and projects under the Renewable Energy Certificate Mechanism (pg1-4). Apart from which it also recommends the promotion of solar energy and hydel projects under the aegis of the APERC. It further earmarks that developers of wind turbine components and manufacturers must also be incentivised. The Telangana Solar Power Policy of 2015 states its objective as (pg.3). “creating an enabling environment for prospective solar power developers to harness substantial quantum of solar power in the best possible manner… to provide competitive, reliable power supply to its consumers and also to ensure a sustainable fuel mix in the long run.” It envisions the setting up of Solar Power Parks, solar rooftop projects, solar pump sets and other off grid solar applications.

4.3.2 Policies at National level and from Other States: The Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) has proposed to augment the generating capacity by 6200 MW in the next few years. The State Government has also been encouraging the development of renewable energy in a big way, with particular emphasis on wind and solar power. The Government has already unveiled the Solar Energy Policy, 2012 to lead the country by generating 3000 MW of Solar power by 2015. The State of TN mandates 6% Solar Purchase Obligation for High Tension (HT) Consumers including SEZ, Industries guaranteed with 24/7 supply, IT parks, Telecom Towers, Colleges Schools, Buildings with built up area of 20000 sq m or more. Tax incentive will be provided to manufacturers of solar components and will seek for the creation of exclusive Solar Manufacturing Parks. It will also seek to set up Solar Power Plants in all industrial estates. A review of various renewable energy policies of the State of Maharashtra indicate that the state while heading in the right direction is far behind other states on the question of setting up and implementing targets for renewable energy power generation. Maharashtra has differential renewable purchase obligations for Solar and non-Solar RE- The total RPO for power purchasers is 9%, out of which 8.5% of the total energy must come from non-solar and 0.5% of the total energy consumption must come from solar energy. However the review states that what is missing is a “clear roadmap and targets for development of RE technologies based on overall resource potential. “The draft Karnataka energy efficiency and conservation policy aims to conserve around 300 million kWh of elec-

tricity consumption and would result into avoiding fossil fuel based generation capacity addition of around 70 MW in the medium term. It seeks to develop a detailed energy efficiency and conservation action plan for the following sectors such as: municipality, domestic, agriculture, commercial and Industrial sector. For the industrial sector it mandates that there shall be Energy auditing of small and medium enterprises and identification of energy efficiency measures; Development of technology specific demonstration project for various industrial clusters; Organization of workshop for promotion of energy efficient technologies specific to various industrial clusters; Development of innovative financial assistance scheme (interest free loan) for implementation of identified energy efficiency measures

4.3.3 Pertaining to Developing Countries: Energy for Sustainable Development: Policy Options for Africa is a guidebook on policy regulations developed by UN-Energy/Africa to address issues pertaining to policy, regulation, renewable energy development, energy access in urban, peri-urban and rural areas, regional strategies for addressing energy poverty, power sector reforms, energy planning, and energy finance. It provides detailed accounts of renewable policy ranging from cogeneration to geothermal power with emphasis on the use of financial regulation and incentives for promotion of renewables (pg.25-30). It covers different African countries such as Ghana, Kenya, Uganda, Zamibia and Mauritius.

A report by UNIDO on Renewable Energy (pg.12) highlights the key challenges and opportunities for a decentralised renewable energy policy. This decentralisation according to the report must be achieved by building a greater network of small scale renewable energy instalments such as with the case of renewable energy use in rural agricultural production, generation of micro and small scale hydropower, solar power etc., In terms of renewable energy use in Industry for developing countries in identifies the following goals: cogeneration potential in rice and sugar mills, power and heat applications in biomass gasification, biogas from industrial residues, power generation from industrial solid waste, liquid biofuels, as well as solar thermal and photovoltaic applications. It also suggests hat these goals can be achieved by giving priority to assessment of energy requirements of manufacturing SMEs; designing appropriate technology applications; creating awareness of the use of renewables; and taking an integrated approach to the adoption of renewable energy based industrial applications

4.3.4 Pertaining to Developed Countries: Policy Considerations for Deploying Renewables by IEA looks at the different international statistics on the deployment of renewable energy. Based on this analysis it looks at the challenges faced for the successful deployment of Renewable energy and the possible policy tools required to achieve them. Its emphasis therefore is on scaling up the use of renewable energy in industry, looking at both economic and non-economic barriers for such a scaling up and also look at what it terms the “dynamic aspects of deployment” in terms of policy making. Here the emphasis is clearly on the market signals provided by pricing of decentralised renewable energy.

Reference

APERC RPO- pg.4-6
Andhra Pradesh Solar Power Policy 2012
Tamil Nadu Industrial Policy- pg.8,12
Re-Energizing Maharashtra: An Assessment of Renewable Energy Policies, Challenges and Opportunities Page-3
Karnataka Energy Efficiency and Conservation Policy 2014-2019- pg.5,11,12
Energy for Sustainable Development: Policy Options for Africa pg.25-30
UNIDO and Renewable Energy: Greening the Industrial Agenda
Industrial Policy for a sustainable growth path Policy Paper no13
Policy Considerations for Deploying Renewables by IEA
Telangana Solar Power Policy
Andhra Pradesh Wind Power Policy

4.4 Optimising resource efficiency (Audits, implementation)

4.4.1 Pertaining to Andhra Pradesh and Telangana: A GIZ report on Resource Efficiency in Development Cooperation highlights the specific case of implementing a Green Accounting System for the State of Andhra Pradesh (pg.33). This green accounting produces a measure for environmental cost adjusted for gross domestic product. In order to do so GIZ has started a multi-stakeholder group consultation of government representatives and NGOs and conducted workshops on the same. This project according to the report can be considered as a pilot for developing the concept of green accounting and auditing across different states in the country.

4.4.2 Pertaining to India and other states: While there are no explicit laws pertaining to resource efficiency and optimisation pertaining to Industry. Different standards have been developed. The Resource Optimization Initiative (ROI) based in Bangalore has come up with a series of studies on conducting optimisation audits and improving resource efficiency of different Industrial Clusters in different parts of the country. In particular it has developed tools for (i) Resource Flow Analysis (RFA) of Industrial clusters (ii) Life Cycle Inventory (LCI) analysis (iii) analysis of waste flows to quantify the amount of hazardous material

4.4.3 Pertaining to Developing Countries: A working paper series by Hollander et al (2009) analyses policy on Sustainable Development of Industrial Parks in China (pg.4-24). In particular in terms of resource and optimisation efficiency the paper looks at how the concept of Circular Economy was used by the management at the Economic-Technological Development Area (TEDA) developed across 14 sea-port cities in China. TEDAs in general focussed on constructing a material cycle analysis of industrial park and aimed to perfect the resource efficiency of the industrial processes. It tried to incentivise and make operational projects with low energy consumption and low pollution, through policy measures across the mechanical industry, the food and beverage industry and the pharmacies industry. TEDA also launched initiatives such as methods for new water resource management; water pollution control methods; regulations for energy saving and reducing consumption; development of circular economy; and development of recycling economy.

4.4.4 Pertaining to Developed Countries: The World Business Council on Sustainable Development in its report titled Eco-Efficient Leadership for Improved Economic and Environmental Performance lists out its primary objective as developing “environmental policy developed from end-of-pipe controls with the cutting of pollution to the environment.” It maintains that there is no coherent framework or policy available to optimize utilization of resources in our economies while preventing pollution. It therefore tries to “champion” the concept of “eco-efficiency” as one of the means of achieving sustainability and identifies seven elements of eco-efficiency: Reduce the material intensity of goods and services; Reduce the energy intensity of goods and services; Reduce toxic dispersion; Enhance material recyclability; Maximize sustainable use of renewable resources; Extend product durability; Increase the service intensity of goods and services. The OECD report on Measuring Material Flows and Resource Productivity provides an accessible guide for the measurement of resource productivity within an industrial life cycle, identifies desirable characteristics of material flows and resource productivity that can link systems theory and environmental industrial assessment, and smoothens this analysis over various set of international regulations and standards acceptable to the OECD. Chapters three and four of this report identifies in exhaustive detail the various aspects of material flow analysis required from the identification of levels at which a MFA can be applied to identifying a coherent set of measures for using the MFA (input and output indicators, balance indicators, efficiency indicators, etc.,).

Reference
Green Accounting System for the State of Andhra Pradesh in the report on Resource Efficiency in Development Cooperation (pg.33)
Projects of the Resource Optimization Initiative in Bangalore
China's move to a Circular Economy as a development strategy
Measuring Material Flows and Resource Productivity-OECD Guide (pg.5, 39-125)
Sustainable Development of Industrial Parks Working paper by Hollander et al. (pg.4-24)
Eco-Efficient Leadership for Improved Economic and Environmental Performance. Geneva.

4.5 Implementation of Zero Waste Cleaner technologies

4.5.1 Policies pertaining to Andhra Pradesh and Telangana: The state pollution control boards of the two states provide recommendations for standards to be maintained with respect to the environment that are applicable to different industrial units including industrial processes and industrial parks. These include: Ambient Air Quality Standards, Ambient Noise Standards, BIS 10500 2012 New Standards, CPCB Water Quality Criteria, Fuels Euro Norms, General Standards For Discharge Of Environmental Pollutants, Air Pollution Limits, Water Pollution Limits and Noise Pollution Limits. There are three specific regulations pertaining to the two states which are of relevance. The Municipal Administration and Urban Development Department of the Government of Andhra Pradesh issued broad order for Municipal Solid Waste Management in 2006. The orders resulted in the constitution of the Andhra Pradesh Integrated Solid Waste Management Board with an explicitly stated objective (pg .2, and 3) of promoting," Zero-waste Andhra Pradesh" where the public, industry and government strive to reduce, reuse, or recycle all municipal solid waste materials back into nature or the marketplace in a manner that protects human health and the environment". A report prepared by the Municipal Administration and Urban Development Department of the Telangana State government in compliance to the National Green Tribunal forms the basis of the Telangana action plan for Municipal Solid Waste Management of Telangana State. The document highlights detail plans instituted for the treatment of waste including separate treatment of different types of industrial and residential waste, medical hazardous waste, food and perishable commodity waste as well as calls for plans to implement waste segregation of dry and wet garbage (pg.12-15). It also calls for different Urban Local Bodies to develop a City Sanitation Plant to identify gaps and develop short and long run solid waste management action plans.

4.5.2 Policies Pertaining to Other States in India: The national policy on municipal waste management and zero-waste technologies fall under the Ambit of the Municipal Solid Waste (Management and Handling) Rules. This rule was first passed in 2000 following which a revised version was drafted by the Ministry of Environment and Forestry in 2013. The Rules specifies that MUniciplaities must clearly have a solid waste management plan, including the establishment of non-landfill technologies, waste extraction, and recycling facilities.

The Government of India, through its Ministry of Environment & Forests, is implementing a World Bank funded project titled "Capacity Building for Industrial Pollution Management" with the objective of strengthening the environmental management capacity of central and state level regulatory authorities with emphasis on rehabilitation of polluted sites and for undertaking area-based demonstration projects on remediation of contaminated sites. The project also aims at developing a "National Program for the Rehabilitation of Polluted Sites" to reduce or eliminate the environmental and health risks associated with legacy pollution. The development objectives of the Capacity Building for Industrial Pollution Management Project for India

are: (i) to build tangible human and technical capacity in selected state pollution control agencies of the Borrower for undertaking environmentally sound remediation of polluted sites; and (ii) to support the development of a policy, institutional, and methodological framework for the Borrower to establish a national program for rehabilitation of polluted sites. Some of the negative impacts and mitigation measures include: (1) sprinkling of water which lead to dust suppression; (2) adequate ventilation to reduce the impact of health of workers; (3) ensure that vehicles have pollution under control (PUC) certificate; (4) install compost filter at the landfill gas ventilation well to prevent landfill gas emission; (5) reduction in fire risk by supplying fire extinguisher; (6) use well maintained fuel storage and delivery equipment; and (7) installation of storm water drainage system. Andhra Pradesh (before bifurcation) and West Bengal were the two states identified for this World Bank aided project. For the states of Andhra Pradesh and Tealangana the CED-Green Origin' project availed grants from the World Bank in order to implement a study to identify hazardous waste categories and their potential treatment in Andhra Pradesh and Telangana. It reviewed existing data of the then Andhra Pradesh Pollution Control Board as well as conducted surveys across different industrial units and sectors including- Bulk drugs, Power plants (thermal, biomass based), Cement plants, Sponge iron plants, Metal finishing units (galvanizing, electroplating, Petroleum refineries, CETPs and TSDFs- Treatment, Storage, and Disposal Facility)etc.,

In the case of the Tamil Nadu Industrial Policy of 2014 states that developers of Industrial parks/ SEZs/ Industry clusters, etc., will be provided incentives to encourage industries to undertake large waste water treatment and recycling plants on the Public Private Partnership (PPP) mode for treating urban sewage to industrial grade water. The Industrial Estate Developer agencies will be encouraged to promote common Effluent Treatment Plants (ETP) and Sewage Treatment Plants (STP) apart from providing a site for solid waste disposal. Tamil Nadu Vision 2023 provides a coherent policy vision for the management of sewerage and waste. It calls for the provision of sewerage network in Urban Agglomerations (population greater than 100,000) by 2015 and in all urban areas of the state by 2017; along with achievement of SLB norms for sewerage in Urban Agglomerations by 2017 and in all urban areas in the state by 2022. The Integrated Solid Waste management Policy of Karnataka formulates that municipal solid waste and industrial waste must comply with the following rules: Dumping of MSW in oceans, rivers, open areas, and compaction or bailing are not acceptable; The biodegradable waste has to be processed by means of composting, anaerobic digestion or any other appropriate biological processing for stabilization of wastes; Mixed waste containing recoverable resources should be recycled; Other technologies for treatment such as Pelletisation, Gasification, Incineration etc., require clearance from Pollution Control Board before planning and implementation; Land filling should be the waste disposal method for non-biodegradable, inert waste and other waste that is not suitable either for recycling or for biological processing.

4.5.3 Policies Pertaining to Developing Countries: A UNEP report on Guidelines for National Waste management Strategies describes and analyses how optimal waste management strategies can be used across different countries for sustainable industrial Development. Part ii of this report titled 'Challenges and Opportunities in Waste management' provides a broad policy overview of the challenge of Waste Management in the developing world (pg.22-45). While highlighting the economic and environmental imperative of waste management in Industry the report highlights the successful solid waste management programmes in developing countries such as Brazil. It emphasises the need to incorporate life cycle analysis and methods of technology transfer to achieve a higher standard of waste management. With special reference to the context of Developing countries it also underscores the importance of low cost and low technological scale of technologies that can be used to achieve this end. It also highlights the need to pay attention to local communities and the health of workers involved in waste management in in an informal set up such as with the case of waste pickers in different parts of India. A World Bank Report on Waste management in China provides a detailed account of

the volume of waste generated by different Industries in China, the existing policy framework available to tackle such waste, and calls for a greater role of the recycling industry to reduce such waste. Section 4 and section 5 of the report (pg.27-38), look at the issues of policies and legislations, as well as points out certain lacunae when it comes to minimizing waste. It also advocates that for the growing volumes of waste generation in China, waste management facilities must be integrated with policies of municipal solid waste management, the improvements in waste recycling technologies and industrial waste management system in general. While doing so it also sounds the following warning of the economic structure of industrial operations (pg.50): "Introduction of commercial operations must be done carefully. As the industry grows, it will become powerful and will fight to protect the high grade portions of an integrated waste system, while leaving the rest to the municipalities. If proposed innovations affect industry profitability they will oppose it." It also states that a national level plan is what is the need of the hour in order to set the tone for handling industrial and municipal solid waste, as well as for unlocking the role of the private sector in doing so (pg.20-28). It advocates this by stating the following, "Some elements of policy require consistency across a country if they are to be effective (e.g. policy and programs relating to industrial waste, or policies aimed at changing consumer attitudes, which may sometimes be introduced through mass media campaigns).....A national approach provides a level playing field for the private sector, with greater certainty and clarity, thus providing a better environment for investment" (pg.21).

4.5.4 Policies Pertaining to Developed Countries: Report on the policy analysis of Eco-Industrial Developments in Japan (pg.4-8) looks at the need for reducing landfill dumping of waste in land scarce Japan and the need for creating alternative means for waste management other than waste incineration and land filing. In concrete terms it proposes the following measures to be set up in terms of waste management for a zero waste policy: a fluidized-bed gasification combustion and ash-melting system which converts industrial and municipal waste, agricultural waste, sewage, and plastic into commercially viable outputs of ammonia, methane and hydrogen from combustion gases. The combustion provides heat for power generation; a flue gas treatment system which treats the gases to remove nitrogen and sulphur oxides, that are then used as agricultural fertilizers; removing solids from waste water and sent through the sludge treatment process, while the remaining gray water is used to flush toilets and water lawns, gardens, and landscaping.

Reference

Andhra Pradesh and Telangana State Pollution Control Board and recommended Standards
Inventorisation and Characterisation of Hazardous Waste Categories in Andhra Pradesh and Telangana funded by the World Bank for “Capacity Building for Industrial Pollution Management (CBIPMP)
Capacity Building for Industrial Pollution Management Project for India
Municipal Administration and Water Supply Department, Tamil Nadu (2014) Operative Guidelines for Septage Management for Local Bodies of Tamil Nadu. pg.3-7
Vision Tamil Nadu 2023
Karnataka State Policy on Integrated Solid Waste Management 2006 pg. 2,3
Eco-Industrial Developments in Japan (pg.4-8)
Municipal Solid Waste (Management and Handling) Rules
Municipal Administration and Urban Development Department –Municipal Solid Waste Management -Constitution of Andhra Pradesh Integrated Solid Waste Management Board –Orders-Issued.
Report on the action plan for Municipal Solid Waste Management of Telangana State
Waste Management in China: Issues and Recommendations (pg.27-35, 50)

Guidelines for National Waste Management Strategies: From Challenges to Opportunities (pg.20-30)

4.6 Health & safety at workplace

4.6.1 Pertaining to Andhra Pradesh and Telangana: The laws mentioned in 4,6,2 primarily the Factories Act of 1948 is the main act governing Occupational Safety and Health guidelines across different States in the country. However the Directorate of Factories in Andhra Pradesh oversees the implementation of these regulations A detailed report of this Directorate of Factories in terms of the implementation of the act, the appointment of safety officers etc., in the state of Andhra Pradesh is also detailed by its website:

http://dgfasli.nic.in/publication/reports/andhra/chapter7.htm

http://www.aponline.gov.in/apportal/departments/departments.aspx?dep=23&org=158&category=Introduction.

4.6.2 Pertaining to India and other states in India: Health Provisions under the Factories Act, 1948: The Factories Act, 1948 was enacted with the object of protecting workers from subjecting to unduly long hours of bodily strain or manual labour. It lays down that employees should work in healthy and sanitary conditions so far as the manufacturing will allow and that precautions should be taken for their safety and for the prevention of accidents. The Act defines a 'worker' as any person employed directly or through any agency (including a contractor), whether for remuneration or not in any manufacturing process or in any work incidental to or connected with the manufacturing process. It is required that work performed should be connected with the product which is produced in the manufacturing process. The working group report on Occupational Safety and Health (OSH) for the 12th five year plan details the important issues related worker safety and industries. It does so across the mining, unorganised and manufacturing sector. The report has incorporates separate chapters on overview of the OSH status, existing set-up in OSH management, constraints in the existing set up along with suggestions for improvement. It also reviews the implementation of regulations and legislations pertaining to worker safety and conditions. The special focus relevant to this literature review would be the section pertaining to Manufacturing and port sector (pg.81-132). . It details the various budget layouts for the implementation of OSH schemes. This section highlights the entire organisational set up and hierarchy across different government bodies with respect to OSH in the Factory and Industrial spaces.

4.6.3 Pertaining to Developing Countries: A study on risks and policies of Occupational Safety and Health in Brazil used a combination of data from national household surveys and existing policies to comment that the Status of policy on worker health and safety at Brazil remains quite strong. However, the key issue according to this analysis of policy is that there is severe under reporting of factory related health concerns including fatalities and injuries. Further most of the reporting occurs within the formal sector. The study concludes that "Brazil has an impressive array of public policies designed to prevent injuries, although again they often apply only to the formal sector of the economy. Although the labour inspectorate is sizable, the number of staff who are knowledgeable about safety and health may not be adequate". The ILO National Profile Report on Occupational Safety and Health in China describes and analyses all the laws and policies pertaining to Worker health and safety in China. These regulations and laws look at OSH issues in industries and factories such as Mining, Hazardous chemicals, firework and firecracker production, infrastructure development, safety and supervision of agricultural machinery etc., It provides detailed analysis of the regulations for compliance and implementation of these laws in terms of insurance, compensation and rehabilitation measures etc.,

4.6.4 Pertaining to Developed Countries: The EU OSH strategic framework looks at three major concerns- implementation of existing health and safety rules, prevention of work-related diseases and to account for the ageing of the EU's workforce. To do so it lists seven strategic objectives for OSH implementation: consolidating national health and safety strategies, providing practical support to small and micro enterprises for better compliance with laws, increasing the enforcement of laws by Member States, simplifying existing legislation, addressing the ageing of the European workforce and improving prevention of work-related diseases, improving statistical data collection to have better evidence and developing monitoring tools and reinforcing coordination with international organisations with the International Labour Organisation (ILO), the World Health Organisation (WHO) and the Organisation for Economic Co-operation and Development (OECD). pg.5-7 are of particular relevance for the Indian context.

Reference

REPORT OF THE WORKING GROUP ON OCCUPATIONAL SAFETY AND HEALTH FOR THE TWELFTH FIVE YEAR PLAN (2012 TO 2017) pg.82-135
Occupational Safety and Health in Brazil: Risks and Policies by John Mendel off
National Profile Report on Occupational Safety and Health in China (pg.2-17)
EU Occupational Safety and Health (OSH) Strategic Framework 2014-2020 pg.5-7

5. Market, supply chain, finance and insurance

5.1 Diversifying suppliers to reduce dependency

5.1.1 Policies pertaining to Andhra Pradesh and Telangana: NA

5.1.2 Policies pertaining to India and other states: NA

5.1.3 Policies pertaining to Developing countries: Research Note by Department of Marketing Kent State University on Supply chain vulnerability offers a useful form of analysis for understanding supply chain risks in emerging markets and the difference in response between developing and developed countries to supply chain risks. It defines supply chain risks as unexpected variations in the quantity and/or quality of supply flows resulting from the failure of a single, direct vendor (atomistic source) or multiple, collaborative channel partners (holistic source). Based on a quantitative assessment of supply chain risk measures it infers that the two markets differ in terms of having a single point or multiple and varied consequences to supply chain risks. Its recommendations include the need to expand the concept of supply chain vulnerability to include a number of macro level variables to better anticipate disruptions. A working paper titled Climate change, private sector and value chains: Constraints and adaptation strategies by PRISE- Pathways to Resilience in Semi-arid Economies project, looks at the impacts of climate variability and the role of the private sector. In a section on Climate change and private sector and private sector strategies for adaptation and resilience (pg.29-47), the report provides an overview of the vulnerabilities and expected effects of climate change on private sector companies in arid and semi arid countries. It tabulates operational, financial and reputational (risk to brand image and consumer satisfaction) market risks for companies based on a sector specific list of risks, and their impacts. In terms of adaptation it recommends that companies (categorised as goods and service, manufacturing, agricultural sectors etc.,) conduct an assessment and contingency plan for the following set of risks- physical risks from extreme events to business operations, supply chain and raw material risks (eg

effect of water scarcity in business operation and production), product demand risk due to decline in demand from perceived loss of quality, and logistics risk due to impacts on transportation corridors used by the company/industry.

5.1.4 Policies pertaining to Developed countries: A report by the International Transport Forum titled Building Supply Chain Resilience: a Review of Challenges and Strategies uses the framework of ESCAP (2013) and proposes a five stage procedure for improving supply chain resilience. “This starts with a risk audit and then analyses the effects of these risks on the supply chain. ‘Continuity strategies’ are devised to deal with these risks should the adverse events actually transpire. Strategies are then implemented and the continuity plan reviewed and updated at regular intervals in the light of experience. This framework is applicable to both companies and government agencies. In some cases each stakeholder group can act independently: in others it makes sense to work together on joint risk mitigation / supply chain resilience initiatives.” (pg.14). It states that Supply Chain resilience can be built by: Fostering a risk management culture; Mitigating risk within internal production and logistics systems; Strengthening supply chain collaboration; Sharing risk information with supply chain partners; increasing the agility of the supply chain; Increasing redundancy / inventory at critical point; Stress-testing systems regularly; and by Insuring against supply chain risk. A report on Value Chain Climate Resilience: A Guide to managing Climate in Companies and Communities by Partnership for Resilience and Environmental Preparedness (PREP) identifies different types of business value chains and strategies to adapt to climate risk impacts. For instance in the case of resources it identifies three important aspects of the value chain such as- access to finance, policy environment and stakeholder expectations (pg.10-15). Within each of these value chain aspects it further goes on to identify a framework of opportunities and risks. For e.g. within access to finance the risks to be identified are- investors and lenders integrating climate risk in their appraisal, and increased investor request for disclosure of climate risk management policy; and the opportunities identified are- mounting weather risks to be tackled by innovative risk management techniques, and new sources of adaptation finance. Similarly it details such a value chain operation for different aspects of business operations so that the threat of climate change risk to business operations is accounted for by Industry leaders and managers.

Reference

Supply Chain Vulnerability in Developing Markets: A Research Note by Department of Marketing Kent State University, USA
Building Supply Chain Resilience: a Review of Challenges and Strategies by the International Transport Forum
Climate change, private sector and value chains: Constraints and adaptation strategies by PRISE- Pathways to Resilience in Semi-arid Economies project
Value Chain Climate Resilience: A Guide to managing Climate in Companies and Communities by Partnership for Resilience and Environmental Preparedness (PREP)

5.2 Shading of storage facilities, reduce flooding exposure

5.2.1 policies pertaining to Andhra Pradesh and Telangana: NA

5.2.2 Policies pertaining to India and other states NA

5.2.3 Policies pertaining to Developing countries: A report on Insuring Flood Risk in Asia’s High-Growth Markets by a Geneva Association highlights that factories in Asia are most vulnerable to flooding, and that flooding risk poses the greatest threat to industries in terms of

threat from natural hazards. Some of the estimates it provides is that floods in Thailand affected over 1000 factories with estimated losses of upto 20 billion USD. It states that (pg.18) "with the current defences, Asia's average annual flood losses could grow to USD 500 billion by 2050. The report makes a flood risk assessment of various industrial cities and ranks them in order of vulnerability and flood risk preparedness as a marker for insurance standards and as a warning for the nee of introducing flood risk mitigating measures. An Asian Development Bank report on Flood Risk Management in the People's Republic of China Learning to Live with Flood Risk highlights the Chinese policy on dealing with flood risks.

5.2.4 Policies pertaining to Developed countries: A recovery Advisory by the USA FEMA on Reducing flood effects in Critical Facilities provides information and recommendations to improve the functionality of critical facilities by reducing the vulnerability of essential systems and equipment to flooding. IT identifies two key issues: 1) Major components of essential systems and equipment are frequently placed on the lowest floors or subgrade (basement) levels potentially well below the base flood elevation (BFE) 2) critical facility managers may not have a complete understanding of all the different system components and the vulnerabilities to flooding that may be present in their facility. It recommends the implementation of the following: he importance of maintaining critical facility; functionality for community resilience;Protecting components of essential systems and equipment; Code requirements and FEMA recommendations; Mitigation measures to help protect essential systems and equipment; Design considerations for protecting essential systems and equipment; Vulnerability assessments; and Conclusions and recommendations. A strategic document on Best Practices on Flood Prevention, Protection and Mitigation prepared by the EU as an update on the United Nations and Economic Commission for Europe (UN/ECE) aims to describe measures and best practices to prevent, protect and mitigate the adverse impact of flood events on human health and safety, on valuable goods and property, and on the aquatic and terrestrial environment. It identifies key measures such as flood risk assessment, a flooding evacuation strategy, compensation scheme, creating efforts to reduce rivers' natural flood zones etc., as being important. A paper on Flooding of Industrial Facilities –Vulnerability reduction in practice focuses on land use planning in flood-prone areas as an effective strategy to mitigate vulnerability of industrial facilities from Flooding. As an indicative list of measures to be implemented it identifies the following: Build walls around the critical equipments, those which are the most important for operation and safety, Close certain openings, Control, and if necessary, strengthen tanks attachment, Move storage to areas that are not likely to be flooded, Move equipments, sensors, networks (electricity, gas, water, telecommunications, computer system) above the highest past flooding water height, Install system to cut automatically power and gas supplies, Provide pathways which cannot be flooded to make intervention easier, and refuge area outside water for staff.

Reference

Reducing Flood Effects in Critical Facilities
Best Practices on Flood Prevention, Protection and Mitigation
Flooding of Industrial Facilities –Vulnerability reduction in practice

5.3 Development of resilient products, options for Change of Routes, transportation, etc.,

5.3.1 policies pertaining to Andhra Pradesh and Telangana: NA

5.3.2 Policies pertaining to India and other states: NA

5.3.3 Policies pertaining to Developing countries: A report on Business and Climate Change adaptation: Toward resilient Companies and Communities highlights the important policy measures taken by Industries in Brazil, China and other developing countries to develop resilience to Climate Change (pg.19-25). In the case of China the report analyses the role played by China Minmetals, a smelting firm which has developed and deployed a new technology that is enabling one of its large smelting operations to treat and recycle wastewater, thus greatly reducing the factory's use of new freshwater resources. "For its operations, Zhu-Zhou Smelter Group a subsidiary of China Minmetals group initially obtained water from the water utility in ZhuZhou municipality and treated wastewater through a chemical process before releasing it from the factory according to the government's environmental regulations. The company recognized that its water usage ratio could be greatly improved through better water management and use of new technology."

5.3.4 Policies pertaining to Developed countries: One key policy initiative is to push for Industrial and production resilience within the definitions and policy frameworks used for planning of Urban CCA and Urban CC resilience. This tries to argue for the case of business resilience where businesses make their operations resilient to climate change impacts and require specific business vulnerability assessments and adaptation strategies. They rely on the implementation of conducting a thorough analysis of the business or product chain, and identifying vulnerabilities relating to physical risks from climate, weather and disaster to production. CCA plan for industries by the US Engineering Corps identifies the need to plan for climate related risks to the supply chain operations. The policy was focussed on exploring the effects of both flood and drought on navigation efficiency and the use of downscaled climate data and information to develop projections of future heat stress. A Forfa's report titled "Adaptation to Climate Change: Issues for Business Summary Report" highlights the key issues where businesses need to ensure that their operations are adjusted to changes in climate variability, extreme events and climate change. The key areas which businesses need to adapt according to this report include (pg.19-24): water supply and quality, flood protection, energy infrastructure, transport and communications and waste management. By identifying such a policy framework for each of these sectors the report states that business would value risk reduction and realise opportunities from climate related risks.

Reference

Business and Climate Change adaptation: Toward resilient Companies and Communities
Insights into Climate Change Adaptation by UK Companies Carbon Disclosure Project for Department (CDP)
Business and Climate Change adaptation: Toward resilient Companies and Communities by UN Global Compact and UN Environment Programme
Climate Change Adaptation Plan by US Army Corps of Engineers (USACE)
Adaptation to Climate Change: Issues for Business Summary Report (pg.19-30)

5.4 Use of Insurances against disasters

5.4.1 Policies pertaining to Andhra Pradesh and Telangana: NA

5.4.2 Policies pertaining to India and other states: A viewpoint taken by some experts such as Padmavati (2012) to tackle this issue is to suggest a change in the system of disaster relief management. According to these experts the financing of post-disaster relief and rehabilitation expenditures is mostly supply-driven, and that a better suited system would it would be one which account for the victims' demands and needs. The key observation with respect to the insurance and disaster scenario is that there has been meagre growth within the Indian non-life insurance market; that disaster risk has largely been met out with the Government payouts

in India; and that this can be better managed by the privatisation of disaster risk through demand driven initiatives such as the insurance-linked security market (ILS) and catastrophe (CAT) bonds.When it comes to international policy on CCA and industry, one of the key issues identified pertains to the financial management of risk and insurance practices. With the case of the former, Here emphasis is given to the analysis of costs and finances of Climate Change Adaptation, the need to increase insurance practices and open up both personal and institutional insurance markets, and to have greater transparency in terms of finances utilised for adaptation.

A study on compensation, safety, and insurance by Dr. Usha Ramanathan states that in the Indian scenario, providing liability for victims emerges from within the folds of law and policy. The relationship between safety and compensation is relevant in the context of lessening the probability of disasters, in the costs generated by the event, and apportionment of the cost among the various players – willing, unwilling and unaware – including the affected person, the person in control of the event, the state and third parties. Further insurance and compensation for natural disasters according to the paper will catch on in the future as the ambiguity around the definition and meaning of the causes of natural disaster, human intervention, and state policy changes. " Natural disasters have generally remained outside the development of compensation law. This may be traced to a principle which sees 'acts of God' as beyond the control of human beings..However, a relationship is emerging between disasters and state policy; there is, in addition, the gradually unfolding of a notion of 'culpable inaction'. These may alter the contours of the 'acts of God'".

5.4.3 Policies pertaining to Developing countries: A background paper on the role of Insurance industry in mitigating financial risks is provided in this policy paper titled Insurance against Losses from Natural Disasters in Developing Countries highlights how insurance and other risk financing strategies should be viewed as efforts to recover from negative income shocks through risk pooling and transfer. The paper speaks of efforts such as public-private insurance programs for households, business-firms, and governments and explains their limitations. A World Bank report titled Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions emphaises the role of developing disaster risk financing strategies, and advises for moving from traditional risk transfer policies of government based insurance compensation (post disaster) to a more proactive burden sharing alternatives by way of increasing the role of private insurance industry in mitigating risks.

5.4.4 Policies pertaining to Developed countries: A CCA policy option developed by the PEW centre calls for the establishment of a multi-national climate insurance front. This includes an international response fund targeted to assist countries suffering from extreme climate impact and an insurance backstop where "Donor countries support the introduction or expansion of insurance-type instruments in vulnerable countries by committing funds to subsidize premiums or to reinsure governments or primary insurers."

Reference

Managing disaster risk exposure in India an opportunity for better risk management and growth by Vankayalapati Padmavathi

Climate change adaptation in industry and business: A framework for best practice in financial risk assessment, governance and disclosure by Jason West and David Brereton (Griffith University, University of Queensland). Published by the National Climate Adaptation Research Facility, Australia

Adaptation to Climate Change: International Policy Options by Ian Burton (University of Toronto), Elliot Diringer (Pew Center on Global Climate Change), Joel Smith (Stratus Consulting Inc.)

Compensation and Insurance by Dr. Usha Ramanathan

Insurance against Losses from Natural Disasters in Developing Countries
Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions background paper for UN world Economic and Social Survey

6. Policies, Regulations for IP

6.1 CCA policies, regulations, vulnerability assessment

The National Action Plan on Climate Change and various State Action Plans on Climate Change are the guiding policy documents and frameworks available in the country order to implement practices for climate change mitigation and climate change adaptation in the country. By way of their policy recommendations, they encompass a wide range of actions for CCA which indirectly pertain to climate factors that may affect industry. Another aspect is that each state action plan focuses on strategies pertaining to Urban Development and the management of transport, waste and land use. Some of these features are mentioned below:

6.1.1.Policies Pertaining to Andhra Pradesh and Telanaga: Andhra Pradesh SAPCC: The SAPCC incorporates climate change strategy for monitoring and evaluation as well as looks to assess vulnerabilities and the adaptive capacity of the state, which include assessment of the following parameters: economic resource endowment (per capita GDP, percentage of agricultural workers), demographic status (ranking of regions on the basis of population density, percentage of urban population in slums), infrastructure availability and access (road density, access to banking amenities, access to telephones, permanent and fixed roof housing condition), access to education (population to school ratio and literacy rate of males and females), access to health infrastructure (ratio of population to health care centers and hospitals) and environmental determinants (land, forest and water area, and access to drinking water and sanitation). However, more than other state action plan, the Andhra Pradesh one closely couples itself with the existing development policies of the state such as policies to eradication of extreme hunger and poverty, achievement of universal primary education, reduction in child mortality, promotion of gender equality, reduction of prevalence of malaria and other diseases, and achievement of environmental sustainability. While this might suit the co-benefits paradigm of Climate Change Adaptation, there is present a danger that policy directives and funding for development objectives get conflated with climate change adaptation. As a consequence adaptation might mask priorities of development which require greater public resources and whose nature is of building capacities for people as a part of their inalienable rights, which strengthen their human development, income and employment opportunities, and which must be provided for irrespective of their physical vulnerabilities.

6.1.2. Policies Pertaining to Other Indian States: Maharashtra SAPCC: The Maharashtra SAPCC consists of the following broad sections: identification of vulnerabilities from climate and projecting this to the future. This would include projecting sea level rise, and projected changes in socio-economic projections of demography and economic growth rates. Interestingly this action plan has detailed sections on land use and the development of a macro-level vulnerability index for the state in this regards. TI also has an adaptation focus for the sector of agriculture, health and biodiversity. Its adaptation action plan includes measuring and coping with the impact of climate variability on livelihoods, as well as action plans for disasters such as floods, extreme rainfall and urban flooding. It contains recommendations for energy and infrastructure such as the case with green buildings etc.,

Tamil Nadu SAPCC: The action plan emphasises the role of research with respect to climate change domains, consists of a detailed tabulation of climate parameters such as rainfall distribution, temperature etc., The adaptation plan focuses on the impacts of climate variability and strategies to cope with it for the sectors such as agriculture, water resource management, and biodiversity conservation. It also has a specific plan and recommended policies in place for coastal area management (which includes port location and management, fisheries infrastructure) and energy efficiency. The action plan has further specified its vision for urban development and adaptation in order to address issues of housing, waste management, energy, transport and pollution.

Gujarat SAPCC: The action plan of the state focuses on identifying vulnerabilities to the Gujarat economy in terms of sectors of agriculture, water, health and biodiversity. It then goes on to recommend strategies and actions for each of these sectors. In particular with respect to CCA and Industry direction is provided for Urban development (section 11) which includes specific recommendations such as rapid public transportation systems, improving disaster preparedness across different governmental institutions, increasing community participation, policy support and incentives for improving waste management, and promoting water management. It also includes specific policies for land use in terms of tree plantations, and recommendations for environmentally sustainable infrastructure. In particular it identifies land use planning based on risk assessment, which makes a trade-off between physical risks identified and development in that area.

Chattisgarh SAPCC: 'Adaptation' is the primary concern identified by the Chattisgarh SAPCC.It identifies both 'hard' and 'soft' adaptation approaches – :"where hard adaptation options' include options that have physical attributes (e.g. infrastructure and engineering structures) and 'soft adaptation options' include the development of skills, processes, institutions, social systems, policies and programmes." It calls for flexibility (within livelihoods, economic, social, cultural, ecological and institutional systems), diversification (involving multiple independent flows to livelihood and natural systems), learning and education (from events at both individual and institutional levels and knowledge base required to develop new systems when existing ones are disrupted), mobility (an attribute of flexibility), operational techniques (for risk reduction before and following disruptions), convertible asset and innovation (designing new systems and options). It seeks to explore a greater role for the private sector in pursuing the climate agenda in terms of encouraging or promoting its role in: primary sectors such as agriculture and forestry in terms; incorporation of climate change concerns into PPP projects in the state; brining in new financial practices, products, and innovation, capital, investments, climate risk transfer mechanism, etc., and outlining the necessary enabling frameworks and regulatory mechanisms for involvement of the financial sector. It also identifies that "Industry is likely to be vulnerable to a variety of climate risks, including extreme weather events that can adversely impact industrial infrastructure. Agro-based and food processing industries that rely on agricultural resources can be particularly vulnerable. Likewise, industries that are either water or energy intensive could also be similarly vulnerable to climate change and its impacts. Because of their financial and technical resources, large industrial organizations typically have a significant adaptive capacity for addressing vulnerability to weather extremes."

Rajasthan SAPCC: The Rajasthan SAPCC like other SAPCCs identifies the potential climate impacts and the need for CCA for the sectors of agriculture, forestry and biodiversity, energy, and urban governance. Some of its main policy imperatives include: "Building climate scenarios and investing in knowledge and research to reduce uncertainty and improve knowledge about appropriate responses; Assessing impact of climate change on existing vulnerabilities, and Identifying and enhancing risk management tools for addressing climate change; Setting out options and evaluating and ranking them according to criteria (cost effectiveness, cost-benefit, feasibility, ease of implementation, "no-regrets", robust to different scenarios, incremental vs transformative change etc.,); Identifying and implementing state-planned and community-based; voluntary/autonomous adaptation; Building broader stakeholder engagement

to maximize perspectives and involvement in implementation; Addressing state-specific priority issues, whilst also creating appropriate enabling environment for implementation of NAPCC at state level; Considering governance and institutional contexts and ensuring appropriate Institutional arrangements and building capacities, keeping in view the coordination, inter-departmental consultations, stakeholder involvement, and integration with regular planning and budgetary processes' Estimating additional resource requirements and exploring existing and new & additional carbon finance potential"

West Bengal SAPCC: The adaptation of the West Bengal SAPCC largely focuses on the adaptation to climate impacts in terms of conservation of forests and bio diversity, agricultural production, and water resource management. Its adaptation action plan includes plans for water resource management according to topography of regions i.e. different policies for water conservation and storage based on categorisation such as hill regions, alluvial zone, red and laterite zone, saline coastal zone. Of importance to this project is its identification of adaptation strategies for the electricity sector which the SAPCC identifies to include the following: developing the ecosystem for Performance achieve and trade; Leveraging International Financial Instruments for promotion of energy efficiency'; leverage CDM for designated sectors; create energy efficiency markets.

Punjab SAPCC: In terms of the adaptation agenda the SAPCC seeks to (i) build capacity to enhance scientific knowledge for informed decision/policy making on climate change (ii) establish administrative capacity to successfully coordinate the climate change agenda of the state through an integrated approach as any solution would involve multiple sectors, (iii) establish technical capacity to implement projects to ensure adaptation to climate change, (iv) formulate project design documents for priority activities, estimating concrete budgets, establishing implementation arrangements and (v) seek technical collaboration to access state of the art technology for successful implementation of activities. Another interesting aspect is the recognistion of equity in terms of adaptation by the Punjab SAPCC which it envisages as the following: "The impacts of climate change will be experienced unevenly, both spatially and temporally and the consequences of climate change will also vary as a result of the differing vulnerability of individuals, communities, different age groups and gender. Thus equity and justice are important factors when considering adaptation interventions"

From Margins to Mainstream (Himachal Pradesh, Karnataka, Madhya Pradesh, Odisha, Sikkim): A review of SAPCCs by the CPR Climate Initiative highlights that the SAPCCs focus more on adaptation than on mitigation. And that one of the main reasons for this is the directives obtained from the guidelines of the NAPCC, as well as the perception that there will be additional fund allocations to these states for funding adaptation policies. The CPR review describes certain policy emphasis of these states with respect to the assessment of Climate Vulnerability and CCA as follows:

Himachal Pradesh: The vulnerability assessment provides a district-wise vulnerability profile of the state based on current trends and future climate projections. Additionally the state seeks exploration of payment for ecosystem services as well as acquiring more carbon credits through the CDM process.

Karnataka: Plan states that, "projected increase in rainfall and temperature is expected to cause changes in the cropping pattern and production… of the state." Karnataka has also made efforts to restructure agricultural power tariffs as a means of CCA.

MP: Climate forecasts chapter predicts a 1.25 fold increase in monsoon rainfall in all but four districts in 2021 and 2050.

Odisha: The plan carries no model based regional projections. The vulnerability assessment is not scientifically analysed, nor does it offer any spatial or temporal vulnerability trends. Odisha's SAPCC focuses on reducing losses in the electricity system

Sikkim: The SAPCC seeks “village specific adaptation packages” because of the high degree of climatic variability within districts.

6.1.3 Pertaining to Developed Countries: International Policy briefs and documents: There is a wide ranging literature on CCA practices and the role of Industry. This assessment will focus on large case studies of policies and practices from different countries. However despite these studies there is still no consensus on a methodology which can be used to identify CCA practices for the Industry. At best certain broad methodological concerns have been identified such as risk and vulnerability assessments, cost benefit analysis of loss and damage, conformity to local government and national policies on CCA. International policy briefs on Climate Change adaptation mentioned here are: the CCA plan developed by the US Engineering corps: The policy emphasises the need to modernise programmes and policies to support climate resilient investments such as adapting to changing sea levels and assessing paleo-flood hydrology; managing land and water for climate preparedness and resilience; creating institutional support through state and local institutions with a focus towards preparedness of vulnerable local populations; planning for climate related risks to the supply chain operations. CCA policy option developed by the PEW centre: It looks at creating a proactive agenda for adaptation instead of a reactive one. It recognises that adaptation is an issue which requires constant monitoring and reassessment capacities to be set in place; It also notes that adaptation action plans must account for challenges brought about by both climate variability and climate change; It calls for policy options on adaptation including funding options to be integrated with the UNFCCC; And it calls for integrating adaptation concerns with Development issues. Another aspect of the Policy document is its call for establishing climate “insurance” (elaborated in section 5.4) CCA and impacts policy by OECD: The policy brief begins with an important formulation for adaptation- “Uncertainty about the future need not be a barrier to preparing for the effects of climate change. Some aspects of the climate (e.g. rising temperatures) are better understood than others (e.g. changes in precipitation) but all are subject to some uncertainty. Moreover, climate risks are the result of complex, and often unpredictable, interactions between climate and economic, social and environmental systems.” It calls for a risk based approach to adaptation which consists of 4 steps 1) identifying risks (risk assessment, vulnerability assessment) 2) characterising risks 3) choosing and exploring policies 4)feedback loop in terms of decision making. It further does a brief case study of adaptation constraints of different sectors such as water, agricultural commodities, energy sector and nuclear power. A policy brief by IDDRI on adaptation to Climate Change and Industrial vulnerability identifies the need to integrate CCA concerns in vulnerability assessment in industrial decision making.

Reference

National Action Plan on Climate Change by Government of India
Andhra Pradesh SAPCC by Environment Protection Training and Research Institute (EPTRI)
Maharashtra SAPCC by State Action Plan Committee and TERI
Tamil Nadu SAPCC by State Action Plan Committee and GIZ
Gujarat SAPCC by State Action Plan Committee and by TERI & GIZ
Chattisgarh SAPCC by State Action Plan committee and by
Rajasthan SAPCC by State Action Plan committee and by
West Bengal SAPCC by State Action Plan committee
Punjab SAPCC by Punjab State Council for Science and Technology and by GIZ
From Margins to Mainstream? State Climate Change Planning in India as a ‘Door Opener’ to a sustainable future by Navroz K. Dubash and Anu Jogesh (CPR Climate Initiative)
Adaptation to Climate Change: International Policy Options by Ian Burton (University of Toronto), Elliot Diringer (Pew Center on Global Climate Change), Joel Smith (Stratus Consulting Inc.)

Climate Change Adaptation Plan by US Army Corps of Engineers (USACE
Adapting to the impacts of climate change by OECD

6.2 Set-up and use of Rehabilitation budgets: NA

6.3 Emergency plans, disaster preparedness

6.3.1 Policies Pertaining to Andhra Pradesh and Telangana: The Andhra Pradesh and Telangan State Governments do not have a detailed policy document on Industrial Disaster Management. However their industrial Disaster preparedness falls within the ambit of the plans envisioned by the NDMA highlighted in sub section 6.3.2

6.3.2 Policies Pertaining to other States in India and National Policies: Post the Bhopal gas tragedy industrial disaster management became an important feature of the national disaster management plan. The focus of these plans has been on Chemical (Industrial) disaster management. The relevant laws pertaining to industrial disaster preparedness are: Explosives Act 1884, Petroleum Act 1934, Factories Act 1948, Insecticides Act 1968, Environment Protection Act 1986, Motor Vehicles Act 1988, Public Liability Insurance Act 1991, Disaster Management Act 2000. With respect to the case of vulnerability to disasters and the role of Industry, the disaster Vulnerability Atlas of India identifies 286 as industrial hazard districts based on the location of what it classifies as 1949 Major Accident Hazard (MAH) industries. Research on this field, including the policy of the NDMA, identifies that industrial risk management (the assessment of physical vulnerability of production to natural disaster, and the estimation of economic losses) and the incorporation of better information system are crucial to minimise damages and losses due to disasters. State Disaster Management Plans: Different State Disaster management plans (SDMP) also issue directives for the role of industry for disaster and emergency preparedness. We highlight some of them here- Gujarat SDMP volume 2 provides an analysis of vulnerabilities, risk assessments and a comparative risk index of infrastructure development and investments in the state of Gujarat. It categorises different talukas and districts as zones of very high risk, moderate risk and low risk based on this index to gauge the vulnerability and potential risk of infrastructure development in these regions. The second volume of the SDMA specifies an action plan for Industrial disasters such as: demarcating the role of the state and local authorities; maintaining a chain of command and a flow of information during industrial hazards; and identifying responsibilities during and post the occurrence of industrial disasters.

6.3.3 Policies Pertaining to Developing countries: In China, the National Committee for Work Safety manages industrial accidents as a part of its Integrated Disaster response mechanism. According to the OECD report on China's Disaster Reduction Mechanism. "Around 717,900 industrial accidents occurred in 2005, killing 127,100 persons, down 10.7 and 7.1 percent from the year 2004, leading to 89 billion RMB direct economic loss. But big accidents with more than 10 persons killed happened 136 times, killed 3084 persons, up 3.8 and 18.3 percent than previous year. Huge accidents with more than 30 persons killed happened 17 times, killed .1197 persons, up 6.3 and 27.9 percent. In coal mine and transportation industries, big and huge accidents were still not well controlled. China has started disaster risk (public security) management work on the basis of traditional disaster management and reduction, and has formed the primary disaster risk management framework of related professional fields. Besides, it is supposed to legislate emergency laws to enhance the legal system construction of disaster risk emergency management.

6.3.4 Policies Pertaining to Developed countries: The Fourth Assessment Report of the IPCC indicates that with climate risks will increase with climate change and that disaster risk reduction (DRR) is an aspect of climate adaptation. A UNFCCC technical paper on climate risk assessment and disaster risk reduction reaffirms this view and outlines" the needs, practices tools and systems for advancing the integration of adaptation and disaster risk reduction into national policies and programmes." The paper also outlines that adaptation is a broader concept and is not restricted to DRR, but also recognises that DRR policies must focus on the adverse impacts of climate variability and climate change. One of the key thrusts of the paper is that it emphasises a 'no regrets' approach which it defines as follows- "Where climate change is not mainstreamed into national development planning there is a high risk of maladaptive policies that increase vulnerability. These practices may favour short-term 'solutions', such as rebuilding with insurance and aid in exposed locations. Instead, a 'no regrets' approach is required that combines the need to address existing concerns with reducing risk in the long term."

Reference

National Disaster Management Authority Guidelines for Chemical and Industrial Disaster BY NDMA
Disaster Prevention, Preparedness and Management and Linkages with Climate Change Adaptation by Anand Patwardhan, Meeta Ajit (Technology Information, Forecasting and Assessment Council,)
Gujarat SDMP
Karnataka SDMP
Maharashtra SDMP
Tamil Nadu SDMP.
Chattisgarh SDMP
Integrated Disaster Risk Management of China, report prepared for OECD
Integrating practices, tools and systems for climate risk assessment and management and strategies for disaster risk reduction into national policies and programmes by UNFCCC technical paper

6.4 Standards and regulations that integrate climate change considerations, land use polices

6.4.1 Pertaining to Andhra Pradesh and Telangana: NA

6.4.2 Pertaining to Other states and India: NA

6.4.3 Pertaining to the Developing countries: NA

6.4.4 Pertaining to the Developed World: The World Bank in particular has several research publications detailing land use practices with Climate Change Adaptation, which include: a multi-dimensional landscape approach to land use which calls for more participatory and spatially-enabled local resource governance; the utilisation of innovative technologies for land and resource administration such as ICT, GPS, GIS, SDI and satellite based remote sensing, in combination with similar types of spatially indexed data from DRM and CCA practitioners; and a no regrets climate risk management approach which promote efficient and equitable sustainable development by reducing the vulnerability associated with climate risks, and thereby increase resilience

Reference

Linking Land Policy with Climate Change: A Multi-dimensional Landscape Approach to Territorial Development with a Focus on the Europe and Central Asia (ECA) Region by Malcolm D.

Childress, Paul Siegel and Mika Törhönen (Land Administration and Policy Specialists, World Bank)
Land use planning tools for local adaptation to climate change by R.A. Richardson, Climate Change Impacts and Adaptation Division, Natural Resources Canada and José Otero, School of Urban Planning, McGill University

6.5 Public Private Risk Reduction Initiatives, joint warning systems

6.5.1 Policies Pertaining to AP and Telangana: Andhra Pradesh Infrastructure Development Enabling Act mandates that the government Agency or the Local Authority will endeavour to disclose, allocate and provide for the treatment of the following risks to the private developer as well as the public residing within the industrial zone: Construction Period Risks: Land Expropriation, Cost Overruns, Increase in Financing Cost, Time & Quality Risk, Contractor Default, Default by the Developer, Time, Cost & Scope of identified but related Work, and Variations, Environmental Damage - Subsisting/Ongoing; Operation Period Risks: Government Agency Default, Developer Default, Termination of Concession Agreement by Infrastructure Authority or Government or Government Agency, Environmental Damage – Ongoing; Labour Risk; Technology Risk; Market & Revenue Risks: Insufficient Income from User Levies, Insufficient Demand for Facility; Finance Risks: Inflation, Interest Rate; Currency Risk; Legal Risk: Changes in Law, Title/Lease rights, Security Structure, Insolvency of Developer, Breach of Financing Documents; Miscellaneous Risks: Direct Political Force Majeure, In-direct Political Force Majeure, Natural Force Majeure, Sequestration, Exclusivity, Development Approvals, Adverse Government Action/In Action, Provision of Utilities, Increase in Taxes, Termination of Concession by the Government, Payment Failure by the Government.

6.5.2 Policies Pertaining to other Indian States: In Tamil Nadu, as a part of the SDMP a Community Based Disaster Risk Management (CBDRM), Installation of Early Warning Systems, laying underground the Electricity Boards cables are initiatives taken by this project. Its components include the components include: Vulnerabuluty reduction, sustainable fisheries, and capacity building in disaster risk reduction.

6.5.3 Policies Pertaining to Developing Countries:

A UNISDR report for Public Private Partnership in the arena of DRR (The Development of a Public Partnership Framework and Action Plan for Disaster Risk Reduction (DDR) in Asia) identifies the main problem in the following terms, “To date, private sector involvement in disaster management seems to have focused on disaster response and relief. There is great need and potential extending this engagement to DRR." This report then goes on to look at discussions surrounding PPP in DRR. It envisages (pg.2) the following three goals of raising awareness about PPP and DRR: agreement on the objectives and scope of PPPs for DRR and identification of priority areas; channelling private sector views and expertise into DRR processes at all levels; and identifying pivotal stakeholders. Another one of its objectives is to call for the the establishment of industry-specific working groups on PPPs for DRR at regional levels.

A policy assessment report titled, 'Private Sector Activities in Disaster Risk Reduction' prepared by the UNISDR provides by way of different policy case studies, an analysis of policies of private public disaster risk reduction frameworks in the developed and developing world. In case of the developing world it looks at examples of policy framework from Central America, the Caribbean Islands, India, Indonesia, Sri Lanka Philippines, Africa and Asia. It looks at a range of alternatives to the traditional approach of disaster risk management including

measures such as- safety measures in Industries which are vulnerable, social security, micro-credit and insurance schemes for disaster impact mitigation.

Jonatan A. Lassa's working paper titled Public Private Partnership in Disaster Reduction in a Developing Country: Findings From West Sumatra, Indonesia looks at ways in which an alternative risk reduction financing can create a new form of risk governance by inviting non-state actors such as civil society and private entities to collaborate in risk reduction. It looks at the unique case of the PPP between Mercy Corps in West Sumatra who received co-finance grants from OFDA-USAID and Boeing Corporation for a project entitled 'Public Private Partnership for Disaster Management'. The analysis points out that co financing models with a loose model of financing and management allows NGOs to better implement their vision and reach out to stakeholders. Further with the finances obtained from Semen (Padang) and Coca-Cola in this case, the NGOs were able to work on a moral imperative by integrating it with internal CSR policies to engage with wider stakeholders.

6.5.4 Policies Pertaining to Developed Countries

A joint report of the UNISDR and PwC titled, 'Working together to reduce disaster risk' seeks to answer the following question that it identifies "What legislation and policies does the public sector have to come up with to create the right incentives for the private sector to share and implement its disaster risk management know-how?" (pg.5). Based on case studies and policy reviews across 144 MNCs across the world, it identifies the following important concepts- the need for a uniform and common Disaster Risk Management Framework (DRM-F), the creation of a disaster risk maturity management tool, and identifying various levels of PPP in terms of identifying risk exposure and potential loss to supply chain value from disaster (pg.12-27). It identifies that the public sector role in all this is to create right incentives for private entities to share their expertise, as well as to identify deficiencies in DM strategy at the regional and national level using private sector expertise and knowledge (pg.28).

A policy assessment report titled, 'Private Sector Activities in Disaster Risk Reduction' prepared by the UNISDR provides by way of different policy case studies, an analysis of policies of private public disaster risk reduction frameworks in the developed and developing world. In case of the developed world, specifically France and Japan (pg.3-7;24-32;45-48,71-75) it looks at measures of creation of research partnerships in knowledge generation, fostering DRR through empowering communities, a glass safety campaign analysis, media and communication strategies, the creation of consumer cooperative union, safe gas use, integrating approaches between geographers and insurers to look at disaster risk reduction.

6.5.5 Policies Pertaining to Developed Countries:

Reference

Andhra Pradesh Infrastructure Development Enabling Act
Tamil Nadu Coastal Disaster Risk Reduction Programme – page 72-75
The Development of a Public Partnership Framework and Action Plan for Disaster Risk Reduction (DDR) in Asia (pg. 2-10)
Public Private Partnership in Disaster Reduction in a Developing Country: Findings From West Sumatra, Indonesia
Private Sector Activities in Disaster Risk Reduction: Good Practices and Lessons Learned (pg.3-7;24-32;45-48,71-75)
Working together to reduce disaster risk (1, 12-28)

6.6 CCA included in Environmental Impact Assessments Procedures

6.6.1 Policies Pertaining to AP and Telangana: NA

6.6.2 Policies Pertaining to other Indian States: NA

6.6.3 Policies Pertaining to Developing Countries:NA

6.6.4 Policies Pertaining to Developed Countries: One of the main reasons to look at EIA as a tool to facilitate the successful "climate proofing" of projects or to avoid maladaptation to climate change, is that EIA is a well consolidated and publicly accepted process in many countries and in bilateral and multilateral development co-operation agencies. A submission to the International Association for Impact assessment on EIA policies and CCA concerns (Modak and Ginoya 2013) states that Although CC related concerns and understanding are growing, incorporation of CC in the EIA process has not seen an acceptance as expected. It also concludes that data availability and expertise on CC modeling are the major issues preventing this integration between CCA and EIA.It identifies based on this comparisonal analysis that "for designing and implementing adaptation related plans, a simultaneous consideration to multiple projects is required to assess the cumulative impacts over the region. The entry point for developing adaptation plan is thus at strategic level where tools such as Regional EIA (REIA), SEA and Cumulative Impact Assessment (CIA) need to be used."

OECD brief on adaptation and EIA: the brief identifies that the consideration of climate change issues through EIA might in turn improve the resilience of the project being assessed to natural climate variability and natural hazards. From an implementation perspective it may therefore be potentially more efficient and effective to broaden the scope of existing EIA modalities to include climate change and adaptation considerations, as opposed to establishing and implementing parallel procedures for screening projects for climate change risk. Guidelines for a incorporating CC concerns within EIA include: 1) establish a preliminary scope for impacts consideration; identify impacts consideration (including project sensitivity to changing climatic parameters) 3) assess range of possible impacts and determine the potential risks to the environment or public 4) if risks are identified to the public and to the environment ensure that an adaptive management plan is introduced and that a distinction is maintained between private and public sector risks.

Reference

Incorporating Climate Change Impacts and Adaptation in Environmental Impact Assessment: Opportunities and Challenges by Shardul Agrawala, Arnoldo Matus Kramer,Guillaume Prudent, Richard and Marcus Sainsbury(OECD)
Challenges to Integrate Climate Change Considerations in Environmental Impact Assessment by Prasad Modak and Namrata Ginoya- Environmental Management Centre (EMC) LLP

6.7 Upgrading policies for planning of IP, include CC Risks and Hazards

6.7.1 Policies Pertaining to AP and Telangana: NA

6.7.2 Policies Pertaining to other Indian States: CCA and IP, require a constant assessment of the existing research base on CCA and policy frameworks used for planning of industries. In the case of India, there are largely two fronts which can be identified on which industrial planning needs to be better suited to CCA. These are- industrial planning which incorporates the concerns of urban CCA and urban resilience; An industrial level response or framework for disaster management. Here two research/policy initiatives are presented.

The first is the Asian Cities Climate Change Research Network (ACCCRN) is a programme of research aimed to investigate the concept of the resilience of cities to climate change impacts. It is spread across 10 cities in 4 Asian countries (India, Indonesia, Thailand and Vietnam), with the objective of addressing urban climate vulnerabilities, the use of multi-stakeholder planning as well as implementing targeted intervention projects. In the case of India the cities selected for the project are Surat, Indore, Gorapkhpur, Shimla, Bhubaneshwar, and Mysore. These are also sites of industrial production and agglomeration. A comparison of different reports, their recommendations and the methodologies developed by the ACCRN project partners across different cities indicates important parameters considered by the project for Urban Risk assessment: 1. Climate projection and physical vulnerability assessment: 2. Vulnerability assessment of populations and Stakeholder assessment: 3. Sector Wise assessment of Flood Risk management, water and energy security, as well as Urban Transport. The key issue remains however, that there is an absence of a general quantitative estimate are unavailable across different cities so far.

In the case of disaster management and industry, the confederation of Indian Industry in association with the NDMA has through various initiatives prepared framework for “Disaster Risk Management and the Role of the Corporate Sector”. The primary concern of this framework is to address the major lacunae for emergency preparedness of Industry in India- the inadequate (and many a times absence of) planning and implementation of local industrial level disaster management plan which addresses the concerns of (and therefore coordinates with) local governments, workers, as well as the local population residing within industrial areas. It also includes arguments in favour of seeking disaster insurance for physical damages, and closely working with local government authorities for emergency evacuations and relief operations.

6.7.3 Policies Pertaining to Developing Countries

A BSR and Rockfeller report on the private sector role in Climate Resilience in Thailand states that role played by the private sector is important in building resilience and adaptive capacity while dealing with climate shocks. Of note are the four roles it identifies for the private sector in building resilience: resilience to be included as part of the risk management protocol of the company; to look at a framework which incorporates natural resources, society, and the private company with respect to supply chain networks; identify opportunities to collaborate with public- and private-sector players in order to amplify the impacts of resiliency efforts; View increasing adaptive capacity as a business opportunity in terms of tracking corporate costs, investments, and return on investments (ROI) on climate change adaptation projects etc., (pg.11).

6.7.4 Policies Pertaining to Developed Countries

Swiss Re has a policy brief titled, “Opportunities and risks of Climate Change” focussing on the risks and opportunities presented to different private industries and looks at the role of the insurance industry in particular (pg.20, 24).It identifies the role of the insurance industry by saing that in the event of greater risks and burdens of changes in climate can only be addressed by increasing the burden on the individual insured by way of limiting benefits or increasing premiums. In particular the role of the insurance industry is defined by it to be one of spreading out risks to the insured community. Therefore it places emphasis on preventing an increase in weather related damage and losses from climate change.

Two Industrial estates in New South Wales and an assessment of their ‘Strategic Environmental Compliance and Performance Review’, has been provided by The Department of Environment and Climate Change, New South Wales, Australia. The report identifies certain best management practices for integrating environmental concerns and reducing environmental harm with respect to industrial estates which include (pg.8): effectively managing stormwater; improving dust and odour control measures; properly containing chemicals; storing waste materials away from stormwater drains and waterways; monitoring the integrity of underground

storage tanks; identifying potential risks and developing management plans to handle those risks; properly maintaining plant and equipment.

Reference

ACCCRN City Projects: Asian Cities Climate Change Resilience Network
Mainstreaming climate change adaptation in Indian cities
Industrial Sitting in Multi-Hazard Environment: Application of GIS and MIS
Assessing Green Industrial Policy: The India experience
Disaster Risk Management and the Role of the Corporate Sector- The Indian Perspective
Climate Resilience and the Role of the Private Sector in Thailand
Opportunities and risks of climate change
Strategic Environmental Compliance and Performance Review: Industrial Estates

6.8 Introducing Incentives to the CCA implementation agencies / organizations

Incentives for green industrial parks in India specifically include the creation of various favourable taxation laws for entrepreneurs and some targeted industrial sectors identified by different state industrial policies. However, these financial incentives do not directly imply a recognition integrating Climate Change Adaptation and Industrial Policy. Rather, they can be best characterised as incentivising green growth of Industrial parks and industrial clusters

6.8.1 Policies Pertaining to Andhra Pradesh and Telangana: Andhra Pradesh Industrial Policy and Industrial Parks: For SME, MSME, and Large Industrial projects, it specifies policy recommendations and incentives such as: projects engaged in recycling waste into environment friendly products/energy (such as waste to energy, waste to bio-gas, waste to manure) will be brought under zero rated category schedule of the VAT Act; 35% subsidy on cost of plant & machinery for specific cleaner production for MSME certified by Andhra Pradesh Pollution Control Board (APPCB); 25% subsidy for sustainable green measures on total fixed capital investment for projects which install: a) Waste water treatment b) Green Buildings: Buildings which obtain green rating under the Indian Green Building Council (IGBC/LEED Certification) or Green Rating for Integrated Habitat Assessment (GRIHA) systems. c) Use of renewable source of power (erecting captive sun, wind and biomass plants etc.,). d) Installing Continuous Emission Monitoring System (CEMS) for red category industries. e) Adopting rain water harvesting; restoring water bodies by de-stilting defunct water bodies. f) Any other environment management project approved by Empowered Committee of Secretaries. Setting up of the APSEZ, a Multi-Product SEZ developed over an area of 5595.47 acres of land at Atchutapuram and Rambilli mandals of Visakhapatnam District also entails the provision of certain incentives including Exemptions from Customs duty on imports; Exemptions from Central Excise duty on procurement from domestic market; Reimbursement of Central Sales Tax paid on domestic purchase; 100% Income Tax exemption for Block of 5 years, 50% tax exemption for 2 years and up to 50% of the profits ploughed back for next 3 years etc., Exemption from payment of VAT; Exemption from payment of Royalties & Cess on construction materials; Exemption from Sales Tax; Exemption from Stamps Duty & Registration Charges. Telangana Industrial Policy on Industrial Parks: It stipulates that both “the user industry and the non-conventional energy suppliers will be provided appropriate incentives to encourage investments in non-conventional energy projects, especially solar power”. Further under the T-IDEA (Telangana State Industrial Development and Entrepreneur Advancement) incentive scheme it will provide the following financial incentives: Stamp duty reimbursement; Land cost rebate; Land conversion cost; Power cost reimbursement; Investment subsidy; VAT reimbursement; Interest subsidy; Seed capital for 1st generation entrepreneur; Training and skill development;

cost reimbursement; Quality/patent support; Clean production measures; Reimbursement of infrastructure development costs. It also seeks to provide inter-state tax rationalization on industrial inputs and outputs with neighbouring states like Karnataka, Maharashtra, Gujarat and Tamil Nadu will be brought out within a short span of time

6.8.2 Policies Pertaining to Other Indian States: The Tamil Nadu Industrial Policy states that it will provide a back-ended Industrial Park Infrastructure Grant of Rs 2 crores or 25% of the investment in eligible fixed assets for approved industrial parks 50 km away from Chennai city limits. Such industrial parks must attract at least 20 new units with investments primarily in manufacturing with a total direct employment of at least 2000. This grant can then be used by the industrial park developers to fund common intern al infrastructure like roads, water supply, Common Effluent Treatment Plant (CETP) or Common Hazardous Waste Treatment, Storage and Disposal Facility (HWTSDF). Manufacturing units set up in approved industrial parks would be eligible for all subsidies and incentives applicable to manufacturing units and permissible under this industrial policy. The Maharashtra Industrial Policy stipulates certain incentives for the setting up of industries within specified SEZ zones such as Timely refund of Value Added Tax (VAT) to the units and the developers; Exemption from payment of royalty on excavation of minor minerals within the SEZ; Exemption from payment of Non Agricultural (NA) tax; Stamp duty exemption for land acquisition; and single interface for payment of multiple taxes like dividend distribution tax, minimum alternate tax. Karnataka Industrial Policy proposes various incentives and promotions for industries according to the 4 tier classification of industrial investment that it specifies. These include investment promotion subsidies, exemption from stamp duty, exemption from entry tax, additional incentives for export oriented enterprises, exemption of APMC cess, interest free loan on VAT. Further the Policy states that it will provide subsidy for the set up of effluent treatment plants such that it will provide a one time capital subsidy upto 50% of the cost of Effluent Treatment Plants (ETPs), subject to a ceiling of Rs.100 lakhs per manufacturing enterprise in Zone – 1, 2 & 3 and a ceiling of Rs. 50 lakhs in Zone – 4. A review of the Green Industrial Policy framework of India by CEEW identifies the following Financial Incentives introduced for the set up of industrial parks in India: Promotion of decentralised Renewable energy generation in Industrial parks by way of providing: 1) Accelerated depreciation: Under section 80(I)(C) the of the Indian Income Tax code, a company (commercial or non-commercial) is allowed to claim 80 per cent of the project cost under the AD scheme in the first year of installation leading to savings on income tax and overall profit. 2) Waiving of industrial clearances and Tax holiday: under section 80(I)(A) of the Income Tax Act, the central government offers a 10-year tax holiday within a block of the first 15 years during the lifecycle of all infrastructure projects, which also includes renewable energy power generation projects. 3) Excise duty and customs duty exemptions/reduction: Creation of export oriented industrial clusters which are exempt from the levy of export duty on their products.

6.8.3 Pertaining to Developing Countries and 6.8.4 Pertaining to Developed Countries

OECD Training Manual on CCA and policy guidance looks into various policy measures for incentivising CCA and development policy measures. It provides a context for both developing and developed countries. It specifically looks at CCA at the sector level and identifies the key role of climate change adaptation with respect to water security. It lists certain priority sectors which are vulnerable to climate change such as agriculture and hydro-electric power generation, and a range of other sectors across which water security and CCA concerns should be implemented and tracked. It looks at providing incentives to the various stakeholders involved in order to achieve this implementation. The primary form of incentivisation in envisages refers to (pg.92-130): devising policy incentives for risk management behaviour, incentives to encourage stakeholders to change existing structures and practices, and a top down approach

where sub-national actors are incentivised to understand the changing risks they face and take actions to reduce their vulnerability to these risks.

Reference

Andhra Pradesh Industrial Policy and Industrial Parks pg.16-18
Andhra Pradesh SEZ Incentives
Telangana State Industrial Policy and Industrial Parks pg.20
Tamil Nadu Industrial Policy- pg.22-24
Maharashtra Industrial Policy 2013 pg.16, 17
Karnataka Industrial Policy- pg.21-23, 31
Assessing Green Industrial Policy (Council on Energy, Environment and Water (CEEW) and International Institute for Sustainable Development (IISD))
Policy Guidance on Integrating Climate Change Adaptation into Development Co-operation (pg.92-130)

6.9 Different financing models for CCA

6.9.1 Policies Pertaining to Andhra Pradesh and Telangana: NA

6.9.2 Policies Pertaining to other Indian States: NA

6.9.3 Policies Pertaining to Developing Countries:

A policy brief on CCA financing options by the Sustainable Energy Regulation and Policy-making for Africa argues for speaks of a wide range of existing renewable energy policies and regulations across different African countries and assesses them based on their ability to deal finance them as a part of CCA. In particular it mentions the important role which can be played by market base instruments, energy audits, clean energy policies, and factors affecting (either positively or negatively) investor confidence and investor risk. It states that in order to attract more private sector funding, legislation and regulations must provide the following incentives (pg. 53): lower investment costs for project developers; reducing risks for investors based on Renewable energy; more awareness of investment in terms of capacity building measures; and to lower transaction costs by developing more innovative tools for their implementation.

A BSR guide for CCA and finance industry summarises how financial service companies report climate change risks and hazards. It identifies a range of responses and practices which companies use to adapt to the new threats of climate change and private industries such as value protection (Business continuity planning with scenario modelling, promoting company and client investment in lo-climate risk sectors) and value creation (investment in sustainable energy, solutions for companies with high climate risk, etc.,) (pg.2-5)

6.9.4 Policies Pertaining to Developed Countries: One of the most pressing concerns of CCA is the fact that although the need for adaptation policies and actions is ascertained, an estimate of the costs of these actions reveal that funding capabilities to finance these actions are often found to be inadequate. This necessitates that different approaches to financing CCA be looked into and that existing approaches be reviewed constantly. In order to do some international studies identify the need to incorporate the following concerns within the framework of CCA: identifying the most relevant and immediate financing level within the region; to supplement this by also improving on capacity development of personnel nd institutions at the organisational level; enhance enabling environments to foster greater investment; and facilitate finances for project and programme preparation to implement specific regional and local adaptation programmes and policies.

Reference

Toolkit to Enhance Adaptation Finance by Organisation for Economic Co-operation and Development (OECD) and Global Environment Facility (GEF)
Climate Change and India: Adaptation GAP by Amit Garg, Vimal Mishra, Hem H. Dholakia (IIM Ahemadabad)
Financing options for renewable energy and Energy efficiency (pg. 53)
Adapting to Climate Change: A Guide for the Financial Services Industry (pg.2-5).

7. Capacity Development and Awareness of Industries

7.1 Mass Awareness Campaigns involving communities like IEID

7.1.1 Pertaining to Andhra Pradesh and Telangana: The APIIC from the 5th of June 2014 initiated a one month IEID (Industrial Environment Improvement Drive) in collaboration with GIZ with a view to improve environmental awareness in communities that are stakeholders across 75 industrial parks in 15 zones across Andhra Pradesh. This drive includes activities such as Interaction Meets with experts; Month Long cleanliness drive; Plantation drive; Environmental Awards for best 3 IPs / IALAs; and Awareness campaign Materials. The aim of this drive was to address issues such as solid waste and waste water management, creating awareness amongst entrepreneurs, improve plantation amongst IPs, encourage the monitoring of environmental infrastructure and address industry specific issues.

7.1.2 Pertaining to India and others states: Indian environmental Society conducts a series of environmental awareness programmes for local communities across various industrial belts partnership with the industries located in those regions. For instance they conducted an awareness programme in the pUri District of Odisha, to improve and strengthen waste management systems within Puri district through public participation techniques and improved coordination of municipalities, industry and civil societies involved in waste collection using the transfer of technology practices and the expertise of the European. The objective of this awareness campaign was to “broaden and deepen environmental law knowl edge at the governmental, community and non-governmental, industry and professional levels through the medium of workshops, stakeholder meetings and compiled research material”. (pg. 23)

7.1.3 Pertaining to Developing Countries: Environment Hong Kong 2006, a Community Awareness by the Hong Kong Environmental Protection Department sought to “promote community environmental awareness through campaigns, publicity, education and action programmes, with a view to harnessing the community’s support for, and contribution to achieving desired environmental goals, thereby securing a long term solution to environmental problems through development of an improved environmental ethic within the community.” Through these awareness campaigns the Environment Protection department sought to address the important issue of air pollutions standards, industrial pollutant emission and public health in China.

7.1.4 Pertaining to Developed Countries: The OECD report on encouraging Environmental Management in Industry underscores the importance of considering environmental management and communication of this position by industry to different stakeholders in the region in which it operates. It summarises the issue as follows (pg.14), “Five interrelated factors appear to be driving the initiatives: government policies and regulations, commercial and economic considerations, corporate image, codes of conduct, and growing pressures from the financial/investment community. As discussed at the Forum, deriving the full benefits from these

drivers depends in large measure on the knowledge and effectiveness of stakeholders (i.e. the general public, public authorities, the financial/investment communities, NGOs, and other interested parties). The more that these stakeholders know about environmental issues, the better able they will be to advocate and pursue more forward-looking strategies". It also calls for public voluntary programmes such as to use conducted in the USA and EU. It envisions such programmes (pg.17), in which firms participating in a programme established by a governmental agency enter into agreements which establish standards related to their environmental performance, technology or management."

Reference

APIIC Industrial Environment Improvement Drive
Project Update Document of the Indian environmental Society (pg.23-25)
Environment Hong Kong 2006: Community Awareness by the Hong Kong Environmental Protection Department
Encouraging Environmental Management in Industry in the Science Technology Industry: Business and Industry Policy Forum Series of OECD

7.2 Capacity Development for Park Managers, Industrial Associations and Industries

7.2.1 Policies Pertaining to Andhra Pradesh and Telangana: NA. There are references for capacity development in terms of training of planners within Industrial parks. See section 1.3

7.2.2 Policies Pertaining to India and other states: The Ministry of MSME and the office of the development Commissioner (MSME- Statistics and databank division) has initiated a scheme for capacity building strengthening of database and advocacy by Industry/Enterprise Associations and for holding Seminars/Symposiums/Workshops by the MSME Industrial Associations. It acknowledges the absence of capacity on the part of these associations to collect data and the paucity of funds facing these industries. It proposes a PPP model to strengthen and increase efficiency and financial assistance to select national associations, organiszing seminars and symposiums to better understand the functioning of industrial associations, MSME industries, and their capacities to manage and operate industrial clusters. The Micro, Small and Medium Industries Policy, Government of Tamil Nadu calls for improving capacities by way of imparting Skill Development and Training, as well providing support in terms of information and marketing (pg.19-20). This includes a Customised Entrepreneurship Development Training Programme for entrepreneurs in sunrise sectors like Information Technology, Information Technology Enabled Services, Business Process Outsourcing, Enterprise Process Outsourcing, Knowledge Processing Outsourcing and Bio-Technology. It also calls for sector specific studies on MSME industries and MSME Market Development Assistance schemes. The MSME Umbrella Programme: Public Support Scheme, by FISME advocates ways in which Training Instructions, participant handouts, charts and background readings can be provided to entrepreneurs and managers within Industrial zones for the following issues: identification and prioritization of public support schemes, process related issues, and building the internal capacities of business management officers,

7.2.3 Policies Pertaining to Developing Countries: UNIDO Green Industry Policies for supporting Green Industry in its fifth chapter on Supporting Industry led Initiatives (pg.43-55) calls for raising industry awareness and capacity development, promoting environmental Management system (EMSs), creating Industry based standards, Promoting eco-labels and certification, greening the supply chain, extending producer responsibility, promoting Corporate Social

Responsibility, Environmental Accounting and implementing good practice. The report envisions a role for Government "crowding in" of capacity development and states that (pg.12), "Governments can positively influence the internal decision-making processes within enterprises through policies and incentives that promote improved production efficiencies and environmental management. Long-term partnerships between governments and business are important in fostering improved efficiencies and environmental management".

7.2.4 Policies Pertaining to Developed Countries: A Draft Programme on Innovation, Higher Education and Research for Development (IHERD) calls for the establishment of Centres of Excellence (CoE) as a Tool for Capacity Building within Industrial clusters and the management of Industries. It defines the role and scope of CoEs as "organisational environments that strive for and succeed in developing high standards of conduct in a field of research, innovation or learning. They are often highly attractive to research and development (R&D) investments and talent in their field. Therefore they possess the ability to absorb and generate new knowledge. Ideally they would distribute and utilise this new knowledge in the form of new capacity in their field, be it research results, innovations or talent. CoEs are typically geographically concentrated and focused on high potential/growth areas in science and industry, but they may also be virtual/distributed and consist of a network of co-operative partners with a co-ordinating centre" (pg.6).

Reference

Scheme for capacity building, strengthening of database and advocacy by Industry/Enterprise Associations and for holding Seminars/Symposiums/Workshops by the Associations
Micro, Small and Medium Industries Policy, Government of Tamil Nadu
MSME Umbrella Programme: Public Support Scheme, FISME
UNIDO Green Industry Policies for supporting Green Industry
Draft Programme on Innovation, Higher Education and Research for Development (IHERD)- Centres of Excellence as a Tool for Capacity Building

8. Interaction with Communities around IP

8.1 Joint initiatives, early warning systems,

8.1.1 Policies Pertaining to Andhra Pradesh and Telangana: NA

8.1.2 Policies Pertaining to States in India and national Policies: The need and emphasis for joint initiatives based on public initiative for disaster risk reduction is increasingly being recognised by the Indian. However, the Government of India in its policy report suggests that what is required is the training of personal in disaster management and communication as well as logistics in a scientific manner to address this concern- "Given the new dimensions of climate-change impacts and ecological degradation pace, the national and state frameworks are focused towards more multi-institutional settings in planning and actions.

District state plan of disaster management that incorporate the components of hazard, risk and vulnerability assessment; prevention and mitigation plan, and a response plan also provide the strategies for sustainable reconstruction and recovery mechanisms in post-disaster

situation, disaster impact (damage and loss) assessment, and integration of DRR into environmental action and developmental planning and main stream disaster management into the process of sustainable development.

8.1.3 Policies Pertaining to Developing Countries: This paper analyses policies pertaining to early warning hazard system especially in the context of the lessons learnt from Tsunami of 2006 and its effect on South Asia. It lists the importance of industrial and infrastructure design as an important factor of relevance to early warning systems. It emphasises that in order to be effectivce early warning systems need to be both scientifically sound but also have a strong focus on the people exposed to risk. It argues for a systems approach that can account for various relevant factors that will map the natural hazards and social vulnerabilities of the local populations. The Global insurance industry statement on Adapting to climate change in developing countries further emphasises that in the case of developing countries (pg.2) the key factor which needs to be identified in terms of disaster risk including industrial disaster risk is that of risk assessment and risk measurement.

8.1.4 Policies Pertaining to Developed Countries: A draft report prepared by the UNEP on Early Warning Systems: State-of-Art analysis and Future Directions suggests that industrial threats and disasters are normally along the lines of slow moving creeping threats. For instance it gives a detailed account of air quality (pg.26) and how it is a threat that creeps up in both developed and developing countries. Early warning systems according to this brief also need to account for such threats through way of initiatives between local communities and environment pollution and protection agencies. It also lists various policies and initiatives from across the world to combat various threats such as drought, flood, storms, climate variability, food insecurity etc., It calls for establishing (pg.31) state of the art multi hazard global monitoring and early warning systems such as : WFP (which is the UN food aid agency), HEWS, AlertNet (humanitarian information alert service by Reuters), ReliefWeb (humanitarian information alert service by UN-OCHA), GDACS (Global Disaster Alert and Coordination System, which is a joint initiative of the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA).

Reference

Human Resource And Capacity Development Plan for Disaster Management and Risk Reduction in India 2013
Global early warning systems for natural hazards: systematic and people-centred
Draft report on Early Warning Systems: State-of-Art analysis and Future Directions (pg. 26-32)

8.2 Joint water and waste management, community dialogues, etc.,

8.2.1 Policies Pertaining to Andhra Pradesh and Telangana: NA

8.2.2 Policies Pertaining to States in India and national Policies: Tamil Nadu is one of the few States that has initiated sewerage network provision in all corporations, municipalities and town panchayats through a sustainable financing and user charge framework. The successful ‘Alandur’ model that involved financing of sewerage projects through a combination of user deposits, loans and Government grants with user charges to manage debt servicing and O&M is being replicated across the state. The Government of Tamil Nadu has recently announced provision of sewerage schemes in all the remaining ULBs and Town Panchayat.

8.2.3 Policies Pertaining to Developing Countries: A World Bank report on the state of Public-Private Partnerships for Urban Water Utilities in Developing Countries (Chapter 2

pg.35) highlights that water rationing had become the norm in the developing world by the 1980s as “water supply systems in most cities of the developing world were facing growing problems of quality, reliability, and coverage.” It identified the following PPPS in joint water management system post the 1990s to be the most significant: Cancun (Mexico) and Gdansk (Poland) in 1994; Kelantan state (Malaysia) and Santa Fe province (Argentina) in 1995; Senegal, Manila (the Philippines), Cartagena (Colombia), and Aguascalientes (Mexico) in 1996; and Gabon, Cordoba (Argentina), La Paz–El Alto (Bolivia), Budapest (Hungary), Barranquilla (Colombia), and Casablanca (Morocco) in 1997.Here Latin America played the lead role. It describes that in terms of policy the awarding of contracts and the finance model for the Water utilities are the most important considerations that determine the operation of Water PPPs. From 2007 it indicates that private water operators from developing countries served more than 67 million people and had a greatest share of the market than any other time period (at 40%). In terms of assessing performance of such PPPS it mentions that ambiguity of performance indicators, influence of multiple local factors on operating costs and wide variety of tariff structures and difficulty of obtaining performance data on water services are the important issues. On page 61 table 3.1 it provides a summary of the performance of various major water utilities in the developing world.

8.2.4 Policies Pertaining to Developed Countries: The World Bank initiative of Public Private Partnerships identifies the Water and sanitation sector as the key area where investments from both private and public sector is required for achieving standards of well being in a sector that is infrastructure intensive. It identifies the following key sectors and highlights policy case studies for this implementation: Water Sector Regulation; Water and Sanitation Utility Reform through Joint ventures; Urban Water and Sewerage/ Sanitation Agreements such as Management, Operation, Maintenance Contracts, Concessions and Build-Operate-Transfer (BOT) Agreements, Lease and Affermage Contracts and Bulk Supply Agreements; Small scale Water Projects: Rural and Peri-Urban; and PPPs in Irrigation

Reference

Tamil Nadu Vision 2023 pg.178
Public-Private Partnerships for Urban Water Utilities: A Review of Experiences in Developing Countries (pg. 35-40, 61)
Website of the World bank on Public Private Partnership Information resource Centre

This project, assisted by the German Government, is being carried out by a consortium consisting of 'INTEGRATION Environment & Energy GmbH, Adelphi consult GmbH and ifanos concept & planning' on behalf of the Deutsche Gesellschaftfür Internationale Zusammenarbeit (GIZ) GmbH.

Published by

INTEGRATION Environment & Energy
Climate Change Adaptation Project (CCA),
1st Floor, ParisramaBhavan
FatehMaidan Rd, Basheerabagh, Hyderabad – 04, Telangana, India
www.integration.org
Tel. +91 (0)40 66184019, Fax. +91 (0)40 23233677

Responsible

Dr. Dieter Brulez

Authors

Dieter Brulez, Hrishikesh Mahadev, Rajani Ganta