

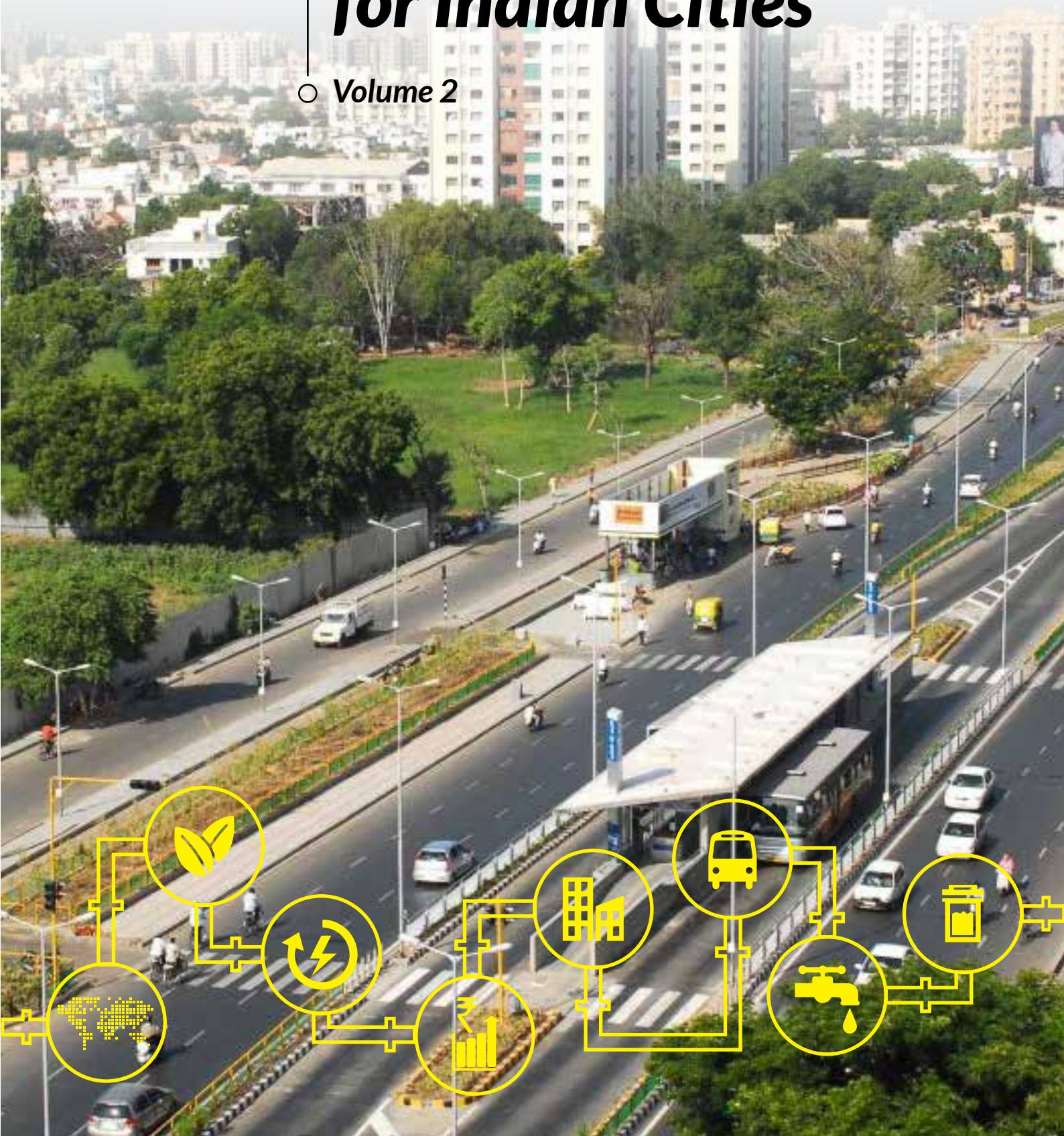
Urban Green Growth Strategies for India Cities

VOLUME 2
Green Growth Profiles of Ten Indian Cities



Urban Green Growth Strategies for Indian Cities

○ Volume 2



Title:
VOLUME 2, GREEN GROWTH PROFILES OF TEN INDIAN CITIES

Publisher
ICLEI - Local Governments for Sustainability, South Asia

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Design: Studio Eksaat, New Delhi, India

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Cover photo credit: http://cept.ac.in/file_manager/gallery/photo-janmargjhansirani.jpg

Year Of Publishing: 2015

Acknowledgments:

The project team wishes to thank our advisors Mr. Anand Bhal, Dr.Renu Khosla, Prof. Dinesh Mehta, Mr. Rakesh Ranjan and Prof. Neelima Risbud for their expert inputs. We also want to thank administrators, representatives and stakeholders from cities covered under the project for their support and contribution to the successful compilation of the document.

The team thanks GGGI for conceptualising the study and providing technical and financial support to the project.

Disclaimer:

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ICLEI-South Asia (2015) "Green Growth Profiles of Ten Indian Cities", Vol. 2, Delhi, India.
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Foreword

India has undergone unprecedented population growth and urbanization in the recent decades, propelling the country to become the second largest urban system globally. With urban areas expected to contribute to 75% of the country's GDP and house 590 million of its people, emerging cities of India are truly the engines of her future growth.

Local governments in particular, face a key challenge in ensuring that urban infrastructure and services keep pace with this rapid urban transformation. There has been an increased focus on following a responsible growth path which takes into consideration impacts on the environment while ensuring optimum economic and social prosperity for urban dwellers.

In light of the recent thrust by Government of India on Smart Cities, 'Urban Green Growth' is a very relevant but relatively new approach which integrates economic and social objectives with environmental goals. ICLEI South Asia and the National Institute of Urban Affairs (NIUA), with support from the Global Green Growth Institute (GGGI), have undertaken this project to enable Indian cities to better understand the Green Growth process and communicate its potential benefits to India's urban growth story. To this end, the project entails developing a framework to pilot the Green Growth approach in Indian cities. An assessment of ten tier-two Indian cities of geographically diverse regions and compilation of fifteen good practices of urban India in the context of Green Growth Principles were carried to test the applicability of the framework. The idea is to demonstrate the imperative of long term integrated planning and investment that would yield multiple development benefits.

The project team would like to thank the local governments and the stakeholders in the cities for their enthusiastic response and support. Going forward, we hope that the outcomes of this initial exercise will help Indian cities to develop and implement the Green Growth theory and practice, to meet their development objectives in a holistic manner. We also believe the analysis and recommendations would be useful to design the national and state policies on smart cities.

With best regards,

Mr. Siddarthan Balasubramania
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Executive Director
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Agartala City Profile

Volume 2



Agartala City Profile

1.1 Introduction

Agartala, the capital and the most populous city of Tripura, is one of the most important and progressive city not only in Tripura but also in the entire North East. The city is home to almost 4 Lakh people within the city limits. The local body converted in January 2014 into a municipal corporation (Agartala Municipal Corporation - AMC) and is characterized by an efficient and pro-active governance approach.

1.2 Main Green Growth Message / Lesson /'Take Away' for This City

Being the capital of Tripura, Agartala is the center of administrative and economic activities. The city has several strengths which include regional linkages, tourism, trade and commerce. Agartala needs to take steps to improve its sewerage and transportation service and infrastructure, manage its growth and conserve its ecosystem. Managing the growth efficiently can help the city leverage its strengths and tap potential opportunities. This can be done by promoting local natural resource based industries and eco-tourism, thus boosting local economy and employment. The city should take appropriate measures to manage and conserve its water bodies. Strengthening and integrating its formal and informal public transport systems - along with integrated water resource management and controlling haphazard growth, will certainly help the city move towards Green Growth while ensuring high livability.

1.3 Main Features Of The City: Summary

Type Of City (According To The Project "Filters" Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Agartala
District	West Tripura
State	Tripura
Connectivity	Air, Rail and Road
Area of the city	City: 62 sq.km.
No. of administrative wards	35
Population (2011)	City: 3.99 lakhs
Location	North East India
Climate	Tropical Monsoon Type
Economy	Trade and Tourism sector, State Capital

Type of Cities This Profile Is Relevant To

The city represents administrative cities as well as very fast growing urban agglomerations.

Demography:



Population

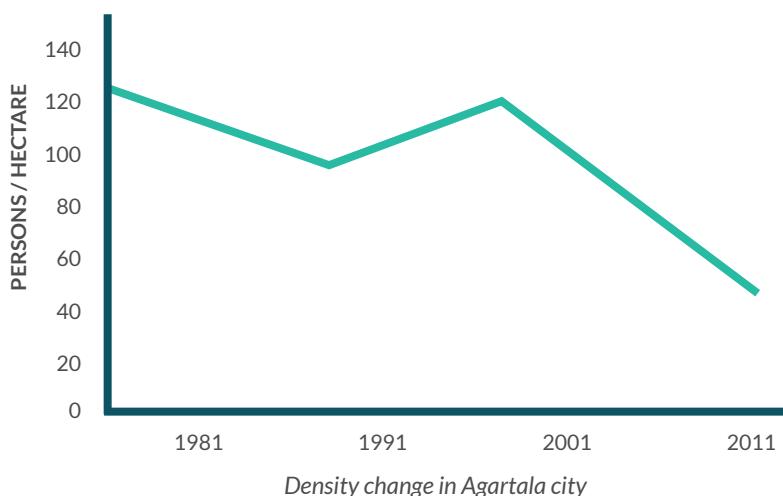
3.99 lakhs (2011 census)

Growth Rate:

The decadal population growth of Agartala city in 2011 was more than 110%, which is well above the national average of 17.64%. The population growth in 2001 and 1991 was around 20% and 19% respectively. In the last decade the city experienced a high decadal population growth rate mainly due to its trade growth and accompanying opportunities.



The overall population density has been reducing in Agartala due to the increase in the city area, which has grown from 10.94 sq. km. in 1981 to over 62 sq. km. in 2011.



Economic Activities:

- State Capital
- Administrative city
- Trade city
- Tourism sector

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water	DWS	DWS	DWS, AMC
Sewerage and Sanitation	DWS	DWS	AMC
Solid Waste Management	AMC	AMC	AMC
Urban Transport	NA	NA	NA
Urban planning and town planning			

DWS: Drinking water and sanitation
AMC: Agartala Municipal Corporation
UDD: Urban development Department



TRIPURA UNIVERSITY CAMPUS, AGARTALA

1.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Ecosystem and Biodiversity
- Economy and Business
- Transportation
- Water and Sanitation

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Agartala, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Due to rapid growth, the city area has increased from 16 sq. km. in 2001 to 62 sq. km. in 2011. As the city is surrounded by forest and environmental sensitive areas, proper land utilisation is required. It is recommended that the city implements GIS-based mapping of land use and develops a Master Plan based on the surrounding ecosystem. The Master Plan should lay special focus on TOD development with integration of land use and transport and optimal land utilisation based on the principles of compact development. Since there are more than 500 water bodies within the city, the Master Plan should focus on their conservation and on developing them as public space.

The city can promote **industries** based on local forest resources such as bamboo and rubber by providing technological support to local people. The forest based industries will increase the economic opportunities in the area. Innovation in promoting efficient resource utilisation will help the city to accelerate business opportunities and create employment. The city has a potential for eco-tourism due to the presence of a rich local ecosystem surrounding the city. Currently the city lacks formal public **transport** system and is dependent on IPT and private vehicles for mobility. The introduction of a public transport system integrated with the IPT system will reduce the increasing number of private vehicles and improve the liveability in the city, thanks to reduced air pollution and congestion. The existing e-rickshaw policy by AMC can be utilised to promote battery operated rickshaws to facilitate last mile connectivity and it can be utilised as a feeder to public transport. An improved public transport system will also facilitate mobility in the city, thus accelerating trade opportunities.

The city needs to adopt an integrated **water** management approach as current water coverage is very low and a centralised sewerage system is absent in the city. Steps can be taken for watershed management to rejuvenate seasonal rivers. In absence of a sewerage system, untreated sewage is discharged into the rivers making them unsuitable for drinking purpose; DEWATS can thus be encouraged, especially in the peri-urban areas of the city. The city can adopt economic and regulatory instruments to minimise the discharge of sewage into the water bodies. These steps will not only help to reduce water pollution but will reduce the deteriorating water quality in water bodies.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

A GIS-based Master Plan will help the city to track the rapid development around peri-urban areas and enforce Master Plan norms. It will also help the ULB to track changes in the natural ecosystem and take necessary actions to minimise the impact of development on it. Promoting technology will help to create economic opportunities through locally

¹Economic Implications of Congestion, NCHRP report 463, National Academy of Press, Washington D.C.

available resources. Improved public transport system will help to reduce congestion and air pollution, and save energy. Reduced congestion will have added economic benefits and reduce investments for vehicles oriented infrastructure. Integrated water management will not only help city to provide necessary water to its citizen but also to manage the issues of untreated sewage, which is currently discharged into the rivers. A sewerage system will help to improve the water quality in rivers.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

The city needs to map the status of all the priority sectors to allow actions to be taken. The status includes a detailed database of the state of services, including the current status of development in the city, disaggregated economic data at the city level, GIS mapping of all the buildings and a study related to mobility pattern and demand in the city. An integrated water resources management plan needs to be prepared and should include wastewater management as well.



NEERMAHAL PALACE

Agra City Profile

Volume 2



Agra City Profile

2.1 Introduction

Agra is a city of historic importance, as it is evident from the numerous historical monuments in and around it, the most famous one being the "Taj Mahal", one of the Seven Wonders of the World and a World Heritage Site. Agra Fort and Fatehpur Sikri, other two World Heritage Sites, constitute – together with the Taj Mahal – the 'Taj Trapezium (TTZ)', a 10400 sq. km area around the monuments where industrial activities are restricted. Its central location makes Agra an important regional urban centre. All traffic going south be it by rail or road, passes through Agra thus making it a major transport node at the regional and at the national level. This has however led to an extremely rapid and unsustainable growth pattern.

2.2 Main Green Growth Message / Lesson / 'Take Away' for This City

The presence of the Taj Mahal makes tourism one of the major contributors to the local economy. With more than 5,000 small scale industries, the city can also boast of a well established commerce which together with the tourism sector is one of the main reasons why the city is growing at such a rapid pace. The infrastructure development in the city is unable to cope with this growth and is impacting the local environment. Agra can take transformative steps to shift its current growth on a green pathway, which will open new opportunities that will allow the city to pursue growth, while improving quality of life and avoiding damages to the environment. Developing a local tourism circuit, which includes the Taj Mahal and the other monuments of historical importance, can give potential impetus to tourism in the city. The implementation of the solar city Master Plan will reduce energy consumption and ensure availability of clean energy, thus reducing air pollution due to diesel operated generator sets. Providing improved efficient technology to the numerous small scale industries in the city will help improve productivity. The city also needs to better manage its solid waste, particularly from micro and small scale industries operating in households, to minimize impacts on the environment.

2.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Agra
District	Agra
State	Uttar Pradesh
Connectivity	Rail and Road
Area of the city	City: 217 sq.km.
No. of administrative wards	90
Population (2011)	15.78 lakhs
Location	North India
Climate	Tropical Monsoon Type
Economy	Tourism and Industrial City

Type of Cities This Profile Is Relevant To

The city represents tourist cities with tourism being at the centre of economy along with multiple unorganized small scale industries.

Demography:



Population

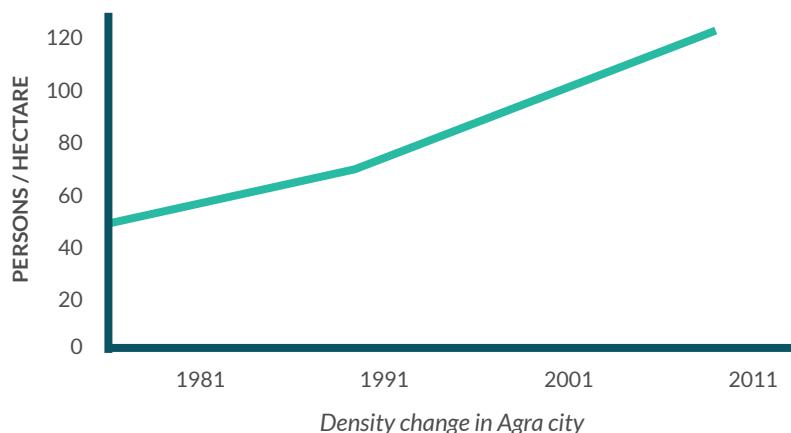
15.78 lakhs (2011 census)

Growth Rate:

The population of the city is 15.78 Lakhs as per the census 2011. The decadal population growth in Agra in 2011 was 23%, which is above the national average of 17.64%. The growth of the population in 2001 was 30%. The decadal growth rate reached maximum of 32.15% during 1971-81. The high growth rate during 1971-81 was also due to the fact that the city area doubled from around 60 sq. km. in 1971 to 141 sq. km. in 1981.



The overall population density is increasing steadily. The Gross density has increased from 55 persons /hectare in 1981 to 111 persons /hectare in 2011. New growth is witnessed by suburban areas surrounding the core Agra City.



Economic Activities:

- Tourism
- Small-scale and household industries
- Trade

In addition to being a tourism destination, Agra is also a commercial city. A major part of its industrial activity is in the form of small-scale and household industries, mainly located in the old city

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water	UPJN	UPJN	Agra Jalakal
Sewerage and Sanitation	UPJN	UPJN	ANN
Solid Waste Management	ANN	ANN	ANN
Urban Transport	PWD, UPSTC	PWD, UPSTC	PWD, UPRSTC
Urban planning and town planning	ADA	ADA	ADA
Street lighting	ANN	ANN	ANN
Environment	UPPCB	UPPCB	UPPCB

UPJN: Uttar Pradesh Jal Nigam
PWD: Public Works Department
ADA: Agra Development Authority
UPRSTC: Uttar Pradesh State Road Transport Corporation
ANN: Agra Nagar Nigam
UPPCB: Uttar Pradesh Pollution Control Board



TAJ MAHAL, AGRA

2.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Economy and Business
- Solid Waste Management
- Energy
- Housing and Buildings

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Agra, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

The city has numerous monuments of historical importance that can potentially give impetus to the **tourism** in the city. Currently Taj Mahal is the sole centre of tourism; developing a local tourism circuit that consists of major ASI monuments will increase the average stay duration of tourists, thereby creating more economic opportunities in the hospitality sector.

Currently there are more than 5,000 small scale **industries**, which mostly operate at household level. Organising and regulating them will improve the access to finance and advanced technology, thus enhancing productivity and efficiency and considerably reducing the environmental impacts.

Agra is famous for its Petha (Sweet) and shoe industries, which generate a large amount of **solid waste** when combined with domestic waste, this has resulted in local environmental degradation and is one of the major issues city is facing. Separate collection of industrial waste will help the city to dispose it scientifically without mixing with domestic waste. Household coverage and segregation of waste at source can be improved by involving the community in these measures. The city can also reduce GHG emissions with the help of waste management, by scientifically closing open dumpsites, composting biological waste, and implementing efficient logistics and transport for waste collection. Furthermore, waste to energy facilities can replace the need for fossil fuels. Promoting the 3R principles (i.e. Reduce, Reuse, Recycle) and implementing an integrated resource recovery system can help to recover valuable resources from waste.

The city is facing frequent power cuts and hence most of the businesses depend on diesel/kerosene based electric generators which cause air pollution. For a transition towards green growth, the city requires measures that transform the **energy** consumption of businesses and makes it more efficient and secure, with a lower environmental impact. Efficiency improvements will reduce the need for energy, cut fuel costs and increase competitiveness, as well as reducing greenhouse gas emissions and local air pollution. As one of the Solar Cities and with a Solar Master Plan already in place, Agra can promote solar based water heating and cooking systems in the hotels and residential buildings.

There are numerous old **buildings** in the city with heritage value but, due to the absence of a proper database, these are quickly deteriorating. The city needs to develop a GIS based database of all existing as well new buildings, which will help the city authority to formulate heritage conservation plans. A GIS map will also assist the city in developing buildings Bye laws regulating building heights and energy efficiency; the local administration should also enforce these Bye laws, as their violation is one of the major issues in the city.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

The local tourism circuit will help to increase the average stay duration, creating additional jobs in the hospitality sector. GIS mapping of buildings will help the city to identify buildings of heritage value, which can be included in heritage conservation plans, as well as to enforce local Bye laws that are currently being violated, thereby reducing the resource demand of these buildings. Organising small scale industries will help them to access better advanced technology, making them more efficient in terms of energy and resource usage while improving their productivity. It will help authorities to monitor these industries and improve the economic opportunities without having adverse impact on local environment. Promoting renewable energy based decentralised power supply system will reduce the dependency of local businesses and community on diesel/kerosene based generators, thus reducing pollution as well as ensure continuous power for local industries. Integrated solutions for Solid Waste Management will reduce the impact on the local ecosystem.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

- The starting point for this would be to transfer the functions listed in the 12th Schedule to urban local body.
- Another key step for the city to pursue a green growth path will be to map the status of Economy and Business, Energy, Solid Waste Management, and Buildings and Housing to allow actions to be taken. The status includes a detailed database of the state of services, including the current status of development in the city, disaggregated economic data at the city level, GIS mapping of all the buildings and status of waste generation in the city.



THE MOSQUE BESIDE THE TAJ MAHAL, AGRA

Cochin City Profile

Volume 2



Cochin City Profile

3.1 Introduction

Cochin, also known as Kochi , is a major port city on the west coast of India by the Arabian Sea; it's part of the district of Ernakulam, in Kerala, and is thus often also called by the name of Ernakulam, which refers to the mainland part of the city. The city of Cochin, with its population of 6.01 lakhs, is the most densely populated city in the state and is part of an extended metropolitan region with a population of 2.1 million, the largest urban agglomeration in Kerala. The civic body that governs the city is the Cochin Municipal Corporation (CMC), which was constituted in the year 1967, and the statutory bodies that oversee its development are the Greater Cochin Development Authority (GCDA) and the Goshree Islands Development Authority (GIDA).

Acclaimed as the Queen of the Arabian Sea, Cochin has been an important spice trading centre on the west coast of India since the 14th century. Cochin ranks first in the total number of international and domestic tourist arrivals in Kerala and has been recognized as one of the best tourist destination in India.

3.2 Main Green Growth Message / Lesson / 'Take Away' for This City

Famous for its backwaters, Cochin is the most densely populated city in Kerala. Due to the presence of a major port, trade activities have been increasing in the city, whose economy is also benefiting from the growing tourism activities. Due to the limited availability of land in the core city, new developments are emerging in suburban areas in a haphazard and unregulated manner. The city's inadequate infrastructure presents also a considerable barrier for green growth. The absence of a centralized sewerage network is degrading the vulnerable backwaters of the city. The city can manage its growth efficiently, thus improving quality of life with minimal impact on the ecosystem by adopting green strategies, which include optimal use of scarce land through GIS based Master Planning using TOD principles; developing a comprehensive action plan for the ecosystems in the city; formulating city specific building Bye laws to optimize resource conservation and promote clean energy technologies; implementing an integrated sewage management approach; and aiming at conservation of heritage buildings on priority basis to tap its economic potential.

3.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Cochin
District	Ernakulam
State	Kerala
Connectivity	Air, Rail and Road
Area of the city	City: 94.88 sq. km, UA: 330.02 sq. km
No. of administrative wards	74
Population (2011)	City: 6.01 lakhs, UA: 21.17 lakhs
Location	Southern India
Climate	Tropical Monsoon Type
Economy	Trade and Tourism sector

UA: Urban Agglomeration

Type of Cities This Profile Is Relevant To

Cochin represents cities dependent on trade and tourism for their economy.

Demography:

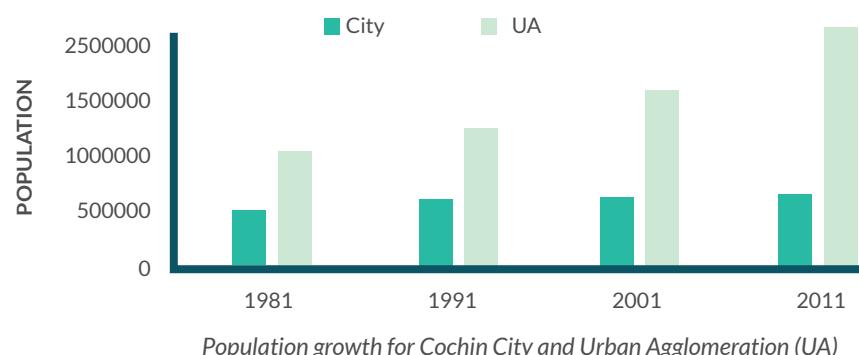


Population

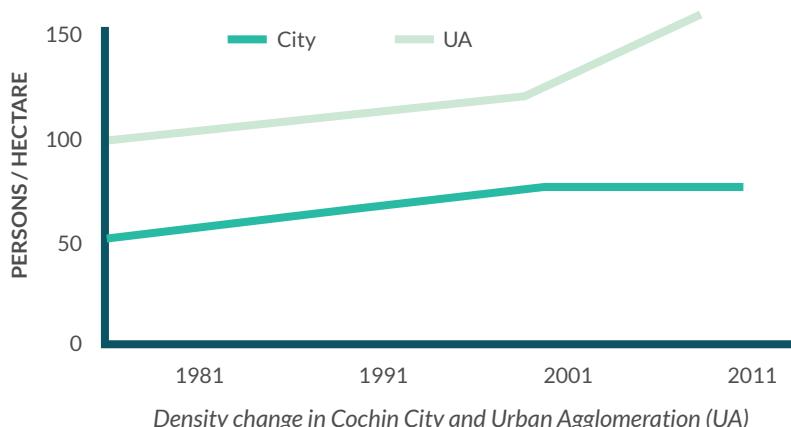
6.01 lakhs (2011 census)

Growth Rate:

The decadal population growth of Cochin city in 2011 was less than 1%, but at same time the growth rate of the urban agglomeration was around 74%, which is well above the national average of 17.64%. In the last three decades, the urban agglomeration (UA) experienced a high decadal population growth rate mainly due to its trade growth and accompanying opportunities.



The overall population density has been stagnant in Cochin core city due to the lack of land availability, which has contributed to the urban sprawl. The new growth is witnessed by suburban areas surrounding the core Cochin City.



Economic Activities:

- Trade
- Tourism

Tourism is one of the strongest drivers of the local economy for Cochin. The presence of several leading hospitality brands has been a major source of employment for locals. Cochin is a major exporter of spices and is home to the International Pepper Exchange, where black pepper is globally traded. The Spices Board of India and World Spice Organization's headquarters are also located in Cochin.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water	KWA	KWA	KWA
Sewerage and Sanitation	KWA	KWA	CoC
Solid Waste Management	CoC	CoC	CoC
Urban Transport	KSRTC	KSRTC	KSRTC
Urban planning and town planning	DTCP	DTCP	DTCP
Street lighting	CoC	CoC	CoC

KWA: Kerala Water Authority
 KSRTC: Kerala State Road Transport Corporation
 CoC: Corporation of Cochin
 DTCP: Department of Town & Country Planning

3.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Land-use and density
- Ecosystem and biodiversity
- Water and sanitation
- Housing and buildings



RESIDENTIAL DEVELOPMENT AROUND COCHIN BACKWATER

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Cochin, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Cochin is known for its backwaters but due to the rapid growth of the region in past decades, the city has experienced heavy construction activities especially in peri-urban areas. The development has led to city witness rapid change in **land use** and violation of Master Plan norms. The uncontrolled haphazard construction around the backwaters has significant impacts on the local ecosystem. Cochin backwaters are now recognised as one of the vulnerable wetlands along the Indian coast that are deteriorating due to increased developmental activities. The city therefore needs to undertake restoration measures to ensure the development of this region without damaging its bio-resources. The city needs to develop an action plan that restricts/minimises the impact of human activities on the ecosystem. The city has the option of developing a GIS-based Master Plan to track changes in land use and monitor the development activities around the restricted/sensitive areas. The

Master Plan developed should include transit oriented development and active involvement of citizens. TOD based compact development will help to increase the transit ridership and hence reduce dependence on private vehicles. City can adopt land use – transport integration and integrated land and water planning. The city should also develop localised development regulations to ensure that new development is harmonised with the local **ecosystem**.

The city needs to develop a centralised **sewerage** system. Currently, most of the untreated sewerage is discharged in the backwaters, deteriorating the water quality. The peri-urban areas that have witnessed rapid development can be provided with decentralised sewerage systems such as DEWATS. The city can develop an integrated water resources management plan that explores economic and regulatory instruments to minimise the discharge of sewage into the water bodies, especially from trade and commercial activities. These steps will help to prevent the deterioration of the ecosystem of the water bodies, which are one of the major attractions for tourists in the city.

Cochin has a large number of old **buildings** with heritage importance. The Corporation does not charge property tax from vacant buildings. In absence of accurate property mapping, the buildings with heritage value are deteriorating along with losses of revenue. GIS-based mapping of buildings will help the city to develop appropriate heritage conservation plans and impose property tax on unregistered buildings.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

Since Cochin's wetlands are one of the most vulnerable areas along the Indian coast, the protection of the local ecosystem is a priority for the city. A GIS-based Master Plan will help the city to evaluate the existing status of development and the extent of development that has impact on the backwaters; it will also help in formulating action plans for the city's ecosystem. Other benefits include increased public safety, reduced air pollution and energy consumption for the infrastructure system - especially for public transport - and indirect economic benefits due to reduced congestion. Centralised sewerage connection will reduce the discharge of untreated sewage in the backwaters, currently one of the major sources of water pollution. Mapping of properties will help the city to monitor the violation of building Bye laws, increase property tax base and conserve buildings with heritage value, thus increasing the tourism potential of the city.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

- The starting point for this would be to transfer the functions listed in the 12th Schedule to urban local body.
- Though the city provides adequate water for households, an integrated water resources management plan needs to be prepared, which includes wastewater management as well.
- The city needs to map the status of all the priority sectors to allow actions to be taken. The status includes a detailed database of the state of services, including the current status of development in the city, disaggregated economic data at the city level, GIS mapping of all the buildings.

Dehradun City Profile

Volume 2



Dehradun City Profile

4.1 Introduction

Dehradun is the administrative center and capital of the state of Uttarakhand. It is situated at the Himalayan foothills in the Doon Valley, known for its pleasant climate and natural beauty. It is also an important educational centre, housing some of India's best schools as well as the Indian Military Academy, the Forest Research Institute, Oil and Natural Gas Corporation Limited (ONGC) and many other key central and state government offices. Dehradun is well linked with rail, road, and air routes to all the parts of the state and the country.

Two other major urban centres in the state - Mussoorie and Rishikesh, are located in close vicinity to Dehradun (within 30-50 km range), making this a highly urbanized region. The nearest airport from Dehradun is the Jolly Grant Airport, situated on the outskirts of the city at a distance of 25 km.

4.2 Main Green Growth Message / Lesson / 'Take Away' for This City

Dehradun is a rapidly growing state capital and tourist destination, situated in an eco-sensitive zone and surrounded by forest land. The city's location and surroundings impose regulatory constraints on spatial and vertical growth, leading to limited useable land resource for future development. The city needs to focus on promoting development in satellite towns and adopt innovative approaches for sensible use of its developable land. The city needs to manage its traffic by improving the public transportation system and providing better infrastructure; as well as to promote energy conservation and use of renewable energy in its buildings and service facilities; undertake improved collection, segregation and processing of its solid waste (at the centralized and decentralized level) for preserving its local ecosystem.

4.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Dehradun
District	Dehradun
State	Uttarakhand
Connectivity	Air, Rail and Road
Area of the city	67 sq. km
No. of administrative wards	60
Population (2011)	5.78 lakhs
Location	North India
Climate	Tropical Monsoon Type
Type of city	Administrative Centre, Educational Hub and Tourist city



DOON VALLEY HILLS AS SEEN FROM DEHRADUN

Type of Cities This Profile Is Relevant To

The city is representative of administrative centers and medium sized state capitals with a population of around 5 lakhs as well as of cities situated in ecologically sensitive locations.

Demography:

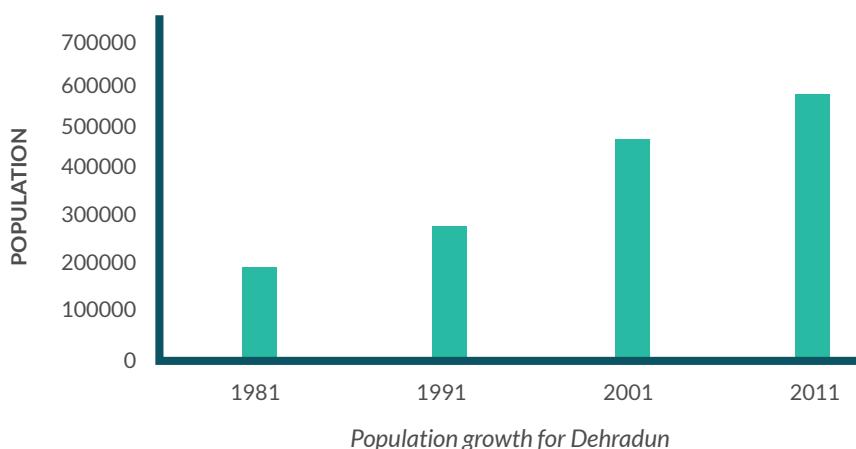


Population

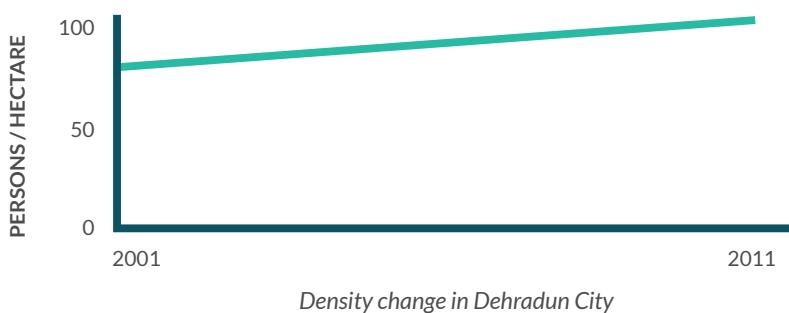
5.78 lakhs (2011 census)

Growth Rate:

The decadal population growth in Dehradun in 2011 was 29%, which is above the national average of 17.64%. The city experienced the highest decadal growth in population of 65.93% between 1991 and 2001, when Dehradun became the capital of the newly created Uttarakhand, a state that had plans for high economic growth. The population growth has since then stabilized at 29% in 2011. The average floating population in the city is about 20,000 people per day.



The overall population density has increased from 67 persons per hectare in 2001 to 87 persons per hectare in 2011.



Economic Activities:

- Tourism
- Academic institutions
- Administrative services

Dehradun is a gateway to the Himalayan region and thus attracts a large number of tourists on their onward journey to other hill destinations. The city hosts some famous schools and many well-known and important institutions such as the Forest Research Institute, the Oil and Natural Gas Commission, the Indian Military Academy, the Indian Institute of Petroleum, the Indian Institute of Remote Sensing etc.. Dehradun is also the wholesale trading center for the entire hill region of the State.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water and Sanitation	UPJN, UJS (small projects)	UPJN, UJS (small projects)	UJS
Sewerage and Drainage	UPJN, UJS (small projects)	UPJN, UJS (small projects)	UJS
Solid Waste Management	DNN	DNN	DNN
Urban Transport (Roads)	PWD, MDDA	PWD, DNN	PWD, MDDA, DNN
Urban planning and town planning	MDDA	MDDA	MDDA

UPJN: Uttarakhand Pey Jal Nigam
UJS: Uttarakhand Jal Sansthan
DNN: Dehradun Nagar Nigam
PWD: Public Works Department
MDDA: Mussoorie-Dehradun Development Authority

4.4 Green Growth Recommendations

Priority Sector for Green Growth in the City

- Land use and density
- Energy
- Transportation
- Solid waste Management

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Dehradun, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Dehradun is surrounded by forest land and is situated in an eco-sensitive zone in the foothills of the Himalayas. This imposes regulatory constraints on the city's **spatial expansion** (horizontal) and also limits vertical growth. Since the city has limited useable land resources for future development, it is important that it looks at integrated planning for the larger urban agglomeration and promotes development in its surrounding towns/satellite areas. This would help the growth of the larger urban agglomeration. To maximize the use of its developable land, the city should identify specific pockets or areas wherein vertical development can be promoted.

Being an administrative centre for the state and a popular tourist destination, the city caters to an increasing number of visitors. This has resulted in substantial volume of **traffic** and intercity buses entering Dehradun. When coupled with narrow roads (owing to its topography and unplanned development), the result has a vehicular population exceeding the carrying capacity of the city's roads, leading to heavy traffic congestion. The operations of the public bus service in the city are constrained due to the narrow road width and unsuitability of the city bus fleet to the local topography. The inadequacy of the public transport system has resulted in the prevalence of IPT vehicles. Dehradun needs to create dedicated infrastructure and implement effective regulatory measures to improve the management of the inter-city buses and IPT vehicles; developing a bypass road will also help decongest the core area of the city. The city can achieve increased access and reduced use of private vehicles by putting in place an efficient city bus service operating on well planned routes, comprising of a bus fleet well suited to the city's topography and using clean fuels such as CNG.

Growing population along with rising tourism and allied commercial activities is increasing the demand of **energy** in Dehradun. Dehradun needs to leverage the opportunity of being a designated solar city, to build internal capacity and promote and implement energy efficiency and renewable energy solutions. The city benefits from a good amount of clear sunlight all year round due to its high altitude and thus has high potential to tap solar energy by promoting solar photovoltaic and solar water heating systems in the numerous institutional buildings, academic campuses, and hotels. Carrying out awareness generation activities on energy conservation in the city's schools and academic institutions will bear long term benefits. The city should undertake energy conservation measures and street lighting retrofits to improve service delivery and reduce energy use. To do this, the city can leverage municipal demand side energy management schemes and opt for PPP engagement through ESCO models.

Inadequate door to door **waste** collection, lack of waste segregation and unscientific open dumping practice are posing serious challenges for the city's municipal solid waste management. The lack of processing facilities is further contributing to the majority of Dehradun's solid waste being dumped in the landfill site, which is thus filling up fast. Even though the city is implementing a centralized integrated solid waste management project, given the issues in availability of land resource in the city, it is recommended that the city should promote decentralized waste segregation practices and decentralized waste processing through community level composting facilities and biogas plants. NGOs and institutions can be involved to strengthen this intervention. Improved waste management and recycling should be actively promoted in academic institutions, administrative offices and hotels in the city.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

The recommended options for land use and density in the city would facilitate improved planning of its urban form and density and enable the city to use its scarce land resource judiciously, as well as contribute to the preservation of the city's ecosystem. The options for urban transportation would decongest the city, improve mobility and access, and drive economic growth while at the same time reducing local air pollution. By implementing the energy recommendations, the city would reduce its dependence on coal based grid electricity, reduce its GHG emissions by tapping local renewable energy resources and raise long-term awareness in the community. The options for solid waste management can enable the city to recover its waste resources, achieve financial gains, improve community participation and ensure long term sustainability in waste management practices.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

- A key initial step would be to transfer the functions listed in the 12th Schedule of the 74th Constitutional Amendment Act (CAA) to the DNN. The Government of Uttarakhand would thus have to devolve basic functions such as urban planning, water supply, sewerage, drainage to the DNN; this will help improve departmental co-ordination and provide services in an integrated manner.
- Dehradun needs to map and document its current status across its priority sectors in order to undertake informed and well planned actions. This includes mapping of the detailed status of existing development in the city, status of urban transport, pattern of energy use and demand across all sectors, and status of solid waste generated.

Kota City Profile

Volume 2



Kota City Profile

5.1 Introduction

The city of Kota is located in the south-eastern part of Rajasthan on the eastern bank of the Chambal River, on a high sloping table that forms part of the Malwa Plateau. The city has fertile land and greenery with irrigation facilities through canals. Kota is one of the industrial hubs of the state, with chemical, fertilizers, synthetic fibres and sophisticated instruments industries being based in the city. The city is connected to the Delhi-Mumbai railway line and is also located on the national trade route between Delhi and Gujarat.

5.2 Main Green Growth Message / Lesson / ‘Take Away’ for This City

Kota is an industrial and academic center that is well positioned to tap into the growth opportunities presented by developments such as the Delhi Mumbai Industrial Corridor (DMIC) along which the city is located. The city needs to leverage such opportunities and boost local industry and employment by undertaking efficient well-planned development and ensuring a rational use of land. The city has the potential to promote cycling and needs to put in place a reliable and well-connected public transport system while also focusing on strengthening its solid waste management service.

5.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Kota
District	Kota
State	Rajasthan
Connectivity	Rail and Road
Area of the city	527.03 sq. km
No. of administrative wards	60
Population (2011)	10.01 lakhs
Location	West India
Climate	Arid
Type of city	Education, Trade and Industries

Type of Cities This Profile Is Relevant To

This profile would be relevant to cities having a population of around a million and with an industrial base.

Demography:

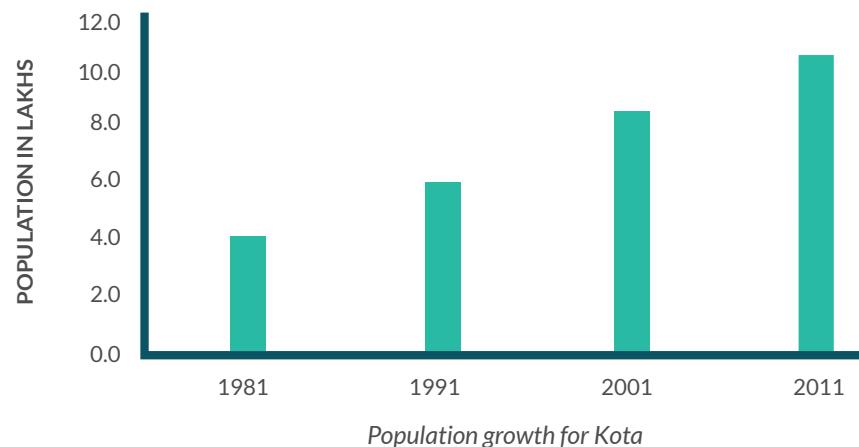


Population

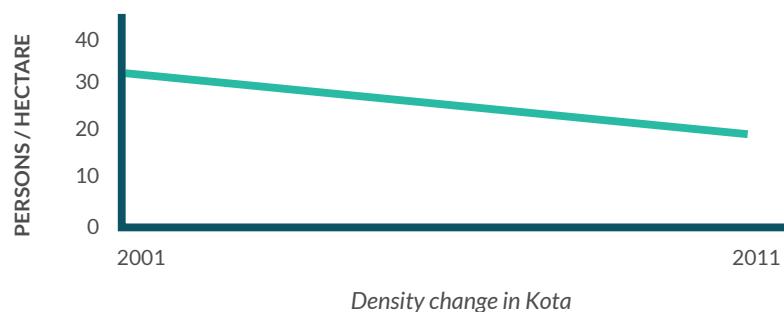
10.01 lakhs (Census 2011)

Growth Rate:

As per the census 2011, the population of Kota was 10.01 lakhs. There was a growth of 42.40% in the population compared to the figure in 2001 which was 6.94 lakhs. In 2001, the population had increased of 29.63 % compared to 1991



The overall population density has decreased from 31 persons per hectare in 2001 to 19 persons per hectare in 2011. This happened, as the area under the jurisdiction of Nagar Nigam Kota has increased to 527.03 sq. km. from 221.36 sq. km. in 2007



Economic Activities:

- Education
- Trading (mainly agro)
- Industries

Kota is one of the industrial hubs of the state. Its main economic activities also include education and trading in agricultural produce.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water Supply	PHED	PHED	PHED
Sewerage and Drainage	UIT	UIT	UIT
Solid Waste Management	KNN	KNN	KNN
Urban Transport (Road)	RSRTC	RSRTC	RSRTC
Urban planning and town planning	UIT	UIT	UIT

RSRTC= Rajasthan State Road Transport Corporation
PHED: Public Health Engineering Department
UIT: Urban Improvement Trust
KNN: Kota Nagar Nigam



KOTA MUNICIPAL CORPORATION BUILDING

5.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Land-use and density
- Economy and business
- Transportation
- Solid Waste Management

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Kota, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Kota is located on the fertile banks of the Chambal river. The city is witnessing rapid growth, leading to extensive construction and development activities. At present, the fertile **land** in the city is being used for commercial and residential development whereas development is restricted in certain areas that are classified under forest land and have infertile soil. This will, in the long term, negatively impact agricultural produce and biodiversity in the city. The city needs to undertake measures to identify and allocate land use rationally on the basis of the usability of the land. New and existing development in the city is currently not being mapped or documented; the city should begin by mapping its current development status on GIS. This can be aided by a dynamic Master Plan based on TOD principles that is periodically revised and enforced including local height/density restrictions. The mapping of properties would also help the city in its property tax collection, thus improving revenue generation.

Kota has significant potential for industrial growth. Industries in the city can benefit from the city's location near the Delhi Mumbai Industrial Corridor (DMIC). The Agro Park developed by RIICO provides opportunities for development of agro based industries. Opportunities offered by the State through its schemes for cluster development of **industries** should be harnessed. Local products such as the Kota stone should be promoted to generate employment and boost the local economy. The city should identify and demarcate such strategic clusters or pockets, which can be developed as industrial areas to leverage opportunities while also giving due consideration to the provision of associated social and urban infrastructure, to ensure efficient and dense development that has adequate service provision and high livability.

Kota lacks a public **transport** system, which poses issues in mobility, particularly in the newly developed areas. 32 buses acquired by the KNN are non-operational due to lack of manpower. The city should utilize the buses to start a city bus service, which will benefit the city immensely by improving connectivity in the city, reducing use of private vehicles and boosting the local economy. The city can look to operate the service on a PPP basis to improve management and tackle the issue of limited human resources within the KNN. The city bus service can run on clean CNG fuel to minimize air pollution. Integrating the city bus service with the existing Intermediate Para Transit (IPT) vehicles in the city can provide last mile connectivity. A large number of the student population in the tuition centers in Kota use cycles. The city can develop dedicated cycle lanes to promote cycling and improve safety of cycle users. Since students stay in the city for a short duration, models/arrangements such as cycle rent and share can be useful.

A door-to-door **waste** collection system is currently hardly exist in Kota; the lack of transfer sites and sanitary landfill facilities poses a number of additional challenges. Settlements

residing on the banks of the Chambal river, dump solid waste into the river, leading to pollution of the city's sole water source. The city needs to improve solid waste management system beginning with segregated door-to-door collection. Decentralized composting at the neighbourhood level should be promoted to reduce transportation costs and extend the life of the landfill site. The city can involve NGOs and small enterprises in the decentralized waste management. The city should promote public-private partnership for solid waste management, secured through robust and clear contractual arrangements, to strengthen service delivery.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

The recommended options for urban land use and density would ensure that the city grows in a well-planned manner and that utilization of land for different purposes is done in a rational way; it would also facilitate conformance to building bye-laws and development controls, regulate unauthorized construction activities, improve collection of property tax and improve the financial condition of the KNN. The recommended options for economy and business would enable the city to plan and implement enabling infrastructure and services to maximize its industrial potential, leverage opportunities for growth and improved business due to the DMIC corridor, promote local industry and generate local employment. The options suggested for urban transportation would decongest the city, improve mobility and access, promote cycling and improve safety of cycle users, reduce travel expenditure, drive economic growth, and reduce local air pollution. The options for solid waste management can enable the city to recover and reuse its waste resources, reduce pollution and preserve the Chambal river, achieve financial gains through reduced waste transportation and expenditure handling, extend the life of the landfill site, improve community participation, and achieve long term sustainability in waste management practices.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

- The governance structure needs to be improved in Kota, where currently a multiplicity of agencies are operating. Devolving the functions listed in the 12th Schedule of the 74th Constitution Amendment Act will help KNN function better and efficiently. In particular, transferring the responsibilities of town planning, regulation of land-use, water supply and sewerage, and urban forestry to KNN can improve governance of the city.
- The next step would involve mapping and documentation of the updated current status across its priority sectors in order to undertake informed and well planned actions. This includes mapping of the status of existing development in the city, detailed status of the city's economy, status of the urban transport and of the solid waste generated.

Ludhiana City Profile

Volume 2



Ludhiana City Profile

6.1 Introduction

The city of Ludhiana is a prominent industrial hub in the Ludhiana district, located centrally in the state of Punjab. The city lies at a distance of 8 km from the South bank of the river Sutlej and was founded on a ridge of the Budha Nallah, previously a bed of the Sutlej. Ludhiana is the first metropolitan center in Punjab and also its largest city in terms of both area and population. The city, governed by the Ludhiana Municipal Corporation (LMC), has witnessed enormous industrial growth over the last few years and is one of the fastest growing cities in Punjab. It houses many textile and manufacturing industries and is commonly known as the 'Manchester of India', as well as the national capital of small scale industries. The city is also a major trading hub for commodities in Northern India.

6.2 Main Green Growth Message / Lesson / 'Take Away' for This City

Ludhiana is a vibrant business center that substantially contributes to the state's GDP. While the city's diverse industrial base is undoubtedly one of the main reasons for the strong local economy, it has also resulted in alarming pollution and environmental degradation. Ludhiana has the opportunity to become a green industrial city by cleaning up its water bodies and implementing mechanisms and clean technologies that minimize discharge of untreated wastewater from its industries. The city needs to expand its storm water drainage network, conserve its depleting groundwater resources by regulating usage and reducing leakages. Adopting travel demand management measures will help the city to manage traffic in its core areas. There is a good potential to promote energy efficient and renewable energy systems in the industrial units in the city, particularly in the water intensive industrial sectors. Construction of adequate affordable housing facilities for the migrant labour is also critical to deter slum settlements from mushrooming in the city.



FLY-OVER, LUDHIANA

6.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Ludhiana
District	Ludhiana
State	Punjab
Connectivity	Rail and Road
Area of the city	159 sq. km
No. of administrative wards	75
Population (2011)	16.13 lakhs
Location	North India
Climate	Semi-arid
Economy	Industry, Trade and Commerce

Type of Cities This Profile Is Relevant To

The city represents industrial cities with a population of over one million, having a large number of small scale industries and significant retail and allied service activities.

Demography:

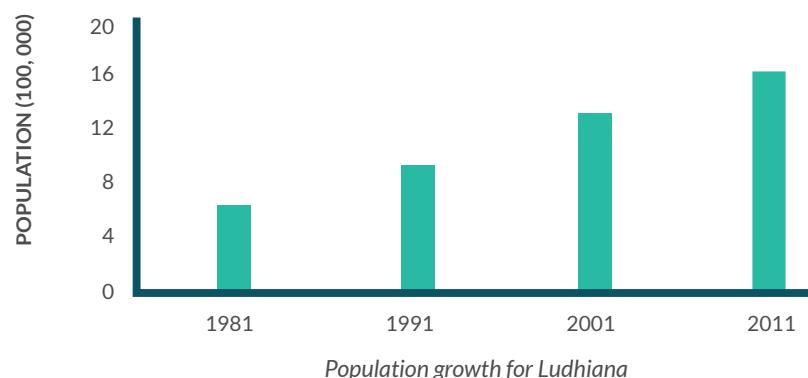


Population

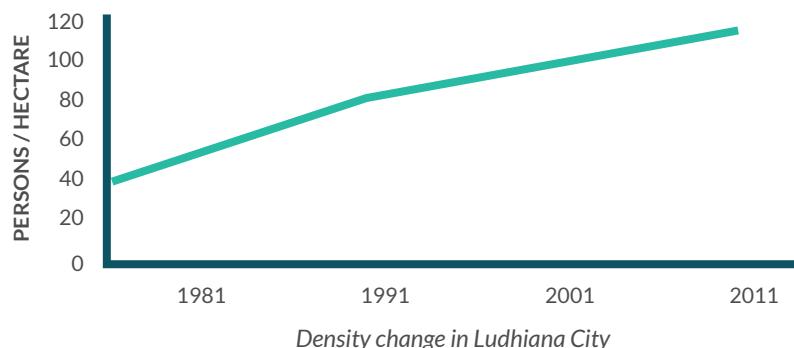
16.13 lakhs (2011 census)

Growth Rate:

Ludhiana witnessed a very high decadal population growth rate of over 33% during the period 1981-2001, mainly due to the population influx resulting from growing industrial, trade and commerce activities. However, during the 2001-2011 decade, the population growth rate decreased to 15.69%, a figure lower than the national average of 17.64%. As per the 2011 census, the city's population of 6.07 lakh in 1981 grew to 16.13 lakh in 2011, with the growth rate of population peaking in 1981-1991 (71.77%).



The area under LMC increased from 110 sq. km in 1981 to 159 sq. km in 2001. The density of population nearly doubled from 55.2 persons per hectare in 1981 to 101.2 persons per hectare in 2011.



Economic Activities:

- Manufacturing and textile industries
- Trade, retail and allied services

A variety of industries exist in the city, from textile, to hand tools, auto components, foundry and electroplating. Ludhiana is Asia's largest bicycle manufacturing hub and contributes to more than 50% of India's total bicycle production. The city produces 60% of India's tractor parts along with a large share of auto and two-wheeler components and is a major producer of agro based products. Ludhiana is well known for its hosiery goods, woolen garments and leather items. Retail and allied service activities are also a vital part of the city's economic structure.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water and Sanitation	PWSSB	PWSSB	LMC
Storm Water Drainage	LMC	LMC	LMC
Solid Waste Management	LMC	LMC	LMC
Urban Transport (Road)	LMC	LMC	LMC
Urban planning and town planning	GLADA	GLADA	GLADA

PWSSB: Punjab Water Supply and Sewerage Board
LMC: Ludhiana Municipal Corporation
GLADA: Greater Ludhiana Area Development Authority

6.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Ecosystem and biodiversity
- Energy
- Housing and buildings
- Transportation
- Water and sanitation



TRAFFIC CHAOS NEAR CLOCK TOWER, OLD CITY, LUDHIANA

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Ludhiana, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

The **industrial sector** in Ludhiana has contributed to the growth of the city but has also resulted in alarming air, water and land pollution. The large volumes of untreated industrial effluent containing heavy chemicals along with domestic sewage flowing into the Budha Nallah have caused significant environmental degradation and pose serious health hazards for the citizens. The city is undertaking a bio-remediation project to clean the Budha Nallah; this intervention can be well supported by efforts to prevent discharge of industrial and municipal wastewater into the river. To this effect, promoting clean technologies in the water intensive textile and electroplating industries, setting up smaller scale affordable wastewater collection and treatment systems in the industrial clusters, enforcing effective monitoring and regulatory mechanisms, and relocating industrial clusters and settlement along the Budha Nallah to other appropriate locations is recommended.

To prevent **flooding**, Ludhiana needs to cover the entire city with drainage networks and undertake regular cleaning and maintenance of the existing drainage and sewer network. Encroachments obstructing natural drainage channels need to monitored and regulated. To check usage of water and improve financial recovery from water supply services, the city should undertake metering of water connections and levy volumetric tariffs, supported by local policies or guidelines. Water audits and leakage mapping studies can help reduce water losses in the distribution network. The city should promote rainwater harvesting and wastewater recycling in large complexes, buildings and hotels as well.

The **roads** in the core city area have narrow widths and extreme traffic congestion due to the mixing of slow moving vehicles and Intermediate Para Transit(IPT), coupled with a lack of adequate parking facilities. The city bus service is weakened by low financial recovery and connectivity. Economic growth and lack of reliable public transport have thus resulted in very high private vehicle ownership. Being an industrial and trade hub, Ludhiana has also high daily freight vehicle traffic. The city will benefit substantially from an efficient and effective public transport system, strengthened by improved financial viability. The focus should be on traffic decongestion in the core city, achieved through restricting vehicles in certain areas, promoting Non-Motorised Transport (NMT) and pedestrian movement, and providing better parking facilities to allow citizens to 'park and ride'.

The **grid power supply** is unable to match the growing energy demand, driven mainly by the industrial and commercial sector. The city is subjected to frequent power cuts, which are impacting industrial operations and result in increased use of diesel generator sets. Moreover, a majority of the city's industrial units are in need of modernization/technology upgradation. Ludhiana is a designated solar city and should undertake promotional activities (e.g. workshops, exhibitions...) to promote renewable energy and energy efficient technologies. The city should ensure that new buildings comply with building bye-laws with regards to the installation of solar water heating systems. To cut down on industrial energy use, the city should focus on promoting technology upgradation to boost the uptake of energy efficient devices. Solar water heating systems offer a high potential to meet the thermal energy demand in the textile units.

A majority of the **city's workforce** consists of migrant industrial labourers, housing facilities for whom are currently highly inadequate, resulting the spreading of slum settlements all over the city. The city thus needs to focus on creating affordable housing to cater to the

industrial workforce and to build night shelters or short term homes for migrant laborers and working women. Private building developers should be incentivized to construct affordable housing units.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

The recommended options in the ecosystem and biodiversity and the water and sanitation sectors would lead to prevention of environmental degradation and aid rejuvenation of the Budha Nallah, improvement of water quality, reduction of health hazards, conservation of water resources and contribution to a cleaner local environment. The options suggested for urban transportation would decongest the city, improve mobility and access, and drive economic growth while also reducing local air pollution. Interventions in the urban energy sector would reduce the city's dependence on coal based grid electricity, reduce industrial and community expenditure on energy, cut down on use of fossil fuel, and lead to lower GHG emissions by tapping local renewable energy resources. The suggestions for housing and built environment would help provide safe and affordable housing facilities, improve security, reduce proliferation of slums and their impacts on the local environment.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

- A key initial step would be to transfer the functions listed in the 12th Schedule of the 74th Constitutional Amendment Act (CAA) to the LMC. The Government of Punjab would thus have to devolve basic functions such as urban planning, water supply and sewerage to the LMC; this will help improve departmental co-ordination and provide services in an integrated manner.
- Ludhiana needs to map and update its existing status across its priority sectors, in order to undertake informed and well planned actions. This includes mapping points of disposal and volumes of untreated industrial effluent and domestic sewage in the city; status of drainage and mapping of locations with frequent water logging incidence; status of urban transport; pattern of energy use and demand across all sectors; and status of slum and informal settlements along with housing demand in the city.

Nadiad City Profile

Volume 2



Nadiad City Profile

7.1 Introduction

Nadiad is located in the Kheda district in Gujarat. It is an important urban centre having major health and industrial node. It is the largest town of Kheda district as well as a district headquarter. Due to its strategic location between Ahmedabad and Vadodara, Nadiad has developed into a trade centre. With the presence of Agricultural Produce Market Committee (APMC), the city serves as trade centre for the entire Kheda district. Many hospitals and educational institutions are located in the city, among which the Kidney Hospital, Dharmasingh Desai Institute of Technology and the Ayurvedic College are well known.

7.2 Main Green Growth Message / Lesson / ‘Take Away’ for This City

Due to its strategic location between Ahmedabad and Vadodara and the upcoming dedicated freight corridor that is part of Delhi Mumbai Industrial Corridor (DMIC) project, Nadiad has the opportunity to multiply trade activities in the city. The provision of dedicated infrastructure along with demarcated land for industries will help to boost its economic opportunities. The city can reduce air pollution by improving its public transport, which will also reduce the congestion on major streets. GIS mapping of buildings will help the city to map heritage ones and accordingly formulate a heritage conservation plan. It will also assist the ULB to bring more buildings under property tax, increasing the sources of revenue.

7.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Nadiad
District	Kheda
State	Gujarat
Connectivity	Rail and Road
Area of the city	City: 28.48 sq.km
No. of administrative wards	14
Population (2011)	2.24 lakhs
Location	West India
Climate	Tropical
Type of City	Trade and Administrative (District headquarter)

Type of Cities This Profile Is Relevant To

The city is representative of the all district headquarters with a population of above 200,000.

Demography:

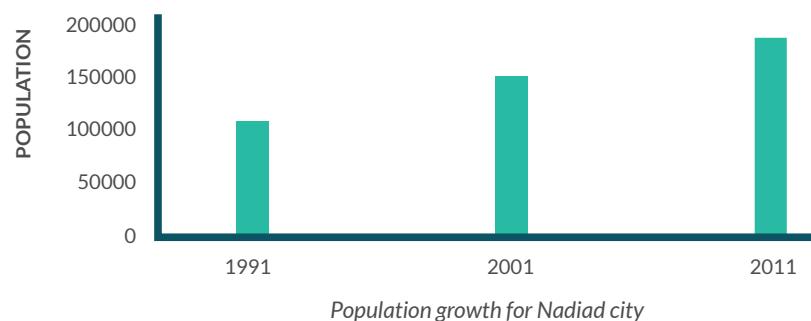


Population

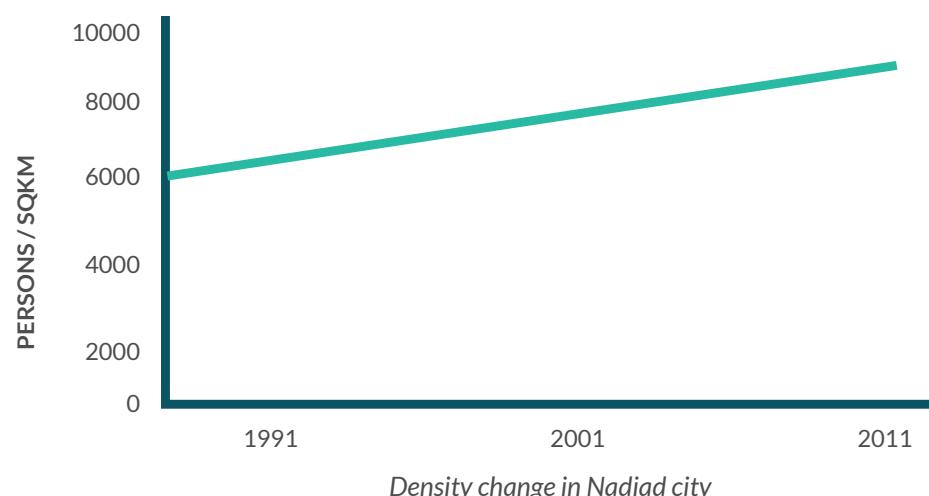
2.24 lakhs (census 2011)

Growth Rate:

As per the Indian census, the population of Nadiad (Municipal Corporation area) in 2011 was 2.24 lakhs. During the 2001-2011 decade the city's population grew by 16.17% while in the previous decade (1991-2001) the decadal growth rate was 18%.



The population density has increased considerably from 5866 to 7879 persons/ sq. km. in the last two decades.



Economic Activities:

- Trade and commerce
- District headquarters
- Agro based Industries

The presence of the Agricultural Produce Market Committee (APMC) makes Nadiad the most important trade centre in Kheda District. Since the city serves as administrative headquarter for the district, it attracts many visitors, thus increasing commercial activities in city. The city has many Agro based industries as well.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water	GWSSB	GWSSB	NNP
Sewerage and Sanitation	GWSSB	GWSSB	NNP
Solid Waste Management	NNP	NNP	NNP
Urban Transport (Road)	N/A	N/A	N/A
Urban planning and town planning	Department of Town and Country Planning	NNP	N/A

Gujarat Water Supply & Sewerage Board (GWSSB)
NNP: Nadiad Nagar Palika



NADIAD MUNICIPAL COUNCIL BUILDING

7.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Economy and Business
- Housing and Buildings
- Transportation

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Nadiad, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Strategically located between Ahmedabad (55 Km) and Vadodara (50 Km), Nadiad has a unique location advantage. The city is also located on the upcoming Delhi Mumbai Industrial Corridor (DMIC). Demarcating dedicated land for **industries** in form of industrial areas, where local business gets easy access to required infrastructure, will increase the industrial base and trade in the city.

The current public **transport** system consists of limited buses managed by a private operator in the city. The bus service can be improved with the allotment of appropriate infrastructure and financial support. With better availability and quality of public transport, the growth of private vehicles can be monitored. Intermediate Para Transit (IPT) services can be also organized in the city with route rationalization so as to support the public transport system and enhance last mile connectivity.

GIS-based property mapping will help the city to identify **buildings** with heritage importance and to increase property tax revenues. With over 11% of the population residing in slums, the city needs to plan for affordable housing and incentivize private developers using various regulatory tools such as extra TDR (Transfer of Development Rights). Enforcing the Energy Conservation Building Code (ECBC) can help to increase the number of energy efficient buildings. The city can utilize local building Bye laws to increase the utilization of local resources in buildings.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

Dedicated facilities for industries and local business will help to unleash the economic opportunities in the city and potentially multiply the trade activities in city related to the upcoming DMIC corridor. The provision of improved public transport system with multimodal integration will improve the quality of service and it will thus help the city to reduce the dependency on private vehicles, congestion and air pollution. GIS-based mapping will help to develop conservation plans for heritage structures, which has potential to attract tourists and will also bring more buildings under the tax slab, thus increasing revenues.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

The starting point for the city to pursue a green growth path will be to map the status of all the priority sectors to allow actions to be taken. The status includes a detailed database of the state of services, including the current status of development in the city, disaggregated economic data at the city level, GIS mapping of all the buildings and a study related to mobility pattern and demand in the city.

Pimpri Chinchwad City Profile

Volume 2



Pimpri Chinchwad City Profile

8.1 Introduction

Pimpri Chinchwad is the fifth-most populated city of Maharashtra located in the north-west quadrant of Pune with the rivers Mula, Pawana and Indrayani forming boundaries on the three sides of the city. The city was developed as a supporting township for the city of Pune (15 km away) and forms a continuous urban stretch with the Pune urban agglomeration.

Pimpri Chinchwad has long been famous for being one of the most prominent industrial destinations outside Mumbai. The city, governed by the Pimpri Chinchwad Municipal Corporation (PCMC), is famous as an industrial township and is also known as the Detroit of the East, because of the presence of many national and international automobile companies. When viewed as a unified geographical unit, Pimpri-Chinchwad, along with Pune, makes up one of India's largest industrial areas.

8.2 Main Green Growth Message / Lesson / 'Take Away' for This City

Pimpri Chinchwad is an industrial hub which is witnessing tremendous growth. The PCMC is a vibrant urban local government that has demonstrated and implemented ideas that are forward looking. It is the first city government in the country to implement GRIHA – green rating for buildings. PCMC has taken a transformational intervention in converting an abandoned quarry into a lake, which also serves as a recreational area for citizens. The city has taken innovative steps for detecting leakages in water supply using helium technology. Pimpri Chinchwad emerges as a city that is proactive and receptive to new ideas.

The city needs to ensure that its growth is well planned and in a rational manner while also preserving and safeguarding its abundant water bodies and biodiversity. The city should leverage existing local policies such as the GRIHA scheme and other energy conservation efforts undertaken to ensure that the growing energy demand is met through a combination of clean renewable energy and energy efficiency solutions.

8.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Pimpri Chinchwad
District	Pune
State	Maharashtra
Connectivity	Air, Rail and Road
Area of the city	City: 177.3 sq.km
No. of administrative wards	64
Population (2011)	17.29 lakhs
Location	West India
Climate	Tropical monsoon type
Economy	Industrial, Service sector

Type of Cities This Profile Is Relevant To

The city represents industrial cities as well as very fast growing satellite cities.

Demography:

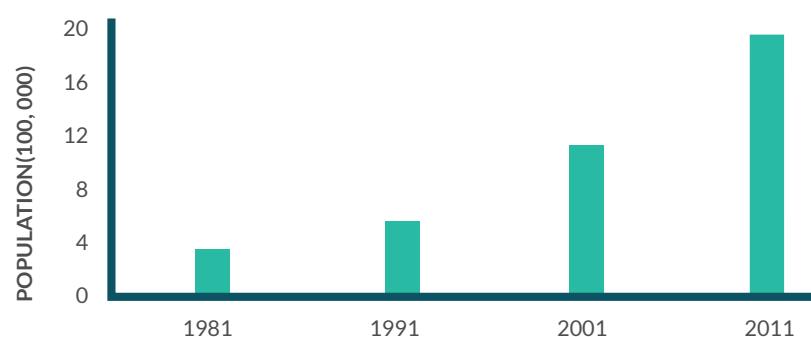


Population

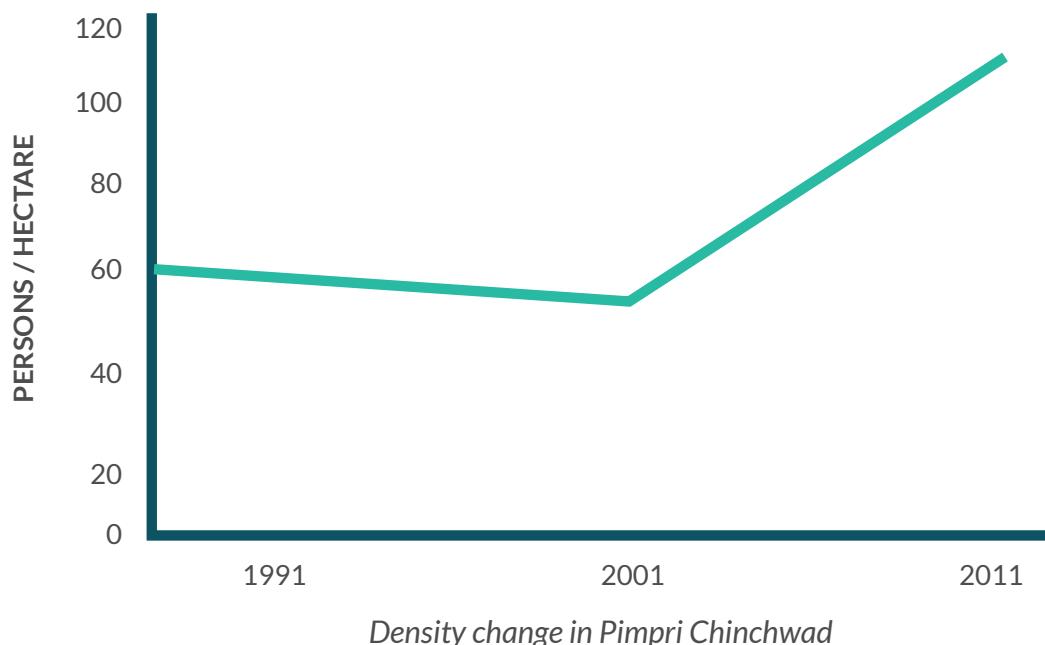
17.29 lakhs (2011 census)

Growth Rate:

The decadal population growth of Pimpri-Chinchwad between 2001-2011 was 72%, which is well above the national average of 17.64%. In last three decades the city experienced a decadal population growth rate of above 70%, mainly due to its industrial growth and accompanying opportunities. The population of the city has multiplied almost seven times in the last three decades. As per the Census, the city's population which was 2.52 lakhs in 1981 increased to 17.29 lakhs in 2011.



The area under PCMC increased from 86.01 sq. km in 1991 to 170 sq. km in 2001. The density of population during this period remained almost constant at 60 persons per hectare. The density increased to 97 persons per hectare in 2011.



Economic Activities:

- Industrial city
- Service sector
- Academic institutions
- IT sector

Pimpri Chinchwad is a major industrial hub and hosts one of the biggest industrial zones in Asia, as well as the Indian operations of major automobile companies. It also has many small and medium manufacturing industries. In the last decade many software firms have set up offices in the Infotech Park in the city.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water	PCMC	PCMC	PCMC
Sewerage and Drainage	PCMC	PCMC	PCMC
Solid Waste Management	PCMC	PCMC	PCMC
Urban Transport (Roads)	PCMC	PCMC	PCMC
Urban planning and town planning	PCMC	PCMC	PCMC

PCMC :Pimpri Chinchwad Municipal Corporation



PIMPRI CHINCHWAD MUNICIPAL CORPORATION BUILDING

8.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Land use and density
- Ecosystem and biodiversity
- Energy

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors in Pimpri Chinchwad, which will help the city to shift to a Green Growth path and realize maximum benefits:

Pimpri Chinchwad is growing quite rapidly and has undergone and continues to undergo widespread building construction activity to meet the demand for built up area. As the city expands, *land use* conversion from agricultural land or open/green spaces to commercial, residential and industrial purpose will take place. The city should ensure that allocation and conversion of land for development or commercial purpose is done in a rational manner based on the usability of land. The city needs to also check unauthorized land use conversion to avoid unplanned growth. It is important for the city to map its current development status on GIS. The mapping of properties can also help in the collection of property taxes and ensure effective enforcement of the building bye-laws and their provisions for mandatory

installation of solar water heating and rainwater harvesting systems. The city should develop a GIS based Master Plan using TOD principles and review and revise it periodically.

Pimpri Chinchwad has three rivers (Mula, Indrayani and Pawana) flowing through city or in close proximity, as well as lakes, reservoirs, ponds etc. within the city itself. Some of these water bodies are getting polluted due to the discharge of untreated sewage and industrial wastewater, storm water intrusion, dumping of solid waste and activities like cattle bathing and washing of clothes. The aquatic **ecosystem** in these water bodies is also getting impacted negatively as a result. Given the city's high growth and expansion, there is a high risk of pollution and environmental degradation of its water bodies and aquatic ecosystem in the future. It is important that the city undertakes measures to clean up the water bodies and revive the ecosystem and also takes necessary steps to safeguard its rivers, lakes and ponds from the ill effects of future development. The city should demarcate boundaries to protect the areas of water bodies and prevent encroachments and also identify non-point sources of pollution. The city can develop green belts in the catchment areas to have a filtering buffer zone for storm water intrusion. Since the city has multiple parks and rich biodiversity, initiatives such as quarry revitalization can be promoted further.

Demand for **electricity** in the city is rising rapidly and is expected to keep increasing in the future as a result of the rising population and growing commercial and industrial energy consumption. Power charges levied on industries are rising and can impact business productivity and inhibit the city's potential as a center for industrial growth. Growing demand for delivery of municipal services is necessitating higher energy use in their operations. The city needs to undertake measures to address these challenges with a long term outlook. An Energy Cell with dedicated technical staff should thus be established. Energy consumption should be mapped at the city level and a city-wide energy plan needs to be developed. It is recommended that PCMC upgrades its energy monitoring system to track energy consumption across its service infrastructure and buildings. The energy savings and benefits accrued from energy conservation activities undertaken by PCMC and through the implementation of PCMC's GRIHA green building rating scheme need to be mapped and documented. This documentation can be used in awareness generation and promotional activities to stimulate energy conservation across the community. The city should explore opportunities for ESCO project implementation in its service infrastructure for water supply, sewage treatment and street lighting. PCMC should include energy efficiency and renewable energy norms in its service infrastructure during the planning, design and construction stage. Programmes promoting energy audits and equipment retrofits should be put in place for the industrial and commercial sector. Coverage of the existing piped natural gas network should be extended to ensure supply of clean natural gas fuel to the industrial, commercial and residential sector.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

The recommended options for urban land use and density would ensure that the city grows in a well-planned manner and that utilization of land for different purposes is done in a rational manner; facilitate conformance to building bye laws and development controls and promote implementation of green interventions therein; regulate unauthorized construction activities and improve collection of property tax. The options suggested for the city's ecosystem and biodiversity would help clean up the city's water bodies and revive their ecosystem; conserve the city's environment and biodiversity and safeguard it from the impacts of future development. By implementing options recommended for the urban

energy sector, the city would reduce its dependence on grid electricity for municipal service delivery, inculcate awareness and cut down on energy use in the community in the long term, reduce industrial energy expenditure thus improving business competitiveness.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

Pimpri Chinchwad needs to map and update the existing status across its priority sectors in order to undertake informed and well planned actions. This includes mapping and document the status of new and existing development within the city, the existing status of its water bodies and aquatic ecosystem and their sources of pollution; and the status of energy use and demand across all sectors.

Shimla City Profile

Volume 2



Shimla City Profile

9.1 Introduction

Shimla was declared the Summer Capital of the Government of India in 1864, paving the way to the Grand Hindustan-Tibet road. In 1871, the Government of Punjab decided to use Shimla as its summer capital as well. In 1904, the Kalka-Shimla railway line was commissioned. After the Partition in 1947, the offices of the Punjab Government were shifted from Lahore in Pakistan to Shimla. In 1966, with the reorganization of the territory into Punjab, Haryana and Himachal Pradesh, Shimla became the capital of Himachal Pradesh. Since then, Shimla has become a popular hill station and most preferred tourist destination.

9.2 Main Green Growth Message / Lesson / ‘Take Away’ For This City

Both the city and the state are active on the green agenda and have already taken steps to preserve the forests within the city limits. However, the city needs to prevent construction on its hill slopes, manage traffic and parking, regulate impacts of tourist inflow by introducing appropriate norms and policies, minimize leakages in its water supply network, and promote a shift to clean renewable energy options and efficient heating technologies to preserve the ecosystem of the city and avoid negative impacts on the local environment.

9.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Shimla
District	Shimla
State	Himachal Pradesh
Connectivity	Rail and Road
Area of the city	35 sq. km
No. of administrative wards	25
Population (2011)	1.69 lakhs
Location	North India
Climate	Cold
Type of city	Tourism and Administrative (State capital)

Type of Cities This Profile Is Relevant To

The city is representative of hill stations in the country with a population around 200,000.

Demography:



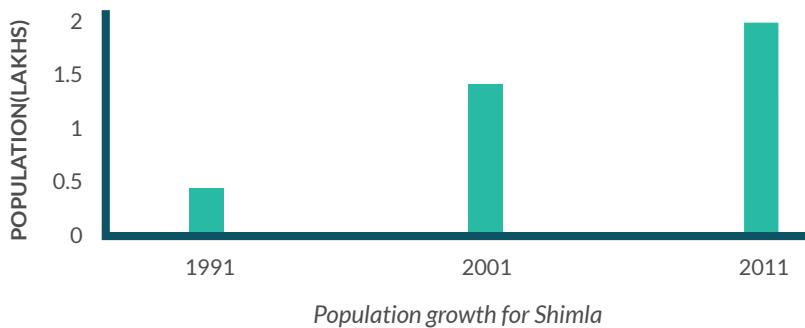
Population

1.69 lakhs (Census 2011)

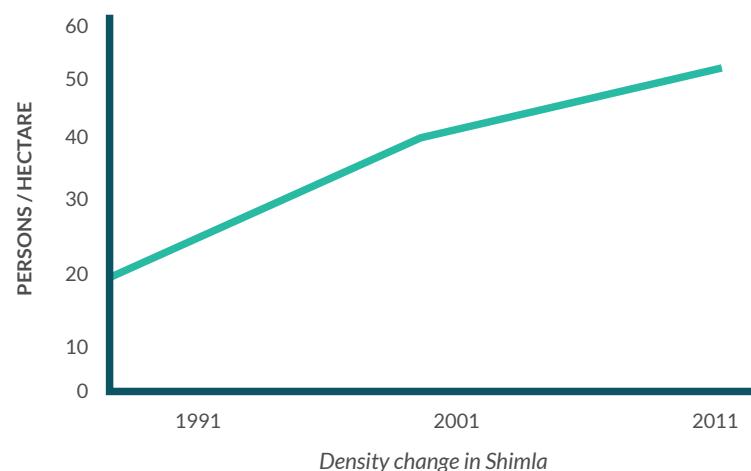
Floating Population: 20,000/day

Growth Rate:

As per the Indian Census, the population of Shimla (in the Municipal Corporation area) in 2011 was 1.69 lakhs. During the 2001-2011 decade, the city's population grew by 19% while in the previous decade (1991-2001) the decadal growth rate was 39%. This fall in decadal growth rate is because most of the population growth is taking place outside the city limits in the newly developing areas.



The population density has increased considerably from 29 to 48 persons/hectare in the last two decades.



Economic Activities:

- Tourism
- State Capital
- Service Sector

Shimla is the capital of Himachal Pradesh. Its main economic activities are tourism, agriculture, horticulture and service sector.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water Supply	IPHD	IPHD, MCS <i>(Small projects)</i>	IPHD, MCS
Sewerage and Drainage	IPHD	IPHD, MCS <i>(Small projects)</i>	IPHD, MCS
Solid Waste Management	MCS	MCS	MCS
Urban Transport (Roads)	PWD, HRTC	PWD, HRTC	MCS
Urban planning and town planning	Department of Town and Country Planning	Department of Town and Country Planning	Department of Town and Country Planning

IPHD: Irrigation and Public Health Department
MCS: Municipal Corporation of Shimla
PWD: Public Works Department
HRTC: Himachal Road Transport Corporation



SHIMLA MUNICIPAL CORPORATION BUILDING

9.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Land use and density
- Ecosystem and biodiversity
- Energy
- Transportation
- Water and sanitation

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Kota, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Being a capital city, Shimla has seen - and continues to do so - extensive construction activities across the city. The city has no mapping or documentation of new development and **land use**, not even on the slopes on hill sides. It is thus recommended that the city begins by mapping its current development status using GIS as well as a dynamic Master Plan based on TOD principles. The Master Plan should be periodically revised and enforced and should include local height/density restrictions. With the city being located in an environmentally sensitive area and surrounded by forests, the Master Plan should pay special consideration to local **ecosystem and biodiversity**, and continue to reserve adequate green areas and forest pockets within the city limits.

The city is spread over 35 sq. km. along hills and valleys connected by narrow winding roads. State Transport Corporation buses help the population commute in the city; however, private vehicle ownership has been on the rise at a fast pace. The city will benefit tremendously by a local city **transport** system such as ropeways or minibuses run on CNG or Hydel electricity; this will also help to ease access and improve local tourism and economy. Better parking facilities to allow citizens for park and ride are also recommended.

Being a hill city, Shimla uses a lot of electricity and fuel wood to meet its heating requirements (cooking, hot water and space heating) in the winter months. It is recommended that the city shifts to solar energy based renewable technologies such as solar water heating systems and solar space heating systems. Modern wood fired boilers and improved cook stoves can help meet residential cooking, hot water and space heating requirements by utilizing the abundantly available firewood in an efficient manner. This approach can be promoted extensively within the local hotel industry. The above steps will help the city to reduce dependency on traditional sources of **energy** and hence reduce local pollution and GHG emissions.

Shimla currently receives **water** supply for only about an hour daily. During the peak tourist months water demand is higher, leading to major issues in ensuring daily water supply. The city reports water losses of over 50% and has high costs of water production. The city should thus promote water conservation activities such as local water audits, leak detection studies and levy incremental tariffs for high water consumption. Rainwater harvesting and local recycling can be promoted in large complexes, buildings and hotels. Major awareness activities should be undertaken to involve citizens in water conservation and to influence behavioural change.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

The recommended options for land use in the city would facilitate improved planning of its urban form and density and enable the city to use its scarce land resource judiciously; regulate rampant building development on the hill slopes and reduce vulnerability; and contribute to preservation of the city's natural ecosystem. The options for urban transportation would decongest the city; improve mobility and ease access; improve local tourism and economy; and reduce local air pollution. By implementing options recommended for the urban energy sector the city would meet its growing energy demand in a sustainable manner; reduce its dependence on coal based grid electricity; reduce its GHG emissions by tapping local renewable energy resources; and conserve local biomass resources. The recommended options for the water sector would help the city minimize wastage and improve service delivery; improve cost recovery; maximize use of natural water sources; and conserve local water resources.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

- The starting point would be to transfer the functions listed in the 12th Schedule to the MCS. The government of Himachal Pradesh thus has to devolve basic functions like urban planning, water supply and sewerage, urban forestry to the MCS; this will help improve departmental co-ordination and provide services in an integrated manner.
- The next key step will be to map the status of all the priority sectors for the city to allow actions to be taken in an informed and well planned manner. This includes current status of development, current energy use, current urban transport status, and water usage and leakages in the city.



SHIMLA CITY VIEW

Vijayawada City Profile

Volume 2



Vijayawada City Profile

10.1 Introduction

Vijayawada, the second largest city and the newly designated capital of Andhra Pradesh, is located on the banks of the river Krishna. The city is a major trading and business center and is therefore also known as “The Business Capital of Andhra Pradesh”.

Vijayawada is flanked by the river Krishna on the east and west side, and by the river Budameru on the north side. The northern, north-western, and south-western parts of the city are covered by low range hills, while the central, south-western and north-western parts are covered by rich and fertile agriculture lands with three major irrigation canals.

10.2 Main Green Growth Message / Lesson / ‘Take Away’ for This City

Vijayawada has an abundance of natural resources and has experienced rapid growth in past few decades. Being the new state capital, it is expected to grow exponentially in the coming years. The proactive governance structure of the city allows decision making by the ULB, making the implementation of new ideas easier. The city is surrounded by fertile agricultural land; the availability of land for growth is thus one of the major barriers. The city thus needs to develop efficient land use strategies that are integrated with physical infrastructure. Vijayawada can upgrade its infrastructure and urban services using green solutions; a more efficient resource utilization will help the city to tap economic opportunities and improve the quality of life while preserving the rich ecosystem around the Krishna river.

10.3 Main Features Of The City: Summary

Type Of City (According To The Project “Filters” Of City Size, Geography, Region Etc.)

Demographic Profile	
City	Vijayawada
District	Krishna
State	Andhra Pradesh
Connectivity	Air, Rail and Road
Area of the city	City: 61.88 sq.km
No. of administrative wards	59
Population (2011)	10.48 lakhs
Location	Southern India
Climate	Tropical climate with hot summers and a monsoon season
Economy	Agriculture, Commercial Trade, Tourism, Industries, Transportation and Tertiary Sectors

Type of Cities This Profile Is Relevant To

The city is representative of hill stations in the country with a population around 200,000.

Demography:



Population

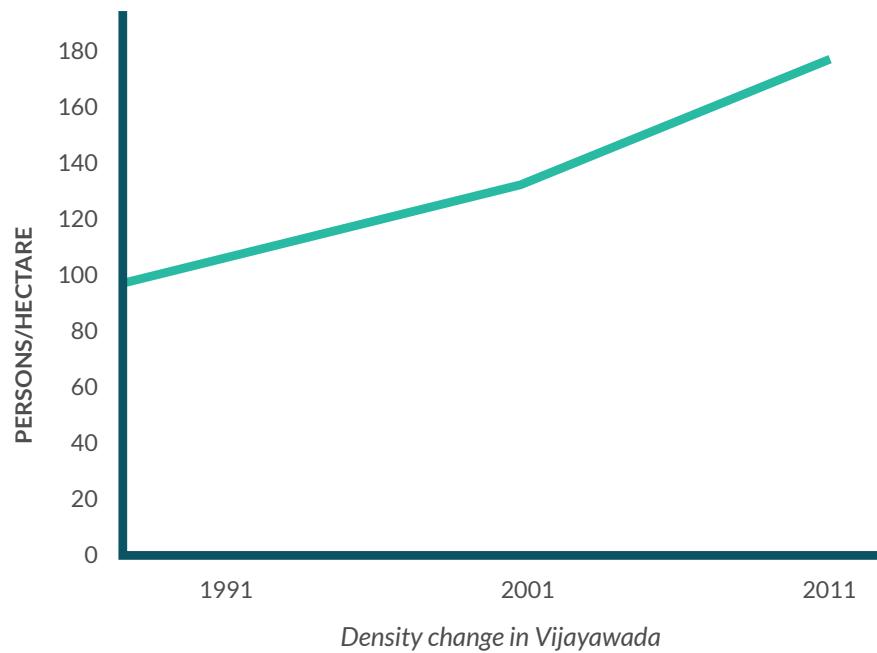
10.48 lakhs (2011 census)

Growth Rate:

The decadal population growth of Vijayawada during 2001-2011 was 24.02%, which is well above the national average of 17.64%. During the decade 1991-2001, the decadal population growth of the city was 20.43%. During the 1981-91 decade the growth rate of the population was about 51.99% due to the large influx of rural population to the city.



As per the 2011 census, the area of Vijayawada city is 61.88 sq. kms, with a population density of 169 persons per hectare. The population density has increased considerably from 113 to 169 persons/hectare in the last two decades.



Economic Activities:

- Trade and Commerce
- Auto ancillary units
- Agriculture related business

Vijayawada acts as a major commercial centre, hosting a number of wholesale and retail activities dealing in consumer goods, textiles, automobiles, industrial products, etc. It is also a major trading centre for processed Virginia tobacco, cotton and turmeric. Vijayawada is also known for its mango exports.

Main “Actors” For Operations, Implementation, Service Delivery, And Regulation In The City

Urban infrastructure service	Planning and design	Construction / Implementation	O & M
Water Supply	VMC	VMC	VMC
Sewerage and Drainage	VMC	VMC	VMC
Solid Waste Management	VMC	VMC	VMC
Urban Transport (Roads)	VMC, APSRTC	VMC, APSTRC	VMC, APSRTC
Urban planning and town planning	VMC, VGTM UDA	VMC, VGTM UDA	VMC

VMC: Vijayawada Municipal Corporation

APSRTC: Andhra Pradesh State Road Transport Corporation

VGTM UDA: Vijayawada, Guntur, Tenali, Mangalagiri Urban Development Authority



KRISHNA RIVER PASSING THROUGH THE CITY

10.4 Green Growth Recommendations

Priority Sector For Green Growth In The City

- Land-use and Density
- Solid waste
- Economy
- Housing and buildings

Recommended Options For The City To Transform Its Growth To A Green Growth Pathway

The following options are recommended for the priority sectors identified in Vijayawada, which will help the city to shift to a Green Growth path and maximize the deriving benefits:

Vijayawada struggles to balance the need of **land** for new development (especially having now become the state's new capital) with the fact that it is surrounded by fertile land. The city can take a proactive approach to integrate water, agriculture and energy into land use planning. Land suitability analysis will help the city to identify land for new development without impacting the local ecosystem. Vijayawada is already developing a GIS based Master Plan; adopting Transit Oriented Development (TOD) will help the city to efficiently utilise the available resources. The city can also promote urban waterfront mix use development to prevent the deterioration of its river bodies.

Solid waste is a major issue for Vijayawada. Due to the absence of sufficient infrastructure, most of the waste (domestic as well as commercial) is disposed of along the river and canals, thus polluting water bodies. The city can promote the 3R principles (i.e. Reduce, Reuse and Recycle); separate collection of agricultural waste will help to compost it. Household coverage and segregation of waste at source can be improved by involving the community in these measures. The city can reduce GHG emissions by implementing efficient logistics and transport for the collection of waste. The city's authority is already developing a project for waste to energy using advanced technology, which will help the city to save land from the dumping site.

The availability of fertile agricultural land and the presence of abundant water from the river Krishna contributed to the flourishing of **agro products** trade in the city, which is a major part of the local economy; this provides an opportunity for Vijayawada to promote agro based industries. With its new status as state capital, the city will attract lot of new commercial activities and can therefore adopt strategies to promote a more resource efficient economy by conserving and enhancing the city's natural resources base.

The rapid urbanization of the past few decades has resulted in large unregulated growth. The city can now simplify procedures for obtaining planning and construction approvals by implementing online approvals of **buildings**. Incentives for buildings with a focus on energy and resource efficiency, waste reduction and pollution prevention should also be offered, by adopting city specific Bye laws and development control regulations. City specific Bye laws will also help to increase the use of local resources and reduce the impacts of buildings on the local ecosystem. GIS based property mapping will help ULB to track unauthorised buildings and violation of building regulations along with increase in property tax revenue.

Benefits Of Recommended Options To The City To Achieve A Green Growth Vision

Integrated land use policies will help the city to efficiently utilise the limited land available for its future growth, without impacting the rich local ecosystem. Improving solid waste management will make the city clean and also reduce GHG emissions. City specific building Bye laws will help to promote the use of local sustainable resources as well as to regulate the buildings sector. The above steps will help the city to attract agro based industries, which will in turn unleash economic opportunities. GIS based mapping of buildings will help to increase revenues from property taxes as well as assist the city to check the violation of building permissions. An online approval system for buildings will increase the transparency of the process. All these measures will help the city to transit towards a green pathway of growth, improving the quality of life for its citizen without impacting the surrounding ecosystem.

Key First Steps For This City To Begin Pursuing A Green Path Of Growth

The city needs to map the status of all the priority sectors to allow actions to be taken. The status includes a detailed database of the state of services, including the current status of development, disaggregated economic data at the city level, GIS mapping of all the buildings and a study related to solid waste management.

Annexure 1

Agartala

Volume 2



Annexure 1: Agartala

1.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level:

Drinking water and sanitation, PWD, Tripura

The Drinking Water & Sanitation (DWS) wing of PWD has been created with effect from 1st April, 2008 after reorganization of the erstwhile Public Health Engineering wing of PWD. DWS has been given the responsibility of the implementation of all drinking water supply schemes and rural sanitation works for the entire State of Tripura. The mission of PWD (DWS) is to enhance quality of life of the people by providing sustainable safe water & sanitation facilities and services along with promoting hygiene practices among the people.

Urban Development department,

The Urban Development department was established to direct, control and monitor the activities of the Urban Local Bodies in the state.

The functions of the Directorate include:

- Planning, coordinating and monitoring the working of urban local bodies.
- Helping urban local bodies to effectively carry out their functions.
- Respond to the directions, instructions and resolutions of the Government (with the Urban Local Bodies).

State level:

Agartala Municipal Corporation (AMC)

The Agartala Municipality was instituted in 1871 and was converted to a Municipal Corporation in Jan 2014. The functioning of AMC is governed by the Tripura Municipal Act, 1994 replacing the applicability of the Bengal Municipal Act, 1932 and performs the obligatory and discretionary functions as incorporated in the said Act.

Functions

- Public health, sanitation, conservancy and solid waste management
- Roads and bridges
- Provision of urban amenities and facility such as park gardens, playground
- Burials and burial grounds, cremations and cremation grounds and electric crematoriums
- Public amenities including street lighting, parking lots, bus stops and public conveyance;
- Promotion of cultural education and aesthetic aspects
- Planning for social and economic development
- Urban forestry, protection of environmental aspects and promotion of ecological aspects
- Safeguard the interests of weaker section of society, including handicapped and mentally retarded

- Slum improvement and up gradation
- Urban poverty alleviation
- Cattle ponds, preservation of cruelty to animal
- Regulation of slaughter houses and tanneries
- Water supply (only revenue collection)
- Construction of buildings

what powers does the municipal government have?

As per the Tripura Municipal Act, 1994, 15 of 18 functions mentioned in the 12th Schedule have been devolved to AMC which are listed below:

- Public health, sanitation, conservancy and solid waste management
- Roads and bridges
- Provision of urban amenities and facility such as park gardens, playground
- Burials and burial grounds, cremations and cremation grounds and electric crematoriums
- Public amenities including street lighting, parking lots, bus stops and public conveyance
- Promotion of cultural education and aesthetic aspects
- Planning for social and economic development
- Urban forestry, protection of environmental aspects and promotion of ecological aspects
- Safeguard the interests of weaker section of society, including handicapped and mentally retarded
- Slum improvement and up gradation
- Urban poverty alleviation
- Cattle ponds, preservation of cruelty to animal
- Regulation of slaughter houses and tanneries
- Water supply (only revenue collection)
- Construction of buildings

Functions not delegated to AMC:

- Urban planning including Town Planning
- Regulation of Land use
- Fire service
- Water supply for domestic, industrial and commercial purposes

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision).

Agartala Budget 2014-15	
Head (major heads)	(in Rs. Million)
Total Income	3198.1
1. Revenue Income	439.7
1.1. Property tax	40
1.2. Building permission fees	28
1.3. Water tax	8.82
1.4. Interest	40
1.5. Trade license	17.5
1.6. Others	305.38
2. Capital Revenue	2758.3
Total Expenditure	3206.36
1. Revenue Expenditure	413.37
2. Capital Expenditure	2790.2

What role does the state play in city decisions and operations?

- AMC has been entrusted with most powers to carry out its functions and the role of the state government is limited.
- Tripura Municipal Act, 1994 which governs the functioning of the Municipal Corporation has been made by the state government with the power to amend as and when required.

How does the city participate in and leverage state/ national urban development schemes and missions?

AMC is able to leverage grants from the state as well as state government through Central programmes like the JnNURM and the North Eastern Region Urban Development Programme (NERUDP) implemented by the Ministry of Urban Development (MoUD) with the financial assistance from Asian Development Bank (ADB). The city also receives support from both governments for various poverty reduction initiatives.

How active is civil society and non-government organizations in the city?

Based on the discussions with AMC it emerged that there are no active NGO in the city dealing with urban infrastructure, urban planning and service delivery issues.

1.2 City Growth Story

1.2.1 Water:

Describe Growth (people, demand, infrastructure, impact).

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	32.33%
Per capita supply of water	86 lpcd
Extent of metering of water connections	0%
Non-revenue water	22%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The demand for water in the city is increasing due to growth in population and increase in commercial activities.

what recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

AMC is implementing various projects under Jawaharlal Nehru National Urban Renewal Mission (JnNURM). A project has been undertaken to implement a water supply scheme in North Zone of the city. The project also includes reduction in non-revenue water (NRW). While another project for NRW reduction is being implemented under NERUDP programme.

what negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The rivers in the city are getting polluted due to discharge of untreated sewage into the river.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of water quality in the river, reduction in the availability of water.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Only about 32.33% of the area is served by central water supply network. The rest of the population depends upon own tube wells, community wells, river water etc.
- The average duration of water supply is 4 hours in most of the part of city.
- Under the policy to provide equitable water supply, connections to public stand posts and government institutions are not charged and these are accounted for under NRW.
- Tariff needs to be raised to reduce the gap between the cost of supplying water and tariff charged. The cost of supplying water in AMC is INR 0.50/kl and the average tariff charged from domestic consumers is quite low.

Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Improve water coverage.
- AMC needs to increase water tariff and create political will for this.
- Reduce NRW by checking on illegal connections.
- Improve maintenance of water supply infrastructure.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water : 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in Redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

The DWS prepares project proposals for augmenting infrastructure and service levels based on the projected increase in population, economic and non-economic activities.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

AMC is implementing projects in the water sector under JnNURM for improving storage and treatment capacity, laying distribution network in new areas. The city also has a project to cover central zone by central water supply under NERUDP. This project will reduce physical loss of water.

1.2.3 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	0%
Adequacy of sewage treatment capacity	0%
Extent of reuse and recycling of treated sewage	0%
Storm water	
Coverage of storm water drainage network:	8%
Incidence of water logging/flooding	22%

The city lacks service coverage due to absence of centralized sewerage network.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population, economic and commercial activities is increasing the demand for the service. The city is witnessing a growth in the construction of residential and commercial buildings which is creating additional demand for the service.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Project for expanding the sewerage network in the city and augmenting the capacity for treatment of sewage has been under progress in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Apart from pollution of rivers due to discharge of untreated sewage and industrial waste, the areas not covered by sewerage system also discharge wastewater into open drains. Open defecation is a problem in slums and settlements of poor.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Water quality is affected adversely and there is potential threat to health of the residents.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The sewerage system in the city does not exist.
- Open defecation is a problem in some areas (slums).

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc)

- Expand sewerage network.
- Build community toilets and maintain them well to stop open defecation.
- Build STPs in the city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%

- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

how does the city plan for future infrastructure and service delivery in the sector?

The concerned department of AMC, project the requirements in the sector and prepares proposals for expanding sewerage network and service levels based on the projected increase in population and area.

what specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city has two schemes for sewerage system under JnNURM. About 75% of the work under both the schemes has been completed. The projects are planned to meet the present and future needs of the city and enhance service levels.

1.2.4 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	73%
Efficiency of collection of municipal solid waste	92%
Extent of segregation of municipal solid waste	6.00%
Extent of scientific disposal of municipal solid waste	16%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the city's population, area, economic and other activities the waste generated in the city is increasing.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The city has implemented door-to-door waste collection system with help of local NGO.
- AMC has given SWM on PPP basis to a private operator. The corporation pays the operator a tipping fee for the services rendered.
- AMC collects user charges for solid waste management ranging from Rs. 30 per household to Rs 50 per household.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

AMC is taking measures to improve solid waste management in the city and not many negative impacts are reported.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Waste segregation into dry and wet waste
- Recycling waste
- Collecting 100% of the waste generated in the city
- Covering all households by the service

Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (special project or infrastructure needs, known problems to solve, etc)

- The city needs to introduce waste segregation at source.
- Encourage decentralized composting.
- Engage rag pickers/NGOs for waste recycling.
- Extend the waste collection service to the entire city..

Known/Stated City Objectives and Plans

what are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Household coverage -100%
- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%

How does the city plan for future infrastructure and service delivery in the sector?

The Solid waste management department of AMC prepares project proposals for improving and expanding the service and to bridge the gap in service delivery.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

The city is Planning integrated solid waste management project under PPP mode to manage issues of solid waste in the city.

1.2.5. Urban Transport:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Agartala do not have any public transport system in the city. There are a large number of private motorized two wheelers and four wheelers in the city. The rate of growth in the number of vehicles is high. The expansion of city limits has resulted in increased travel and trip length which requires better public transport but due to absence of integrated mobility plan people prefer to use private vehicles.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

There is increase in the number of vehicles since growth in population, commercial and economic activities has generated additional demand for mobility.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city has regulated e-rickshaws to cater the need of transport in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Increasing congestion during peak hours on major routes.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Due to the absence of a bus service, people have to be dependent on IPT or private vehicles for their mobility needs.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Increase in the number of vehicles in the city.
- Pedestrian safety.
- Ignorance towards Non motorized transportation (NMT).

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc)

- Promote CNG for public and private vehicles.
- Reduce the number of private vehicles on road by building public transport.
- Promote NMT infrastructure.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Modal split of 70 % towards public transport.
- CNG promotion.
- Reduced private vehicles.
- Promote NMT trips.

How does the city plan for future infrastructure and service delivery in the sector?

- AMC is preparing a city mobility plan.
- It has planned the Mass Rapid Transit system (MRTS) for Agartala.

what specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

A detailed project report for Mass Rapid Transit system has been underway for the city.

1.2.6 Housing and Buildings:

Describe Growth (people, demand, infrastructure, impact).

what is the current state of infrastructure and service provision in this sector?

- AMC is a city with high population growth due to which the city has seen heavy construction activity.
- Currently, AMC has 52 notified slums and almost 9 % of the population lives in slums and therefore there is a need to build large number of affordable housing units to achieve slum free city vision.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

- The main reason for an increase in demand for housing is the rapid growth in population, economic and other activities.
- To prevent further slums coming up in the city, the poor need to be provided affordable dwelling units.

what recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- Slum free city Plan of action is under progress to determine the exact number of housing units required.

what negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Housing for the urban poor and lower income groups is insufficient, leading to creation of unauthorized settlements and slums.
- The price of housing is high making it difficult for lower income groups to buy property.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Slum formation
- Social security issues
- Unplanned development in the city

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- With increasing population in the city the demand for built up area is increasing and therefore energy requirement.
- Providing affordable housing to poorer sections of society.
- Increasing land prices had made housing expensive
- Infrastructure and services need to match growth in housing.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc)

- Government housing agency to build houses for the poor.
- Incentivize builders to construct affordable housing units.
- Make available more land for housing to manage rising cost of land.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum free city
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector. These builders assess the growth rate of the city and construct buildings accordingly.

what specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect not available.

1.2.7 Energy:

□ Describe Growth (people, demand, infrastructure, impact).

what is the current state of infrastructure and service provision in this sector?

The Tripura State Electricity Corporation, distributes electricity within the city.

Energy	
Electricity as main source of lighting	95.9%
Share of households by main source of cooking energy	
LPG/PNG	88.2%
Fuelwood	4.8%
Kerosene	6.1%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With growth of city the demand for electricity in the city is increasing driven by the rising population, commercial and industrial sector. Residential fuel consumption (LPG, PNG) is growing rapidly while demand in the transport sector is fuelled by high growth in private vehicle population.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The city has high dependence on conventional grid energy supply leading to GHG emission, rising energy use and wastage of energy.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- City level data for energy consumption in various sectors is not available.
- The existing central energy monitoring system of Agartala does not cover all of its facilities and buildings.
- Low emphasis on energy management in the municipal budget.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc)

- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- A city-wide energy plan needs to be developed and an Energy Cell with dedicated technical staff should be established.
- Energy audits should be promoted to record and reduce energy use in the industrial sector.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Being a designated solar city, the city aims at a minimum 10% reduction in projected demand of conventional energy at the end of five years, through the implementation of a combination of renewable energy and energy efficiency measures.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. However, since Agartala is a solar city, a Solar Master Plan is under development for the city, targeting a 10% reduction in conventional energy use over a period of five years through the implementation of a combination of renewable energy and energy efficiency measures..

what specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The Solar Master Plan is under development for Agartala city.

1.2.8 Economy and Business:

Describe Growth (people, demand, infrastructure, impact).

What drives the economy of the city?

Primary Economy:

- Administrative city, more than 30 % of people are employed in government sector.
- Small scale Industries and commercial activities.
- Tourism.

How is the economy changing? And what is driving the changes?

The region attracts people from surrounding region since Agartala is state capital. Due to increase in population there is an increase in commercial activities in the city which is one of the major sources of economy.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Water pollution due to increased commercial activities.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Due to untreated sewerage being discharged, rivers are getting polluted.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

STP needs to be set up so that the sewage generated by commercial activities can be treated before it is discharged into the river.

Known/Stated City Objectives and Plans

what are the city's stated (or unstated) urban development goals/objectives in this sector? (E.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect not available.

1.2.9 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact).

what is the current state of infrastructure and service provision in this sector?

Agartala falls under tropical moist forest area and is characterized by semi-ever green rain forests and moist deciduous forests. However, there are no designated forest areas or sanctuaries within the Greater Agartala boundaries.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Due to increase in population there is need for more open spaces, parks, trees and water bodies in the city.

what recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The diversity in terms of flora is not significant, and the study reveals that all locations fall short of that a primary forest.
- In none of the locations, rare/endangered tree/plant species have been identified that need to be taken up for conservation or special protection.

**what negative impacts (environmental or social/people) are evident from activities in this sector?
And what are the expected trends for these impacts?**

- There is no major air polluting sources such as industries etc. within the city. The air pollution in the city is localized and limited to roads and major junctions in the city.
- The major cause for pollution of land and water in Agartala is the lack of an underground sewerage system, and an efficient solid waste collection and management system. In the absence of these, the natural streams and drains are the recipients of wastes leading to degraded quality of life in most of the localities.
- Water logging and improper is one of the important environmental issues. Chocking of roadside drains due to garbage disposal is creating problem.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Depletion of natural environment will create problems for the city in the long run.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Creating a database at city level for ecosystem and biodiversity.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc)

The city is actively implementing the recommendation of Tripura State Biodiversity Action Plan.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

The Tripura State Biodiversity Action Plan has identified pockets of rich biodiversity as conservation hotspots. None of the identified hotspots are located within the Greater Agartala boundaries. While a number of endangered primate species are found within Tripura state, none of them are reported within Greater Agartala. There are no designated forest areas or sanctuaries within Greater Agartala boundaries. The closest site identified as protected area is the Shipahijala Wildlife Sanctuary which is 28 km from Greater Agartala Planning area.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Tripura State pollution control board has done an inventory of the water bodies (Total of 584 water bodies) in Agartala Municipal Council. Out of the total 584 ponds, 383 ponds are under private ownership. Under a recent guideline issued by the District Magistrate filling up of these ponds have been made illegal to protect them from encroachment.

1.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI can start by having discussions with the state level government bodies such as District industries commissionerates about promoting local economy and recommended green growth options for the city.
- Hold discussions with urban local government (Agartala Municipal Corporation) about the problems in the city and how the green growth options can be implemented.
- Engaging with all stakeholders (government, local body, private sector, citizen groups) by holding workshops to understand various sectors and the possible partnership options.

Annexure 2

Agra

Volume 2



Annexure 2: Agra

2.1 Governance Structure

Who are the main “actors” with decision making power in the city?

Agra Development Authority

Agra Development Authority was created with the aim to provide houses at appropriate rates. In this direction Agra Development Authority was constituted by Uttar Pradesh Government on 13th Sept. 1974 under Uttar Pradesh Urban Planning & Development Act 1973. The first Master Plan for Agra City was approved by the Govt. in July 1975.

Main functions:

- Preparation of Master Plan for planned urban development.
- Development & control as per Master Plan.
- Acquisition of Land and Management for housing and urban development.
- Provision of Physical and Social Infrastructure in the city.
- Providing houses at low cost to economically weaker section.

UP Jal Nigam

Uttar Pradesh Jal Nigam came into existence with effect from 18th June 1975. Its area of operation extends to whole of Uttar Pradesh excluding Cantonment areas under an Act called as Uttar Pradesh Water Supply & Sewerage Act, 1975. The basic objective of creating this corporation is development and regulation of water supply & sewerage services and for matters connected therewith.

Public Works Department

P.W.D. is responsible for construction, maintenance and planning of roads, bridges and Govt. Buildings.

Archaeological Survey of India

The Archaeological Survey of India (ASI), under the Ministry of Culture, is the premier organization for the archaeological researches and protection of the cultural heritage of the area.

Agra Nagar Nigam (ANN):

The Agra Nagar Nigam is among the largest municipal bodies in the state of Uttar Pradesh providing civic services. Within its jurisdiction are some of the most attractive tourist spots of the world including Tajmahal and Sikandra. ANN came into existence under Nagar Mahapalika Adhiniyam, 1959 of UP (U.P Municipal Corporation Act, 1959). Agra Nagar Nigam (ANN) is a local government responsible to provide basic infrastructure facilities to the people of the city. The corporation has elected counsellors from the constituencies who elect mayor.

City Institutional Structure

Agra urban agglomeration consists of Agra Municipal Corporation and Agra Cantonment Board. The spatial area of Agra Municipal Corporation is spread over 120.57 sq. km and an area of about 20 square km falls within the Cantonment Board and Swami Bagh and Dayal Bagh municipalities. The entire area of the Corporation is divided into 90 electoral wards. The local government is constituted by Agra Municipal Corporation, Agra Cantonment Board

and Dayal Bagh and Swami Bagh Nagar Panchayats. The Administration, Engineering and Lighting, Accounts, Health, and Revenue departments of Agra Municipal Corporation carry-out various governance functions. Apart from the municipal administration, a government level urban development authority, named the Agra Development Authority, is in place to provide quality housing to the local people at an affordable cost.

what powers does the municipal government have?

Out of the 18 functions mentioned in the 12th Schedule, 16 functions have already been devolved to the ULBs. As per U.P Municipal Corporation Act, 1959 the following 16 functions have already been transferred to ULBs as per the act:

1. Registration of death and birth
2. Slum improvement
3. Urban poverty alleviation
4. Provision of urban amenities
5. Burial grounds
6. Cattle pounds
7. Regulation of slaughter houses
8. Public amenities
9. Fire services
10. Safeguarding the interest of weaker sections
11. Promotion of cultural, educational, and aesthetic aspects
12. Urban forestry
13. Water supply
14. Public health
15. Road and bridges
16. Social and economic

The process to transfer the balance functions to the ULBs is already underway:

1. Regulation of land use and construction of buildings
2. Urban planning including town planning

Transfer of most of above functions in true spirit is yet to take place as major functions are still under the control of state agencies.

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Agra Nagar Nigam Budget 2014-15	
Head (major heads)	(in Rs. Million)
Total Income	3363.33
1. Revenue Income	2873.82
1.1. Octroi	2250
1.2. Property Tax	200
1.3. Advertisement Tax	40
1.4. Otherheads	383.82
2. Capital Revenue	479.51
3. Others	10
Total Expenditure	3057.96
1. Revenue Expenditure	2422.46
2. Capital Expenditure	625.5
3. Other	10

What role does the state play in city decisions and operations?

The Municipal corporation act which governs the function of Municipal Corporation have been made by state government with the power to amend as and when requires.

How does the city participate in and leverage state/ national urban development schemes and missions?

ANN is able to leverage grants from state as well as state government through Central programmes like the JnNURM. The city also receives support from both governments for various poverty reduction initiatives.

How active is civil society and non-government organizations in the city?

CURE: Centre for Urban and regional excellence (CURE) is a development NGO that works with poor communities and local governments. CURE works actively with the Agra Municipal Corporation and District Urban Development Agency to implement slum upgrading in Agra under JnNURM and Rajiv Avas Yojana (RAY).

2.2 City Growth Story

2.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	70.8%
Per capita supply of water	109 LPCD
Extent of metering of water connections	0.02%
Non-revenue water	27.59%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Population Growth has a direct change in the demand for urban services. The growth in city area requires the expansion of existing infrastructure to the periphery of city. Agra with high growth rate had witnessed tremendous growth in last few decades epically around the periphery of city due to low value of housing.

The newly developed areas lacks the service coverage as the authorities is able to cater to only 48 % of the area. The major reason for the change in water demand is the rapid increase in population of the city. The increase in population has severely put the pressure on urban service in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The local government strives to improve urban services to reach the service level benchmarks described by Ministry of Urban Development, Government of India. To reach the benchmark the city had taken multiple projects across the sectors to improve the infrastructure under the JnNURM which is a Government of India (GoI) flagship programme for urban development.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The river in the city is getting polluted due discharge of untreated sewage and industrial wastewater into the river and activities like cattle bathing, washing clothes etc.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of water quality in the source (river) and increase in the cost of treatment.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Transfer of functions in true spirit is yet to take place and the existing staff and officers needs to be trained to provide these services. The legislative provisions have been made in the Act but the actual transfer of water supply, sewerage and other services have been

transferred to ANN partially. The water supply system at present is managed by UPJN.

- As per discussion with officials NRW is high because of leakages in old pipes.
- Collection efficiency is less due to unwillingness of the people to pay.
- Cost recovered is very less because tariffs are very low and tariffs have not been revised recently.
- Both bulk and consumer level metering is yet to be initiated.

□ Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Improve quality of water source.
- ULB needs to increase water tariff and create political will for this.
- Reduce NRW by checking on illegal connections.
- Improve maintenance of water supply infrastructure.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

Uttar Pradesh Jal Nigam (UPJN) prepares project proposals for augmenting infrastructure and service levels based on the projected increase in population, economic and non-economic activities

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

In Agra, project related to Water supply have been sanctioned under JnNURM. 90 % of work under this project has been completed. The project envisages to improve the water supply of the city and supply 135 lpcd of water.

2.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of toilets	88%
Coverage of sewage network services	23%
Adequacy of sewage treatment capacity	68.2%
Quality of sewage treatment	97%
Extent and reuse of recycling of treated sewage	88.3%
Storm Water	
Coverage of storm water drainage network:	61%
Incidence if water logging/flooding	14

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Population Growth has a direct change in the demand for urban services. The growth in city area requires the expansion of existing infrastructure to the periphery of city. Agra with high growth rate has witnessed tremendous growth in last few decades epically around the periphery of city due to low value of housing.

what recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

City had taken multiple projects across the sectors to improve the infrastructure under the JnNURM which is a Government of India flagship programme for urban development.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Apart from the pollution of rivers due to discharge of untreated sewage and industrial waste, the areas not served by sewerage system also discharge wastewater into open drains. Open defecation is a problem in slums and settlements of poor.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The existing sewerage system is in a limited area of the city and is aged and in dilapidated condition. Under JnNURM local body is implementing a sewerage project. Currently, the coverage is merely 23%.
- Lack of technical staff as no new recruitment is being done.
- Water logging due to encroachment. Obstruction to the natural flow by encroaching sides

of the drains by construction of slums.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Expand sewerage network.
- Build community toilets and maintain them well to stop open defecation.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The ANN projects the requirements in the sector and prepares proposals for expanding sewerage network and service levels based on the projected increase in population and area. A City Sanitation Plan has also been prepared for Agra city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

- There are two schemes for the sewerage system, as condition of sewerage in the city is poor. The schemes aim at improving the sewer network in the city and enhancing service delivery.
- The city had implemented DEWATS for waste water treatment.

2.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	46.3%
Efficiency of collection of municipal solid waste	93.5%
Extent of segregation of municipal solid waste	8.6%
Extent of scientific disposal of municipal solid waste	0%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the city's population, area, economic and other activities the waste generated in the city is increasing.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Population growth has a direct change in the demand for urban services. The newly covered areas lacks the service coverage as the authorities is able to cater to only 46 % of the households. The major reason for low coverage is, limited infrastructure with the municipal corporation, increase in population have severely put the pressure on urban service in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Information for this aspect is not available.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information for this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The waste is handled multiple times leading to potential health hazards for the workers as all types of wastes including hospital wastes, human wastes, etc. are disposed off in the same storage points.
- All the waste is added to the municipal waste without segregation.
- Agra Nagar Nigam does not have a proper disposal site for dumping of solid waste.
- The arrangement for separate collection of infectious biomedical waste is non-existent and there are no separate arrangements for transportation of infectious waste from hospitals and nursing homes.
- Several temporary storage points are not cleared on a day-to-day basis. This backlog of unserved bins continues to build up during rest of the week.
- Community involvement is absent.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to introduce waste segregation at source.
- Encourage decentralized composting.
- Engage rag pickers/NGOs for waste recycling.
- Extend the waste collection service to the entire city.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%
- Extent resource recovery - 80%
- Extent of scientific disposal of MSW - 100%
- Extent of cost recovery - 100%
- Efficiency in collection of SWM charges- at least 90%
- Efficiency in redressal of customer complaints – at least 80%

How does the city plan for future infrastructure and service delivery in the sector?

The Agra Nagar Nigam prepares project proposals for improving and expanding the service and to bridge the gap in service delivery.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

In Agra Municipal Solid Waste Management project was approved under JnNURM. 80% of the work under this scheme has been completed. The scheme aims at meeting the future demand of solid waste management in the city. The scheme emphasizes 100% household door to door collection and total segregation at source. The total approved cost for the project is Rs. 3083.99 lakhs, of which 50% is funded by the central government.

2.2.4 Urban Transport:

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Agra has a city bus service which is operated by UPSRTC. There is a large number of private motorized two wheelers and four wheelers in the city. The expansion of city limits has resulted in increased travel and trip length which requires better public transport but due to absence of integrated mobility, people prefer to use private vehicles.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The number of vehicles in Agra has grown by 45% from 4.25 lakhs in 2003-04 to 6.15 lakhs in 2010 of which 76% are two wheelers. This has had an impact on the average travel speed, which is less than 15kmph on nearly 65% of the network.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city has procured bus under JnNURM to improve the public transport system.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Quality of public transport needs to improve.
- Congestion during peak hours.
- Intermediate public modes of transport need to be regulated.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Due to poor quality of the bus service, people have to wait for long at bus stops.
- Bus service needs to expand the area of operation and cover newly developed areas.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Increase in the number of vehicles in the city.
- Pedestrian safety.
- Poor quality of public transport service.

□ Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Promote CNG for public and private vehicles.
- Reduce the number of private vehicles on road by improving public transport.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Revitalize the bus service in Agra which includes augmentation of new buses and restructuring of bus routes.
- Redevelopment of the 3 existing bus terminals.
- Modal split of 70 % towards public transport.
- CNG promotion.
- Reduced private vehicles.
- Promote Non-motorized transport.

How does the city plan for future infrastructure and service delivery in the sector?

Agra has a Mobility Plan to improve the mobility in city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

The city plans to implement the recommendations of mobility plan.

2.2.5 Housing and Buildings:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

IN 2006 the city had 199,497 residential units on which the deficit was about 16585 units. The Master Plan has also envisaged that the city will require 256,488 units by the year 2021. Currently Agra has 252 slums and almost 10 % of the population lives in slums and therefore there is a need to build large number of affordable housing units to achieve slum free city vision.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The Rapid increase in population has severely put the pressure on housing stock in the city and hence there is huge demand for affordable housing.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Detailed Project Report (DPR) have been prepared for affordable housing projects for 13 slums in Tajganj area under Rajiv Awas Yojna (RAY).

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Housing for the urban poor and lower income groups is insufficient – leading to formation of unauthorized settlements and slums.
- The price of housing is very high making it difficult for lower income groups to buy property.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Slum formation
- Social security issues
- Unplanned development in the city

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- With increasing population in the city the demand for built up area is increasing.
- Shortage of affordable housing to poorer sections of society.
- Increasing land prices.
- ANN has limited role in preparation of Master Plan.

□ Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Housing department needs to build houses for the poor.
- Incentivize builders to construct affordable housing units.
- Make available more land for housing to manage rising cost of land.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum percentage: 0
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector. There are a large number of builders in the residential and commercial sector. These builders assess the growth rate of the city and construct buildings accordingly.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

The city has prepared DPR for resettlement of 23 slums in Tajgan Area under Rajiv Awas Yojna (RAY).

2.2.6 Energy

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

The private distributor Torrent Power distributes electricity within the city. The city is totally dependent on conventional power sources to meet demand. Oil marketing companies are engaged in distribution of LPG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System.

Energy	
Share of households with electricity as main source of lighting	95.8%
Share of households by main source of cooking energy	
LPG	68.9%
Fuelwood	29.1%
Kerosene	2.9%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The electricity consumption in the city is increasing driven largely by the increasing demand in the commercial and industrial sector.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information for this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Power supply is unable to match rising demand leading to frequent power cuts in the city. With the city being completely dependent on grid power supply, this necessitates use of diesel generators in industries and commercial establishments. Rising income levels and changing lifestyles have led to a prevalence of heavy loads in the form of appliances such as air conditioners in households resulting in higher peak energy demand. The industrial units in the city use non modernized technology and thus are energy inefficient. The relatively high share of Fuel wood for cooking purposes in households can be linked to the large number of poor/slum settlements in the city.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Frequent power cuts is impacting industrial operations and hampering effective functioning of service infrastructure facilities such as water supply, sewage treatment. Use of costlier diesel generator sets for power supply has financial implications on businesses and industries while also resulting in air and noise pollution in the city. Use of Wood for cooking leads to poor indoor air quality and impacts health.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- ANN does not have any mechanism or technology in place to track energy use in its facilities.
- While Agra is a designated solar city under the Solar Cities Programme and a solar city cell has to be established in the administration and the city lacks adequate capacity to promote renewable energy and energy conservation.
- City level data for energy consumption in various sectors is not available.

□ Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to ensure that energy consumption in its facilities and buildings is tracked and monitored regularly to regulate energy use and identify potential opportunities.
- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- Since the city has good availability of solar energy, it should promote renewable energy systems such as solar water heaters and solar photovoltaic systems to reduce both energy demand and dependence on diesel generator sets.
- The city should undertake strict enforcement to ensure conformance for installing solar water heating systems in the new buildings as per the building bye-laws.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Being a designated solar city, the city aims at a minimum 10% reduction in projected demand

of conventional energy at the end of five years, through the implementation of a combination of renewable energy and energy efficiency measures.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. However, since Agra is a solar city, a Solar Master Plan is developed for the city, targeting a 10% reduction in conventional energy use over a period of five years.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

The Solar Master Plan is developed for Agra city.

2.2.7 Economy and Business:

Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

Agra is a mix of tourism and commercial city. The city receives large number of tourist due to historical monuments such as Taj Mahal which forms foundation of its economy. Apart from tourism the major part of its industrial activity is in the form of small-scale and household industries. These are mainly located in the old city areas. The important industries are leather, foundries, electrical goods, fans, pipes, C.I, casting, leather goods including shoes, steel rolling, packaging materials, etc.

How is the economy changing? And what is driving the changes?

The region attracts Shoe making industries, Petha making units and small scale and household industries.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Water pollution is increasing because of many small scale industries as they do not have resource to treat effluent.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The river is getting polluted and this will impact water supply in the city

Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Common Effluent Treatment Plants (CETP) need to be set up so that the small scale industries do not discharge untreated effluent into river.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Information Technology (IT) sector should be encouraged as a lot of skilled workforce for the same is available.
- Large number of cold storage units exist in the city; creating pollution in the absence of proper monitoring and regulating policy.
- There is a need to develop a tourism circuit within Agra.
- Appropriate infrastructure improvements can double the number of Tourists visiting the city.
- Centralized Effluent treatment plant need to be set up so that the small scale industries do not discharge untreated effluent into rivers.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

2.2.8 Urban Ecosystem and Biodiversity:

□ Describe Growth (people, demand, infrastructure, impact)

what is the current state of natural environment and biodiversity?

As per the data available in District Forest Office (DFO), the total reserve forest area in the city is 1912.20 hectares. The green area in the city comprises of about 58 parks, out of which 3 are city level parks namely: Shahjahan Park, Paliwal Park and Nehru Park.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Increase in population needs more open spaces, parks, trees and water bodies required in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The ANN is trying to conserve existing 58 parks in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The exponential population growth together with rapid urbanization over the years has substantial impact on the environment of the city. Also due to increasing number of tourists there is a heavy pressure on the environment of the city. Although the presence of industrial and commercial activities, tends to have strong impact on the environmental quality of the city.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Depletion of the natural environment will create problems for the city in the long run.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Information on the status of natural environment and biodiversity in the city is lacking.
- The ANN does not have a dedicated department or resources allocated for natural environment and biodiversity.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (special project or infrastructure needs, known problems to solve, etc.)

- Air pollution in the city is localized and limited to roads, industrial areas, major junctions and at some extent in residential areas. While pollution in the city along arterial roads is due to increased traffic, small-scale industries and also the Mathura Refinery.
- The surface water of the city is contaminated. Water resources in the city are polluted due to disposal of sewerage directly into the surface drains or surface water bodies.
- Solid waste has been identified as one of the most pressing urban environment issues. The absence of a sanitary landfill site is another critical issue related to sanitary land filling.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

For city the environmental aspect is an important component for sustainable development of a city.

How does the city plan for future infrastructure and service delivery in the sector?

Information for this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is undertaking measure to improve the Solid waste management issues in the city along with cleaning of river Yamuna.

2.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI can start by having discussions with the government bodies especially Agra Development Authority which take decisions for the city in various sectors about the recommended green growth options for the city.
- Hold discussions with the urban local government (Agra Nagar Nigam) about the problems in the city and how the green growth options can be implemented. Capacity building needs can be assessed during these discussions for implementing the green growth options.
- Engaging with all the stakeholders (Industries, local body, private sector, citizen groups) by holding workshops to understand various sectors and the possible partnership options.

Annexure 3

Cochin

Volume 2



Annexure 3: Cochin

3.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level:

Kerala Water Authority

Kerala Water Authority was established on 1st April 1984 as an autonomous body of the Government of Kerala by converting the erstwhile Public Health Engineering Department(PHED) for the development and regulation of water supply and waste water collection and disposal in the State of Kerala.

Functions

- Design, construction, execution, promotion, operation, maintenance and financing of schemes for the supply of water and for the collection and disposal of the waste water.
- Rendering all necessary services to the Government in relating to water supply and collection & disposal of the waste water in the State of Kerala.
- Establishment of standards for water supply and waste water services.
- Fixation and revision of rates for water supply and sewerage maintenance with the approval of Government.
- Taking other measures necessary to ensure water supply in time of emergency.

Greater Cochin Development Authority:

The Greater Cochin Development Authority is the planning and development Authority of the Metropolitan area of Cochin, which is the urban hinterland of Cochin Port. The jurisdictional area of GCDA comprises of the Cochin City, the commercial capital of Kerala, 6 surrounding municipalities and 25 intervening panchayats covering an area of 632 sq.km

Functions

- To guide urban development by checking urban sprawl and promoting healthy growth of urban and rural areas through long term, short term and action area oriented detailed development plans.
- To coordinate the activities of different developmental agencies including Government departments operating in the area.
- To take up model schemes and projects in different sectors of development.
- To monitor and implement the plans and proposals through public participation, timely revision and by prioritizing proposals.

Department of Town and country Planning, Kerala

The Department of Town Planning started functioning in 1957 to ensure planned development of urban settlements in the State. In order to ensure the achievement of the above, this Department prepares various spatial development Plans at State, District / Regional and local levels, examines development potentials and advises the Government in matters related to Town Planning.

Major Functions

- Preparation, processing, continuous monitoring, review and revision of:
- State spatial development plan.
- District development plans.
- Regional development plans.
- Urban development plans.
- Detailed town planning schemes for thrust & priority areas.
- Development schemes for potential tourist destinations and pilgrim centres.
- Development schemes for areas of environmental and heritage concerns.
- Identification of towns under the centrally sponsored scheme - IDSM (integrated development of small and medium towns) and formulation of project reports, monitoring and evaluation of the implementation of projects thereof by local bodies etc.
- Advising the local bodies and the government on all issues relating to urban and regional planning.

State level:

Cochin Municipal Corporation (CoC)

Cochin Municipal Corporation was formed in 1967, covering area of about 94.88 sq km. As per 2011 census population of Cochin urban agglomeration was 2.1 million growing at a rate of 7% annually, (national average being 2.1%).

Functions

- Conservation of traditional drinking water sources
- Maintenance of waterways and canals under the control of Municipality
- Collection and dispersal of solid waste and regulation of disposal of liquid waste
- Storm water drainage
- Maintenance of environmental hygiene
- Maintenance of roads and other public properties
- Street lighting and its maintenance
- Establishment and maintenance of burial and burning grounds
- Registration of birth and deaths
- Arranging ferries
- Providing parking places for vehicles
- Preparation of detailed town planning and action plan for implementation in a phased manner
- Regulating building construction

What powers does the municipal government have?

As per the Kerala Municipality act, 1994 most of the 18 functions mentioned in the 12th Schedule have been devolved to the ULBs these are:

1. Collection and dispersal of solid waste and regulation of disposal of liquid waste
2. Storm water drainage
3. Maintenance of environmental hygiene
4. Management of public markets
5. Regulation of slaughtering of animals and sale of meat, fish and other easily perishable food Stuffs etc
6. Maintenance of roads and other public properties
7. Street lighting and its maintenance
8. Adopt immunization measures
9. Establishment and maintenance of burial and burning grounds
10. Issue of licenses to dangerous and offensive trades and industries
11. Registration of birth and deaths
12. Arranging ferries

13. Providing parking places for vehicles
14. Providing basic facilities in slum areas
15. Amenities including footpath and road crossing facilities for pedestrians
16. Preparation of detailed town planning and action plan for implementation in a phased manner

What does the financial picture of the municipal government look like? (sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Corporation of Cochin Income-Expenditure 2013-14	
Head (major heads)	(in Rs. Million)
Total Income	4924.53
1. Revenue Income	2349.8
Rent from Municipal properties	34.82
Tax revenue	1222.51
Fees and user charges	176.82
Grants	797.82
Other income	117.83
2. Capital Revenue	2295.37
3. Others (Including closing balance of last year)	279.37
Total Expenditure	4596.23
1. Revenue Expenditure	1991.5
2. Capital Expenditure	2604.73

What role does the state play in city decisions and operations?

Corporation of Cochin (CoC) has been entrusted with most powers to carry out its functions and the role of the state government is limited. There are two state level agencies, KWA and GCDA, which play a role, but their role is limited to the area of their operations i.e. water supply and new developments in the peri-urban areas respectively.

The Kerala Municipality Act 1994 which governs the functioning of the Municipal Corporation has been made by state government with the power to amend as and when required.

How does the city participate in and leverage state/ national urban development schemes and missions?

CoC is able to leverage grants from state as well as state government through Central programmes like the JnNURM. The city also receives support from both governments for various poverty reduction initiatives.

How active is civil society and non-government organizations in the city?

Based on the discussions with CoC it emerged that Centre for Public policy research is active with urban infrastructure, urban planning and service delivery issues.

3.2 City Growth Story

3.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	100%
Per capita supply of water	150 LPCD
Extent of metering of water connections	NA
Non-revenue water	15%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The demand for water in the region is increasing due to growth in population and growth in service sector, and other economic, tourism and commercial activities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

CoC is implementing various projects under Jawaharlal Nehru National Urban Renewal Mission (JnNURM). A project has been undertaken to improve water supply in a part of the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The water bodies in the city are getting polluted due discharge of untreated sewage into them.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of water quality in the water bodies.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The average duration of water supply is low.
- Under the policy to provide equitable water supply, connections to public stand posts and government institutions are not charged and these are accounted for under NRW.
- Lack of consumer awareness is an issue.
- Tariff needs to be raised to reduce the gap between the cost of supplying water and tariff charged.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Improve surface water quality.
- CoC needs to increase water tariff.
- Improve maintenance of water distribution network.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

The Kerala water Authority (KWA) prepares project proposals for augmenting infrastructure and service levels based on the projected increase in population, economic and non-economic activities.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

KWA is implementing projects in the water sector under JnNURM for improving storage and treatment capacity, laying distribution network in new areas.

3.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	5%
Adequacy of sewage treatment capacity	5%
Extent of reuse and recycling of treated sewage	0%
Storm Water	
Coverage of storm water drainage network:	43%
Incidence of water logging/flooding	NA

The newly developed areas lack service coverage as the authorities are able to cater to only 5 % of the area.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population, economic and commercial activities is increasing the sewage generated.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Projects for expanding the sewerage network in the city and augmenting the capacity for treatment of sewage has been under implementation in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And water are the expected trends for these impacts?

Apart from the pollution of water bodies due to discharge of untreated sewage, the areas not covered by sewerage system also discharge wastewater into open drains. Open defecation is a problem in slums and settlements of poor.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Water quality is impacted and there is potential threat to health of the residents.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The sewerage system in the city is insufficient as only 5% of the city is covered by system.
- Open defecation is a problem in some areas (slums).

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Expand sewerage network.
- Build community toilets and maintain them well to reduce open defecation

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%

How does the city plan for future infrastructure and service delivery in the sector?

The concerned department of CoC projects the requirements in the sector and prepares proposals for expanding sewerage network and service levels based on the projected increase in population and area.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city has a project for sewerage system under JnNURM, as the condition of sewerage in the city needs improvement. About 75% of the work under the schemes has been completed. The projects are being funded by the central and state governments.

3.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	7%
Efficiency of collection of municipal solid waste	91%
Extent of segregation of municipal solid waste	25%
Extent of scientific disposal of municipal solid waste	0%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the city's population, area, economic and other activities the waste generated in the city is increasing.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is trying to improve door to door collection system and transfer infrastructure.

What negative impacts (environmental or social/people) are evident from activities in this sector? And water are the expected trends for these impacts?

Dumping of wastes on road sides and open grounds has led to piling up of waste and leachate generation. Inadequate door to door collection and poor waste segregation is leading to environmental degradation along with negative health impacts. Construction and demolition waste is dumped without any processing at unauthorized locations. Waste is also dumped along the drainage network.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Leachate generated due to dumping of waste in an unscientific manner in water bodies. As no waste segregation is taking place, all waste goes to the landfill site and the landfill site is getting filled fast. Water drains and backwaters are getting polluted due to dumping of MSW and construction waste.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Inadequate door to door waste collection practice and absence of waste segregation into dry and wet waste.
- Inadequate infrastructure for collection, storage and transportation of MSW in the city.
- No segregation of electronic waste and hazardous waste.
- Unscientific open dumping practiced at the dumpsite.
- Recycling of waste is near absent.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to improve household level coverage of solid waste management services which is very low currently.
- The city needs to introduce waste segregation at source.
- Encourage decentralized composting.
- Engage rag pickers/NGOs for waste recycling.
- Extend the waste collection service to the entire city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%
- Extent resource recovery - 80%
- Extent of scientific disposal of MSW - 100%
- Extent of cost recovery - 100%
- Efficiency in collection of SWM charges- at least 90%
- Efficiency in Redressal of customer complaints – at least 80%

How does the city plan for future infrastructure and service delivery in the sector?

The Health Department of CoC prepares project proposals for improving and expanding the service and to bridge the gap in service delivery

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

3.2.4 Urban Transport:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

- Cochin has a city bus service which is operated by Kerala State Road Transport Corporation. There are a large number of private motorized two wheelers and four wheelers in the city. The rate of growth in the number of vehicles is 10 % annually.
- The growth of city suburbs has resulted in increased travel and trip length which requires better public transport but due to absence of integrated mobility people are shifting towards private vehicles.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The increase in the area within municipal limits average trip length has increased resulting in increased private vehicles is because of growth in population, commercial and economic activities has generated additional demand for mobility.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is implementing a metro rail system to improve mobility.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Congestion during peak hours on major routes.
- Intermediate public modes of transport need to be regulated.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Due to low frequency of bus service people have to wait for long at bus stops.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Increase in the number of vehicles in the city.
- Pedestrian safety.
- Poor quality of public transport service.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Improve the ferry services (inland water transport).
- Integrate multi modes of transport.
- Promote CNG for public and private vehicles.
- Promote Non-motorized transport.
- Reduce the number of private vehicles on road by improving public transport.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Modal split of 70 % towards public transport.
- CNG promotion
- Reduced private vehicles

How does the city plan for future infrastructure and service delivery in the sector?

- Cochin has a Mobility Plan.
- It is implementing metro rail project in the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

A Metro rail system is being implemented in the city.

3.2.5 Housing and Buildings:

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Cochin is a region with high population growth due to which the area has seen heavy construction activity. Currently the city has 411 slums and almost 19 % of the population lives in slums and therefore there is a need to build large number of affordable housing units to achieve slum free city vision.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The main reason for an increase in demand for housing is the rapid growth in population, economic and other activities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Housing for the urban poor and lower income groups is insufficient ,leading to creation of unauthorized settlements and slums.
- The price of housing is very high making it difficult for lower income groups to buy property.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Slum formation.
- Social security issues.
- Unplanned development in the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- With increasing population in the city the demand for built up area is increasing and therefore energy requirement.
- Providing affordable housing to poorer sections of society.
- Increasing land prices had made housing expensive
- Infrastructure and services need to match growth in housing.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Housing department build houses for the poor.
- Incentivize builders to construct affordable housing units.
- Make available more land for housing to manage rising cost of land.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum percentage: 0
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector. There are a large number of builders in the residential and commercial sector. These builders assess the growth rate of the city and construct buildings accordingly.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

City is implementing affordable housing project under Rajiv Awas Yojana (RAY) - a scheme for housing the poor promoted by the Central Government.

3.2.6 Energy:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The Kerala State Electricity board distributes electricity within the city. Oil marketing companies (BPCL, HPCL, IOC) are engaged in distribution of LPG, CNG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System. A gas distribution pipeline network operated by GAIL have been recently started to supply Regasified Liquefied natural gas (RLNG) .

Energy	
Electricity as main source of lighting	96.8%
Share of households by main source of cooking energy	
LPG/PNG	81.3%
Fuelwood	4.5%
Kerosene	10.9%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The demand for electricity in the city is increasing rapidly as a result of the rising population, commercial and industrial sector. Residential fuel consumption (LPG, PNG) is growing rapidly while demand in the transport sector is fuelled by high growth in private vehicle population.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city have recently completed phase 1 of Regasfied liquefied Natural Gas (RLNG) distribution network.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Power supply is unable to match rising demand leading to frequent power cuts in the city. With the city being completely dependent on grid power supply, this necessitates use of diesel generators in industries and commercial establishments. Rising income levels and changing lifestyles have led to a prevalence of heavy loads in the form of appliances such as air conditioners in households resulting in higher peak energy demand.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Frequent power cuts is impacting industrial operations .Use of costlier diesel generator sets for power supply has financial implications on businesses and industries while also resulting in air and noise pollution in the city. Use of kerosene for cooking leads to poor indoor air quality and impacts health.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- CoC does not have any mechanism or technology in place to track energy use in its facilities.
- While Cochin is a designated solar city under the Solar Cities Programme and a solar city cell has been established in the administration, the city lacks adequate capacity to promote renewable energy and energy conservation.
- City level data for energy consumption in various sectors is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to ensure that energy consumption in its facilities and buildings is tracked and monitored regularly to regulate energy use and identify potential opportunities.
- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- Since the city has good availability of solar energy, it should promote renewable energy systems such as solar water heaters and solar photovoltaic systems to reduce both energy demand and dependence on diesel generator sets.
- Poor settlements should be dissuaded from using kerosene fuel and cleaner cooking fuels such as LPG and improved cook stoves should be promoted instead.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Being a designated solar city, the city aims at a minimum 10% reduction in projected demand of conventional energy at the end of five years, through the implementation of a combination of renewable energy and energy efficiency measures.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. However, since Cochin is a solar city, a Solar Master Plan is under development for the city, targeting a 10% reduction in conventional energy use over a period of five years through the implementation of a combination of renewable energy and energy efficiency measures.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The Solar Master Plan is being developed for city. It envisages reduction in power consumption by 10 per cent by inducting renewable energy options through the implementation of a combination of renewable energy and energy efficiency measures.

3.2.7 Economy and Business:

Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

Primary Economy:

- Important trade city due to presence of Major Port
- Spice trade
- Tourism
- Many Small and Medium Enterprises (SME) and Small Scale Industries (SSI)

How is the economy changing? And what is driving the changes?

The region attracts spice traders, tourist and small and medium enterprises.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Information on this aspect is not available.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

City need to provide better basic infrastructure facilities to the industries.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- The region is developing as a tourist destination as well as trade centre.
- Presence of Major port in the region is a big plus point.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

3.2.8 Ecosystem and Biodiversity:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

Cochin, unlike other cities of India, is a region with scattered water bodies and all developmental initiatives have to be streamlined giving due respect to the geological and ecological footprints of the region. The Vembanad wetland system around city is the largest of its kind on the west coast. Nearly half of the population of Kerala depends directly or indirectly on this wetland or its drainage basins.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in population there is increased demand of land and hence there is stress on wetland system of the city. The domestic sewage from Cochin and its satellite towns ends up in the tidal canals and the backwater.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The backwater on the western parts of the city, stretching in the North South direction, has suffered large-scale siltation. This has resulted in the formation of a number of mud bank islets, which are heavily populated. Overpopulation and industrial activities have degraded the quality of this sensitive marine environment.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Depletion of natural environment will create problems for the city in the long run.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Creating a database at city level related to ecosystem and biodiversity.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Interface between tourism, commerce and environment needs to be recognized and plans/strategies need to be formulated and implemented accordingly.
- Eco-tourism development approach based on preservation of natural environment and water bodies needs to be implemented.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Cochin needs to restrict the discharge of untreated sewerage into the water bodies, including dumping of solid waste which is deteriorating the ecosystem by polluting the water bodies.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is planning for solar boats to promote water transport in the city which will reduce the air pollution.

3.3 City Green Growth Vision And Strategies

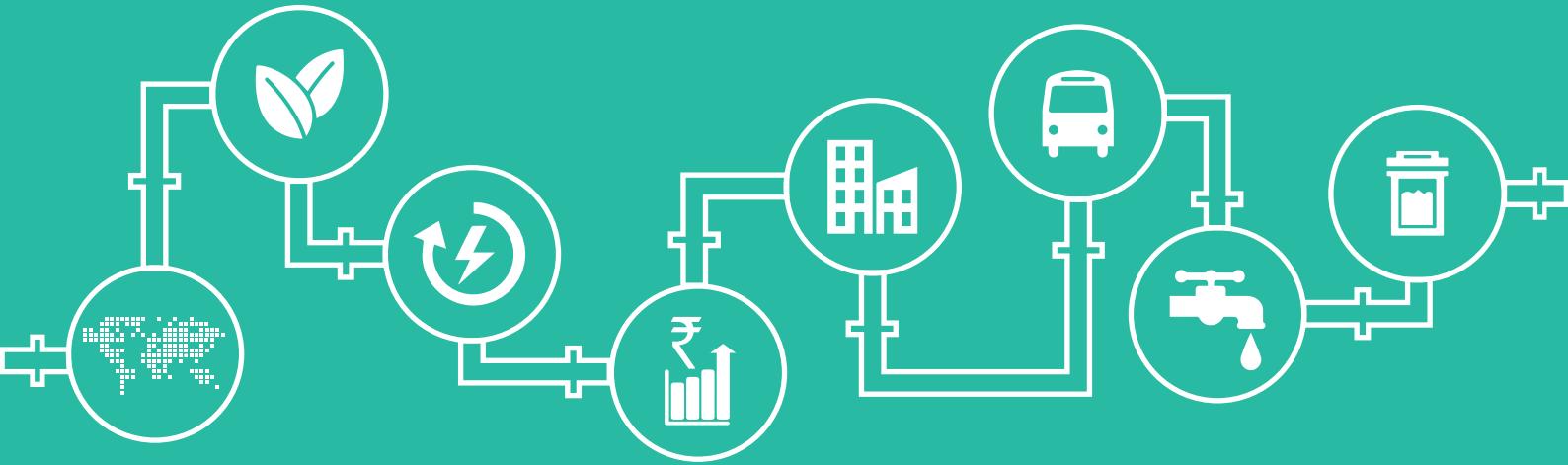
What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI can start by having discussions with the state level government bodies such as Kerala State Pollution Control Board and Kerala Water Authority about the recommended green growth options for the city.
- Hold discussions with urban local government (Corporation of Cochin) about the problems in the city and how the green growth options can be implemented. Capacity building needs can be assessed during these discussions for implementing the green growth options.
- Engaging with all stakeholders (government, local body, private sector, citizen groups) by holding workshops to understand various sectors and the possible partnership options.

Annexure 4

Dehradun

Volume 2



Annexure 4: Dehradun

4.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level Institutions:

Mussorie Dehradun Development Authority (MDDA): The MDDA was established in 1984 with the objective of planning and development of the city. It is responsible for the following functions:

- Implementation of the Master Plan.
- Acquisition of land to implement the various schemes.
- Enforcement of plan and development schemes.
- Adaptation of measure for protection of natural environment in the development area.
- Coordination with Municipal Corporation, public works department and other agencies involved with urban development.

Uttarakhand Pey Jal Nigam (UPJN): The major objective behind the establishment of the Nigam was to have an institution responsible for water supply in the state of Uttarakhand. The UPJN is responsible for planning, survey, design and execution of urban as well as rural water supply and sewage schemes in the state of Uttarakhand.

Uttarakhand Jal Sansthan (UJS): The UJS was constituted under Section 18 of the Principal Act. The functions of the UJS include:

- To plan, promote and execute schemes and operate an efficient system of water supply.
- Where feasible, to plan, promote and execute schemes and operate, sewerage, sewage, treatment and disposal and treatment of trade effluents.
- To manage all its affairs so as to provide the people of the area within its jurisdiction with wholesome water where feasible, efficient sewerage service.
- To take measures, as may be necessary, to ensure water supply in times of any emergency.
- Such other functions as may be ensured to it by the State Government by notification in the Gazette.

Town and Country Planning Organisation (TCPO): The Department of Town & Country Planning, Uttarakhand is the nodal department responsible for preparation of guidelines for regulated urban development in the State. The department is entrusted with the work of preparation of Master Plan for urban centres, zonal plans and industrial hub plans for integrated planned urban development. The department also renders advisory services to all the Development Authorities, Regulated Areas and Urban Local Bodies of the State. Apart from this, the department is also involved in framing of the State Housing policies, Buildings Bye Laws, Zoning Regulations.

State Urban Development Authority (SUDA): SUDA was setup in July 2001 with a view to ensuring proper implementation and monitoring of centrally assisted programmes for generating employment opportunities and alleviation of poverty throughout the state. Its functions include:

- To identify the urban poor in the state.

- To draw up plans and formulate schemes for upliftment of the urban poor in the state.
- To implement schemes for the benefit of the urban poor either directly or through other agencies engaged in this direction, whether private, public or cooperative.
- To review the progress of the execution of these activities as well as effectiveness of the benefits directed towards the urban poor.

State level Institution:

Dehradun Nagar Nigam (DNN): Dehradun city is managed by the DNN. The DNN was established in the year 2000 under the Uttar Pradesh Nagar Nigam Act, 1956. At present, DNN serves an area of 67 sq. km, consisting of 60 administrative wards and housing a population of 578,420 persons.

What powers does the municipal government have?

Out of the 18 functions mentioned in the 12th Schedule, 16 functions have already been devolved to the ULBs. As per the U.P Municipal Corporation Act, 1959 the following 16 functions have already been transferred to ULBs as per the act:

1. Registration of death and birth
2. Slum improvement
3. Urban poverty alleviation
4. Provision of urban amenities
5. Burial grounds
6. Cattle pounds
7. Regulation of slaughter houses
8. Public amenities
9. Fire services
10. Safeguarding the interest of weaker sections
11. Promotion of cultural, educational, and aesthetic aspects
12. Urban forestry
13. Water supply
14. Public health
15. Road and bridges
16. Social and economic

The process to transfer the balance functions to the ULBs needs to be initiated:

1. Regulation of land use and construction of buildings
2. Urban planning including town planning

UJS is responsible for operations and maintenance of the water supply and sewerage network, whereas UPJN is engaged in planning, designing, and construction of the networks for these two services.

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Revenue Income

The major source of own revenue for DNN is property tax, which accounts for 7% of the revenue. DNN's own source of revenue accounts for only 18% of the total revenue. It is highly dependent on the grant from the government to meet its expenditure. Grants contribute ~78% of the total revenue. The Nagar Nigam should take steps to increase the revenue so that it can at least meet its expenditure.

Revenue Expenditure

Establishment expenses are a major expenditure for DNN. The establishment expenses as a percentage of revenue expenditure and income are 54% and 46%, respectively. The collection per staff and efficiency in the staff performance should increase to justify such a high expenditure.

What role does the state play in city decisions and operations?

Since Dehradun is the capital city of the state, various state level agencies are operating in the city and are responsible for some of the major infrastructure and service provision for the city. The state government controls the infrastructure development in the city through various grants, with DNN heavily dependent on state government for its income.

The U.P Municipal Corporation Act, 1959 which governs the function of Municipal Corporation have been made by state government with the power to amend as and when requires.

How does the city participate in and leverage state/ national urban development schemes and missions?

DNN is able to leverage grants from the State for infrastructure development and service delivery as well as from the Central government through Central programmes such as the NURM.

How active is civil society and non-government organizations in the city?

Based on the discussion with DNN and MDDA, the city does not have many active NGOs dealing with issues relating to urban infrastructure, urban planning and service delivery.

4.2 City Growth Story

4.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	48%
Per capita supply of water	120 LPCD
Extent of metering of water connections	8%
Non-revenue water	30%

Water supply for Dehradun city is dependent on both surface water and ground water, with supply being largely sourced from groundwater (about 80%). Abstraction of ground water is done through deep tube wells and the city has a good potential for ground water recharge since it is situated in a valley. Water is supplied for an average daily duration of 6 hours in the city.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The major reason for rising water demand in the city is the rapid increase in population of the city (natural growth as well as expansion of city limits). The city also has a growing floating population visiting for tourism and business purposes.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The groundwater aquifers in the city get recharged due to the high rainfall received and owing to the city's enabling topography as a result of it being located in the valley. However, rising water demand will result in abstraction of groundwater in excess of that being recharged, leading to depletion of the groundwater table. Due to the leakages in the old distribution network, the amount of NRW is high, leading to wastage of water.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Depletion of groundwater table and presence of limited surface water sources will lead to issues in sourcing water and increase vulnerability of the water supply system to climatic variations. High water losses will affect revenue generation and impact service delivery.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The legislative provisions have been made in the Municipal Act but the actual transfer of water supply functions to the DDN is yet to take place.
- The water supply system at present is managed by UJS, hence information specific to DNN jurisdiction is not maintained. The present SLB related information is hence approximate.
- Service coverage is completely lacking in the newly developed areas, with the network catering to only 48 % of the city area.
- The water supply distribution network is quite old and has water leakages at many locations.
- Both bulk and consumer level metering is yet to be initiated in the city.
- Collection efficiency is less due to unwillingness of the citizens to pay.
- Cost recovery of water supply is less due to flat rate and low tariffs. The tariffs have not been revised since 2000.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Mapping of jurisdiction specific information would be important for decision making and future planning once the water supply function is completely transferred to DDN.

- Extending service coverage to the city's unserved population, particularly in the newly developed areas.
- Undertake physical mapping of the distribution network and carry out regular leakage detection studies and water audits to reduce NRW.
- All connections should be metered and appropriate volumetric tariffs should be levied to reduce wastages, check illegal connections and improve revenues.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

The responsibility of planning and service delivery for water supply lies with the State government institutions, which decide on the future requirements for water supply in the city based on the projected increase in population, economic and non-economic activities and prepares project proposals for augmenting infrastructure and service levels. The overall planning and capital works are carried out by the UPJN and O&M is undertaken by the UJS. DNN is consulted but not actively involved in the planning for infrastructure and service delivery.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is implementing a Water Supply Reorganization scheme under the NURM programme, aiming to meet the future demand of water supply in terms of 135 lpcd and 24 hours supply duration. The scheme emphasizes on the construction of tube-wells, overhead tanks, and pumping houses and connecting mains. 80% of the work under this scheme has been completed.

4.2.2 Sewerage and Sanitation:

□ Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of toilets	70%
Coverage of sewage network services	12%
Adequacy of sewage treatment capacity	0%
Extent and reuse of recycling of treated sewage	0%
Storm Water	
Coverage of storm water drainage network:	11%
Incidence if water logging/flooding	4

The centralized sewerage service coverage extends to an alarmingly low 12% of the city's population, with newly developed areas lacking coverage. In the absence of a sewerage network, the city is largely dependent on traditional septic tanks and soak pit systems for treating its wastewater. Dehradun does not have a functional STP at present, with two STPs under construction. Although the natural topography of the city due to its location in the hilly region helps in gravity drainage, a mere 12% of Dehradun's area is covered by the storm water drainage network, which is insufficient.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growing population and expansion of city area along with increasing tourism activities are leading to rising demand for this service. Since the coverage of the sewerage network in the city is extremely low, the demand for the service is very high in the existing as well as in the newly developing areas.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is currently implementing two schemes for renovating and augmenting the sewer network and construction of STPs in the city under the NURM programme. Construction of two STPs of 20 MLD and 68 MLD capacity is underway. 75% of the work under both the schemes has been completed.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The low sewerage network coverage and lack of sewage treatment facility leads to high dependence on soak pits and septic tanks and unsafe disposal of wastewater into water bodies, low lying areas or open land. The city receives high rainfall in the monsoons and the inadequate drainage network coupled with building developments and settlements encroaching the natural drainage channels which leads to frequent flooding.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Unsafe disposal of wastewater leads to issues such as pollution of water bodies and land, impacting human health and degrading the vulnerable natural ecosystem of the city. Water logging and flooding poses challenges for the poor settlements residing in vulnerable locations along the water bodies and low lying areas while also resulting in health hazards.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The legislative provisions have been made in the Municipal Act but the actual transfer of sewerage and drainage services to DNN is yet to take place.
- The sewerage system at present is managed by UJS, hence information specific to DNN jurisdiction is not maintained. The present SLB related information is hence approximate.
- The existing sewerage system caters to a very limited area of the city and is aged and in dilapidated condition.
- Sewage treatment facilities are non-existent and need to be put in place.
- The city lacks adequate technical capacity to manage and operate this service.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Mapping of jurisdiction specific information would be important for decision making and future planning once the sewerage function is completely transferred to DDN.
- Augmenting sewage collection and treatment capacity by putting in place centralized and decentralized systems.
- Mapping locations vulnerable to water logging in order to develop specific plans.
- Co-ordinating with planning and development authorities to regulate construction activities and encroachment along natural drain channels.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The responsibility of planning and service delivery for sewerage and drainage lies with

the State government institutions, which decide on the future requirements based on the projected increase in population, economic and non-economic activities and prepares project proposals for augmenting infrastructure and service levels. The overall planning and capital works are carried out by the UPJN and O&M is undertaken by the UJS. DNN is consulted but not actively involved in the planning for infrastructure and service delivery.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

4.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	70%
Efficiency of collection of municipal solid waste	60%
Extent of segregation of municipal solid waste	0%
Extent of scientific disposal of municipal solid waste	0%

The city generates about 257 MTD of solid waste. The average quantity of waste collected and transported to the dump site at present is 155 MT/day. The Public Health Department of DNN is responsible for solid waste management in the city. The municipal solid waste is being managed on a PPP basis by a private operator. The private operator has initiated door-to-door collection in all the wards. DNN pays the operator a tipping fee for the services rendered. User charges for solid waste management, ranging from Rs. 20 per household to Rs 50 per household, have been imposed by DNN. The city has one solid waste disposal site is located at a distance of about 7 km from the city and unscientific waste disposal is being practiced in the absence of a sanitary landfill.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The demand for solid waste management service is increasing as a result of growing solid waste generation due to growth in population, expansion of city limits and increasing commercial activities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

DNN is implementing an integrated project on a Public Private Partnership (PPP) basis for integrated solid waste management under the NURM programme. Under this project, door-to-door collection has been initiated by the private operator in all the wards.

The other key components covered under the project are:

- Construction and operation of the transfer station, treatment, and disposal facilities.
- Construction of 150 MTD capacity composting plant with all necessary tools and equipment.
- Development of 50 MTD day capacity engineered sanitary landfills for ensuring safe disposal of rejects.
- Equipment, vehicles, tools, etc., to augment primary collection, street sweeping and secondary storage containers to augment secondary storage.
- Covered hydraulic vehicles to improve the transportation of waste through covered containers to ensure direct transfer stations/treatment plants

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The solid waste is dumped at various unauthorized locations in the city due to absence of door-to-door collection system in the city. This coupled with the absence of a sanitary landfill site can cause health hazards and lead to pollution of the land and water bodies. Waste is also being dumped in drainage channels leading to their clogging.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Lack of scientific disposal and waste processing facilities is leading to all of the generated waste going to the dumpsite. With the city facing major constraints in land availability, this will pose serious challenges in identifying and securing new locations for waste disposal.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Inadequate door to door waste collection practice and absence of waste segregation into dry and wet waste.
- Inadequate infrastructure for collection, storage and transportation of MSW in the city.
- Unscientific open dumping practiced at the dumpsite.
- Recycling of waste is near absent.
- Difficulties in securing EIA(Environment Impact assessment) land clearance for the landfill site identified under the Integrated Solid Waste Management project, leading to delay in the development of the sanitary landfill.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to extend door-to-door collection service to the entire city and introduce waste segregation at source.
- Waste going to landfill needs to reduce substantially by focusing on decentralized processing facilities through involvement of NGOs and institutions.
- Waste management and recycling should be actively promoted in the academic institutions and administrative offices.
- Waste should be disposed at the landfill sites in a scientific manner.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Household coverage -100%
- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%

How does the city plan for future infrastructure and service delivery in the sector?

The Public Health Department of LMC prepares project proposals for improving and

expanding the service and to bridge the gap in service delivery. The proposals are submitted to the State and the Central government to be approved for funding.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

An integrated solid waste management project on a PPP basis is underway in the city covering door-to-door collection, construction and operation of transfer stations and composting plant for treatment. The city also plans to develop an engineered sanitary landfill site under this project.

4.2.4 Urban Transport:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The Uttarakhand Transport Corporation operates a bus fleet for intra-city and inter-city travel in Dehradun. The bus fleet has limited frequency due to narrow road width and this has resulted in prevalence of IPT vehicles. The city has a high share of privately owned two wheelers. A large number of private and tourist buses operating from different locations in the city for intercity travel. The city lacks adequate infrastructure for proper management of these buses.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Since becoming the capital of the recently formed state of Uttarakhand, Dehradun has experienced rapid demand for mobility due to population influx and substantial floating population visiting the city from peri-urban areas owing to improved connectivity. Increased tourism activities have led to an increase in the number of public and private inter-city buses coming to the city. The number of private vehicles has been growing due to rising population and changing lifestyles.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is undertaking the Choraha Road construction and renovation project under the NURM programme, aiming to construct and renovate roads at various junctions for smooth movement of traffic.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The inadequacy and low frequency of public transport service has resulted in increasing IPT vehicles, which hampers smooth traffic flow. The large number of intercity buses coming into the city has resulted in traffic congestion due to the narrow roads, especially in the core areas.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Limited connectivity and frequency of city bus services poses challenges for access to cheap mobility.
- Traffic congestion increases commuting time and causes air pollution leading to health impacts.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The city's location has resulted in limited availability of space to widen roads in the core city. Vehicular population is exceeding the carrying capacity of the roads.
- Enforcement of traffic rules is a challenge.
- Regulation of IPT is lacking.
- Frequency of public buses cannot be increased due to space and infrastructure constraints. Buses allocated to the city under NURM programme are unsuitable due to small turning radius due to the topography and narrow road width.
- Facilities for IPT vehicles, intercity buses and pedestrians are highly inadequate
- The designated parking areas in the city are inadequate leading to haphazard parking on the streets.
- Street lighting is in poor condition and near absent in few locations.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Providing efficient and cheap city bus service in the city, particularly connecting peri-urban areas with the core city areas. The bus service can comprise of mini-buses which are well-suited for the city's road width and topography.
- Improving infrastructure for IPT vehicles and intercity buses and developing parking facilities.
- Improved regulation of IPT vehicles.
- Promoting cleaner fuels such as CNG, LPG in public and private vehicles.
- Providing a bye-pass road to reduce vehicular traffic in the city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Providing efficient and economic intermodal transport system with city wide coverage.
- Promoting use of clean fuels in public, private and IPT vehicles.
- Providing adequate NMT and pedestrian facilities in the city.

How does the city plan for future infrastructure and service delivery in the sector?

The MDDA and DNN along with the transport department of the State government share the primary responsibility for urban transport planning, design and management.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is undertaking projects to construct and renovate roads at various junctions to ease traffic congestion in the city.

4.2.5 Housing and Buildings:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Limited data exists currently on the status of housing and built environment in the city. Nearly 26% of Dehradun's population resides in 118 slums in the city. The city is undertaking nine affordable housing projects for the urban poor under the Basic Services for the Urban Poor (BSUP) scheme. Six of these projects are under construction, with about 500 dwelling units, which is highly inadequate considering the high share of the urban poor population in the city.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The city has witnessed tremendous inward migration leading to high increase in population since Dehradun was declared the capital of newly formed Uttarakhand state. This has put high pressure on housing stock in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Currently, nine affordable housing projects for urban poor in the city have been sanctioned under the BSUP and RAY scheme but the construction work has been initiated only in six projects due to issues in land availability.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Dehradun city is growing rapidly and has a high proportion of slum population. It lacks adequate affordable housing facilities. There is also growth in tourism and allied commercial activities. Land availability is a major issue in the city due to regulatory constraints as a result of its location in an eco-sensitive zone surrounded by forest land. These issues will lead to increase in the slum population and unauthorized construction in ecologically sensitive areas.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Limited land resource and resultant rise in land prices necessitates huge investment is required for housing projects which impacts financial viability of affordable housing projects.
- Inadequate housing facilities are leading to unauthorized settlements leading to disputes.
- Informal settlements and limited land resource is leading to encroachment which is impeding natural drain channels.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The limited land resource and constraints on vertical development make identification of land for housing projects a challenge.
- There is lack of adequate housing leading to encroachments and unorganized development on vacant lands.
- Resistance of people to relocate from the existing slums to affordable housing is a problem.
- DNN has limited role in the preparation of Master Plan.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provide affordable housing units in all housing projects to cater to the growing demand.
- Incentivize builders to construct affordable housing units.
- The city is undertaking a comprehensive survey for identification of slums and creation of a database with details of slum dwellers with proper identification.
- Mapping of existing housing and buildings and strict monitoring of new constructions to prevent unauthorized construction activity.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- To ensure housing for all with well-functioning infrastructure facilities.
- Slum free city.
- Restricting all unauthorized construction activity.

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector, which constructs residential and commercial buildings based on the demand. DNN along with MDDA makes plans for constructing affordable housing for the urban poor and economically weaker sections. The city has recently started work to prepare a slum free city action plan.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Construction is under progress in six of nine sanctioned affordable housing projects for urban poor in the city under the BSUP and RAY scheme. Land for the remaining three projects has been acquired and the construction will be commencing soon.

4.2.6 Energy

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

The Uttarakhand Power Corporation Limited (UPCL) distributes electricity supply within the city. The city is almost completely dependent on conventional power sources to meet demand. Oil marketing companies are engaged in distribution of LPG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System.

Energy	
Share of households with electricity as main source of lighting	97.9%
Share of households by main source of cooking energy	
LPG/PNG	71%
Fuelwood	18.3%
Kerosene	5.1%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The increasing energy demand in the city is driven largely by the rising consumption in the residential and commercial sector as result of growing population and tourism and allied activities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

No information is available on this aspect.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The city is facing increasing power cuts indicating that power supply is lagging behind rising energy demand. The city is almost completely dependent on GHG intensive conventional grid power to meet its demand. With abundant biomass resource being available in the city, a substantial number of households are dependent on fuel wood to meet their cooking energy requirement.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Frequent power cuts pose challenges in the commercial sector and lead to increasing dependence on diesel generator sets. Inefficient and excess use of fuel wood in an unsustainable manner can lead to degradation of forest resource, air pollution and impact health.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- DDN does not have any mechanism or technology in place to track energy use in its facilities.
- While Dehradun is a designated solar city under the Solar Cities Programme, the progress

with regards to development and implementation of the Solar Master Plan is slow. A solar city cell is yet to be established in the administration.

- City level data for energy consumption in various sectors is not available.
- By-laws mandating solar water heating systems are existing but uptake of RE systems is low due to poor enforcement and monitoring.
- Street lighting system is operating poorly with low illuminance.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to ensure that energy consumption in its facilities and buildings is tracked and monitored regularly to regulate energy use and identify potential opportunities.
- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- Since the city has good availability of solar energy, it should promote renewable energy systems to offset conventional energy demand. The promotion can be done in hotels, and academic and institutional buildings.
- The city should undertake strict enforcement to ensure conformance for installing solar water heating systems in the new buildings as per the building bye-laws.
- Street lighting lamp retrofit and control system should be setup to improve delivery of public lighting.
- A piped natural gas network should be put in place in the city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Being a designated solar city, the city aims at a minimum 10% reduction in projected demand of conventional energy at the end of five years, through the implementation of a combination of renewable energy and energy efficiency measures.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. However, since Dehradun is a solar city, a Solar Master Plan is under development for the city, targeting a 10% reduction in conventional energy use over a period of five years.

DNN and UJS are responsible for managing energy use in municipal service infrastructure for water supply, sewage treatment and street lighting.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The Solar Master Plan is being developed for Dehradun city.

4.2.7 Economy and Business:

□ Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

Dehradun is an administrative hub of the state and also hosts prominent schools and academic institutions. A substantial share of the population is engaged in administrative and educational services. The city is a favored tourist destination and the tourism sector forms an important part of the city's economy. The city also acts as a center for wholesale trading for the hill region of the state.

How is the economy changing? And what is driving the changes?

Being the state capital and a tourist destination, Dehradun is attracting tertiary activities such as retail, transport, communication, trade, hospitality, finance and real estate.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Increased pressure on the scarce land resource.
- Rising demand for water and energy.
- Unregulated housing and building development can lead to haphazard growth of the city, impacting its vulnerable ecosystem.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- The city can face increased pollution and degradation of natural resources.
- The presently inadequate urban service infrastructure will face increasing pressure.
- The land prices will escalate further, creating issues in housing availability.
- Rapid growth coupled with inadequate housing will lead to proliferation of slums.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provision and upgradation of infrastructure such sewerage collection and drainage network needs to be provided.
- The city needs to focus towards integrated development for the larger urban agglomeration, including other ULBs and councils in its vicinity such as Rishikesh, Haridwar and Mussorie. This integrated approach towards economic development of the larger urban agglomeration will help overcome issues in infrastructure, resource and land availability and help develop the urban agglomeration as a counter magnet to the National Capital Region.
- The city is rich in natural resources and should focus on agro-based cluster development.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

4.2.8 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

Information on this aspect is not available.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Information on this aspect is not available.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Information on this aspect is not available.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Information on this aspect is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Information on this aspect is not available.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

4.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI must first engage with the State government bodies for discussing prevalent issues and suggested recommendations related to transportation, energy and governance.
- GGGI should also engage deeply with the DNN to better understand the issues in the priority sectors and seek a way forward for implementing green growth strategies.
- Engaging with the key academic and government institutions and citizen groups in the city through workshops can help GGGI gain holistic understanding of issues and identify possible options for partnerships.

Annexure 5

Kota

Volume 2



Annexure 5: Kota

5.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level Institutions:

Urban Improvement Trust (UIT):

The Urban Improvement Trust, established in 1970, is responsible for the overall development of Kota. The UIT's major responsibilities include implementing the Master Plan, acquiring land, developing infrastructure, including construction of houses for the poor.

Public Health & Engineering Department (PHED)

The PHED, a state government department, is responsible for water supply and sewerage in Kota city. Its functions include development of water and sewerage infrastructure in the city, and operation and maintenance of the systems.

State level Institution:

Kota Nagar Nigam (Kota Municipal Corporation)

Kota has a directly elected mayor and has 60 elected representatives.

What powers does the municipal government have?

As per the Rajasthan Municipalities Act 2009 the following 14 functions are either already being performed or have been transferred to KNN:

1. Registration of death and birth
2. Slum improvement
3. Urban poverty alleviation
4. Provision of urban amenities
5. Burial grounds
6. Cattle pounds
7. Regulation of slaughter houses
8. Public amenities
9. Fire services
10. Safeguarding the interest of weaker sections
11. Promotion of cultural, educational, and aesthetic aspects
12. Urban forestry
13. Public health
14. Social and economic

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Kota Nagar Nigam (2013-14)	
Head	(in Rs. Million)
Total Income	1587.21
1. Revenue Income	1168.92
1.1. Octroi compensation	1023.98
1.2. Urban development tax	26.06
1.3. Income from parking fee	1.78
1.4. Construction and development work license fee	29.99
1.5. Sign advertisement board fees	16.71
1.6. Income from road cutting	4.66
1.7. Entry fees from Chambal garden	0.95
1.8. Others	64.79
2. Loan receipts	-52.26
3. Capital receipts	470.75
Total Expenditure	1483.37
1. Revenue Expenditure	989.73
1.1. Salary, administration and Establishment exp.	883.33
1.2. Exp. on cleaning of garbage & transportation on contract	58.45
1.3. Maintenance of road, gutters	45.36
1.4. Maintenance of sewerage treatment plant	2.59
2. Loan repayments	14.9
3. Capital repayments	478.73

What role does the state play in city decisions and operations?

As KNN relies heavily on state government grants for carrying out its functions, the state government influences the decision making of KNN in most matters. Matters related to finances and capital works are especially influenced by the state government.

Rajasthan Municipalities Act, 2009 which governs the functioning of the Municipal Corporation have been made by state government with the powers to amend as and when required.

How does the city participate in and leverage state/national urban development schemes and missions?

The city submits proposals under national programmes, such as Rajiv Awas Yojana (RAY) and obtains funds. These are generally routed through a state level agency – in Kota it is the UIT. Cities that would receive funding under the state government programmes/ schemes are generally decided by the respective state government departments.

How active is civil society and non-government organizations in the city?

Based on the discussions with KNN and UIT it emerged that there are very few active NGOs in the city dealing with urban infrastructure and planning as also service delivery.

5.2 City Growth Story

5.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	88%
Per capita supply of water	200 LPCD
Extent of metering of water connections	55%
Non-revenue water	30%

Kota is able to supply water 24x7 in the old parts of the city - except in the newly developed areas that have come up in the rocky upper regions and in peripheral areas. These new developments form about a third of the city and here the supply duration is between 3 to 6 hours a day. The water supply system in the city is gravity based while the supply to new developments needs pumping as these are located in the upper rocky regions.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The growth of population, expansion of city limits and growth of economic activities in the city is increasing the demand for water in Kota.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Kota's water supply system got upgraded under the Rajasthan Urban Infrastructure Development Project (RUIDP). The following infrastructure was put in place by November 2011: 125 km pipeline, 11 pumping stations, 21 water tanks, 1 water treatment plant, 12 tubewells, and 8 bulk meters.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The negative impact from this sector mainly relates to unaccounted for water, which is estimated at about one-third of the total supply. With this level of wastage, if the per capita supply remains at 200 lpcd, the revenues from the service will be negatively impacted. This also sends a negative signal to consumers on water conservation.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

High levels of water wastage will make the water supply system economically unviable and impact the service negatively in the long run.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

The main issues and challenges in this sector are:

- The Urban Local Body has not yet been handed over the responsibility for this service in accordance with the 74th Constitution Amendment Act, 1992. This should be accorded priority.
- Water losses due to leakage from old, damaged, corroded pipe lines/ connections and leaking joints and overflowing overhead tanks.
- High unaccounted for water levels with high level of per capita supply is a disastrous combination. Yet nothing much has been done mainly because plenty of water is available from Chambal river and the supply is based on gravity system.
- Most of the water leakage is in old city area.
- Partial metering of connections: This leads to wastage of water by households and also leads to revenue loss.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- PHED should regularly carry out regular leak detection checks.
- It should improve metering and cover all connections
- It should seek cooperation of people to carry out pipeline maintenance work in the old city area.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

PHED and UIT plan the infrastructure for water supply in the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

5.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	29%
Adequacy of sewage treatment capacity	0%
Extent and reuse of recycling of treated sewage	0%
Storm Water	
Coverage of storm water drainage network:	55%
Incidence if water logging/flooding	3 nos. in old city areas

Kota has very limited sewerage network at present and even this network has been developed only recently. Only 29% of the city's area is covered by the centralised sewerage network and household connectivity to this network is still low. Open defecation remains a challenge in the city, particularly in slums.

The drainage system covers only 55% of the city, a large part of it being in the newly developed areas. The old city is quite vulnerable to water logging during monsoons.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growing population and expansion of city area is increasing the demand for this service. Since the coverage by sewerage system in the city is very low the demand for the service is very high in the existing and in the newly developing areas.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

There is a plan to cover over three-fourths of the city area with sewer lines - this project is under implementation. Currently three sewage treatment plants (STPs) are under construction.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Low coverage of households in the city by sewerage system can lead to unsafe disposal of wastewater into water bodies, low lying areas or open land. These can have serious implications for health of the citizens.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The main challenge of improper/ unsafe disposal of wastewater is pollution of water bodies and land, which will have adverse impact on human beings, flora and fauna. The poor would be impacted disproportionately due to this negative impact.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- KNN needs to be made responsible for this service as per the 74th Constitution Amendment Act, 1992. The technical capacity of KNN needs to be enhanced to be able to handle this service.
- Covering the entire city by sewerage system is a challenge in the unplanned old city and the rocky terrain of the newly developed areas.
- For storm water drainage, there is a need to map the areas that get water logged in the city so that a plan can be prepared to address the issue. Tackling the problem would include not only cleaning the drains regularly, but also preventing the drains from clogging, removing encroachments and educating/ involving communities in the water logged areas to not litter the drains.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Develop of an “Integrated Sewage Disposal Project” for Kota.
- Expand the sewerage network.
- Get the households to connect to the sewerage system.
- Provide adequate sewage treatment capacity to treat wastewater.
- Charge for sewerage services.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The PHED and UIT plan the infrastructure in this sector in the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is planning to cover three-fourths of the city area with sewerage system at present.

5.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	7%
Efficiency of collection of municipal solid waste	91%
Extent of segregation of municipal solid waste	0%
Extent of scientific disposal of municipal solid waste	0%

The city generates about 200-250 metric tonnes of waste daily with an average per capita generation of about 280 grams per day. Door-to-door collection of solid waste was started by KNN in the city in 2008-09 but was stopped due to legal issues in the contractual arrangement with the private partner. The city has one dumping ground which is 15-16 km away. Solid waste is also dumped into the Chambal river by the settlements living on the banks of the river, causing pollution of the only source of drinking water for the city. In the absence of transfer sites and a sanitary landfill site, the biggest problem for the city is to manage the service efficiently.

Kota has no municipal solid waste treatment facility and the biomedical waste from the city is taken to a treatment facility 100 kms away (in Sawai Madhopur).

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population, area and economic activities has increased the quantity of waste generated by the city. The service also needs to be extended to the newly developed areas of the city.

what recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

KNN had started door-to-door collection system for solid waste management (SWM) in 2008-09 but it was stopped due to legal issues in the contractual arrangement with the private partner. The system has not yet been revived and no concrete steps are being taken by the city to improve SWM at present.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

As proper waste collection system is not in place, the solid waste is dumped in various places in the city and also in the river Chambal. This will pollute the water source and create shortage of water in future. Unscientific disposal of waste is a health hazard and with increasing quantity of waste generated in the city, the health aspect will become critical to the well being of people.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The main challenge for the city is to keep the city clean, collect and dispose waste scientifically, and prevent diseases that arise due to improper management of solid waste.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Kota's majority of solid waste comes from domestic and non-domestic sources – some of which is also industrial waste. Collecting and disposing waste scientifically is a challenge. Kota's educational institutions also generate paper waste which can be collected and recycled separately. The capacity of officials in KNN needs to be enhanced to deal with this service efficiently and scientifically.

Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

KNN needs to introduce door-to-door collection in the city and improve the entire process of collection, transportation and disposal. The city needs to develop a sanitary landfill site for final disposal of waste. The city should also look at decentralized waste processing options by involving NGOs or small enterprises. Involvement of private sector can be considered for waste collection, transportation and disposal through a well drawn contract so that the contracting process is not stalled. Kota can look at other cities where this service is being managed well and learn from them.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Household coverage -100%
- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%

How does the city plan for future infrastructure and service delivery in the sector?

KNN decides on the shortfall in service and future service requirements. The proposal will then be cleared by the state government for funding.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is planning an “Integrated Solid Waste Management” project for Kota City and plans to implement the project on design, build, own, operate and transfer basis.

5.2.4 Urban Transport:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Urban Transport	
Bus	90
Mini bus (Minidor/Magic)	978
IPT	4400

Kota has mini-buses and intermediate modes of public transport (IPT) such as auto-rickshaws and other motorised shared transport. In the absence of an organised public transport system, most people use private vehicles for their travel. The total number of motorised personal private vehicles in the city was about 652,500 as of March 2014. With an annual growth rate of over 9 % of private modes in 2013, the vehicle ownership in the city (at 651 vehicles/1000 persons) is very high².

In March 2013, KNN acquired 34 buses under the UIDSSMT stream of JnNURM. Only two buses out of these 34 are actually being run. The remaining 32 buses remain parked³ as, according to KNN, there is a shortage of drivers and conductors to run the buses.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The city is witnessing a rapid growth in private vehicles over the years. The city also has a large number of cycles - mainly used by students who come to the city for education. The city requires a public bus transport system to reduce dependence on private modes of transport.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city recently acquired 34 full sized buses but most of these buses could not be plied due to manpower shortage to run the buses.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The negative impact of increasing use of private motorized vehicles is on air pollution and congestion on roads. Without an organized bus system, congestion and parking will create a problem for the city in the long run.

²Source of Data :Regional Transport Office
UIDSSMT – Urban infrastructure for Small and Medium Towns
JnNURM – Jawaharlal Nehru National Urban Renewal Mission

³The global economic downturn in 2008 affected India too and in order to give a boost to the economy the Government of India, the JnNURM and UIDSSMT cities to purchase buses for running city bus service. This move was useful for some cities but not for all.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The increase in air pollution due to growth in private motorized vehicles will create health problems for the residents of the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The private mini buses plying in the city need to be regulated properly.
- Getting adequate manpower to run the full length buses acquired by the city.
- Lack of adequate and safe facilities for pedestrians.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Improve mobility within city through following:
- Public transport system
- Pedestrian facilities
- Safe lanes for cyclists

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Described above.

How does the city plan for future infrastructure and service delivery in the sector?

Transport in the city falls within the functional domain of the state transport department. Therefore, the planning for transportation rests with this department. Despite this arrangement, KNN was involved in the purchase of buses under UIDSSMT programme.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city already has buses purchased for introducing a city bus services. This needs to be implemented.

5.2.5 Housing and Buildings:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

There is limited data available on status of housing and built environment in the city. The Slum Free Action Plan, 2014 for the city mentions a demand of 15,000 low cost housing units of which approximately 10,000 housing units are in the process of being constructed through various schemes under the JnNURM and Rajiv Awas Yojana (RAY) programs.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population, area and growth in economic activities is driving the demand for this service in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Adequate housing needs to be provided to people, especially the low income groups otherwise the city will see an increase in the number of slums.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The main challenge is providing adequate housing to the migrant population and the poor to prevent slum formation.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Information on this aspect is not available.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Provide affordable housing with basic services to low income population so that pollution of water bodies due to discharge of untreated waste is prevented.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum percentage: 0
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

UIT estimates the demand in this sector and later helps implement housing projects.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

5.2.6 Energy:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The power distribution in Kota is managed by the state power distribution enterprise i.e. the Jaipur Vidyut Vitran Nigam Limited. Kota has three different types of power stations in its close vicinity – Thermal, Hydro and Nuclear. Currently the city enjoys uninterrupted power supply and its close proximity to various power plants reduces the distance for power transmission and also the allied losses (due to transmission and distribution of power in the main grid). At present, the city is totally dependent on conventional power sources to meet its existing demand.

GAIL (India) Limited commenced supply of natural gas to the industrial sector in Kota since 2011, making it the first city in Rajasthan to have an operational city gas distribution network. CNG stations for transport and PNG for households in the city also started in 2011.

Energy	
Share of households with electricity as main source of lighting	97.2%
Share of households by main source of cooking energy	
LPG/PNG	74.6%
Fuelwood	17.1%
Kerosene	4.8%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The energy consumption in the city is rising at a steady rate of 2.5% per annum, mainly due to the increased demand in the commercial and residential sector.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The city has high dependence on grid power supply and energy demand is seen to be rising rapidly in commercial and residential sector. A substantial number of households are dependent on fuel wood to meet their cooking energy requirement. Overexploitation of fuel wood can occur with growing population in the city.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Inefficient and excess use of fuel wood in an unsustainable manner can lead to degradation of forest resource, air pollution and impact health. Increased demand for fuel wood can result in unauthorized felling of trees and lead to depletion of local natural resources.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- KNN does not have any mechanism or technology in place to track energy use in its facilities.
- KNN lacks adequate capacity to implement city-wide energy conservation activities and programmes.
- City level data for energy consumption in various sectors is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Kota gets sufficient sunshine through the year, offering a high potential for solar energy generation. The city should promote the use of solar thermal and solar photovoltaic systems that, along with the use of natural gas by industries, will reduce dependence on conventional power sources. Rajasthan has a Bio Fuel Mission and the state has decided to allocate culturable wasteland in 11 districts for the production of Jatropha and other such tree borne oil seeds and Kota district is one of them.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level.

KNN and PHED are responsible for managing energy use in municipal service infrastructure for water supply, sewage treatment and street lighting.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The City has submitted an application to the Ministry of New and Renewable Energy (MNRE) for inclusion under its Solar Cities programme.

5.2.7 Economy and Business:

□ Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

The major employers in Kota district are the micro and small enterprises, which deal with the following industrial groups: agro-industry, readymade garments and embroidery, wood and wooden furniture, leather, chemical, minerals and metals, engineering, and repairs and servicing. The state government has identified clusters in Kota district under the Cluster Development Scheme: major clusters include Sand stone and Kota stone; Welding Electrode; Kota Doria; Engineering Fabrication and general engineering; Chemical industry; Edible oil; Agricultural implements; and Snacks (food items).

Kota has about 130 big and small coaching centres (as in 2013). According to city sources, nearly 125,000 students come to Kota every year to get coaching for various entrance exams. The coaching centres have also fuelled the growth in the realty sector in the city by creating a demand for housing (hostels).

How is the economy changing? And what is driving the changes?

The district provides opportunities for cluster development of industries. The Government's Cluster Development Scheme for Small and Medium Enterprises will encourage the growth of manufacturing clusters, which is at present the largest employer in the industrial sector. Kota offers opportunities for more agro-based industries to come up as it has a thriving agricultural mandi. This will be helped by the agro business policy of Rajasthan which focuses on strengthening the market infrastructure and creation of modern supply chains. The Rajasthan State Industrial Development and Investment Corporation (RIICO) has developed an Agro Park in Kota for the development of agro based industries. RIICO has also developed an Information Technology Park in Kota. The city has an Inland Container Depot developed by the Container Corporation of India Ltd. which can help in the economic growth of the city and region.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Increase in demand for water and pollution of water sources.
- Waste generation will be higher. Unscientific disposal of waste will create health hazards.
- Unregulated housing development can result in disorderly growth of the city

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- The city can face water shortage in future, particularly if the source of water gets polluted.
- Improper disposal of waste can result in health problems for the citizens and make the city look dirty.
- Proliferation of slums creates insanitary conditions.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

According to the industrial profile of Kota District, only about 5% of the industrial units were registered, indicating that the remaining were in the informal sector, which are more difficult to regulate. This would make it difficult to bring changes in the working of these enterprises to make them green.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available

5.2.8 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

In Kota, many species of trees have become locally extinct due to the unscientific and unsystematic process of exploitation of forest. There has been a change in the species composition and various types of weeds have invaded the area and can be seen on the degraded forest patches⁴.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Information on this aspect is not available.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Information on this aspect is not available.

⁴Source: Biodiversity and Conservation Across Selected Ecosystems and Agroecological Zones in Rajasthan' By Seva Mandir, Udaipur

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Information on this aspect is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Information on this aspect is not available.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

5.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI can engage with state government bodies for recommendations related to transportation, energy, and governance.
- Discussions can be held with the Mayor (KNN) and UIT at the city level to chart out a way to pursue the green growth strategies for the city.



Annexure 6

Ludhiana

Volume 2



Annexure 6: Ludhiana

6.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level Institutions:

Greater Ludhiana Area Development Authority (GLADA)

GLADA is a specially designated urban development authority, constituted in 2006, for the development of Ludhiana District and Phillaur tehsil of Jalandhar District.

Functions

- Development of urban estates and new townships
- Preparation of regional plans and Master Plan
- Approval of building plans of public buildings
- Group housing schemes
- Land use of pockets reserved for public purposes
- Set up industrial areas for planned and systematic industrial development
- To function as a special planning authority in development of industrial areas.

Punjab Water Supply and Sewerage Board (PWSSB)

The PWSSB is a Punjab Government undertaking under Local Government Department, set up under the Punjab Government Act 28 of 1976, for planning, designing and undertaking capital works for water supply and sewerage services in the urban areas of Punjab state.

State level Institution:

Ludhiana Municipal Corporation (LMC)

Ludhiana city is governed and managed by the LMC. The city Municipal Council was established in the year 1870. Subsequently, Ludhiana became a Class II municipality in 1886 and with population increase and expansion of the city limits, it was upgraded further to a Class I municipality in 1949. The Municipal Corporation came into existence in 1976 under the Punjab Municipal Corporation Act, 1976. The spatial area of the LMC is spread over 159 sq. km., and the city is divided into 4 zones consisting of 75 wards for administrative purposes.

What powers does the municipal government have?

As per the Punjab Municipal Corporation Act, 1976, all the 18 functions mentioned in the 12th Schedule have been devolved to the Urban Local bodies (ULBs). These are:

1. Urban planning including town planning
2. Regulation of land use and construction of buildings
3. Planning for social and economic development
4. Roads and bridges
5. Water supply for domestic, industrial and commercial purposes
6. Public health, sanitation, conservancy and solid waste management
7. Fire services

8. Urban forestry, protection of the environment and promotion of ecological aspects
9. Safeguarding the interests of the weaker sections of the society; including the handicapped and mentally retarded
10. Slum improvement and up-gradation
11. Urban poverty alleviation
12. Provision for urban amenities and facilities such as parks, gardens and play grounds
13. Promotion of cultural, educational, and aesthetic aspects
14. Burials and burial grounds, cremations and crematoriums grounds and electric crematoriums
15. Cattle pounds, prevention of cruelty to animals
16. Vital statistics including registration of births and deaths
17. Public amenities including street lighting parking lots, bus stops and public conveniences
18. Regulation of slaughter houses and tanneries

In Ludhiana, the planning, designing and construction of water supply and sewerage network in the LMC area is undertaken by the PWSSB and only the operation and maintenance of the system is with the LMC. Urban planning is undertaken by GLADA in close consultation with the LMC.

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

LMC Income-Expenditure 2013-14	
Head (major heads)	(in Rs. Million)
Total Income	
1. Revenue Income	7781.6
1.1. Octroi	3535.0
1.2. Building Sanction	560.0
1.3. Tax revenue	6.0
1.4. Property Tax	800.0
2. Capital Revenue	1710.0
3. Other Revenue (Other dept revenue, rents, interest on investment, etc.)	1710.6
Total Expenditure	7643.8
1. Revenue Expenditure	4425.6
2. Loan Repayments	650.0
3. Capital Expenditure	436.5
4. Others	8.7

What role does the state play in city decisions and operations?

LMC has been entrusted with most powers to carry out its functions and the role of the state government is limited. The two key state level agencies, GLADA and PWSSB, play a role limited to their functional areas as described above.

The Punjab Municipal Corporation Act, 1976 which governs the functioning of the Municipal Corporation, has been made by the state government with the power to amend as and when required.

How does the city participate in and leverage state/ national urban development schemes and missions?

LMC is able to leverage grants from the State as well as Central government through Central programmes like the Jawaharlal Nehru National Urban Renewal Mission (JnNURM). The city also receives support from both the Central and State governments for various poverty reduction initiatives.

How active is civil society and non-government organizations in the city?

Based on the discussions with LMC it emerged that there are very few active NGOs in the city dealing with urban infrastructure, urban planning and service delivery issues.

6.2 City Growth Story

6.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	87%
Per capita supply of water	314 LPCD
Extent of metering of water connections	0%
Non-revenue water	51%

The municipal water supply is entirely dependent on groundwater resources. A network of tube-wells extract groundwater for supply, with overhead service reservoirs storing water as required. Municipal water is supplied 3 times a day for a total duration of about 10 hours.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The demand for water is escalating primarily due to increasing number of households as a result of rising population and growth in the industrial and service sector in the city. Ludhiana has a number of water intensive textile industries which consume high volumes of water.

what recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

LMC is implementing a project for 100% coverage of water supply under the JnNURM programme. Due to depletion of groundwater aquifers and falling groundwater table, LMC is looking to tap surface water sources.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Rising water demand and absence of alternate water sources has led to over exploitation of ground aquifers and groundwater table is decreasing at an alarming rate of 1.5-2 meters per year. Moreover, the groundwater available is of poor quality and not potable due to industrial pollution. The unserved areas have no other option but to use the contaminated untreated groundwater to meet their needs. The Budha Nallah, a perennial tributary of the Sutlej River flowing through the city, is critically polluted due to indiscriminate discharge of residential sewage from unserved colonies and industrial wastewater from textile and electroplating units.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Reduced yield of existing tube wells, increase in cost of groundwater extraction due to increasing number of deep tube-wells and higher energy use, health impacts of consuming contaminated groundwater are the key issues emerging in the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The per capita water supply is well in excess of the prescribed limit of 135 lpcd
- The city completely lacks metering, and non-volumetric tariff is levied, leading to low cost recovery and high share of non-revenue water (51%). This also indicates the prominence of illegal connections
- Duration and quantity of water supply varies significantly across the city
- Existing water distribution network is old and runs close to the sewer lines, leading to water contamination from wastewater at times
- Existing public water stand posts in slums are inadequate

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Extending service coverage to the city's unserved population (13%) not having access to municipal water supply at present
- Undertake metering of water connections and levy volumetric tariffs
- The city is exploring alternate surface water sources to reduce groundwater exploitation
- The city is undertaking a bio-remediation project to clean up and rejuvenate the Budha Nallah
- Refurbishment and improved maintenance of water supply infrastructure along with checking of illegal connections to reduce NRW and physical losses

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in Redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

LMC, along with PWSSB, decides on the future requirements for water supply in the city based on the projected increase in population, economic and non-economic activities and prepares project proposals for augmenting infrastructure and service levels. The PWSSB implements all capital works for water supply in Ludhiana while LMC is responsible for Operations and Management (O&M).

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is implementing a project under the JnNURM programme to extend the water supply coverage to 100%. Projects are underway to explore potential surface sources for the city, with the Sidhwan Canal and Sirhind Canal emerging as feasible options from studies conducted in this regard.

6.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	76%
Adequacy of sewage treatment capacity	67%
Extent and reuse of recycling of treated sewage	NA
Storm Water	
Coverage of storm water drainage network:	11%
Incidence if water logging/flooding	NA

The centralized sewerage service coverage extends to 76% of the city's population, with newly developed areas lacking coverage. The installed capacity of STPs is insufficient to treat the household sewage and the substantial industrial effluent generated. A mere 11% of Ludhiana's area is covered by the storm water drainage network.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Rise in population and growing industrial and commercial activities is increasing the demand for the service. Growing number of residential and commercial buildings require sewerage connections to be provided. Industrial effluent is being discharged in the domestic sewer network due to the lack of adequate dedicated effluent treatment facilities which is overloading the system. Due to the highly inadequate drainage system, the rainwater flows into the sewer network, creating additional pressure on the network.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- Projects for extension and augmentation of sewerage network and treatment capacity are under progress under the JnNURM programme and Housing & Urban Development Corporation Limited (HUDCO) scheme. Distribution network has been expanded and 2 STPs have been commissioned at Balloke (105 MLD) and Bhattian (50 MLD). Additional projects for upgradation of STPs at Bhattian, Balloke and Jamalpur are also underway.
- A project for upgradation, expansion and development of the storm water network has been initiated recently.
- A zero liquid discharge technology based common effluent treatment plant (CETP) currently exists in the industrial area in Ludhiana. About 692 small scale electroplating units have been discharging their effluent into this CETP for treatment.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The Budha Nallah is getting critically polluted due to discharge of untreated domestic sewage from nearby slums and the unserved colonies and untreated toxic industrial effluent. The highly insufficient drainage network leads to frequent flooding and water logging in low lying areas even during periods of moderate rainfall.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Alarming environmental degradation of the Budha Nallah is impacting groundwater quality as well as posing a significant threat to the health of the population residing in its vicinity. Absence of drainage network leads to frequent flooding and water logging leading to traffic congestion. Storm water inflow into the sewer network leads to clogging, siltation and overflow of sullage.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The sewerage system in the city is insufficient as only 76% of the city is connected to sewerage network and this also leads to underutilization of the existing STPs.
- A substantial proportion of the unserved population is dependent on soak pits/septic tanks.
- Excessive water supply leading to high sewage generation.
- Inadequate infrastructure for treating industrial effluent and non-feasibility for small industries to treat effluent at existing CETP due to high charges levied. This results in high volumes of untreated industrial effluent being discharged into the Budha Nallah.
- Very few community toilets in existence.
- Absence of drainage network in industrial areas leading to significant water logging and impacting road surface.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city is extending sewerage network coverage to 100% of the city area.
- The city is also undertaking projects to augment storm water drainage infrastructure.
- Undertaking regular cleaning and maintenance of the sewer lines.
- Robust monitoring and strict enforcement to stop untreated discharge of industrial effluent into the Budha Nallah.
- The city is undertaking projects to augment sewage collection, treatment and disposal facilities in the industrial areas.
- Constructing community toilets and maintaining them well to stop open defecation.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The concerned department of LMC in consultation with the PWSSB projects the requirements in the sector and prepares proposals for expanding sewerage network and service levels based on the projected increase in population and area.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city has two projects for augmenting its sewerage system (under JnNURM and HUDCO), with about 80-90% of the work completed under both the projects. Additional projects for upgradation of STPs at Bhattian, Balloke and Jamalpur are also underway. Plans are in place to set up 2 CETPs with a cumulative capacity of nearly 130 MLD for dyeing clusters in the city.

6.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	46%
Efficiency of collection of municipal solid waste	NA
Extent of segregation of municipal solid waste	NA
Extent of scientific disposal of municipal solid waste	0%

Ludhiana generates about 1100 metric tonnes of solid waste per day (MTD), with per capita waste generation of 530 grams. The Public Health Department of the LMC is responsible for the collection, transfer, transportation, treatment and disposal of solid waste generated in the city. The municipal solid waste in Ludhiana is being managed on PPP mode since November 2011, for a concession period of 25 years. Under this arrangement, door to door collection of MSW commenced in September 2012. Waste from industries contributes a substantial 20% to the city's solid waste. The city has two dumpsites located at a distance of around 10 km from the city, with waste disposal done in an unscientific manner at present in the absence of sanitary landfill facilities.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The solid waste generation in the city is increasing as a result of rising population, increasing number of households, and growing industrial and commercial activities. Being an industrial city, industrial activities contribute substantially to the total solid waste generated in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The city has implemented door-to-door waste collection system in 61 out of 75 of its administrative wards, covering about 46 per cent of the population.
- There exist several waste collection points across the city, serving as intermediate transfer points for Municipal Solid Waste (MSW). The solid waste from these designated collection points is transported to the dumping sites at Jamalpur and Jainpur using different types of vehicles such as JCBs, tippers and compactors.
- The city is implementing an integrated solid waste management project under the JnNURM programme.
- Under this project, SWM is managed currently on PPP basis by a private operator. The corporation pays the operator a tipping fee for the services rendered.
- An integrated MSW processing facility is presently being set up at the Jamalpur site by the private operator, comprising of composting plant, refuse derived fuel (RDF) plant and a plastic waste recycling unit. The proposed facility will be designed to process 1,200 TPD of MSW. Engineered sanitary landfill facilities will also be constructed and maintained at the Jamalpur and Jainpur dumpsites.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Indiscriminate dumping of non-hazardous industrial wastes on road sides and open grounds has led to piling up of waste and leachate generation. Inadequate door to door collection and poor waste segregation is leading to environmental degradation along with negative health impacts. Hazardous household waste such as old batteries, mobiles, computers and empty containers of chemicals, pesticides etc. is disposed off at the existing landfill sites, violating prescribed rules for MSW management. Construction and demolition waste is dumped without any processing at unauthorized locations. Waste is also dumped along the drainage network.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Leachate generated due to dumping of waste in an unscientific manner is impacting groundwater and soil quality. As no waste segregation is taking place and there is no neighbourhood level composting, all waste goes to the landfill site and the landfill site is getting filled fast. Storm water drains are getting clogged due to dumping of MSW and construction waste.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Inadequate door to door waste collection practice and absence of waste segregation into dry and wet waste.
- Inadequate infrastructure for collection, storage and transportation of MSW in the city.
- No segregation of electronic waste and hazardous waste.
- Unscientific open dumping practiced at the dumpsites
- Recycling of waste is near absent.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to extend door-to-door collection service to the entire city and introduce waste segregation at source.
- Waste going to landfill needs to reduce substantially by focusing on processing of biodegradable and recyclables.
- Decentralized composting facilities and biogas plants need to be promoted.
- Hazardous and electronic waste should be duly segregated and processed at appropriate facilities.
- Unauthorized open dumping of waste needs to be monitored and checked.
- Waste should be disposed at the landfill sites in a scientific manner.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Household coverage -100%

- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%

How does the city plan for future infrastructure and service delivery in the sector?

The Public Health Department of LMC prepares project proposals for improving and expanding the service and to bridge the gap in service delivery. A plan for integrated solid waste management has been prepared by the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

An integrated solid waste processing project is underway in the city with waste to energy and composting facilities being setup at its dumpsite to process organic and recyclable waste. The city plans to construct and maintain sanitary landfills at the existing dumpsites.

6.2.4 Urban Transport:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The city bus services are operated by the Ludhiana City Bus Services Limited (LCBSL), a special purpose vehicle (SPV) has been set up for this purpose. There is a marked trend of high private vehicle ownership and the number of private motorized two wheelers and four wheelers in the city has risen rapidly, at a growth rate of nearly 10% per annum. Ludhiana has the highest vehicular density in Punjab. The expansion of the road network has not kept pace with the vehicular growth. The formal parking spaces existing in the city are inadequate.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Ludhiana being the commercial and industrial hub of the state has generated additional demand for mobility (passenger as well as freight). Growing population and increasing income levels have led to high demand for private vehicles.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city has acquired 50 city buses under the JnNURM programme, with LCBSL responsible for their operation. However, the city bus system is not operating presently due to financial losses incurred in the service delivery. Efforts to develop the BRTS corridors, as identified in the comprehensive City Mobility Plan, are underway in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Trend of high private vehicle ownership.
- Limited public transport service leading to high growth of Intermediate Para Transit (IPT) resulting in slow movement of vehicles.
- Large number of freight vehicles moving in the city on a daily basis.
- Severe traffic congestion and notable air pollution at all major junctions and roads.
- Inadequate parking facilities leading to haphazard parking on the roads.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Long waiting time at bus stops due to limited connectivity of city bus services.
- Lack of options for comfortable and cheap mobility.
- Poor air quality leading to respiratory and other health impacts.
- High congestion is impacting logistics and commuting time in the city.
- Substantial diesel fuel use in IPT.
- Safety of pedestrians is an issue

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Limited connectivity and low cost recovery of city bus service.
- IPT infrastructure and regulation is highly lacking.
- Capacity constraints of inner city road network.
- Highly inadequate parking and pedestrian facilities.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provide an efficient and effective public transport system to reduce private vehicles.
- Better regulation and improved infrastructure for IPT.
- Promote CNG for public and private vehicles.
- Provide bye-pass road to reduce vehicular traffic in the city.
- Provide adequate parking facilities.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Providing efficient and economic mass transportation system with city wide coverage
- Promoting use of clean fuels in public, private and IPT vehicles
- Providing adequate NMT, pedestrian and intermodal facilities in the city

How does the city plan for future infrastructure and service delivery in the sector?

The LMC and GLADA along with the transport department of the State government share the primary responsibility for urban transport planning, design and management. Ludhiana has developed a City Mobility Plan to bring about long term improvements in the traffic and transport system in the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

- A BRTS is proposed to be implemented across 5 corridors identified in the city.
- The city is constructing a bye-pass road and projects are under progress/being planned for constructing flyovers, subways, under passes in the city.

- Development of parking facilities is being planned across the city and locations for the same have been identified.

6.2.5 Housing and Buildings:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Limited data exists currently on the status of housing and built environment in the city. Nearly one-fourth of Ludhiana's population resides in 209 slums which have mushroomed in the city owing to the scarcity of urban land for residential use and non-availability of industrial housing facilities for the migratory labor. About 2,400 dwelling units have been constructed by the LMC for the urban poor under the Basic Services for the Urban Poor (BSUP) scheme. However, these dwelling units are highly insufficient and cater to less than 5% of the 83,538 slum households in the city.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The main reason for an increase in the demand for housing is the rapid growth in population and the large number of migratory labor coming to the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- An online system for building approval has been implemented and the duration of the approval process has been reduced to 1 month from 2 months.
- LMC is constructing 4,832 units for the urban poor at Giaspura, Mundian Kalan and Dhandari Kalan under the BSUP scheme of the NURM programme. Of these, 2400 units have been completed and 1100 units have been allocated. The dwelling units typically have an area of 25 sq. m.
- GLADA has constructed about 7,500 tenements for the Economically Weaker Sections (EWS) and Low Income Groups (LIG).

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Lack of housing facilities for migratory labour and low income group lead to proliferation of slums in the city at vulnerable locations - along low lying areas, near railway lines and close to the Budha Nullah.
- Most of the slums are unauthorized and lack basic service infrastructure.
- Substantial numbers of unauthorized constructions are there in the city due to scarcity and high value of land.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Mushrooming of slums in vulnerable locations leading to health impacts and environmental degradation.
- Issues in social security and safety.
- Unplanned development in the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Escalating land price is impacting housing costs.
- Highly inadequate affordable housing options in the city.
- Relocating slum households into affordable housing schemes is difficult.
- Infrastructure and services need to match growth in housing.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provide affordable housing units in all housing projects to cater to the growing demand.
- Incentivize builders to construct affordable housing units.
- The city is undertaking a comprehensive survey for identification of slums and assessment of service level requirement and creation of a database with details of slum dwellers with proper identification.
- Provision of night shelters or short term homes for migrant laborers and working women.
- Mapping and monitoring unauthorized construction activity and strict enforcement to prevent the same

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- To ensure housing for all with well functioning infrastructure facilities
- Slum free city
- Restricting all unauthorized construction activity

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector, which constructs residential and commercial buildings based on the demand. LMC along with GLADA makes plans for constructing affordable housing for the urban poor and economically weaker sections. The city has recently started work to prepare a slum free city action plan.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

- The city is constructing 4,832 dwelling units under the BSUP scheme.
- The city is undertaking a detailed survey to identify its slums, assess service infrastructure and create a database of slum dwellers.
- The city is working on preparing a slum free city action plan.

6.2.6 Energy

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The Punjab State Power Corporation Limited (PSPCL) distributes electricity supply within the city. The two electricity distribution circles for Ludhiana city are the East Circle and the West Circle. The city is totally dependent on conventional power sources to meet demand. Oil marketing companies are engaged in distribution of LPG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System.

Energy	
Share of households with electricity as main source of lighting	98.9%
Share of households by main source of cooking energy	
LPG/PNG	77.3%
Fuelwood	3.8%
Kerosene	15.5%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The electricity consumption in the city is increasing annually at a rate of 5%, driven largely by the increasing demand in the commercial and industrial sector.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

No information is available on this aspect.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Power supply is unable to match rising demand leading to frequent power cuts in the city. With the city being completely dependent on grid power supply, this necessitates use of diesel generators in industries and commercial establishments. Rising income levels and changing lifestyles have led to a prevalence of heavy loads in the form of appliances such as air conditioners in households resulting in higher peak energy demand. The industrial units in the city use non modernized technology and thus are energy inefficient. The relatively high share of kerosene fuel for cooking purposes in households can be linked to the large number of poor/slum settlements in the city.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Frequent power cuts are impacting industrial operations and hampering effective functioning of service infrastructure facilities such as water supply, sewage treatment. Use of costlier diesel generator sets for power supply has financial implications on businesses and industries while also resulting in air and noise pollution in the city. Use of kerosene for cooking leads to poor indoor air quality and impacts health.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- LMC does not have any mechanism or technology in place to track energy use in its facilities.
- While Ludhiana is a designated solar city under the Solar Cities Programme and a solar city cell has been established in the administration, the city lacks adequate capacity to promote renewable energy and energy conservation.
- City level data for energy consumption in various sectors is not available.
- The power charges levied on industries are quite high.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to ensure that energy consumption in its facilities and buildings is tracked and monitored regularly to regulate energy use and identify potential opportunities.
- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- Since the city has good availability of solar energy, it should promote renewable energy systems such as solar water heaters and solar photovoltaic systems to reduce both energy demand and dependence on diesel generator sets.
- The city should undertake strict enforcement to ensure conformance for installing solar water heating systems in the new buildings as per the building bye-laws.
- The city needs to regulate energy use in industries and promote technology upgradation and renewable energy to reduce industrial energy use. Being a textile hub, there is a high potential for use of solar water heating systems in the textile units.
- Use of cleaner fuels such as natural gas should be promoted in the industrial and residential sector. A piped natural gas network should be put in place in the city.
- Poor settlements should be dissuaded from using kerosene fuel and cleaner cooking fuels such as LPG and improved cooking stoves should be promoted instead.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Being a designated solar city, the city aims at a minimum 10% reduction in projected demand of conventional energy at the end of five years, through the implementation of a combination of renewable energy and energy efficiency measures.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. However, since Ludhiana is a solar city, a Solar Master Plan is under development for the city, targeting a 10% reduction in conventional energy use over a period of five years. LMC is responsible for managing energy use in municipal service infrastructure for water supply, sewage treatment and street lighting.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The Solar Master Plan is being developed for Ludhiana city.

6.2.7 Economy and Business:

□ Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

Ludhiana's economy is mainly based on manufacturing and allied industry which includes bicycles, hosiery, sewing machines, textiles, metal products and automobile components. Ludhiana is also the hub of India's apparel industry and houses most of the top Indian woolen apparel brands. Commercial and trade activities such as real estate, financial and banking services, commercial establishments, hotels, export also contribute substantially to the city's economy. Ludhiana is also a major producer of agro based products.

How is the economy changing? And what is driving the changes?

The city has a large number of micro and small scale manufacturing industries and is also well renowned for its textile industry. With Ludhiana being a vibrant business center in the state, the commercial and service sector is growing rapidly.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Industrial areas lack adequate provision of infrastructure such as sewerage collection and treatment system and storm water drainage network.
- High pollution of the Budha Nallah due to discharge of industrial effluent from textile and electroplating units which are unable to afford the high charges of effluent treatment at CETP.
- The city has frequent interruptions in power supply leading to high dependence on diesel generator sets
- Instances of indiscriminate disposal of industrial solid waste in low lying areas and along roadsides.
- The industry is facing labor shortages.
- There is a lack of formal housing facilities for the predominantly migratory industrial labor.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Environmental degradation of the Budha Nallah is impacting groundwater quality and posing health challenges in the city.
- Slums and informal settlements have mushroomed across the city due to lack of housing facilities for the labor.
- Pollution due to industries located in residential areas leads to health issues for the residents.
- Absence of a drainage network leads to frequent water logging in the industrial areas leading to issues in logistics and impacting condition of road surfaces.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Information on this aspect is not available.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Provision and upgradation of infrastructure such sewerage collection and drainage network, roads, dedicated power lines for reliable power supply needs to be provided in the industrial areas.
- The city is constructing additional CETPs to cater to the textile industries and prevent effluent discharge into the Budha Nallah.
- Robust monitoring and enforcement mechanisms need to be put in place to ensure untreated industrial effluent is not discharged by industries.
- Industries existing in the residential areas and along the Budha Nallah need to be shifted to well-planned designated locations.
- Adequate affordable housing facilities with requisite basic infrastructure need to be developed to cater to the migratory labor.
- Micro and small scale units need modernization and technology upgradation and incentive schemes need to be put in place to promote green technologies.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Ludhiana is Punjab's prominent business center with a diverse industrial base and contributes significantly to the exports from the state. The city is also a part of the Eastern Industrial Corridor, connecting several cities from Punjab to West Bengal. This is expected to further aid industrial growth through faster transportation of goods and freight. An integrated industrial park project is being planned between Sahnewal Airport and Chandigarh Road and will boost economic growth⁵. The region is also an important centre for trade and is witnessing high growth in retail and real estate sector.

6.2.8 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

The city has very limited information existing on its natural ecosystem and biodiversity. The city has 833 parks and 680,000 saplings have been planted by the LMC.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Ludhiana is an industrial city and is witnessing population growth, higher density and increased building development activity. The city needs to have ample open spaces, parks and green cover for its citizens.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Park management committees have been formed, comprising of residents living nearby the parks, to undertake maintenance of around 490 parks in the city.

⁵Progressive Punjab Summit: City Profile - Ludhiana

What negative impacts (environmental or social/people) are evident from activities in this sector? And water are the expected trends for these impacts?

Growing population, higher density, escalating land prices and growth in real estate sector are putting pressure on natural resources and leading to diminishing green cover and open spaces in the city. The industrial activities are causing alarming environmental degradation in the city.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Environmental degradation and dearth of green cover will impact the ecosystem of the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Information on the status of natural environment and biodiversity in the city is lacking. The LMC does not have a dedicated department or resources allocated for natural ecosystem and biodiversity.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to document data on natural environment and biodiversity.
- Dedicated cell needs to be setup and resources need to be allocated for natural environment and biodiversity in the city.
- Awareness generation needs to be undertaken for restoring biodiversity and green cover
- The major parks in the city need to be upgraded.
- The city is undertaking a bio-remediation project to clean up and restore the Budha Nallah.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is undertaking a bio-remediation project to clean up and restore the Budha Nallah.

6.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI must first engage with the Ludhiana Municipal Corporation to discuss green strategies.
- It should also meet with the Punjab State Pollution Control Board to discuss the possibilities of training/handholding for dealing with industrial effluent of small scale industries.
- Engaging with the industry group at the city level will be useful for discussing public-private partnerships for cleaning Budha Nallah, technology upgradation and RE promotion in industries, and providing basic infrastructure and services in the city.

Annexure 7

Nadiad

Volume 2



Annexure 7: Nadiad

7.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level Institutions:

Town Planning and Valuation Department

Town Planning and Valuation Department under the Urban Development and Urban Housing Department of Government of Gujarat headed by Chief Town Planner.

Major Functions:

- Town Planning
- Valuation

Other functions of department

- Preparation of draft development plan
- Preparation of draft Town Planning Scheme (TPS) & finalisation
- Evaluation of Government lands
- Assessment of Government buildings in municipality limit
- UDP-1 Scheme for the implementation of Development plan (DP) and TP scheme
- Integrated Development of Small and Medium Towns of the state, the centrally sponsored scheme (IDSMT)
- Constitutional and procedural Guidance in Urban Development Authority(UDA) planning committee
- Research and development for planning

Gujarat Urban Development Company

Major Functions:

- Identify the investment requirement, phasing and viability of new development areas, through facility studies.
- Assist ULBs and UDAs in identification, preparation, structuring and execution of projects in local infrastructure with/without the assistance of the private sector. Projects in sectors such as roads, storm water drains, water supply and sanitation, solid waste management, street lighting, and slum upgradation would be given emphasis.
- Coordinate with various state level agencies for provision of trunk infrastructure.
- Provide advisory support to Urban Local Bodies (ULBs) in various aspects of capacity building, especially up gradation of management systems. Support would be provided for institutional development in accounting, computerization, training and equipment needs, and reforms of state level agencies including pool-financing mechanism for municipal borrowing in the capital markets.
- Provide a Project Development Facility.

Gujarat Water Supply and Sewerage Board (GWSSB)

GWSSB is a statutory body set up by the State Government for Development, Regulation and Control of the Drinking water sector in the State. The main function of the Board is

to prepare, execute, promote and finance the schemes for supply of water for drinking purposes.

Functions:

The main duties and functions of the Board as identified by the GWSSB Act No.18 of 1979 are as under:

- To prepare, execute, promote and finance the schemes for supply of water and for sewerage and sewage disposal
- To prepare draft State Plans for water supply, sewerage and drainage on the directions of the State Government
- To review and advise on the tariff, taxes fees, and charges of water supply and sewerage systems, in the areas comprised within the sphere of operation of the water supply and sewerage services of the Board and in the areas of the local bodies which have entered into an agreement with the Board

City Level Institution:

Nadiad Nagar Palika (NNP)

Nadiad Nagar Palika is responsible for the maintenance of water supply and sewerage and for the maintenance of public health in the city. Being monitored by Gujarat municipalities act, 1963, the obligatory and discretionary function comes under the as follows:

- Establishing maintaining primary school
- Altering & maintain public street, culverts, sewerage works
- Public works
- Water supply, Public health, sanitation, conservancy and solid waste
- Urban forestry, protection of the environment and promotion of ecological aspects
- Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded
- Sphere of town planning
- Establishing & maintaining public hospital, dispensaries and family planning centres
- Provision of urban amenities and facilities such as parks, gardens, playgrounds
- Promotion of cultural, educational and aesthetic aspect
- Burials and burial grounds; cremations, cremation grounds and electric crematoriums
- Cattle ponds; prevention of cruelty to animals
- Vital statistics, including registration of births and deaths
- Public amenities, including street lighting, parking lots, bus stops and public conveniences
- Regulation of slaughterhouses and tanneries
- Fire services

What powers does the municipal government have?

The Nadiad Nagar Palika carries out all the obligatory functions and discretionary functions entrusted by the Gujarat Municipal Act, 1963.

Obligatory Functions

- Establishing maintaining primary school
- Altering & maintain public street, culverts, sewerage works
- Public works
- Water supply, Public health, sanitation, conservancy and solid waste
- Urban forestry, protection of the environment and promotion of ecological aspects
- Safeguarding the interests of weaker sections of society, including the handicapped and mentally retarded
- Sphere of town planning
- Establishing & maintaining public hospital, dispensaries and family planning centres

Discretionary functions

- Provision of urban amenities and facilities such as parks, gardens, playgrounds
- Promotion of cultural, educational and aesthetic aspect
- Burials and burial grounds; cremations, cremation grounds and electric crematoriums
- Cattle ponds; prevention of cruelty to animals
- Vital statistics, including registration of births and deaths
- Public amenities, including street lighting, parking lots, bus stops and public conveniences
- Regulation of slaughterhouses and tanneries
- Fire services

What does the financial picture of the municipal government look like? (sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Nadiad Nagar Palika Income -Expenditure 2009-10	
Head (major heads)	(in Lakhs)
Opening Balance	65.94
Revenue Income	2635.73
Revenue Expenses	2235.91
Revenue Surplus	399.82
Capital Income	951.36
Capital Expenditure	895.13
Capital Surplus	56.23
Closing Balance	72.27

What role does the state play in city decisions and operations?

Gujarat Municipal Act, 1963 which governs the functioning of the Municipal councils, has been enacted by state government and it has the power to amend as and when required. Nadiad Nagar Palika is highly dependent on the state government grants and therefore, the state government influences the decision making on important matters of NNP. Also, since water supply, sewerage, transport, etc. are implemented by the state institutions, they have a role in the provision of services in the city.

How does the city participate in and leverage state/ national urban development schemes and missions?

The city, like other cities can apply for funding under schemes/programmes of the state government.

How active is civil society and non-government organizations in the city?

Based on discussion with local government it came out that there are no active NGO in the city dealing with urban infrastructure, urban planning and service delivery.

7.2 City Growth Story

7.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	76%
Per capita supply of water	87 LPCD
Extent of metering of water connections	N/A
Non-revenue water	N/A

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population is increasing the demand for water in Nadiad.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Nadiad had submitted a DPR for water supply distribution system in the city, which is approved by GUDM and implementation is in progress by GWSSB. The project aims to provide 135 lpcd water to its citizen.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Information on this aspect is not available.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The unaccounted for water in the city is very high due to leakage from old, damaged, corroded pipelines/connections, leaking.
- Limited hours of supply. This can be increased only when the distribution system is rehabilitated.
- High dependency on ground water.
- Present water supply of 100 lpcd is far below the prescribed norm of 135 lpcd by Central Public Health Engineering and Environment Organization (CPHEEO).
- Many areas in the city have pressure problems cause due to natural terrain and inefficient pumping capacity.
- Distribution network in old city area is old and needs refurbishment.
- The present storage capacity seems adequate (over 62 percent of water supplied, norm is 33 percent of water supplied), however, the capacity declines to 45 percent if supply level rises to 135 lpcd, indicating need for augmenting storage capacity.

- Tube well water supplied to the city contains TDS of 1800 ppm which is above the prescribed norms. Presently there is no treatment plant; only primary treatment in terms of chlorination is given for disinfection which is not sufficient considering the high TDS in water.
- Discussion with NMC officials reveal that the high TDS content and chlorides have resulted in scaling of distribution network, thereby increasing the cost of pumping.
- Metering of water connections completely absent; in-equity in charging for service provided.
- Collection efficiency of water charges is only 45 percent, which is affecting the resources available for O&M of water sector.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to implement the water supply project sanctioned by GUDC.
- Rainwater harvesting should be made compulsory for all building projects. Water harvesting from natural drains shall be implemented as a permanent measure.
- A GIS based management information system can be developed providing detailed information on every pipeline section and pumping machinery with attributes on age, material, etc. The above initiative will provide NMC with adequate asset management and strengthening information.
- Improving the quality and quantity of water supplied at consumer-end through improvements to water treatment facilities and real time monitoring of distribution system for technical losses, water theft and indiscriminate usage of water at public stand posts.
- Reducing the O&M costs of water supply system through energy conservation and monitoring distribution network.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Full coverage of city with water supply connections
- Per capita supply of water @ 135 lpcd
- Extent of non-revenue Water 15%
- Extent of metering 100%
- Continuous water supply (24 Hours)
- Efficiency in Redressal of customer complaints 80%
- Quality of Water Supplied 100%
- Cost Recovery 100%
- Efficiency in Collection of Water Charges 90%

How does the city plan for future infrastructure and service delivery in the sector?

The GWSSB projects the demand for water as per the changing population and plan projects accordingly to cater the increasing demand in the sector.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city is implementing the water supply project with financial assistance under Gujarat Urban Development Mission (GUDM).

7.2.2 Sewerage and Sanitation:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	46%
Adequacy of sewage treatment capacity	NA
Extent and reuse of recycling of treated sewage	0%
Storm Water	
Coverage of storm water drainage network:	9%
Incidence if water logging/flooding	2

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the population of Nadiad, the need for sewerage network is also increasing. At present, the newly developed areas lack coverage by sewerage network as the authority is able to cater to only 46 % of the area.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The city has sewerage treatment plant (STP) with 32 MLD capacity (aerated lagoon). This is not functional because the sewerage network leading to STP is not complete and also lot of repair works are needed to be done at the STP.
- The city is implementing sewerage project to improve coverage with assistance under GUDM.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The water bodies in the city are getting polluted due discharge of untreated sewage into them.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of water quality in the water bodies.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

The GWSSB continues to do the capital works and hands them over to Nadiad Nagar Palika for operation and maintenance. This service has not yet been fully transferred to the urban local body yet. Therefore, the technical capacity of NNP continues to be limited. Finding manpower was also cited as a problem by the officials.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Development of “Integrated Sewage Disposal Project” for Nadiad.
- Upgradation and expansion of sewerage network and providing linkages to STPs.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in Redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The city depends on state level bodies for implementing capital works and until this is transferred to NNP, all future infrastructure in this sector will be done by GWSSB.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The City is implementing the sewerage project with help of GWSSB under the financial assistance under GUDM.

7.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	80
Efficiency of collection of municipal solid waste	81
Extent of segregation of municipal solid waste	N/A
Extent of scientific disposal of municipal solid waste	0%

The Solid Waste Department of Nadiad Municipality is responsible for the solid waste management (SWM) which was constituted under SWM2000. Strategies for solid waste management revolve around optimum use of manpower and making the collection, transportation and disposal effective round the clock.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The solid waste generation in the city is increasing as a result of rising population, increasing number of households, and growing commercial activities. Being a Trade city, commercial activities contribute substantially to the total solid waste generated in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is implementing Door to Door collection system.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

City is improving solid waste management and not many negative impacts are reported.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Inadequate facilities of door to door collection (8%), segregation, recycling/composting and disposal of waste and absence of collection bins at many places. Households, commercials establishment dispose waste on road which creates nuisance points in Nadiad city.
- Less willingness to pay towards door-to-door collection of waste is observed which makes more complicated to maintain the service.
- Daily sweeping on roads & public spaces is observed only in half of the areas.
- Compliance to MSW Rules 2000 is minimal.
- Absence of collection bins at many places results in waste on the roads and dust-bins are located at an average distance of about 2 km.
- No central waste segregation and separate treatment facility for disposal of waste.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to introduce waste segregation at source.
- Encourage decentralized composting.
- Engage rag pickers/NGOs for waste recycling.
- Extend the waste collection service to the entire city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%
- Extent resource recovery - 80%
- Extent of scientific disposal of MSW - 100%

- Extent of cost recovery - 100%
- Efficiency in collection of SWM charges- at least 90%
- Efficiency in redressal of customer complaints – at least 80%

How does the city plan for future infrastructure and service delivery in the sector?

Nadiad Nagar Palika prepares project proposals for improving and expanding the service and to bridge the gap in service delivery.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

7.2.4 Urban Transport:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

- Nadiad has partial public transport system in the city. The buses are operated with the help of private operators. There is a large number of private two wheelers and four wheelers in the city. The rate of growth in the number of vehicles is high.
- The expansion of city limits has resulted in increased travel and trip length which requires better public transport. In absence of integrated mobility plan people prefer to use private vehicles.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Due to growth of the city and increase in the number of commercial activities the number of registered vehicles in the last decade has increased. Traffic volume studies indicate that most of the roads are servicing more than their capacity

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The Bus service has been recently started with the help of a private operator.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

No documentation is available on the negative impact of the sector on environment. City visit by the project team indicates that the number of vehicles in the city is increasing which is a major cause of air pollution and congestion in the city.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deteriorating air quality due to pollution as a result of increase in number of vehicles

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Multiple organizations involved in development and management of traffic & transportation facilities.

- Growth in traffic, congestion and inadequate transportation infrastructure.
- Lack of adequate and safe pedestrian facilities on roads ,pedestrian safety.
- Poor quality of public transport service.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Promote CNG for public and private vehicles.
- Reduce the number of private vehicles on road by improving public transport.
- Improving mobility within city through the following:
- Public transport system
- Pedestrian and Non-motorized transport facilities
- Street lighting

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Modal split of 70 % towards public transport.
- CNG promotion.
- Reduced private vehicles.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city has started public transport system with help of private operator.

7.2.5 Housing and Buildings:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

There is increasing need and demand of land for housing in city due to migration of both unskilled and skilled workforce. Currently more than 10 % of the population is living in slums.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

- The main reason for increase in demand for housing is the growth in population, economic and other activities.
- To prevent further slums coming up in the city, the poor need to be provided affordable dwelling units.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is conducting surveys related to slums and housing shortage in the city to plan the affordable housing units

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Housing for the urban poor and lower income groups is insufficient leading to creation of unauthorized settlements and slums.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Slum formation
- Social security issues
- Unplanned development in the city

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- With increasing population in the city the demand for built up area is increasing and so is the energy requirement.
- Providing affordable housing to poorer sections of society.
- Increasing land prices had made housing expensive.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provision of housing for economic weaker section (EWS) and low income group (LIG) in all housing projects.
- Comprehensive survey for identification of slums and assessment of service level requirement.
- Creation of database with details of slum dwellers with proper identification.
- Relocation, resettlement and rehabilitation of slums in untenable areas by providing housing at affordable cost.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum percentage: 0
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector. They assess the growth rate of the city and construct buildings accordingly.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The city has started detailed survey to identify the number of slums and housing shortage in the city.

7.2.6 Energy

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The Madhya Gujarat Vij Company Limited distributes electricity within the city. The city is totally dependent on conventional power sources to meet demand. Oil marketing companies(HPCL, BPCL and IOC) are engaged in distribution of LPG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System.

Energy	
Share of households with electricity as main source of lighting	96.1%
Share of households by main source of cooking energy	
LPG/PNG	91.7%
Fuelwood	1.5%
Kerosene	4.8%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Information on this aspect not available

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Information on this aspect not available

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Use of kerosene for cooking leads to poor indoor air quality and impacts health.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- NNP does not have any mechanism or technology in place to track energy use in its facilities.
- City level data for energy consumption in various sectors is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to ensure that energy consumption in its facilities and buildings is tracked and monitored regularly to regulate energy use and identify potential opportunities.
- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- The city needs to regulate energy use in industries and promote technology up gradation and renewable energy to reduce industrial energy use.
- Use of cleaner fuels such as natural gas should be promoted in the industrial and residential sector. A piped natural gas network should be put in place in the city.
- Since Nadiad has good availability of sunshine, Solar energy needs to be promoted.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

7.2.7 Economy and Business:

Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

The economy of the city is based on:

- Trade and commerce
- Administrative activities

How is the economy changing? And what is driving the changes?

Due to increase in population and improved connectivity there is increase in trade. Also commercial activities have been accelerating.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Trade related activities are generating additional traffic, congestion and pollution.
- Unauthorized commercial constructions are adding to problems.
- Increase in water requirement due to increase in floating population as a result of increasing trade.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Better infrastructure provision to cater the increasing trade activities.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

7.2.8 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

The city has around nine lakes, as per discussion with officials most of these lakes have been reclaimed. The lakes are subjected to deposition of solid waste and siltation. Over the years, very less focus has been given on recharging of these lakes and making it an important public space at city level.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Due to growth in population there is increasing stress over the urban environment in the city. Increasing population means more open space, parks and water bodies are required in the cities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is actively planning to improve water bodies in the city and develop them as public spaces.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Population of Nadiad is increasing rapidly leading to heavy resource consumption and hence depletion of natural resources.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Creating a database at city level for ecosystem.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Interface between heritage, trade and environment needs to be recognized and plans/strategies have to be formulated and implemented accordingly.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

7.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI can start by having discussions with the state level government bodies such as GIDC which take decisions for the industrial activities.
- Hold discussion with the urban local government (Nadiad Nagar Palika) about the problems in the city and how the green growth options can be implemented. Capacity building needs can be assessed during these discussions for implementing the green growth options.
- Engaging with all stakeholders (government, local body, private sector, citizen groups) by holding workshops to understand various sectors and the possible partnership options.

Annexure 8

Pimpri Chinchwad

Volume 2



Annexure 8: Pimpri Chinchwad

8.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level Institutions:

Maharashtra Industrial Development Corporation (MIDC)

Established in 1961, under Maharashtra Industrial Development Act 1961 as the premier industrial infrastructure development agency of Government of Maharashtra, MIDC provides industries with infrastructure like land (open plot or built-up spaces), roads, water supply, drainage, street lights etc.

Functions

- Set up industrial areas for planned and systematic industrial development.
- To function as a special planning authority in development of industrial areas.

Pimpri Chinchwad New Town Development Authority (PCNTDA)

PCNTDA is one of the development authorities of the Pune Metropolitan Region (PMR) that is responsible for development of peri-urban areas towards the north of PMR. The Pune Metropolitan Region, comprising of Pune and Pimpri Chinchwad, is one of the fastest growing urban agglomerations in India.

The PCNTDA was established in the year 1972 and was mandated with creating Pimpri Chinchwad New Town with well thought out goals and objectives.

State level Institution:

Pimpri Chinchwad Municipal Corporation (PCMC)

Pimpri Chinchwad council was formed in 1970, covering area of about 87 km² which later on was established as Municipal Corporation in 1982, which now covers an area of about 177 square kilometers. As per 2011 census population of Pimpri Chinchwad was 17,29,000 growing at a rate of 6% annually (national average being 2.1%).

What powers does the municipal government have?

As per the Bombay Provincial Municipal Corporation Act, 1949, all the 18 functions mentioned in the 12th Schedule have been devolved to the ULBs (many of them were already being performed by PCMC). These are:

19. Urban planning including town planning
20. Regulation of land use and construction of buildings
21. Planning for social and economic development
22. Roads and bridges
23. Water supply for domestic, industrial and commercial purposes
24. Public health, sanitation, conservancy and solid waste management
25. Fire services
26. Urban forestry, protection of the environment and promotion of ecological aspects

27. Safeguarding the interests of the weaker sections of the society; including the handicapped and mentally retarded
 28. Slum improvement and up-gradation
 29. Urban poverty alleviation
 30. Provision for urban amenities and facilities such as parks, gardens and play grounds
 31. Promotion of cultural, educational, and aesthetic aspects
 32. Burials and burial grounds, cremations and crematoriums grounds and electric crematoriums
 33. Cattle pounds, prevention of cruelty to animals
 34. Vital statistics including registration of births and deaths
 35. Public amenities including street lighting parking lots, bus stops and public conveniences
 36. Regulation of slaughter houses and tanneries

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

PCMC Income-Expenditure 2013-14	
Head (major heads)	(in Rs. Million)
Total Income	32481.4
1. Revenue Income	18550.2
1.1. Octroi	12003.0
1.2. Building Sanction	2509.1
1.3. Tax revenue	2500.0
1.4. Water Tax	585.2
1.5. Grants	171.5
1.6. Other minor heads	781.4
2. Capital Revenue	711.0
3. Other Revenue (Other dept revenue, rents, interest on investment, etc.)	1444.6
3. Others (Including closing balance of last year)	11775.6
Total Expenditure	32481.4
1. Revenue Expenditure	9162.6
2. Loan Repayments	10.0
3. Capital Expenditure	20165.8
4. Others	3143.0

What role does the state play in city decisions and operations?

PCMC has been entrusted with most powers to carry out its functions and the role of the state government is limited. There are two state level agencies, MIDC and PCNTDA, which play a role, but their role is limited to the area of their operations i.e. industrial areas and new developments in the peri-urban areas respectively.

The Bombay Provincial Municipal Corporation Act, 1949 which governs the functioning of the

Municipal Corporation has been made by the state government with the power to amend as and when required.

How does the city participate in and leverage state/ national urban development schemes and missions?

PCMC is able to leverage grants from state as well as state government through Central programmes like the JnNURM. The city also receives support from both governments for various poverty reduction initiatives.

How active is civil society and non-government organizations in the city?

Based on the discussions with PCMC and PCNTDA it emerged that there are very few active NGOs in the city dealing with urban infrastructure, urban planning and service delivery issues.

8.2 City Growth Story

8.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	85.4%
Per capita supply of water	146.6 LPCD
Extent of metering of water connections	81.5%
Non-revenue water	40.6%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The demand for water in the city is increasing due to the growth in population and growth in service sector, and other economic, academic and commercial activities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

PCMC is implementing various projects under Jawaharlal Nehru National Urban Renewal Mission (JnNURM). A project has been undertaken to implement a 24x7 water supply in a part of the city. The project also includes water audit and reduction in non-revenue water. As a part of this, the city has undertaken water leakage detection using helium technology, the first city to do so in India. The city has also implemented an SLB Connect⁶ initiative, supported by the Water and Sanitation Program of the World Bank. SLB Connect was launched as a pilot initiative in PCMC in 2012. PCMC has shown interest in taking this initiative forward and integrate it with its planning and operational processes.

⁶The SLB Connect (Service Level Benchmarking) is an initiative to strengthen citizen engagement in provision of water and sanitation services to help improve service outcomes. SLB Connect allows for analysis by area, including the city's poorest neighborhoods (WSP, South Asia).

**what negative impacts (environmental or social/people) are evident from activities in this sector?
And what are the expected trends for these impacts?**

The rivers in the city are getting polluted due to discharge of untreated sewage and industrial wastewater into the river; and activities like cattle bathing, washing clothes etc. in the river.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of water quality in the source (river), reduction in the availability of water, and increase in the cost of treatment.

what are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Due to illegal connections, theft and maintenance problems, the non-revenue water (NRW) is nearly 41%, of which physical leakages are 20%.
- The average duration of water supply is 6 hours.
- Under the policy to provide equitable water supply, connections to public stand posts and government institutions are not charged and these are accounted for under NRW.
- Ground water is not suitable for potable purposes.
- Lack of consumer awareness is an issue.
- Tariff needs to be raised to reduce the gap between the cost of supplying water and tariff. The cost of supplying water is INR 7.5/kl and the average tariff for domestic consumers is INR 2.5/kl.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Improve river quality-the city is taking steps to rejuvenate the rivers to restore water quality.
- PCMC needs to increase water tariff and create political will for this.
- Reduce NRW by checking on illegal connections
- Improve maintenance of water supply infrastructure

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply
- Efficiency in redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

The water supply and drainage department of PCMC prepares project proposals for augmenting infrastructure and service levels based on the projected increase in population, economic and non-economic activities.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

PCMC is implementing projects in the water sector under JnNURM for improving storage and treatment capacity, laying distribution network in new areas and putting up SCADA.

The city also has a project to cover at least 40% of the area by 24x7 water supply. This project will reduce physical loss of water by detecting leakages and replacing pipes. The project includes automatic meter readers and hydraulic modeling.

8.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	82.7%
Adequacy of sewage treatment capacity	118.5%
Extent and reuse of recycling of treated sewage	2.4%
Storm Water	
Coverage of storm water drainage network:	12.4%
Incidence of water logging/flooding	16

The newly developed areas lack service coverage as the authorities are able to cater to only 83% of the area forming the core of the city.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population, economic and commercial activities is increasing the demand for the service. The city is witnessing a growth in the construction of residential and commercial buildings which is creating additional demand for the service.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- Projects for expanding the sewerage network in the city and augmenting the capacity for treatment of sewage has been implemented in the city.
- An Improved Sequential Batch Reactor (ISBR) technology has been operationalised at Akurdi STP (30 MLD). This has enabled PCMC to generate biogas and hydro-electricity. The plant has generated 1,36,524 kW biogas and 15, 955 kW of hydro-electricity between July 2012 to June 2013. This energy has been used internally to run the sewage treatment plant and thereby helped the Pimpri Chinchwad Municipal Corporation to reduce the electricity demand from MSEDCCL by 50% during the above mentioned period.

What negative impacts (environmental or social/people) are evident from activities in this sector? And water are the expected trends for these impacts?

Apart from pollution of rivers due to discharge of untreated sewage and industrial waste, the areas not covered by sewerage system also discharge wastewater into open drains. Open defecation is a problem in slums and settlements of poor.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Water quality is impacted and there is potential threat to health of the residents.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The sewerage system in the city is insufficient as only 83% of the city is sewered.
- Open defecation is a problem in some areas (slums).
- Sewage pumping stations have electricity problems – interrupted supply and voltage fluctuations.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Expand sewerage network.
- Build community toilets and maintain them well to stop open defecation.
- Ensure uninterrupted electricity supply to STPs.
- Generate electricity from wastewater.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The concerned department of PCMC projects the requirements in the sector and prepares proposals for expanding sewerage network and service levels based on the projected increase in population and area. A City Sanitation Plan has also been prepared for the PCMC area.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

The city has two schemes for sewerage system under JnNURM, as condition of sewerage in the city needs improvement. About 75% of the work under both the schemes has been completed. The projects meet the present and future needs of the city and enhance service levels. The projects are being funded by the central and state governments.

8.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	98.3%
Efficiency of collection of municipal solid waste	94.6%
Extent of segregation of municipal solid waste	11.7%
Extent of scientific disposal of municipal solid waste	100%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the city's population, area, economic and other activities the waste generated in the city is increasing.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The city has implemented door-to-door waste collection system covering 75 per cent of the population. There are mechanical sweepers and compactors for waste management. The city has a landfill site and a waste processing unit (in Moshi), where combustible material and refuse derived fuel (RDF) is manufactured. A waste to energy plant is planned.
- PCMC has given SWM on Public Private Partnership (PPP) basis to a private operator. The Corporation pays the operator a tipping fee for the services rendered.
- PCMC collects user charges for solid waste management ranging from Rs. 20 per household to Rs 50 per household.

In 2011-12 it was able to collect Rs. 16 lakhs as user charges for SWM.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

PCMC has improved solid waste management in the city and not many negative impacts are reported.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Issues:

- Waste segregation into dry and wet waste.
- Recycling waste.
- Collecting 100% of the waste generated in the city.
- Covering all households by the service.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to introduce waste segregation at source.
- Encourage decentralized composting.
- Engage rag pickers/NGOs for waste recycling.
- Extend the waste collection service to the entire city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Household coverage -100%
- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%

How does the city plan for future infrastructure and service delivery in the sector?

The Public Health Department of LMC prepares project proposals for improving and expanding the service and to bridge the gap in service delivery. A plan for integrated solid waste management has been prepared by the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

8.2.4 Urban Transport:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Pimpri Chinchwad has a city bus service which is operated by Pune Mahanagar Parivahan Mahamandal Limited (PMPML). There are a large number of private motorized two wheelers and four wheelers in the city. The rate of growth in the number of vehicles is 10 % annually. The expansion of city limits has resulted in increased travel and trip length which requires better public transport but due to absence of integrated mobility plan people prefer to use private vehicles.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The increase in the number of vehicles is because of growth in population, commercial and economic activities has generated additional demand for mobility.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The city is planning a Bus Rapid Transit System (BRTS) for the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- The quality of public transport needs to improve.
- Congestion during peak hours.
- Intermediate public modes of transport need to be regulated.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Due to poor quality of bus service people have to wait for long at bus stops.
- Bus service needs to expand area of operation and cover newly developed areas.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Increase in the number of vehicles in the city
- Pedestrian safety
- Poor quality of public transport service.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Promote CNG for public and private vehicles.
- Reduce the number of private vehicles on road by improving public transport.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Modal split of 70 % towards public transport.
- CNG promotion.
- Reduced private vehicles.

How does the city plan for future infrastructure and service delivery in the sector?

- Pimpri Chinchwad has a Mobility Plan.
- It has planned the BRT in the city.

8.2.5 Housing and Buildings:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

- Pimpri Chinchwad is a city with high population growth due to which the city has seen heavy construction activity. PCMC is now using Auto DCR (Development Control Regulation) software to give building permission. This has reduced the time for getting permissions. PCMC is the first city government to implement the GRIHA green rating system for buildings.
- Currently, Pimpri Chinchwad has 74 slums and almost 10 % of the population lives in slums and therefore there is a need to build large number of affordable housing units to achieve slum free city vision.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

- The main reason for an increase in demand for housing is the rapid growth in population, economic and other activities.
- To prevent further slums coming up in the city, the poor and the migrants to the city need to be provided affordable dwelling units.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- 10 projects have been sanctioned and are in progress under the Basic Services for Urban Poor component of JnNURM to develop 25,088 dwelling units. Of these 13,152 units have been completed. The dwelling units typically have 25 sq. m. area.
- For Economically Weaker Sections (EWS), 6,722 tenements have been planned, of which 4,000 are ready and 1,000 have been handed over to the beneficiaries. Each EWS unit has 37 sq. m. carpet area.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Housing for the urban poor and lower income groups is insufficient – leading to creation of unauthorized settlements and slums.
- The price of housing is very high making it difficult for lower income groups to buy property.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Slum formation.
- Social security issues.
- Unplanned development in the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- With increasing population in the city the demand for built up area is increasing and therefore energy requirement.
- Providing affordable housing to poorer sections of society.
- Increasing land prices – making housing expensive
- Infrastructure and services need to match growth in housing.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Government housing agency to build houses for the poor.
- Incentivize builders to construct affordable housing units.
- Make available more land for housing to manage rising cost of land.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum percentage: 0
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

The building sector is largely driven by the private sector. There are a large number of builders in the residential and commercial sector. These builders assess the growth rate of the city and construct buildings accordingly.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

The initiatives taken by the in the city include:

- Tax rebates for solar water heater.
- Financial incentives for green buildings - PCMC gives incentives to builders and home owners for adopting GRIHA green rating scheme; a green initiative for promoting energy efficiency in buildings.
- Rajiv Awas Yojana – a scheme for housing the poor promoted by the Central Government.

8.2.6 Energy

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The Maharashtra State Electricity Distribution Co. Ltd. (MSEDCL), distributes electricity within the city. The two electricity distribution divisions for the city are Bhosari and Pimpri divisions. Oil marketing companies (BPCL, HPCL, IOCL) are engaged in distribution of LPG, CNG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System. A gas distribution pipeline network operated by Maharashtra Natural Gas Ltd. (MNGL) supplies piped natural gas (PNG) to some parts of the city 2010-11.

Energy	
Share of households with electricity as main source of lighting	98%
Share of households by main source of cooking energy	
LPG/PNG	81.8%
Fuelwood	7.4%
Kerosene	7.8%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The electricity consumption in the city is increasing annually by over 8% largely driven by the rising population, commercial and industrial sector. Residential fuel consumption (LPG, PNG) is also growing rapidly.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

No information is available on this aspect.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The city has high dependence on grid power supply and energy demand is seen to be rising rapidly in all the key sectors (industrial, commercial, residential, municipal services). With the city's growth, demand for urban services is also growing rapidly, leading to rising energy demand for operating the service infrastructure such as water supply, sewage treatment plants and street lighting. While industries in the city are supplied with reliable power supply, industrial power charges are rising. While power supply in the city is quite reliable at present, rapidly rising demand can lead to rising gap between demand and supply resulting in increased power cuts in the future.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Increased power cuts in the future can hamper industrial operations and cause interruptions in municipal service delivery. Rising cost of power poses financial challenges for the industry and impacts business productivity and can deter business investment in the region.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- The existing central energy monitoring system of PCMC does not cover all of its service facilities and buildings.
- The city has undertaken some measures such as energy efficient equipment retrofits and SWHs in some of its hospitals, pilot LED retrofits in street lighting and energy generation for captive purposes at the STP located at Akurdi. However, the energy savings accrued from these measures have not been measured and documented.
- PCMC has dedicated staff for energy conservation activities, but it lacks adequate capacity to implement city-wide energy conservation activities and programmes.
- The power charges levied on industries are quite high.
- City level data for energy consumption in various sectors is not available.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- PCMC should ensure that its existing central energy monitoring system is upgraded to cover all its service facilities and buildings. PCMC should also ensure that energy savings and benefits realized from its energy conservation initiatives are documented and publicized.
- A city-wide energy plan needs to be developed and an Energy Cell with dedicated technical staff should be established. Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- Energy audits should be promoted to record and reduce energy use in the industrial sector. Incentive based programmes should be promoted to regulate energy use in industries.
- Coverage of piped natural gas network should be extended to cover a larger portion of the city area to ensure supply of cleaner fuel to industrial, commercial and residential sector.
- Awareness generation and promotional activities need to be undertaken to promote energy conservation in the city's growing community.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. PCMC is responsible for managing energy use in its service infrastructure for water supply, sewage treatment and street lighting.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

8.2.7 Economy and Business:

Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

Primary Economy:

- Home to major national and multinational automobile companies
- Auto and auto ancillary industries
- Higher education centres
- IT industry
- Many Small and Medium Enterprises (SME) and Small Scale Industries (SSI).

How is the economy changing? And what is driving the changes?

The region attracts automobile manufacturers, auto ancillaries and small and medium enterprises. New industries in this region are driving the change.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Water pollution by many small scale industries as they do not have resource to treat effluent.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The rivers are getting polluted and this will impact water supply in the city.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

CETPs need to be set up so that the small scale industries do not discharge untreated effluent into rivers.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

- The region is developing as an auto cluster and with big multinationals coming it is having a multiplier effect on the economy. It is boosting employment by 5-6 times in the smaller industries in the supply chain.
- Software and service industry has developed in Pune region, which is an attractive option for industries.
- Availability of skilled man power in the region is a big plus point.
- Growth is largely expected in the engineering and manufacturing units in the region.
- Pimpri Chinchwad is well situated to take advantage of the upcoming International Convention Centre at Moshi and International airport at Chakan which would fuel growth in the region.

8.2.8 Natural Ecosystem and Biodiversity:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

- Pimpri Chinchwad city has 154 gardens with a total area of 142.93 ha.
- According to Maharashtra (Urban Area) Tree Protection and Preservation of Trees Rules, 2009, Municipal Corporation is expected to plant at least 10,000 trees each year. During 2011-12, 69,828 tree saplings were planted in different gardens by both the PCMC and private developers.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

More people means more open spaces, parks, trees and water bodies required in the city.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The Bird Valley Park, developed by the PCMC is a large lake with boating facilities. This park has been developed at an abandoned quarry along the Telco road, occupying an area of 10.53ha. It is being developed on a Build-Operate-Transfer (BOT) basis. A floating mist fountain has been created in the lake that has a nozzle that sprays water in the form of a mist. It serves the purpose of aerating the lake water.
- Durgadevi park has over 1,60,000 trees that have been planted in an area of 75 ha. Waterfall and floating fountain in the quarry add to the natural beauty of this hill park.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Population of PCMC area is increasing rapidly due to development of automobile, education and IT sectors leading to depletion of natural resources.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Depletion of natural environment will create problems for the city in the long run.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Creating a database at city level for biodiversity.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Information on this aspect is not available.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

The Garden Department of PCMC is responsible for maintaining and increasing the open and green spaces of the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

24 new gardens are proposed to be added to the city. The Garden Department has also undertaken road beautification and 45 km road side plantation projects on various roads and additional 26 km of avenue plantation or median beautification is under construction.

8.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- PCMC is a well-functioning urban local government and the city has taken proactive steps to move towards green growth. Recommendations given for green growth can be discussed with city officials for planning interventions.

Annexure 9

Shimla

Volume 2



Annexure 9: Shimla

9.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level Institutions:

Department of Town and Country Planning (TCP)

The Government of Himachal Pradesh has established the Directorate of Town and Country Planning (TCP) under the Himachal Pradesh Town and Country Planning Act 1977 for planning, development and use of land, and execution of town and country development plan. The functions of TCP include:

- Constitution of planning/special areas;
- Preparation of land use plan, and development plan for planning area;
- Implementation of approved/notified development plan or interim development plan; and
- Preparation of sectoral plans and town planning schemes
- TCP is the regulatory authority for implementation of Interim Development Plan 1979.

Special Area Development Authority (SADA)

The Government of Himachal Pradesh has notified Ganahatti, Kufri, and Shoghi as Special Areas under Town and Country Planning Act 1977. The SADA is responsible for planning, implementation of development plan and provision of municipal services in notified special areas.

Directorate of Urban Development

The Directorate of Urban Development was established to direct, control, and monitor the activities of the Urban Local Bodies in the state.

The functions of the Directorate include:

- Planning, coordinating and monitoring the working of urban local bodies.
- Helping urban local bodies to effectively carry out their functions.
- Respond to the directions, instructions and resolutions of the Government (with the Urban Local Bodies).

Irrigation and Public Health (IPH) Department

The IPH Department is responsible for development of water related infrastructure such as:

- Drinking water supply system
- Sewerage system
- Source development, lifting water, boring of tube wells & providing distribution system
- Flood protection works
- Operation and maintenance of above systems

State level Institution:

Municipal Corporation of Shimla (MCS)

Shimla city is managed by the MCS. MCS was established as a municipal committee in 1851 and became municipality in 1871. MCS was given the status of a municipal corporation in the year 1969 under the Himachal Pradesh Development & Regulation Act, 1968. At present,

SMC serves an area of 35 sq. km, consisting of 25 administrative wards and housing a population of 169,758 persons (as per Census 2011).

What powers does the municipal government have?

The MCS is responsible for providing basic civic amenities within the municipal corporation area. The main functions of MCS, apart from others, include:

- Operation and maintenance of water supply and sewerage system.
- Storm water drains, public latrines, urinals and similar conveniences.
- Solid waste management.
- Crematorium, burial grounds.
- Construction and maintenance of cattle pounds.
- Preventing and checking the spread of dangerous diseases.
- Public streets, bridges, culverts, causeways etc.
- Lighting, watering and cleaning of public streets and other public places.
- Maintenance of public parks, gardens or recreation grounds.
- Planting and taking care of trees on road sides.

As per the Himachal Pradesh Municipal Corporation Act, 1994 all the 18 functions listed in the 12th Schedule, under 74th Constitution Amendment Act of the Constitution of India, have already been transferred to ULBs. These functions are:

1. Urban planning including town planning.
2. Regulation of land use and construction of buildings.
3. Planning for social and economic development.
4. Roads and bridges.
5. Water supply for domestic, industrial and commercial purposes.
6. Public health, sanitation, conservancy and solid waste management.
7. Fire services.
8. Urban forestry, protection of the environment and promotion of ecological aspects.
9. Safeguarding the interests of the weaker sections of the society; including the handicapped and mentally retarded.
10. Slum improvement and up-gradation.
11. Urban poverty alleviation.
12. Provision for urban amenities and facilities such as parks, gardens and play grounds.
13. Promotion of cultural, educational, and aesthetic aspects.
14. Burials and burial grounds, cremations and crematoriums grounds and electric crematoriums.
15. Cattle pounds, prevention of cruelty to animals.
16. Vital statistics including registration of births and deaths.
17. Public amenities including street lighting parking lots, bus stops and public conveniences.
18. Regulation of slaughter houses and tanneries.

What does the financial picture of the municipal government look like? (Sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Shimla Municipal Corporation Budget(Actual for 2012-13)	
Head	(in Rs. '00000)
Income	
Tax Revenue	258.15
Assigned Revenues and compensation	1538.96
Rental Income- Municipal Propertie	311.43
Fees & User Charges	1801.44
Sale & Hire Charges	34.72
Revenue Grant, Contributions & Subsidies	46.74
Income from investments	111.0
Interest Earned	44.62
Other income	13.74
Total Revenue Income	4160.80
Grants, Contributions for Special Purpose	1367.34
Total Income	5528.13
Expenditure	
Establishment Expenses	3748.42
Administrative Expenses	231.69
Operations and Maintenance	979.0
Interest and Finance Charges	0.57
Programme Expenses	1.45
Revenue Grant, Contributions & Subsidies	18.64
Prior Period Item	5.45
Total Revenue Expenditure	4985.19
Capital Expenditure	1451.60
Total Expenditure	6436.79

What role does the state play in city decisions and operations?

Himachal Pradesh Municipal Corporation Act, 1994, which governs the functioning of the Municipal Corporation, has been enacted by state government and it has the power to amend as and when required.

MCS is highly dependent on the state government grants and therefore, the state government influences the decisions of MCS on important matters. Also, since water supply, sewerage, transport, etc. are provided by the state institutions, they play a major role in the provision of services in the city.

How does the city participate in and leverage state/ national urban development schemes and missions?

The city, like other cities, can apply for funding under schemes/ programmes of the Central Government. For instance, five projects were approved for Shimla under JnNURM amounting to Rs. 16,373 lakhs, for the development of the city. The projects get grant funds from the Central Government, to which contributions have to be made by the state and local governments.

How active is civil society and non-government organizations in the city?

There are very few active NGOs in the city dealing with urban infrastructure, urban planning and service delivery.

9.2 City Growth Story

9.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	72.90%
Per capita supply of water	108.04 LPCD
Extent of metering of water connections	N/A
Non-revenue water	47.6%

The Irrigation & Public Health Department, which lifts water from natural sources to a head of about 1000 m, supplies bulk water to MCS. The MCS receives 30 MLD of water from IPHD and supplies 90 per cent of the water by gravity. The average shortfall in water supply as on date is about 15 MLD. The water is supplied for an average duration of 45 minutes to one hour. The physio-chemical quality of treated water is safe for drinking purposes.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in resident population and tourists is increasing the demand for water in Shimla.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Shimla had submitted a project under JnNURM for rehabilitation of water supply distribution system in the city, which was approved in February 2009. However, due to non-implementation of works, the project was withdrawn by the Central Government in September 2013. At present, the city has to identify and acquire funds on its own for undertaking the project.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The primary negative impact of this service is the non-revenue water, which is very high at almost 48%. If the physical losses (estimated at 20-25%) and revenue losses are not plugged, the city will start facing crippling water shortages and may not be assured of daily supply.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

High Non-Revenue Water (NRW) means the water supply system is running at a loss and this would negatively impact the service quality and therefore the health of people.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

The main challenges in the water sector in the city are:

- Water losses: The unaccounted for water in the city is very high (about 48%) due to leakage from old, damaged, corroded pipelines/connections, leaking joints and overflowing overhead tanks.
- Extending coverage: About 27% of the city's population is not covered by water supply system.
- Tapping of water by illegal connections and unreliable and unrecorded supply due to poor records and billing errors.
- The duration of water supply is alarmingly low, with the city receiving only one hour of daily water supply.
- Lack of metering impacts revenue from the service and it also leads to wastage of water at user end.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to implement the water supply project proposed under JnNURM by identifying alternative sources of funding (due to delay in implementation of the project).
- Rainwater harvesting should be made mandatory for all building projects. Water harvesting from natural drains shall be implemented as a permanent measure.
- IPHD and SMC should have a specialized wing for monitoring of water supply that shall carry out regular checks on the leakage detection and also regulate unauthorized water connections/water thefts.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% Coverage of households by water supply connections
- Extent of non-revenue water @ 15%
- 100% metering of connections
- 24x7 water supply

- Efficiency in Redressal of customer complaints (at least 80%)
- 100% Cost recovery
- Efficiency in collection of water charges (at least 90%)

How does the city plan for future infrastructure and service delivery in the sector?

The officials from MCS in consultation with IPHD decide on the future requirements for this sector in the city. The IPH Department implements the capital works for water supply in Shimla.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

The city had proposed a project for 'Rehabilitation of Water Supply distribution system for Shimla City' under JnNURM. However, the project got stalled.

9.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	29.47%
Adequacy of sewage treatment capacity	205.6%
Extent and reuse of recycling of treated sewage	0%
Storm Water	
Coverage of storm water drainage network:	58%
Incidence if water logging/flooding	0

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the population of Shimla, the demand for sewerage network is also increasing. At present, the newly developed areas lack coverage by sewerage network as the authority is able to cater to only 29 % of the area. The major reason for low coverage by sewerage network is the terrain and manpower problems. Expansion of the network is the responsibility of IPHD.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

The sewerage system in Shimla has been upgraded with state funding and the city has a new sewerage network designed to cater to the demand till 2031. Shimla has 6 Sewage Treatment Plants (STPs) with a total capacity to treat 35.63 MLD of sewage. The operation and maintenance of these STPs are given on management contract. Due to the low coverage by sewerage network, the requisite quantity of sewage does not reach the STPs leading to their underutilization.

What negative impacts (environmental or social/people) are evident from activities in this sector? And water are the expected trends for these impacts?

Inadequate coverage of the sewerage network impacts the environment since untreated waste water is discharged by households.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Unsafe disposal of wastewater has serious health implications for the citizens.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

The IPHD continues to do the capital works and hands them over to MCS for operation and maintenance. This service has not yet been fully transferred to the urban local body yet. Therefore, the technical capacity of MCS continues to be limited. The terrain of the city is a major challenge to putting up network system and STPs. Finding manpower was also cited as a problem by the officials.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Upgradation and expansion of sewerage network and providing linkages between old and new sewerage network and also the main transmission line to STPs.
- Augmentation of the sewerage network and treatment capacity to cover the special areas (as designated by SADA).
- Implementing and collecting rational tariffs for sewerage services.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Coverage by toilets -100%
- Coverage of sewerage network - 100%
- Collection efficiency of sewerage network - 100%
- Quality of sewage treatment - 100%
- Extent of reuse and recycling of sewage - 20%
- Extent of cost recovery in waste water management- 100%
- Efficiency in redressal of customer complaints – at least 80%
- Efficiency in collection of sewage water charges – at least 90%
- Coverage of storm water drain - 100%
- Incidence of water logging – Zero incidence

How does the city plan for future infrastructure and service delivery in the sector?

The city depends on state level bodies for implementing capital works and until this function is transferred to MCS, planning and implementation of all infrastructure for this service is done by IPHD.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

- Shimla had proposed a project on 'Rejuvenation of Sewerage Network Phase-1' to construct missing network lines for improved linkage and rehabilitate dilapidated lines/channels in various zones of the city. However, the project is presently stalled as there was delay in its

implementation. The city has to look for alternative sources of funding to go ahead with the project.

- The city is planning to implement Decentralized Wastewater Treatment System (DEWATS) for households not connected to the city's sewerage system and a proposal for the same is under development.

9.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	86.1%
Efficiency of collection of municipal solid waste	79.6%
Extent of segregation of municipal solid waste	15%
Extent of scientific disposal of municipal solid waste	0%

MCS is able to cover 86% of the households at present by the door-to-door solid waste collection service. Primary collection needs to be extended to the newly developed areas. The average waste generation in the city is estimated to be 87 MT per day (amounting to 0.43 kg/day per capita). MCS is able to collect only about 35-40 MT of solid waste at present. Primary and secondary collection is done through door-to-door collection system and community bins (comprising of dumper containers and concrete dustbins) and through street sweeping by MCS workers. The volume of waste generation is characterized by a high level of seasonal variation, with 30% increase in peak tourist season.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Rising population and the city's expansion due to new settlements coming up coupled with higher tourist inflow and increase in commercial activities, is leading to higher waste generation and will continue to do so.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Recently MCS has started door-to-door collection of waste covering 35% of the population. This has been done in partnership with a private operator. Transportation of waste is done by dumper placers and tipper trucks. The treatment of waste is done at the waste treatment plant having 100 MT/day capacity. However, the plant currently receives only 35-40 MT of solid waste per day at present, hence it is not being fully utilized.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

With the introduction of door-to-door collection, the negative impacts on the environment have become negligible.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Topography is a major challenge and poses problems in providing the service. The waste from houses on steep slopes can only be collected manually and the snowfall during the cold winters poses problems to the sanitary workers.
- Reluctance of some households and commercial establishments to participate in door to door collection services since they are unwilling to pay for the service.
- Underutilization of the waste treatment plant.
- Financial unviability of compost plant operation due low demand of compost, improper selection of technology of compost plant having problems in efficient operation at lower temperatures.
- Limited financial and technical capability of MCS, leading to possible issues in running the treatment plant after expiry of agreement with the private operator.
- Inability to treat all types of biomedical waste and very high cost of solid waste management.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Cover all households by the door-to-door waste collection system.
- Provide appropriate and good quality waste collection bags, gloves, raincoats and footwear to primary waste collectors doing door-to-door collection.
- Implement waste segregation at source so that decentralized composting can be undertaken.
- Improve efficiency of street sweeping and secondary collection.
- Ensuring secondary collection and transportation of solid waste is done in covered bins/containers.
- Upgradation of biodegradable waste treatment facility
- Encourage citizens' participation through awareness generation programs.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Household coverage -100%
- Efficiency in collection of solid waste - 100%
- Extent of waste segregation - 100%

How does the city plan for future infrastructure and service delivery in the sector?

Based on the changing scenario in the city, the health department of MCS makes plans for improving solid waste management service. This includes all stages of municipal solid waste management, from waste collection to its disposal.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

A proposal for solid waste management for Shimla was approved under JnNURM. This project on **Integrated Solid Waste Management** is currently under implementation and about 30% of the work has been completed. The proposed SWM project is to be implemented on PPP basis. The contract for the project was awarded to a private operator, and door-to-door collection has been initiated in all 25 wards of the city. Environmental clearance for the landfill site is awaited, which is hampering the progress of the project.

9.2.4 Urban Transport:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Mobility in Shimla is unique. The hilly terrain of Shimla requires horizontal as well as vertical mobility. With restrictions imposed on traffic movement in the city (some streets allow only one way traffic movement, the Mall road does not allow any vehicular traffic), mobility and access are constrained within the limited space. While horizontal mobility is primarily on arterial roads that are open to traffic movement, vertical mobility options are limited to a lift between Mall road and Cart Road and pathways or staircases connecting various streets.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Due to growth of the city and increase in the number of tourists, the number of registered vehicles in Shimla Planning Area* has increased substantially in the last decade (at decadal growth rate of 34%). Traffic volume studies indicate that traffic volume is exceeding road capacity on most of the roads. There is an acute problem of parking space in Shimla due to large number of tourist vehicles coming to the city.

***Shimla Planning Area (SPA) comprises of:**

1. Shimla Municipal Corporation (SMC)
 2. Recently merged Special Areas of Dhali, New Shimla, and Tutu
 3. Special Areas of Kufri, Shoghi and Ghanahatti
- The geographical spread of SPA is roughly 100 sq. km.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

No documentation is available on the negative impact of the sector on environment. City visit by the project team indicates that though the number of vehicles in the city is increasing pollution has been kept under check due to regulation of traffic and due to the no vehicle zone in the city centre.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Information on this aspect is not available.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Multiple organizations are involved in development and management of traffic & transportation facilities.
- Growth in traffic, congestion and inadequate transportation infrastructure.
- Lack of adequate parking facilities and limited public transportation.
- Lack of adequate and safe pedestrian facilities on the roads.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Decongesting Shimla City.
- Developing new satellite townships.
- Improving mobility within city through the following:
 - Public transport system.
 - Pedestrian facilities.
 - Street lighting.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Modal split of 70 % towards public transport.
- CNG promotion.
- Reduced private vehicles.

How does the city plan for future infrastructure and service delivery in the sector?

The transport department of the state government and the MCS together plan for this sector in the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies etc.)

Information on this aspect is not available

9.2.5 Housing and Buildings:

□ Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

There is increasing need and demand of land for housing in Shimla due to migration of both unskilled and skilled workforce and land is scarce for habitation due to topographical constraints. Severe cold climate of Shimla during winter threatens the survival of shelter less people.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Total number of housing units in the city is about 45,000. The housing stock is increasing at a decadal growth rate of 27.75%. There are 53 slum pockets with a population of 11,874.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

MCS operates labour hostels/shelter homes for providing night shelter to migrant labour on nominal rental.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Illegal construction of buildings on slopes and unauthorized construction are major problems in this sector

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Unauthorized construction coming up on the hill slopes is highly vulnerable to natural disasters such as landslides. This activity is also impacting the scenic beauty and leading to loss of greenery.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Scarcity of land due to the hilly topography.
- The city has vulnerable landslide zones which further restricts land availability.
- Increasing cost of construction in the city.
- New construction activities are incompatible with traditional culture and heritage.
- No provision of housing for economic weaker section (EWS) or low income group (LIG) in upcoming housing projects.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provision of housing for EWS and LIG in all housing projects.
- Comprehensive survey for identification of slums and assessment of service level requirement.
- Creation of database with details of slum dwellers and proper identification.
- Development of Urban Slum R&R Policy addressing affordable housing, security of tenure, assurance of basic amenities, and community participation.
- Relocation, resettlement and rehabilitation of slums in untenable areas by providing housing at affordable cost.
- In case of situ-upgradation, the provision of all basic amenities like water supply, public toilet, sanitation and power.
- Establishment of night shelters/hostels for migrant labourers and working women, homes for destitute children.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for 100 % population
- Slum percentage: 0
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

The urban development and housing department of the state government plans for the city's housing requirement.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

9.2.6 Energy

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

The Himachal Pradesh State Electricity Board Limited (HPSEBL) distributes electricity supply within the city. The city is almost completely dependent on conventional power sources to meet demand. Oil marketing companies are engaged in distribution of LPG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector. Subsidized kerosene is distributed to households through the Public Distribution System.

Energy	
Share of households with electricity as main source of lighting	98.4%
Share of households by main source of cooking energy	
LPG/PNG	66.1%
Fuelwood	25.1%
Kerosene	4.6%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The electricity consumption in the city is increasing annually at a rate of around 5%, driven largely by the increasing demand in the residential sector (due to changing lifestyles and growing population) and the commercial sector (due to rising tourism and trade and commerce activities). The consumption of electricity and other source of energy increases by as much as 40% during the winter season (November-April) due to increased space and water heating demand.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

The city has high dependence on grid power supply and energy demand is seen to be rising rapidly in commercial and residential sector. With the city's growth, demand for municipal urban services is also growing rapidly, leading to rising energy demand for operating the street lighting and water supply in Shimla in particular. With abundant biomass resource available in Shimla and the cold conditions during the winter season, use of fuel wood to meet household cooking and space heating energy requirements is high. With Shimla undergoing high growth and expansion, demand for fuel wood will increase substantially, particularly due to difficulties of providing alternate fuels such as piped natural gas due to the city's hilly terrain, leading to rapid resource depletion. Rapidly rising power demand can lead to rising gap between demand and supply resulting in increased power cuts in the future.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Frequent power cuts in the future can lead to interrupted operation of electric heating systems. This would impact well-being of Shimla's citizens during the winter season. Power cuts would also increase use of diesel generator sets and have financial implications on the hotel industry and tourism, besides polluting the local environment. Inefficient and excess use of fuel wood in an unsustainable manner can lead to degradation of forest resource, air pollution and impact health. Increased demand for fuel wood can result in unauthorized felling of trees and lead to depletion of local natural resources.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- MCS does not have any mechanism or technology in place to track energy use in its service infrastructure and buildings.
- Shimla is a designated solar city under the Solar Cities Programme and a solar city cell has been established in the city. However, progress with regards to the Solar Master Plan implementation is slow since the city is lacking in capacity.
- City level data for energy consumption across various sectors is not monitored and documented.
- By-laws mandating solar water heating systems are existing but uptake of RE systems is low due to poor enforcement and monitoring.
- The city's hilly terrain poses challenges for provision of a piped natural gas network.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to ensure that energy consumption in its facilities and buildings is tracked and monitored regularly to regulate energy use and identify potential opportunities.
- Data for electricity and fuel consumption in various sectors at the city level needs to be recorded and monitored.
- Since the city has good availability of solar energy, it should promote renewable energy systems such as solar water heaters and solar space heating systems to offset conventional energy demand. The promotion can be done in the hotel industry, housing complexes and institutional buildings.

- The city should also undertake strict enforcement to ensure conformance for installing solar water heating systems in the new buildings as per the building bye-laws.
- The city needs to ensure that fuel wood is used in a sustainable and efficient manner to meet cooking, hot water and space heating requirement. In this regard efficient wood fired boilers and improved cook stoves should be promoted in the city.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Being a designated solar city, the city aims at a minimum 10% reduction in projected demand of conventional energy at the end of five years, through the implementation of a combination of renewable energy and energy efficiency measures.

How does the city plan for future infrastructure and service delivery in the sector?

The planning and design for power infrastructure and service delivery for the city is done at the State and Central level. However, since Shimla is a solar city, a Solar Master Plan is under development for the city, targeting a 10% reduction in conventional energy use over a period of five years.

MCS and IPHD are responsible for managing energy use in municipal service infrastructure for water supply, sewage treatment and street lighting.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

9.2.7 Economy and Business:

□ Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

The economy of the city is based on:

- Tourism and travel industry
- Horticulture
- Agriculture
- Small scale industries
- Collection and distribution of horticultural products

How is the economy changing? And what is driving the changes?

The following sectors of the economy will grow:

- Tourism
- Travel related services
- Trade and commercial activities including retail and wholesale

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Tourism and travel related activities are generating additional traffic, congestion and pollution.
- Unauthorized constructions and land degradation adding to problems.
- High rise buildings are leading to manifold increase in pressure on land resources.

- Indiscriminately adding load to slopes is hazardous for the city as it falls in seismic Zone-IV, which is susceptible to earthquakes.
- Increase in water requirement.
- Increase in liquid and solid waste generation.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The city will become more susceptible to disasters, and service levels will deteriorate. These will ultimately affect tourism and hence the economy of the city.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

Protect the environment so that tourism does not get impacted negatively and the city's economy continues to grow.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

9.2.8 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

Shimla is a hill city and is endowed with forests with a variety of trees. Two-thirds of the forest area falls within municipal limits.

The natural environment of Shimla includes:

- Pockets of dense development interspersed with green cover and forests.
- Variety of trees including Pines, Deodars, Oaks, interspersed with hilly shrubs.
- The city has 17 identified green belts. The green pockets are located both in the core and in restricted areas. No new construction is allowed in these green belts, though reconstruction is allowed with no change in FAR.
- The land demarcated for non-forest use is under heavy stress with regard to services, infrastructure and transportation.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

- The natural environment of Shimla is being tampered with due to felling of trees for construction purposes. This is threatening the city's green cover. Changes in natural environment are being driven by growth of population and tourism.
- Construction is being carried out on slopes. This is hazardous and has led to felling of trees.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Information on this aspect is not available.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- The city has been becoming denser over the years. The city's density ranges from 2,500 to 3,500 persons per hectare while the recommended density for hill settlements is 450 persons per hectare. The natural environment is getting impacted adversely because of this, leading to loss of greenery and tree cover.
- The prime green pockets on the higher altitude and on slopes, which form the crown of the city, already have construction carried out, which has deprived the city of its greenery and beauty.
- Excessive use of Reinforced Concrete Cement (R.C.C.) has already damaged the eco-system to a large extent. Construction of roads and indiscriminate tapping of natural resources (wood and stone) have negatively impacted the beauty and greenery of the city.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Negative impact on the tourism and the economy due to loss of natural beauty.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

Information on this aspect is not available.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Interface between tourism, heritage and environment needs to be recognized and plans/strategies formulated and implemented accordingly.
- Eco-tourism development approach based on preservation of natural environment, flora and fauna needs to be implemented.
- Shimla needs to restrict construction activities in the central area, including in green and privately owned areas. This will also help in improving the provision of basic infrastructure and services.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

Information on this aspect is not available.

9.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI can start by having discussions with the state level government bodies who take decisions for the city in various sectors about the recommended green growth options for the city.
- Hold discussion with the MCS about the problems in the city and how the green growth options can be implemented. Capacity building needs can be assessed during these discussions for implementing the green growth options.
- Engaging with all the stakeholders (government, local body, private sector, citizen groups) by holding workshops to understand various sectors and the possible partnership options.

Annexure 10

Vijayawada

Volume 2



Annexure 10: Vijayawada

10.1 Governance Structure

Who are the main “actors” with decision making power in the city?

State level:

Commissioner & Director of Municipal Administration (C&DMA)

The Directorate of Municipal Administration (DMA) is the apex organization of Municipal Administration and Urban Development Department (MA&UDD) of Government of Andhra Pradesh (GoAP), which provides guidance to Municipal Corporations and Municipalities in performing their day to day activities in adherence to the policies, procedures and guidelines provided by MA&UDD to achieve effective civic administration. DMA monitors the functioning of the ULBs against key parameters such as tax collections, project and civic works executed, implementation of schemes of the Government etc.

City level:

Vijayawada Municipal Corporation (VMC)

- The Municipality of Vijayawada was constituted on 1st April, 1888 and was upgraded as a selection grade municipality in the year 1960 and again upgraded as a municipal corporation in 1981. The Vijayawada Municipal Corporation (VMC) is governed by Vijayawada Municipal Corporation Act, 1981. The Act specifies the governance framework, the spatial jurisdiction and the functional domain of the urban local body.
- The city is divided into 59 political wards. An elected body headed by the Mayor performs the administration of the Corporation. The Commissioner acts as the executive head, and oversees the day to day functioning of the local body.

Vijayawada Development Authority (VDA)

Vijayawada Development Authority also known as the Vijayawada Guntur Tenali and Mangalagiri Urban Development Authority (VGTMUDA) was constituted in December, 1978 under Andhra Pradesh Urban Areas (Development) Act, 1975. Its jurisdiction extends over Vijayawada, Guntur, Tenali and Mangalagiri municipal corporations/municipalities constituted under AP Municipalities Act, 1965. UDA region was extended to 5,108.90 sq.kms. in addition to providing housing facilities for all economic groups, the other significant functions of VDA include:

- Formulating the Master Plan and Zonal Development Plans for the area under development
- Constructing commercial projects like business complexes, shopping areas, offices
- Building infrastructural support systems like roads, bridges, satellite earth station
- Encouraging recreational centers like parks, playgrounds, community centers
- Coordinating with various agencies of the state in order to set up a well planned developmental system
- Encouraging growth of urban forestry

What powers does the municipal government have?

- VMC is responsible for majority of functions provided in the 12th schedule of the 74th Constitution Amendment Act that includes:
- Urban Planning including Town Planning
- Regulation of land use and construction of buildings
- Roads and Bridges
- Water Supply for domestic, industrial and commercial purposes
- Public Health, Sanitation, Conservancy and Solid Waste Management
- Slum Improvement and upgradation
- Provision of urban amenities and facilities such as parks, Gardens, play grounds, burial grounds, cremation grounds and electric crematoriums
- Cattle pounds, prevention of cruelty to animals
- Vital Statistics including registration of births and deaths
- Public amenities including street lighting, parking lots, bus stops and public conveniences
- Regulation of Slaughter Houses and Tanneries
- In addition to the above mentioned functions, the government transferred five more functions to the urban local bodies in 2003 that includes:
- Planning for Economic and Social Development
- Urban Forestry, protection of the environment and promotion of ecological aspects
- Urban Poverty Alleviation
- Safeguarding the interest of weaker sections including the handicapped and mentally retarded
- Promotion of cultural and aesthetic aspects
- Firefighting services are still maintained by the Andhra Pradesh Fire Services Department with five fire stations operating around the Vijayawada City

What does the financial picture of the municipal government look like? (sources of revenue, collection rate for revenues, expenditures, costs and recovery rates for service provision)

Vijayawada Municipal Corporation (VMC) Income-Expenditure 2012-13	
Head (major heads)	(in Rs. Million)
Revenue	
Revenue Income	3657.8
Capital Income	6397.2
Deposits and Advances	563.2
Total	11010.5
Expenditure	
Revenue Expenses	3111.3
Capital Expenses	6923.5
Loan Repayments	264.0
Deposits and Advances	548.2
Total	10847.2

What role does the state play in city decisions and operations?

VMC has been entrusted with most powers to carry out its functions and the role of the state government is limited. Apart from the local body, a number of government institutions are associated with the governance of Vijayawada Urban Agglomeration that includes:

- Municipal Administration and Urban Development Department
- Directorate of Municipal Administration (DMA)
- Directorate of Town and Country Planning (DTCP)
- Public Health Engineering Department (PHED)
- Revenue Department
- Medical and Health Department
- Social Welfare Department
- R&B Department
- Home Department.

Several parastatal bodies include Vijayawada Guntur Tenali and Mangalagiri Urban Development Authority (VGTMUDA); AP State Highways Authority; AP State Road Transport Corporation (APSRTC); AP Transmission Corporation (AP Transco); AP Housing Corporation (APHB); AP Pollution Control Board (APPCB) and AP Industrial Infrastructure Corporation (APIIC).

VGTMUDA is responsible at facilitating Transport, Road Infrastructure and Urban Planning, Development and its Control in the Vijayawada Urban Agglomeration.

The main objectives of VGTMUDA include:

- Preparing Master Plan and Zonal Development Plans (ZDPs) for development of the area.
- Exercise development control viz., approval of building plans and layouts, approval for change of land use, etc in the areas under its coverage.
- Acquire and develop lands for development of townships and construction of dwelling units for sale.
- Take up infrastructure development projects like construction of flyovers, roads, etc.

How does the city participate in and leverage state/ national urban development schemes and missions?

Vijayawada has been innovating various options by adopting latest technology and other means to provide best-in-class civic facilities and infrastructure to the public. VMC is able to leverage grants from State government as well as Central programmes like JnNURM. The city also receives support from both governments for various poverty reduction initiatives.

How active is civil society and non-government organizations in the city?

Based on the discussions with VMC it is understood that there are very few active NGOs in the city dealing with urban infrastructure, urban planning and service delivery issues. However, NGOs commented that the poor cooperation and coordination between the NGOs and VMC has created gap in active participation and requested VMC for their participation and involvement in any kind of activities city initiates.

10.2 City Growth Story

10.2.1 Water

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Water supply	
Water supply coverage:	77%
Per capita supply of water	Approx. 150 LPCD
Extent of metering of water connections	6% (as of 2007)
Non-revenue water	60%

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Increase in population resulting in corresponding increase in water demand. The contribution to population growth is mainly the in-migration from the surrounding villages for better living opportunities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

VMC is aiming at provision of additional OHTs for water storage, additional public taps and also to increase length of distribution lines along new roads to give 100% water supply coverage through its water supply projects.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- The major source of drinking water "Krishna River" is getting polluted due to discharge of untreated sewage and industrial wastewater into the river; and activities like cattle bathing, washing clothes, etc., in the river. Also untreated and unscientific methods of Solid waste dumping in the city are decreasing the quality of ground water.
- Large amount of water is being wasted resulting in more non-revenue water due to leakages in the supply system and theft.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of water quality in the source (river) and ground water, and increase in the cost of treatment. More non-revenue water decreasing the efficiency of water supply.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- No systematic approach is adopted for implementation of water supply schemes by the government.
- Due to theft and leakages in the supply system large amount of water being wasted, resulting in 40% non-revenue water and the remaining wasted due to leakages.
- The average duration of water supply is 4 hours.

- Water is supplied to just 77% of the city.
- Lack of metered connections in the city. The un-metered domestic connections are charged a flat rate, with the Below Poverty Line consumers being charged half the rate at which the Above Poverty Line consumers are charged. Inequitable collection of tariff resulting in low O & M cost recovery of water supply.
- Lack of consumer awareness is an issue.
- tanks.
- Extending coverage: About 27% of the city's population is not covered by water supply system.
- Tapping of water by illegal connections and unreliable and unrecorded supply due to poor records and billing errors.
- The duration of water supply is alarmingly low, with the city receiving only one hour of daily water supply.
- Lack of metering impacts revenue from the service and it also leads to wastage of water at user end.

Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- City government has to adopt systematic approach for sector growth and maintenance.
- Reduce NRW by checking leakages in the old distribution lines.
- Provide water metering for all the existing and new connections and promote equitable and stable tariff collection.
- Supply hours need to be increased by improving water storage capacities.
- City has to take up proper measures to protect River Krishna and ground water quality.

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- 100% coverage of households by water supply connections
- Reduce non-revenue water to 15%
- 100% metering of connections
- 24x7 water supply
- 100% Cost recovery

How does the city plan for future infrastructure and service delivery in the sector?

The water supply department of VMC proposes to increase the length of distribution lines along new roads, increase storage capacity and treatment of ground water considering population projection and urbanization in the area.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc)

- VMC is implementing projects in the water sector under JnNURM to reduce connection costs, take up measures to reduce unaccounted for water in the city, remove illegal connections, to increase water storage capacity and improve maintenance and conduct audits for detection of leakages and old pipelines.
- The city also aims to promote 24x7 water supply, improve quality of water, and operational efficiency of the system.

- VMC has a proposal to prepare detailed plan for water supply scheme in the city.

10.2.2 Sewerage and Sanitation:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

Sewage Management (sewerage & sanitation)	
Coverage of sewage network services	40%
Adequacy of sewage treatment capacity	13.51%
Extent and reuse of recycling of treated sewage	0%
Storm Water	
Coverage of storm water drainage network:	31.6%
Incidence if water logging/flooding	16

Separate systems for carrying sewage, sullage and storm water are existing in the city. Out of 1240.72 kms of road length, the Under Ground Drainage system is provided for just 390 kms stretch. For the remaining road length the road side drains serve as sewers round the year. Only 48.73% of the roads in the city are provided with both open and underground drainage network.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Growth in population, economic and commercial activities is increasing the demand for the service. Increased constructional activities are creating additional demand for the service. Every rainy season resulting in floods and inundation in some areas increasing the demand for replacement of existing drains or construction of new drains.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- Projects for expanding the sewerage network in the city and augmenting the capacity for treatment of sewage, recycling and reusing of treated waste water has been implemented in the city.
- Project also aims to achieve efficiency in operations and maintenance (O&M) cost recovery.
- To improve access to sanitation in slum areas.
- With the JnNURM funds, city has set a target to reach 85% coverage of sewage network services in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Access to sewerage connection and sanitation is very poor in some areas resulting in open defecation leading to health related diseases.
- Discharge of untreated sewage into water bodies thus polluting them.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Pollution of water bodies deteriorating quality of water and increasing health related issues in the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Present sewerage system is serving only 40% of the city population which is very low.
- The existing units are underutilized due to in-sufficient number of connections.
- Most of the system units are old and need replacement.
- Huge gaps in revenue due to insufficient number of connections and low tariff.
- Many public places lack adequate toilet facilities and Open defecation in some places like slums.
- Improper maintenance of existing sewage system, public toilet and storm water drains.
- Existing storm water drainage network is inefficient and inadequate.
- Pollution of water bodies.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Expand network coverage for both sewage and storm water.
- Improve access to individual and community toilets.
- Efficient recycling and reusing of waste water.
- Canal reclamation.
- Achieve efficiency in cost recovery for proper O&M of the sector.
- Generate electricity from waste water.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Sewerage network coverage -100%
- Access to sewerage connection – 100%
- Treatment and disposal – 100
- Recycling/Reuse of waste water – 50%
- Cost recovery (% of O&M) – 100%
- Storm water drainage network coverage – 100%
- Canal Reclamation – 100
- Access to individual toilets and Community toilets – 100%

How does the city plan for future infrastructure and service delivery in the sector?

Considering the current requirement and projecting the future scenario with respect to the increase in population and area, VMC projects and proposes several means in expanding sewerage network and service levels. A City Sanitation Plan has been prepared for the city.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

- VMC proposes protection of water bodies and canals considering future developments and encroachments.
- City is currently operating 6 STPs and one STP is under construction.
- The city under JnNURM project proposed - to prepare comprehensive sewerage Master Plan; energy audit studies to address the problems associated with energy; providing underground drainage sewage schemes in un-served areas; proposed STP to treat the remaining sewage; primary drain rehabilitation and improvement program; protection of water bodies from encroachments; monitoring and quality control; proposals to achieve 100% sanitation system.

10.2.3 Solid Waste Management (SWM):

Describe Growth (people, demand, infrastructure)

What is the current state of infrastructure and service provision in this sector?

Solid waste	
Household level coverage of solid waste management services	100%
Efficiency of collection of municipal solid waste	87%
Extent of segregation of municipal solid waste	N/A
Extent of scientific disposal of municipal solid waste	N/A

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

With increase in the city's population, increased economic activities, industrial activities, changes in lifestyle and other activities the waste generated in the city is increasing.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- The entire city is divided into 3 circles and about 4100 (permanent and outsourced) staff is involved under maintaining the solid waste sector in the city.
- 100% household collection of SW is achieved.
- City is provided with 2 transfer stations. One is currently under use and the other one is under construction and expected to open shortly.
- The city has two dumping yards, one at Srinagar and the other at Jakkampudi which are 8-10 kms and 15-18 kms far from the city.
- The city has proposed to promote efficiency in segregation at source, treatment and disposal and involvement of private sectors in the management of SW.
- Promoting new technologies, cost saving and service delivery improvements for SWM in the city.
- Proposing towards implementing scientific method of treating and disposal of waste.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

Open dumping of waste at Pathipadu village not adhering to SWM rules 2000 is resulting in ground water pollution.

□ Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Deterioration of ground water quality that has ill effect on public health.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Irregular collection in all the areas of the city.
- Inefficient collection and disposal.
- Street sweeping is confined to only main road and junctions.
- Inadequate machinery, equipment, collection units and manpower.
- Waste segregation at source is nil.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to introduce waste segregation at source.
- Encourage decentralized composting.
- Engage rag pickers/NGOs for waste recycling.
- Improve awareness among the public.
- Need efficient and trained experts in the corporation.
- Involvement of private actors for implementing various activities.
- Adopt scientific methods for disposal of solid waste.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Door to door collection - 100%
- Source segregation – 100%
- Treatment and disposal – 100%
- Cost recovery (% of O&M) – 100%
- Extent of scientific disposal of MSW - 100%
- Efficiency in collection of SWM charges- at least 90%
- Increase private sector participation

How does the city plan for future infrastructure and service delivery in the sector?

The Public Health and Engineering Department of VMC prepares project proposals for improving and expanding the service and to bridge the gap in service delivery.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

- VMC proposes to promote efficiency in door to door collection, segregation of waste at source.
- Involving private companies for disposal of waste.
- Safe disposal of inorganic material instead of open dumping.

- As 70% of waste generated in the city is organic, the best possible solution in the city is adopted and a vermi composting plant has been proposed.
- Ministry of Non-conventional Energy (MNES) has proposed to set up 20 MT capacity Bio-methanation plant for power generation at Vijayawada with financial assistance of United Nation Development Programme (UNDP)

10.2.4 Urban Transport:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

- VMC has a city bus service which is operated by Andhra Pradesh State Road Transport Corporation (APSRTC). About 520 buses are available covering the sub-urban areas of the city, out of which 213 were procured through JnNURM project funds.
- Out of 520 buses, 313 are CNG buses and the remaining are diesel buses.
- There are a large number of private motorized two wheelers and four wheelers in the city.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Vijayawada being capital designate of the AP state is attracting several industries, administrative and IT sectors into the city which would result in unexpected increase in population in the coming years. The current increase in the demand for the vehicles is growth in population, increasing income levels, growth in commercial and economic activities.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- In order to make public transport a more convenient option for its public, Vijayawada had implemented Bus Rapid Transit System in 2013.
- The Andhra Pradesh Cabinet has approved metro rail project for Vijayawada connecting Vijayawada-Guntur-Tenali-Mangalagiri regions.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

APSRTC is planning to acquire 90 CNG buses by November 2014 to control air pollution, parking problems, and traffic congestions and improve the frequency in the availability of buses.

Issues / Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Increase in the number of private vehicles polluting the air quality leading to respiratory and other health impacts.
- High congestion is impacting logistics and commuting time in the city.
- Long waiting time at bus stops due to limited connectivity of city bus services.
- Safety of pedestrians is an issue

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Short supply of CNG in the city is promoting diesel vehicles leading air pollution in the city.
- Highly inadequate parking and pedestrian facilities.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Promote CNG for public and private vehicles.
- Reduce the number of private vehicles by improving public transport.
- Improve the BRTS by increasing bus frequencies and connecting city and the sub-urban areas to nearby regions.
- Provide adequate parking facilities.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Providing Non-Motorized transport, pedestrian and intermodal facilities in the city.
- Promoting CNG.
- Improving BRTS connecting several areas in and around the city.
- Reduced private vehicles by improving public transport.
- Encouraging private vehicle holidays (at least few hours a week) in the city.

How does the city plan for future infrastructure and service delivery in the sector?

VMC along with APSRTC share the primary responsibility for urban transport planning, design and management.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

- Vijayawada is developing a Comprehensive Mobility Plan (CMP) for the city and its neighbouring villages. The corporation has invited RFP (Request For Proposal) from the government empanelled consultants to prepare the plan.
- APSRTC is procuring 90 more buses to serve within the city by November, 2014.
- Proposed metro rail connecting Vijayawada-Guntur-Tenali-Mangalagiri regions.
- Development of parking facilities is being planned across the city and locations for the same have been identified.

10.2.5 Housing and Buildings:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of infrastructure and service provision in this sector?

- About 97% of buildings in the city are under residential use, of which almost 99% have plot area less than 250 Sq.yds.
- Vijayawada Development Authority is responsible for giving the building permissions in the city.
- Currently, there are about 111 notified slums in the city of which 25 slums are developed with all infrastructure facilities. The total slum area in the city is estimated to be 9.27 Sq.kms

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

- The main reason for an increase in demand for housing is rapid growth in population, rural urban migration, better living opportunities, etc.
- The rapid growth in population and migration from villages to the cities has led to growth in slum areas that can be prevented by providing affordable dwelling units.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

- Under Basic Services for Urban Poor component of JnNURM programme, infrastructure facilities are primarily improved in few slums. Houses in G+3 pattern are being constructed under BSUP for the slum dwellers residing in few hazardous locations like river and canal bunds. Due to non-availability of land for housing, 94 acres of land has been acquired on 60:40 basis from farmers at Jakkampudi.
- Around 320 acres of land is proposed to be acquired at Gollapudi for construction of housing units under RAY project.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Rapid migration into the city leading to growth in slum areas.
- Most of the slums lack in basic infrastructure facilities.
- Housing for the urban poor and lower income groups is insufficient - leading to creation of unauthorized settlements and slums.
- The price of housing is very high making it difficult for lower income groups to buy property.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Slum formation
- Social security issues
- Unplanned development in the city

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Increase in population is increasing the demand for built up area and therefore increasing the energy requirement.
- Providing affordable housing to poorer sections of society.
- Increasing land prices – making housing expensive.
- Infrastructure and services need to match growth in housing.

□ Observed Needs (infra, systems, management, impact)

what are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Need to earmark adequate land for EWS and LIG segments of the society.
- The city Bye laws should be practically formulated in order to provide greater FSI to these sections of the society.
- Provision of adequate physical, social and economic infrastructure in rural areas in order to discourage migration to urban centres.
- Develop satellite towns, cluster towns, and urban corridors with employment opportunities in order to decongest the core urban area and reduce land demand for housing.
- Incentivize builders to construct affordable housing units.
- Establishment of night shelters or short term houses for migrant laborers and working women.
- Make available more land for housing to manage rising cost of land.
- Need to develop Detailed Project Reports.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

- Housing for all with well functional infrastructure facilities
- Make city slum free
- Energy efficient buildings

How does the city plan for future infrastructure and service delivery in the sector?

- VMC is the implementing agency for executing all component under RAY program.
- Strategies need to be identified to make the housing finance reach the needy. Some of the strategies may be legalizing slum land, forming intermediate finance institutions, cost reduction strategy, and channeling loans from Self Help Groups within the community
- The building sector is largely driven by the private sector. There are a large number of builders in the residential and commercial sector. These builders assess the growth rate of the city and construct buildings accordingly.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

- Land pooling around and along the river fronts.
- 2 slums are being covered under RAY project – one with 304 dwelling units (new construction) and the other with 1413 dwelling units (renovating the existing ones).
- Developing green areas around the river banks by relocating the slum settlements
- Proposed solar initiatives in government buildings
- Submitted solar city proposal to Ministry of New Renewable Energy
- Proposing Green Building concepts in the city which is currently not practiced

10.2.6 Energy

Describe Growth (people, demand, infrastructure, impact)

what is the current state of infrastructure and service provision in this sector?

Southern Power Distribution Company of A.P. Ltd (APSPDCL) distributes electricity supply within the city. The main source is the Grid Source from Ibrahimpatnam which is at a distance of 18 kms from the city. The city is totally dependent on conventional power sources to meet demand. Oil marketing companies are engaged in distribution of LPG, petrol, diesel, etc. used in residential, commercial, industrial and transport sector..

Energy	
Share of households with electricity as main source of lighting	98%
Share of households by main source of cooking energy	
LPG/PNG	NA
Fuelwood	NA
Kerosene	NA

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

The electricity consumption in the city is increasing annually, driven largely by the increasing demand in the commercial and industrial sector.

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Phase III of the Independent Power Project (IPP) located at Kondapalli Industrial Development Area that is at a distance of 20 kms from the Vijayawada City is getting ready for operations.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

With the growth of industrial and commercial sectors in the city, the demand for conventional energy has been increased resulting in frequent power cuts in the city for about 4 hours daily during the summer season. VMC is promoting usage of renewable energy in the hospitals, industries and huge commercial establishments in the city to the extent possible and encouraging diesel generators in industries and commercial establishments.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

Frequent power cuts is impacting agricultural, industrial sectors and hampering effective functioning of service infrastructure facilities such as water supply, sewage treatment. Use of costlier diesel generator sets for power supply has financial implications on businesses and industries while also resulting in air and noise pollution in the city.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- No technology to track energy uses and loses in its facilities
- The city lacks adequate capacity to promote renewable energy and energy conservation. So far only 20-30 individual houses and 2 industries approached APSPDCL for solar roof top systems.
- City level data for energy consumption in various sectors is not available.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- The city needs to track and monitor regularly the energy loses and identify potential opportunities to regulate energy use.
- City need to promote renewable energy systems such as solar water heaters and solar photovoltaic systems to reduce both energy demand and dependence on diesel generator sets.
- City should strictly enforce the installation of solar water heating systems in the new buildings as per the building bye-laws.
- Need to focus on promoting public transport and NMT services to regulate the usage of petrol and diesel.
- Instead kerosene, LPG and improved cook stoves should be promoted at the residential and commercial levels

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

City is initiating measures to merge the southern grid and connect it to the central grid with only 70KW of energy is connected to the roof top currently, the city aims to increase by 10% by end 2015.

How does the city plan for future infrastructure and service delivery in the sector?

Motivating people to use renewable energy to the maximum extent possible.

What specific projects or initiatives is the city planning? (infrastructure, programs, planning/studies, etc)

- Connecting the southern grid to the National grid.
- Proposed Waste to Energy project to the State Government, and is at the approval stage.
- Initiated ESCO technologies for auto night street light dimming.
- VMC is planning to convert entire city street lights to LED lighting.
- Submitted solar city proposal to Ministry of New Renewable Energy.

10.2.7 Economy and Business:

□ Describe Growth (people, demand, infrastructure, impact)

What drives the economy of the city?

- The city is traditionally the main agricultural market centre for Krishna basin. It acts as a major commercial centre to a host of wholesale and retail activities dealing in consumer goods, textiles, automobiles parts, industrial products, etc. It is also a major trading centre for processed Virginia Tobacco, Cotton and Turmeric.
- It is a hub for higher educational centres.

How is the economy changing? And what is driving the changes?

Vijayawada being the second largest city after Visakhapatnam in Andhra Pradesh state is a vibrant business center with rapidly growing commercial and service sectors.

What negative impacts (environmental or social/people) are evident from activities in this sector? And what are the expected trends for these impacts?

- Periodical health issues/hazards with increase in the opportunities for the growth of industrial sector.
- Industrial sector lack in sewage collection and treatment system and storm water drainage network.
- High pollution of Krishna river and Budameru river due to discharge of industrial effluent and sewage.
- Instances of indiscriminate disposal of industrial solid waste in low lying areas and along roadsides.

□ Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

- Environmental degradation of Krishna and Budameru river impacting ground water quality.
- Poor housing facilities lead to the growth of slums and informal settlements
- Absence of underground drainage network leads to frequent water logging in the low-lying areas.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Provision of underground drainage network in the entire city
- Mandate usage of renewable energy in the industrial sector
- Ensure the sewage is treated before letting into the water bodies
- Micro and small scale units need incentive schemes from the government to promote green technologies

Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

10.2.8 Natural Ecosystem and Biodiversity:

Describe Growth (people, demand, infrastructure, impact)

What is the current state of natural environment and biodiversity?

The city has very limited information with respect to city ecosystem and biodiversity. The city has 60 parks within the city boundary.

How is demand changing for services in this sector? And what is driving the changes in demand? (Population growth, lifestyles, environment conditions, etc.)

Vijayawada being the capital designate for Andhra Pradesh is witnessing in-migration, higher density and increased building development activities resulting in demand for huge open spaces, parks and green cover for its citizens

What recent infrastructure or service delivery systems have been put in place in the city? And what are the trends for the future?

Out of the 60 parks, 56 neighborhood parks developed by the corporation are maintained by park communities specially formed and the rest 4 city level parks and 45 fenced and 35 unfenced open spaces are being maintained by the corporation. VMC regularly takes up avenue plantation projects and greenery development programmes in the city.

What negative impacts (environmental or social/people) are evident from activities in this sector? And water are the expected trends for these impacts?

Growing population, higher density, escalating land prices and growth in real estate sector are putting pressure on natural resources and leading to diminishing green cover and open spaces in the city. The industrial activities are causing alarming environmental degradation in the city.

Issues/Challenges

For the negative impacts described above, what are the resulting issues and challenges faced by the city?

The hydro-meteorological hazards have enormous impacts on socio-economic systems reflecting floods, storms, heat waves endangering human lives, disrupt livelihood systems, and derail the process of social and economic development.

What are the other known /observed issues and challenges in this sector? (Related to: physical infrastructure system limitations or problems, service delivery or service quality issues, capacity limitations of city government, financial or budgeting challenges, etc.)

- Over exploitation of mining of sand and other minerals across the city.
- The severe heat waves experienced in recent times.
- Vijayawada had faced 4 major cyclone storms during months of October and November in 2013.
- Information on the status of its natural environment and biodiversity in the city is lacking.

- The VMC does not have dedicated department or resources or allocated for natural environment and biodiversity.
- The city lies in Earthquake Zone III which refers to moderate damage risk zone.

□ Observed Needs (infra, systems, management, impact)

What are the urgent and known things the city needs to do in this sector in order to keep up with growth and to resolve the issues and challenges above? (Special project or infrastructure needs, known problems to solve, etc.)

- Needed separate ecosystem and biodiversity sells in the corporation to address biodiversity in the city.
- Needed efficient air and water quality monitoring stations.
- Awareness generation needs to be undertaken for restoring biodiversity and green cover.
- The major parks in the city need to be upgraded.
- City need to develop its Biodiversity Action Plans annually.

□ Known/Stated City Objectives and Plans

What are the city's stated (or unstated) urban development goals/objectives in this sector? (e.g. types of systems desired, future vision for city, infrastructure/services ambitions, social/people goals, etc.)

Information on this aspect is not available.

How does the city plan for future infrastructure and service delivery in the sector?

Information on this aspect is not available.

What specific projects or initiatives is the city planning? (Infrastructure, programs, planning/studies, etc.)

- Vijayawada city is selected by GoI-UNDP as one among the 10 cities in India for the implementation of UNDP Climate Risk Management Project on pilot basis under the framework of Urban Disaster Risk Reduction project of GoI-UNDP.
- Proposed a project under Green India Mission that aims to mitigate the climate change impact through carbon sequestration and promote adaptations and other resilience mechanisms so as to reduce the impact of extreme climate aberrations.

10.3 City Green Growth Vision And Strategies

What does ICLEI-NIUA suggest to GGGI in terms of following up with this city and pursuing green growth strategies and planning? (Overall GG potential; potential relative to other cities in the study; brief strategies for engaging with this city)

- GGGI should engage with VMC to discuss the green growth plan and understand the concerns of the city in implementing the plan.
- Financing of the green growth plan would be very important and hence engaging with concerned state level departments (water supply and sewerage, transport, energy, housing) would be required.
- Engaging with citizen groups would be important in Vijayawada. There are many NGOs in the city, though not directly working in infrastructure and basic services, but active in social sectors in the city. Such engagement would help in getting people's support for green growth ideas.

