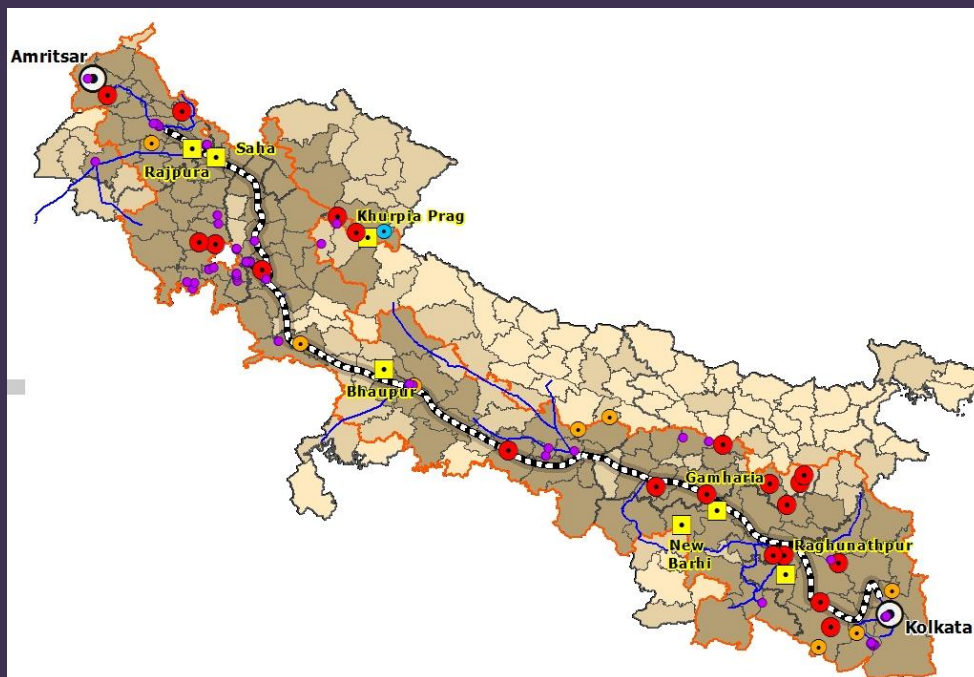




# DMICDC

## FINAL REPORT ON **PERSPECTIVE PLAN** FOR OVERALL AKIC REGION **PART A**



### **PREPARATION OF PERSPECTIVE PLAN FOR AMRITSAR-KOLKATA INDUSTRIAL CORRIDOR (AKIC) REGION**



**LEA Associates South Asia Pvt. Ltd.** India

In Joint Venture with



**Ernst & Young LLP,** India

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# ACKNOWLEDGEMENT AND DISCLAIMER

## ACKNOWLEDGEMENT

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On request from the Delhi-Mumbai Industrial Corridor Development Corporation Limited (DMICDC), the World Bank provided the consultant with data compiled from secondary, publicly available published sources as part of their Non Lending Technical Assistance to the Government of India for identifying options for development along the EDFC. The data and reports covered the states of Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand and West Bengal. The World Bank also provided the consultant with data and reports compiled by their consultants (Deloitte Touche Tohmatsu India Pvt. Ltd and CRISIL Risk & Infrastructure Solutions (CRIS) Ltd.) while preparing detailed regional economic analysis and infrastructure impediments for three sub-regional growth centres in the State of Uttar Pradesh, which is hereby acknowledged.

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# E. EXECUTIVE SUMMARY

## E.1 INTRODUCTION

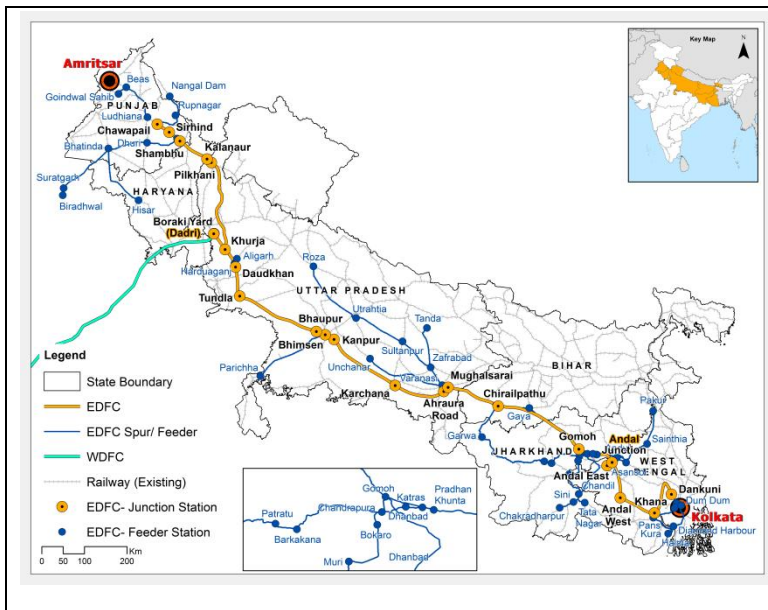
Industrial corridors are the new economic growth paradigms in India. The industrial corridors are pivotal to economic growth for they reduce trade barriers, and increase the outreach of production and consumption centres. The benchmark corridors<sup>1</sup> have achieved the targets of high economic growth, and increased contribution to the national GDP with a large catchment through strategic route, connectivity with international gateways (ports, airports), competitive advantage etc.

The Government of India (GoI) has launched a national programme for building a pentagon of Industrial/Economic corridors in the country. The programme is aimed at unleashing the manufacturing potential of the country, raising its contribution to GDP thereby achieving – (a) accelerated development, (b) inclusive growth and (c) gainful employment.

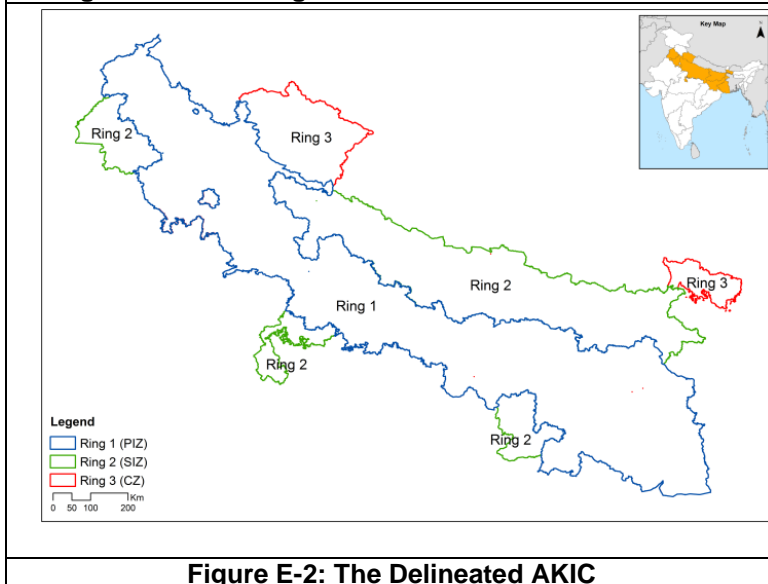
The development of **Amritsar Kolkata Industrial Corridor (AKIC)** is expected to leverage – (a) the Eastern Dedicated Freight Corridor (EDFC), (b) the existing National Highway system and (c) National Waterway-1, connecting Allahabad with Haldia.

The EDFC is envisaged to traverse 1839 km and serve six Indian states (Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand, and West Bengal) connecting Ludhiana in Punjab with Dankuni in West Bengal. The EDFC, currently under construction by DFCCIL, is expected to be commissioned by 2019 (Refer Figure E-1).

The AKIC region has been delineated (Refer Figure E-2) mainly as an influence of the EDFC. While the entire geographical/ administrative domain of the seven states has been included as a part of the Corridor, 3 influence zones (primary, secondary and constrained zone) based on several parameters have been identified within the region. These zones have been based on parameters such as proximity to the EDFC, availability of resources and infrastructure, industrial investments, and physical constraints etc. The linear belt within ~100 km from EDFC is defined as primary influence zone (Ring 1) and is considered to have greater potential and growth than other parts of the region.



**Figure E-1: The Alignment and Feeder Links of EDFC**



**Figure E-2: The Delineated AKIC**

<sup>1</sup> The three international corridors discussed in the report include – (a) Rotterdam-Antwerp-Genoa Corridor, Europe, (b) Boston-Washington Corridor, USA, and (c) Quebec-Ontario Trade Corridor and Continental Gateway, Canada.

The AKIC would revitalise the trade corridor that existed along the historic GT Road. It would also reach out to Northeast Indian states and address the Look-East/ Act-East policy, as also connect with international trade route between BIMSTEC countries in South/ South East Asia, among other international corridors in the region. The AKIC is also projected as a predominantly agro-industrial corridor.

This report presents the final perspective plan for AKIC which includes growth vision for next 20 years – immediate, short, medium and long terms, identified pilot projects/ IMCs, identified priority industrial sectors, critical bottlenecks with regard to targeted growth, identified infrastructure projects with phasing plan and an institutional framework for implementation.

The Vision of AKIC is “**Economically transformed agro-industrial corridor and globally competitive investment destination along a historic trade route, with the aim of achieving green and sustainable industrial and economic development**”.

## E.2 CURRENT PROFILE OF THE REGION

The AKIC is spread over 7 states<sup>2</sup>. The demographic, social and economic profile of this vast region is summarised here;

- **Strategic location yet landlocked:** The AKIC Region lies in the cusp of Central Asia, China and SE Asia which is expected to be the hot bed of dominant economies in the mid to long term globally. Though AKIC is having a strategic location it does not have advantage of a coastline and its relationship with neighbouring countries is mired with security issues at the moment.
- **Large population:** The AKIC region comprises of 1/5th of India's geographical area and is home to over 2/5th of its population (491 million population). Population growth rates higher than India average due to high birth rate, declining death rate and in migration from neighbouring countries. The growth rate of population has diminished over the last 3 decades.
- **Dominant working age population:** There is a high prevalence of working age population (60%), less than 15 age group (34%) alongwith a low share of above 65 years population (5%). It indicates an overall dependency ratio of 65% which is healthy for future growth and development.
- **Large economic base:** The region is ~1/4th of India in economic size; the sum of state GSDPs stands at INR 29,146 billion at prevailing current prices in 2013-14, i.e. ~27% of India's GDP. The regional economy is service oriented (54%) with strong agriculture background (24%) and industrial orientation (22%). Tertiary sector is robust and has grown faster than the other sectors. The growth patterns over the past 20 years indicate India is growing faster (6.9% per annum) than the AKIC region (6.0% per annum).
- **Income inequality:** As regards the economic status of people, there is widespread inequality in terms of per capita income (PCI) and poverty. There is as much as 30% population below poverty line (BPL) in Uttar Pradesh, 34% in Bihar, and 37% in Jharkhand. Purchasing power of population is thus low.
- **Agrarian economy:** The single economic activity that contributes the highest to the share of regional GDP in 2012-13, in current price, is agriculture (21%), followed by trade (16%) and manufacturing (11%). While in the agriculture sector the region suffers from Low productivity and monsoon driven Agriculture in the manufacturing sector it is plagued by low skill-based industrialisation, obsolete technology being used in unorganised manufacturing sector and MSMEs.
- **Disproportioned employment in agriculture:** Manufacturing Sector has stagnated and there has been a decreasing share of agriculture sector. Yet 40% employment is still based on agriculture due to low employment opportunities in other sectors including manufacturing. Unemployment rate has also increased in last decade. There is significant outmigration led by Uttar Pradesh, Bihar and Jharkhand including for work purposes.
- **Human development index (HDI)** of population is lower than India average.
- **Lower WPR:** The workforce participation rate (WPR) in the AKIC project region is 36% which is lower than the India level (39%).
- **Low urbanisation & low GDP per capita:** Urbanisation is low (22%) and urbanisation growth rate is lower than India. Barring a few regions economic growth has not followed urbanisation.

<sup>2</sup> Uttarakhand is the seventh state, added to the list of six states cut across by the EDFC.

- **Influence of metropolitan cities & mega regions:** There are distinct urban regions and fast developing urban corridors. The region is having 15 metropolitan cities and falls under influence of Mega City of National Capital Territory of Delhi. Other prominent urban regions include Kanpur and Kolkata regions.
- **Large agro resources.** The region is having 5 river basins including Ganga basin wherein 70 % of the land is cultivatable. The region is the Food Bowl of Nation growing 50% Rice, 70% Wheat and 40-60% vegetables. Region is also a producer of key Cash crops: 51% Sugarcane, 90% Raw Jute & Mesta.
- **Large mineral resources:** The region is having 40% Coal reserves and 30% Iron Ore (proved). The region currently transports bulk resources for value addition in other parts of the country.
- **Low literacy & marginalised population:** Low literacy levels are witnessed especially in Bihar, Uttar Pradesh and Jharkhand. There is distinct ST population especially in Jharkhand and high growth of ST population in Uttar Pradesh. Population in working age suffer from low level of tertiary education leading to low labour productivity which is considered to be the key growth area for development.

In the wake of Gol policy initiatives the AKIC region is expected to have a large amount of opportunities for development. Certain other opportunities include;

- AKIC has **access to South Asian markets** which is a key regional market in terms of global trade and economy. This is considered to be a huge potential for growth.
- **High consumer base:** Large AKIC Population is seen as a large consumer market. Urbanisation is also growing. The Class I Cities are likely to form the key cities in the long term. These would form the consumer base for the thriving
- **Demonstrated success:** Punjab, Haryana and Uttarakhand have demonstrated growth of a sound industrial base. Uttar Pradesh has also demonstrated a strong export potential followed by Haryana and West Bengal. Industrial synergies amongst traditional sectors have developed and there are certain unique skills (export demand) available in the region.
- **Low cost of labour in** comparison to other Indian states indicates the attractiveness of labour intensive industries.
- **Potential USP:** Improvement in infrastructure and supply chain management can bring about a link between existing agricultural resources and industries.

The threats that would need to be taken care of include the element of high fertility of soil in most of the region that impedes land acquisition for large scale industrial development and the fact that select sub regions are having high ST population, mineral resources and forests indicating vulnerable population.

### E.3 INDUSTRIAL PROFILE

Findings from the market assessment of industrial sectors and the current issues in the region are as follows;

- **Dormant Manufacturing Sector:** India's GDP has grown at a CAGR of ~7% in the last 10 years while India's manufacturing share of its GDP has relatively remained constant at around 15%. Growth in the manufacturing sector has not matched the strong pace in overall GDP growth over the past few years. In terms of contribution to national economy, Uttar Pradesh tops the order among the AKIC states, followed by West Bengal, Haryana and Punjab in the year 2013-14. However, in terms of contribution of manufacturing share in state economy (GSDP) in 2013-14, Uttarakhand is on top of the list, followed by Jharkhand, Punjab and Haryana; Bihar remains at the bottom of the chart in both cases. Manufacturing GVA share by industries in AKIC is 25% of the country's manufacturing GVA. More than 97% of the total MSME units in the region fall under the 'Micro' classification with an investment size lesser than INR 2.5 million. The output and GVA generated per factory lag well behind the national average.
- **Low Investor Confidence:** Manufacturing accounts for maximum share of Indian industry which is justified by the sector's 75.5% share in the Index of Industrial Production (IIP). It is observed that the growth of manufacturing IIP of AKIC states is on a declining mode. The manufacturing IIP for AKIC states has witnessed a drastic fall since 2010-11. A similar trend for manufacturing is observed at the country level with CAGR of just 1% from 2007-08 to 2013-14 with a negative growth in the year 2013-14. AKIC has received 20% of the total IEMs at India level and in terms of

value AKIC share is 15% of the total from 2009 to 2013. This clearly indicates the current sentiment of the investor for AKIC region which is not very positive.

- **Potential Industrial Sectors:** Within the manufacturing sector at India level in 2012-13, the maximum contribution has been made by chemicals & petro-chemicals (28%), metal products (14%), auto & auto components (10%), food processing (9%), textiles & leather (8%) and machinery goods (7%). These goods together make for 75% in terms of their cumulative contribution to manufacturing share. Similarly at AKIC level, manufacturing sectors which are contributing significant share to the corridor's GDP are food processing (21%), metal products (17%), auto & auto components (15%), textiles & leather (10%) and machinery (6%).
- The Food Processing industry is pre-dominant in the resource rich states of Punjab, Haryana, Uttar Pradesh, Bihar and West Bengal. The Textiles industry is pre-dominant in the resource rich states of Punjab, Haryana and Uttar Pradesh. Industries such as Metals have substantial presence in the resource rich eastern states of the region i.e. Jharkhand and West Bengal. Industries such as chemicals and petrochemicals are spread across the region, with substantial presence in the states having raw material availability-i.e. Uttar Pradesh, Bihar and West Bengal.
- **Competitiveness:** Competitive Industrial Performance Index (CIP) indicates that the most industrially competitive state under AKIC region is Uttarakhand which is closely followed by Haryana. Punjab falls at third place in CIP index ranking followed by Uttar Pradesh, Jharkhand, West Bengal and Bihar. This benchmarking also indicates AKIC's positioning as compared to national average. While most of the AKIC states individually perform better as compared to India, AKIC as a whole projects a bleak picture as it falls under the India average in almost all the industrial performance indicators. DMIC is seen to have better competitive advantage than AKIC.
- **Export Scenario:** Even though India's export scenario does not look very promising, AKIC is exhibiting an optimistic trend indicating positive outlook for the longest industrial corridor in the country. Uttar Pradesh is having the highest exports in the region.
- **Low & Mid Value Industries:** A key strength of the region is low unit labour costs, vis-à-vis other developed states such as Maharashtra, Gujarat, Rajasthan and Tamil Nadu. However, skilled labour is primarily available for low-technology intensive and mid-technology intensive industries. About 76% of the AKIC industry sectors manufacturing is of products which fall under the low and mid-value segment.
- **Industrial Lands:** As far as the industrial lands in AKIC states are concerned, land banks are available with states are in the form of (a) designated industrial land use in notified master plans, (b) vacant lands in existing estates, (c) retrievable lands from closed/ sick units (d) government land, and (e) wastelands/ currently under forest ownership.
- **Key issues/ critical gaps** include
  - States have high share in primary processing especially in traditional industries such as food processing and textiles.
  - Small scale industry, the backbone of industrial economy, mostly produces low-value items.
  - The manufacturing structure in some states is mostly unorganized; a significant proportion is in low and mid-value segments. The low technology results in low productivity with poor products – a competitive disadvantage.
  - There exists vacancy in several industrial parks/ estates. Some states have industrial land banks but many of these are not contiguous and hence not suited to large industry parks such as IMC.
  - Policies to regulate large industrial clusters not in place. There are wide contrasts in AKIC states as regards ease of doing business.
  - Labour is not appropriately skilled leading to low productivity. Non-availability of skills for emerging and sunrise sectors.
  - Opportunities of cross-border trade not utilised.

#### E.4 ASSESSMENT OF TRANSPORT INFRASTRUCTURE

The AKIC region spreads across northern India and is intrinsically woven together by the historical GT Road, National Highways (NH), State Highways (SH), MDRs, ODRs, Border Roads and Village Roads. Primarily the part of NHs 3, 44, 19 and 16 (new NH numbering for GT road) along the EDFC corridor forms the spine/ main highways (Refer Figure E-3) for the road network and main corridor NH).

A major section of GT Road is part of GQ linking the major cities of Delhi, Mumbai, Chennai and Kolkata. The region is also serviced by the North-South and the East-West Corridors in parts. The project region has several Asian Highways (AH) passing through, in particular, part of AH1 & AH2.

The traffic on the main NH corridor primarily comprises of passenger vehicles (52%) followed by goods vehicles (43%).

The AKIC states together have a total railway route length of 19,957 km (excluding EDFC), a good 30% of Indian Railways. The analysis indicates that most of the east-west running lines are operating at more than 100% capacity with the exception of West Bengal where the north-south lines too are equally congested. The existing railway lines within the AKIC states cater to both passenger and freight traffic. The total recorded passenger km in 5 railway zones in AKIC region, in 2013-14, was 1,720 billion passenger km (BPKM). The highest traffic density with respect to passenger km per running track km is 14 million (ER) whereas the lowest is 0.03 million (NCR).

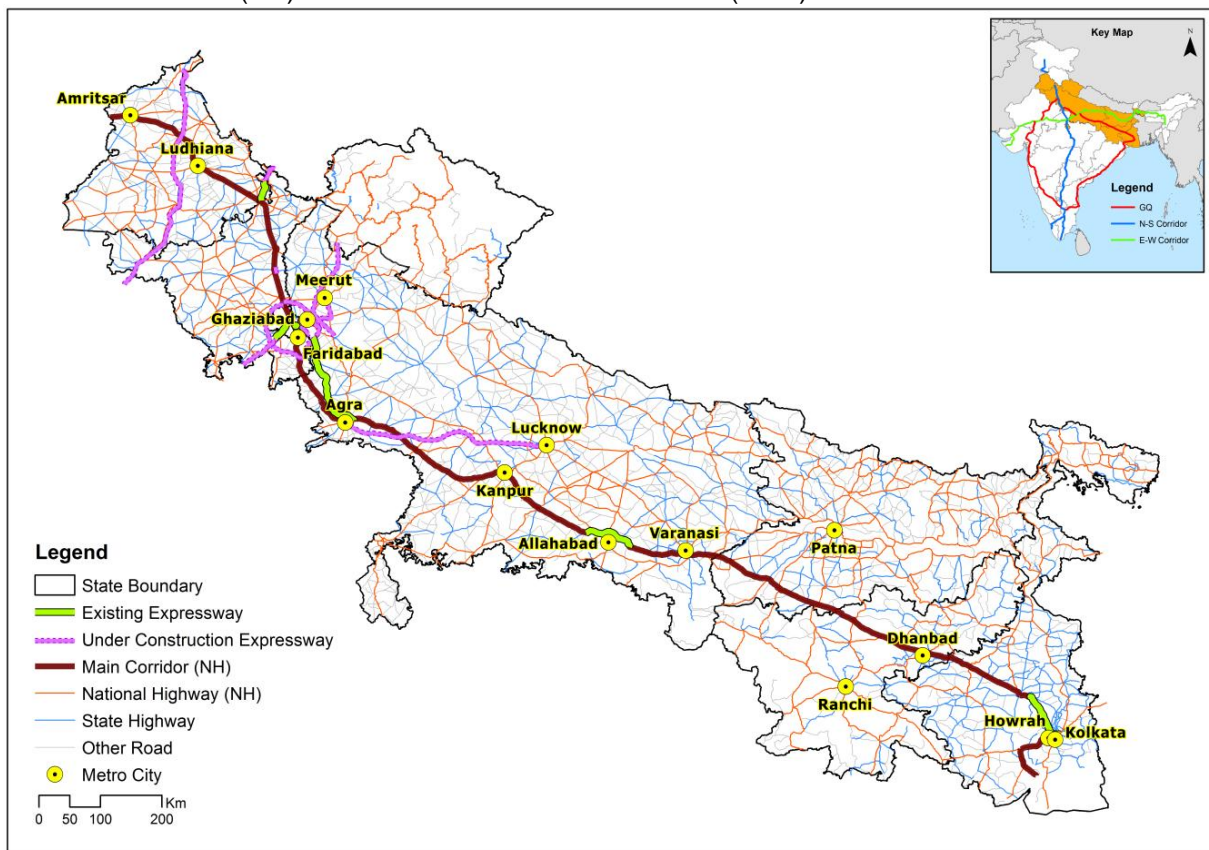


Figure E-3: Road Network in AKIC region & Main Corridor

The EDFC will, apart from diverting freight traffic from existing railway network in the region, provide new opportunities for development of industrial clusters along its entire length. It will facilitate uninterrupted flow of cargo by rail and provide connectivity to sea ports, both on the east coast as well as west coast. The Dadri-Khurja Link will connect the EDFC with WDFC. The EDFC is proposed to have 80 stations of which 22 are junction stations for exchange of freight traffic with the existing Indian Railways network. In addition, 22 feeder routes with a total length of 3,434 km linking major industrial and production centres are being upgraded to DFC standards by the railways.

West Bengal is the only maritime state with 158 km of coastline along the Bay of Bengal. Kolkata Port (KoP) has a vast hinterland comprising the states of West Bengal, Bihar, Jharkhand, Uttar Pradesh, Madhya Pradesh, Assam, Northeast Hill states and the two land-locked neighbouring countries of Nepal and Bhutan. A deep-sea port is proposed at Sagar Island aimed at reviving the riverine port by facilitating larger vessels into Kolkata Port Trust (KoPT).

National Waterway-1 (NW-1) falls in the project region, making use of Ganga-Bhagirathi-Hooghly river system between Allahabad and Haldia (Sagar) over a distance of 1,620 km. There are 24 terminals on NW-1 with 20 floating terminals and 4 fixed/ permanent terminals (i.e. Patna, Pakur RCC, Farakka

RCC and G.R. Jetty 2). There are 18 airports in the project region<sup>3</sup> of which 5 are major international airports, 4 domestic airports, 5 domestic civil enclave airports and 4 custom airports. The total passenger traffic handled in 2014-15 is 20.15 million, with a compound growth rate of 9.8% between 2009-10 and 2014-15. The total freight traffic handled has increased from 121 thousand tonnes in 2009-10 to 159 thousand tonnes in 2014-15, which provides a compound growth rate of 5.1% pa.

There are 57 Inland Container Depots (ICDs) and Container Freight Stations (CFS) in the project region (June 2015). Of these 36 are run by CONCOR, whereas 21 are privately owned. The ICDs and CFS are mostly located along the EDFC and concentrated in the states of Punjab (11), Haryana (12), UP (19) and West Bengal (10). Over 63% ICDs and CFS are operated by CONCOR.

**Key issues/ critical infrastructure gaps** in the AKIC project region include the following.

- High V/C ratio for most NH sections indicates high traffic congestion.
- The LoS in most NH sections is 'D' or more.
- The rail network is highly congested, carrying much more than capacity.
- Most logistic hubs within AKIC are not directly connected to higher order roads (NH).
- The NW1 potential is not appropriately exploited. There are constraints as regards LAD (low), and terminals are ill-equipped.
- Several rail head, inland water terminals and sea ports have poor last mile connectivity.
- Inadequate river conservation measures result in gradual deterioration of waterways.
- There is lack of integrated air cargo infrastructure in the region to cater to perishable goods.

## E.5 WATER RESOURCES

Water resources have consistently dwindled for reasons of extensive extraction of GW coupled with insufficient replenishment, and non-implementation of recycling/ reuse of wastewater. The AKIC region falls within major river basins of India – Indus, Ganga, Subarnrekha, Brahmani, Baitarni and Brahmaputra. The allocation of surface water for irrigation/ agriculture purposes is attached a high priority<sup>4</sup> and the availability of fresh water source for other uses has been limited.

It is inferred that a total of 444.76 BCM of water is available/ allocated for AKIC states, out of which only 312.92 BCM is presently used. It is noted that 5 states – Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal have sufficient water balance (surplus) available for future development, the states of Punjab and Haryana are consuming their allocated share of surface water in full, and extracting the GW more than it can recharge. It implies that necessary mitigation measures will need to be taken up to transform the deficit water situation into water surplus.

It is anticipated that the domestic and industrial water demand in the year 2025 shall together be 8.8% of the total demand, and grow to 12.6% by the year 2050. Also as per National Water Policy, 10% of total available water resources must be reserved for domestic and industrial use. The proportion of demand of water for domestic v/s industrial is 60:40, meaning thereby that 6% of total available water resources must be reserved for domestic use and 4% for industrial use.

Wastewater is a resource; its recycling and reuse may be among the key interventions/ strategies for industrial development in IMCs as well as the overall AKIC region. It is inferred that total sewage generated from the cities/ towns in AKIC states is nearly 13805 MLD. Sewage collection system is available partially in class-I and class-II cities, but absent from class-III to class-V towns. The Sewage treatment facility is available for 4411 MLD only against total sewage generation of 13805 MLD. The practice of tertiary treatment of sewage, recycling and conversion of waste to energy are some of the important states-of-the-art that are currently non-existent but be adopted by AKIC states.

**Key issues and critical gaps** with regard to water and wastewater are as follows:

- GW situation in at least 2 states is critical/ over exploited. Urgent measures are needed to increase GW availability through GW recharge measures and minimisation of GW use.
- Few states allocate a major portion of surface water availability to irrigation and domestic uses. Thus, most industries were observed to be relying on GW resources. However, for increased

<sup>3</sup> The IGI airport at New Delhi and Safdarjung airports have not been taken into account for this analysis.

<sup>4</sup> Around 85% of water in the country is consumed by agriculture/ irrigation.



efficiency of the industrial sector reliable and sustainable water availability through surface water sources is needed in all the AKIC states.

- Wastewater/ sewage collection and treatment in majority of the AKIC cities is extremely limited. This prevents gainful utilisation of wastewater through recycling.

## E.6 ENERGY: POWER, ALTERNATE ENERGY & GAS

Coal based thermal power is the pre-dominant source of electrical energy generation in AKIC states with a share of 74% of total installed capacity, followed by hydro power (18%), renewable energy sources (4%), gas (3%) and nuclear (1%). The availability and demand-supply gap in AKIC is about 20,000 MU; Uttar Pradesh and Bihar are major contributors to large demand-supply gap while other states have marginal gap. The AT&C (commercial) losses are estimated to be high in the region.

The gas pipeline network already exists in some parts of Punjab, Haryana and Uttar Pradesh. Further, it is likely to be extended to south – east part of Uttar Pradesh, part of Bihar small area of Jharkhand and some parts of West Bengal state by the end of 12th five year plan (year 2017).

The renewable and alternative energy (RE) is a dormant yet potent resource for India. Solar power is presently limited by rooftop and open land availability, while other resources such as geothermal and biomass are marginally exploited. The total installed capacity of RE in the AKIC states is 2,130 MW<sup>5</sup>. This comprises solar power, biomass, co-generation units, wind power, waste to energy and small hydro projects (SHPs) belonging to both government and private entities.

### Key issues/ critical gaps include:

- The states majorly rely on non-renewable energy.
- Some states have sufficient power while some others face acute crisis/ deficit.
- In general, there is a problem of quality power to industry during peak production time.
- All states are not equally blessed in terms of fuel – coal, dams, tidal power, natural gas or oil; some states only produce hydel power; others only thermal; some others buy power when short.
- States mostly rely on non-renewable sources of energy, though there is policy in place for renewable energy.
- The presence of gas pipeline if available in the vicinity of industrial park needs be appropriately utilised.

## E.7 ECONOMIC GROWTH PERSPECTIVE

Since AKIC is a Government of India programme the economic forecast of AKIC is estimated through a top-down approach wherein an assessment of the global perspectives, national targets have led to short term, medium term and long term outlook for AKIC. It is also pertinent to mention that the economic growth forecast is an estimate of potential, conveying a sense of opportunity.

- **Global perspectives of an emerging economy:** Globally, India is seen as one of the emerging economies with expectations of higher growth in the short to medium term. India's growth potential also stands tall against other emerging as well as Asian economies. In the long run trade linkages are expected to rise as global value chains continue to expand. Technological advancement and higher skills will help emerging economies climb the ladder towards higher value added manufacturing.
- **India's growth path & challenges ahead:** Based on the growth targeted and achieved in post-Independence the country is considered to have traversed traditional growth path and climbed onto a moderate growth. It may now be the crossroads for India to embark on a sustainable growth trajectory. The key social and economic indicators such as poverty, inequality, and skill levels need quantum improvement and should therefore be the premise for the future growth.
- **The development agenda & growth drivers:** Currently India's development agenda is mirrored in the Sustainable Development Goals that have been coined in United Nations Summit, 2015 for 'Transforming our world: the 2030 Agenda for Sustainable Development'. The goals recognize that economic growth, industrialization, infrastructure, and access to energy provide the foundations of development. These goals and targets are to be met for sustainable development by 2030 through existing and new/ reformed policies, schemes of the Government of India and State Governments.

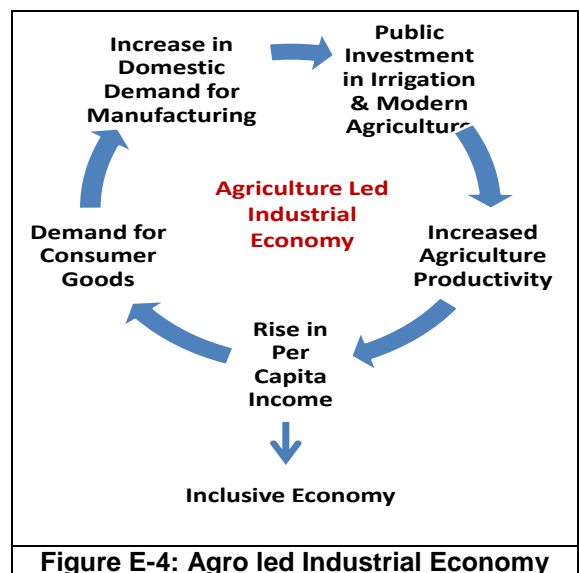
<sup>5</sup> Based on figures of Central Electricity Authority in June, 2015.

Essentially, the future growth is dependent on the ability to build Innovation and Information, International Competitiveness, Institution and Investment. Such policies/ reforms are the key drivers for growth.

- India's transformative growth & manufacturing sector:** With new impetus on focused policy reforms on building blocks and speedy implementation of economic reforms, key economic drivers would result in a long term economic growth rate of 9.4% per annum upto 2037. This long term economic growth is similar to the transformative growth for India being considered by Niti Ayog (considered to be actually 10% per annum upto 2032). The Indian economy is thus anticipated to grow from INR 84 trillion to INR 508 trillion by 2037.

Phased Economic Vision for India	Suggested Theme
<b>2017-2022:</b> <b>Reaping Benefit and Gaining on Initiatives</b>	Manufacturing & Corridor led development with long term Government investments in Irrigation support for Agriculture.
<b>2022-2027:</b> <b>Sustained Momentum &amp; No Flood No Famine</b>	Continued rapid development in Manufacturing with a leap in primary sector output
<b>2027-2032:</b> <b>India on Road To Formidable Power</b>	Growth in All Sectors of Economy, Equitable Growth
<b>2032-2037:</b> <b>India - A Global Leader</b>	Matured economy insulated from external shocks

- India's past performance especially in the last decade is a result of the positive and direct role of services sector. To enable an upward shift and make growth sustainable in the long run the manufacturing sector having multiplier impact on other sectors needs to be strengthened and uplifted (it is considered that every job in manufacturing leads to 2-3 jobs in other sectors). Though India has not followed the traditional pattern of agriculture to manufacturing to services, there is no doubt that the nation has huge untapped potential in manufacturing. Considering that currently manufacturing share is 15% and industrial scenario has not seen any radical change as yet (According to a World Bank report the manufacturing sector's contribution to GDP has fallen from 16% in 2010 to 15% in 2013 with fewer than 5 million incremental jobs having been added to the economy over the past five years), a moderate contribution of manufacturing to GDP has been considered in this study. India's manufacturing sector is therefore anticipated to grow tenfold by 2037, to INR100 trillion.



- The Economic Vision for AKIC:** With the region being largely rural with significant population engaged in agriculture, the corridor development vision (economic) is considered to be **agriculture led industrial development** or **inclusive development** (Figure E-4). Three scenarios; Base Scenario (5-6% growth), Accelerated Growth Scenario (8% growth) and AKIC Induced Scenario (10% growth) have been developed for the long term economic forecast of AKIC, using Manufacturing Income as the forecast parameter. AKIC Induced Scenario has been adopted for the study as it meets national requirements for growth while considering regional potential.
- With major investments suggested in Agriculture/Irrigation, it is expected that the Primary sector grows alongside the Secondary/Manufacturing sectors and the corridor develops into a predominantly agro industrial corridor. The manufacturing sector is conceived to grow as a share within Industry sector from 43% to 75 % while manufacturing share to AKIC GSDP is expected to grow from 13% to 16%. The growth in AKIC is seen together with high growth in other industrial corridors/ economic regions, thereby meaning a faster and higher growth for India. **The manufacturing sector in the AKIC region is expected to grow from INR 3 trillion to INR 21 trillion, meaning thereby a conservative contribution of 21% from the AKIC region towards manufacturing targets of a transformed India by the horizon period.**

- **Regional (States) Growth in AKIC Induced Scenario:** For the long run and transformative shift required of the AKIC economy states would have to realise their potential and grow at consistent rates of growth. The States' potential to absorb the AKIC economic targets has been measured through key performance indicators. It has been conceived that the states of Uttar Pradesh, Punjab, Haryana and West Bengal shall continue to be the key contributors to this economic growth story. The per annum growth rates (manufacturing sector) over 2017-2037 are considered 10-11% for Punjab, Haryana and Uttar Pradesh; 8-9% for Uttarakhand, West Bengal and Jharkhand; and 13% for Bihar (refer Table E.1).

**Table E-1: AKIC & States Growth Forecast (Mfg. Sector) – AKIC Induced Scenario**

States	Past 20 years (CAGR)	Growth Phases				Forecast Growth per annum (CAGR)
		2017-2022	2022-2027	2027-2032	2032-2037	2017-2037
Punjab	6.4	8.2	10	12.6	11.8	10.6
Haryana	7.2	7.7	9.9	12.2	11.4	10.3
Uttarakhand	13.2	6.4	8.4	10.6	8	8.3
Uttar Pradesh	4.6	7.5	9.7	12.2	11.2	10.2
Bihar	5.4	8.5	12.3	14.3	15.3	12.6
Jharkhand	4.1	5.8	9.1	10.7	10.5	9.0
West Bengal	3.4	7	9.1	11.1	10.5	9.4
AKIC	5.4	7.4	9.6	11.9	11.2	10.0

- The AKIC development programme along with reforms and policies of Government in all sectors of the economy (with prime focus of manufacturing and agriculture; AIS) is seen to transform the economy with an anticipated 8-10% growth rate in the manufacturing sector. The growth forecast is a result of transformative policies and infrastructure investments in both agriculture and manufacturing subsectors of which the AKIC development programme is a key contribution. Based on the success of the programme implementation this may have a 2-3 % impact on the GSDP. **The AKIC regional economy is thereby expected to grow from INR 24+ trillion to INR 130+ trillion, assuming a conservative contribution of 26% to Indian GDP.**
- The AKIC development programme is anticipated to transform the regional economy, with huge implications and expectations from the perspective plan. It fuels the need for enhanced road, rail and other transport infrastructure. It also implies that energy and other resources would have to be increasingly planned for. The business climate and human skill development efforts would also need to be enhanced in order to meet the growth target.

## E.8 INDUSTRIAL GROWTH PERSPECTIVE

It is envisioned that the freight corridor would play a catalyst for transitioning of the overall manufacturing in the region towards the high-value segment. An independent approach has been adopted post determining the forecast of manufacturing income, to determine the product mix that could realise state potential in manufacturing. The proposed product mix for AKIC has been arrived at through a 3-step approach. The final 8 sectors (alongwith sunrise sectors) after step-by-step assessment considered as proposed product for AKIC comprise of the following:

- **Shining stars:** agro and food processing, textiles, metals and auto & auto components
- **Emerging stars:** leather & footwear, electronics, rubber & plastics, and electricals

Further certain sub-sectors have been identified to be **sunrise sub sectors** viz., renewable energy – solar, renewable energy –wind, biotechnology, defence manufacturing, and aerospace manufacturing.

Based on the economic forecast the industrial forecast of Value of Output, Gross Value Added, employment and land demand have been estimated.

- **Value of Output:** The value of output in the AKIC region is expected to be INR 136 lakh crores by 2037. Out of the total value of output in 2037, Punjab, Haryana, Uttar Pradesh and West Bengal continue to have stronghold by constituting over 79% of market share. The phase wise forecast value of output across industrial sectors has been highlighted in Table E.2 while the Sector wise State wise Value of Output for horizon period is given in Table E.3.

**Table E-2: Phase Wise Forecast Value of Output (INR Crores) across Industrial Sectors (2022-2037) in AKIC Induced Scenario**

Industry sectors	2022	2027	2032	2037
Food processing	6,06,349	10,06,934	19,29,724	35,83,448
Textiles	1,43,864	2,25,722	4,14,911	7,49,602
Chem. & Petro.	6,68,592	9,88,622	18,69,427	34,59,941
Pharma.	23,937	40,264	78,672	1,46,420
Metals	5,47,260	7,99,158	14,51,140	25,54,017
Electronics	36,929	86,161	1,65,801	3,03,567
Machinery	1,71,758	3,40,383	6,56,443	11,95,954
Auto & Auto Comp	1,90,746	3,29,047	5,97,311	10,66,853
Others	32,572	1,58,216	2,96,811	5,35,907
<b>AKIC Total</b>	<b>24,22,006</b>	<b>39,74,507</b>	<b>74,60,240</b>	<b>1,35,95,709</b>

Source: Consultant's analysis.

**Table E-3: Value of Output (INR '000 Crore) across States/Broad Industry Sectors in AKIC Induced Scenario – 2037**

States	Food Proc.	C&P	Metals	Machinery	Auto	Elec.	Pharma	Textiles	Oth.	Total	% share
Punjab	575	189	336	199	149	31	67	405	107	<b>2,058</b>	15%
Haryana	580	98	442	133	555	46	13	99	70	<b>2,035</b>	15%
U'khand	73	126	79	375	29	23	20	18	59	<b>801</b>	6%
Uttar Pradesh	1,458	1,189	579	315	145	176	37	116	132	<b>4,148</b>	31%
Bihar	319	601	44	43	16	3	3	15	41	<b>1,084</b>	8%
J'khand	43	217	436	50	117	2	1	5	54	<b>926</b>	7%
West Bengal	535	1,042	639	80	55	22	6	92	72	<b>2,543</b>	19%
<b>AKIC</b>	<b>3,583</b>	<b>3,460</b>	<b>2,554</b>	<b>1,196</b>	<b>1,067</b>	<b>304</b>	<b>146</b>	<b>750</b>	<b>536</b>	<b>13,596</b>	<b>100%</b>

Source: Consultant's analysis.

- **Gross Value Added:** GVA in the AKIC region from manufacturing is expected to be INR 15 lakh crores by 2037. Out of the total value of GVA in 2037, Punjab, Haryana, Uttar Pradesh and West Bengal continue to have stronghold by constituting around 80% of market share.
- **Exports:** AKIC is expected to be a largely domestic market. However, with the implementation of EDFC and augmentation of logistic infrastructure, it is expected that the overall export share of the estimated value of output will grow upto maximum 37% as compared to around 20% at present. More than 85% of the exports from the AKIC by the year 2037 are likely to be generated from food processing, chemicals, textiles, metals and auto & auto components.
- **Employment:** Total employment potential from the region in the horizon year is 43 million in the manufacturing sector.
- **Land Demand:** The AKIC is expected to generate about 13 lakh acres (5136 sq km) of land demand for industries in AKIC region by 2037.
- Skill development is going to be the driving force of economic growth and social development of the AKIC project in order to achieve industrial transformation growth. It is estimated that about 9 million jobs will be required under high-skilled category by 2037 out of which automobile, electronics and pharmaceuticals will account for maximum requirement of high skill jobs. Hence, it is critical for AKIC region to introduce specialised courses in the high value processing sectors to bridge the skill gap.

**Intensification of Future Industries in Ring 1:** Ring 1 which is the primary influence area within the AKIC project region (alongwith its constituent subzones/bands) is the most promising region for locating the pilot as well as prospective IMCs. The constituent districts whether currently urbanised or not would grow at a faster pace considering both market influence and Government push (together with availability of committed lands, infrastructure investment, tailored policies, etc.). The development of the eastern sub region of AKIC would result in the basic objective of achieving balanced regional development. **It is conceived that the Ring 1 (Primary Influence Zone) comprising of 127 districts shall contribute more than 90% to the regional manufacturing income (currently contributes over 80%).**

A total of 44 locations in the 7 States have been identified in consultation with States, for Future IMCs out of which 7 have been taken up for master planning in Part B of the current assignment.

Considering that AKIC population share was 39% in 1991 that grew 1-2 base points in the next 2 decades. The AKIC population therefore, based on Shift Share analysis and the trends conceived till the horizon period, is expected to grow to 0.7b by 2037 when India is projected to reach 1.7b. It has been considered that the current population within age group of 5-39 shall become the future working age population assuming that in-migration and out-migration within the age group are balanced out. By 2037, the urban population in AKIC region is estimated to be more than 200 million which would be almost 38% of the total population.

### E.9 ENABLING INFRASTRUCTURE

The path to economic growth for AKIC and enabling infrastructure is based on Green Vision. The key contributors to the green vision include – (a) green transport system (b) renewable energy (c) integrated water & wastewater, (d) smart planning, and (e) sustainable industrial development; refer Figure E-5.

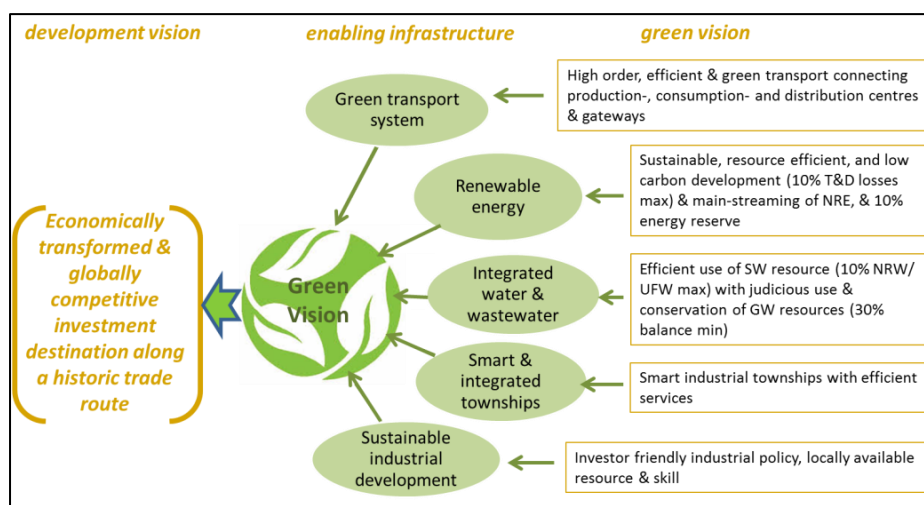


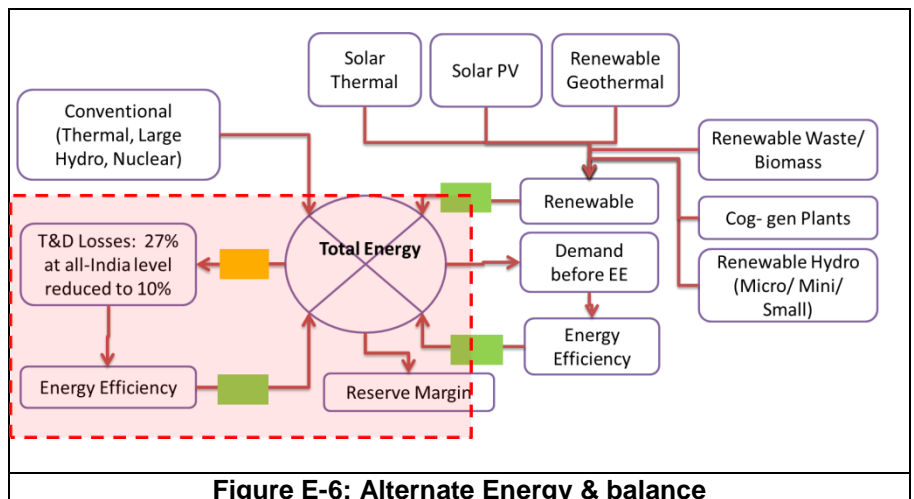
Figure E-5: Green Vision for Sustainable Development

The infrastructure demand, strategies and plan have been a holistic approach taking into account all economic sectors.

- **Transportation Strategy & Plan:** The transportation strategy and plan has been developed on the following major approaches;
  - **Increased Transportation & Logistic Efficiency** by increasing the density of higher order roads for the use of freight traffic and provision of adequate logistic hubs in anticipation of potential demand.
  - **An Integrated Multi-Modal Transport System** that serves the traffic generators (such as IMCs, industrial regions, urban centres and growth centres) with road & rail accessibility and further links the freight terminals, inland waterways, logistic centres, airports and seaports and ensuring last mile connectivity.
  - **Promotion of modal shift from road to rail, road to IWT and rail to IWT** in region towards promotion of green transport system and minimising carbon emissions; promote public transportation system by increasing the efficiency of all transport modes.
  - Strategies towards achieving this vision include – (a) development of international and regional trade routes on priority, (b) extension of feeder routes to EDFC to leverage the improved freight rail facilities, (c) development of higher order roads to achieve freight transportation efficiency, (d) promotion of freight movement through IWT by integration of the terminals with all modes of transportation, (e) development of new logistics hubs based on potential industrial demand (f) development of new airports based on potential demand (considering urban population, tourism

potential, and the economic & regional connectivity considerations), and (g) development of access control NHs along the proposed EDFC.

- Energy Strategy & Plan:** The green vision for the AKIC region is to achieve a sustainable and resource efficient, low carbon development in a way that AT&C losses are minimised, and energy balance increased which can be achieved through – (a) main-streaming the renewable energy as a dependable source of energy in the energy supply demand balance, (b) efficient use of energy to produce the same quantity and quality of output such as space cooling, heating and processes (with specific application in IMCs, small townships, mixed use developments, towers/buildings), (c) capturing and converting waste heat for use in downstream activities (with specific application in IMCs, small townships, mixed use developments, towers/ buildings), (d)

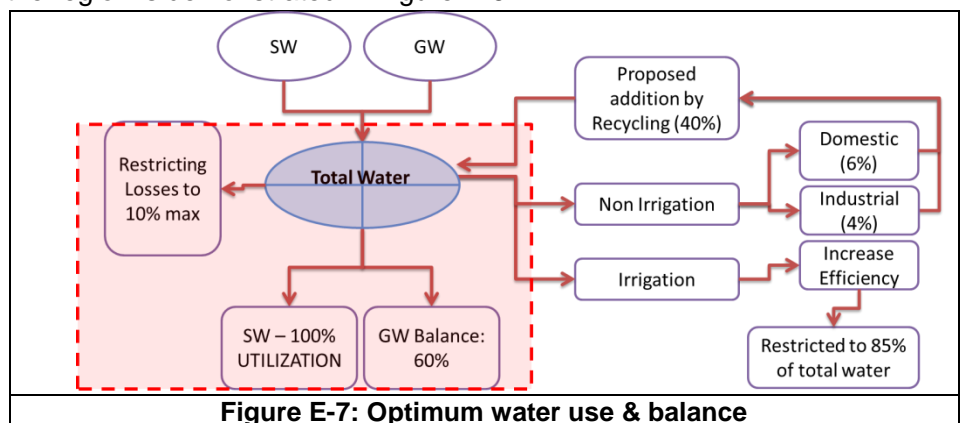


processing the solid waste (combustibles) and effluent to produce energy (with specific application in IMCs, small townships, mixed use developments, towers/ buildings), (e) reducing T&D losses within IMCs and large industrial estates by developing efficient T&D equipment such as low loss transformers and cables (can also be applicable at state-, city levels).

- The total power demand in the horizon year for the region is estimated to be 386,130 MW (~2,185,745 MU); the additional power demand over the base year is 326,636 MW (~1,846,608 MU). Based on the projections and estimation of power supply, there will be a total residual demand of 1,846,608 MU by 2037, i.e. the installed capacity of the states can fulfil only 45% & 16% of the power requirement by 2027 & 2037 respectively and this residual demand will grow up to 84% by 2037. This emphasises the need for major capacity additions in AKIC region. It is estimated that 1,24,000 MW of power demand will be met through 13 ultra-mega thermal power plants, 72 super coal based thermal power plants, while around 56000 MW demand will be met through 80 Gas based thermal power plants by 2037. Around 64,977 MW of power will be met by renewable energy sources with around 282 power units across the region. 20% of the additional power demand in 2037 shall be met from renewable sources.
- Technological improvement in manufacturing sector, cross sectoral enhancements in power consumption, generation & consumption at source, reduction in losses are some of the key strategies that are required for demand side management of power. It would result in lower power intensity per unit of GDP and contribute towards reduction in carbon emissions. An alternate energy and balance for the region is demonstrated in Figure E-6.

- Water & Wastewater Integration:**

The green vision in terms of water and wastewater is to minimise the losses and achieve increased balance through reduction of fresh/ surface water demand, reduction in (UFW & NRW) losses, maximisation of GW reserve. Measures for meeting water demand for industries and ensuring sustainable use of water resources include (a) allocation of 10% of water for domestic and industrial, (b) adaptation of



of GW reserve. Measures for meeting water demand for industries and ensuring sustainable use of water resources include (a) allocation of 10% of water for domestic and industrial, (b) adaptation of

zero liquid discharge policy and RWH in industrial areas, (c) minimizing irrigation water demand and water use efficiency, (d) efficient management of water transmission and distribution systems, (e) improved water supply management.

- Water Balance in the AKIC region in 2037 has been proposed based on – (a) redistribution of water to meet the industrial and domestic needs, (b) introduction of recycling to minimise demand of industrial and domestic needs and limit it to approximately 10% of overall water availability as per National Water Policy 2012, (c) reducing water availability in the agricultural sector where further efficiencies of water use is required, and (d) capping GW utilisation to sustainable limits. An optimum water use and balance chart for the region is demonstrated in Figure E-7.

## E.10 PHASING & IMPLEMENTATION PLAN

The vision of AKIC requires a series of interventions in priority sectors over the next 20 years. The interventions suggested in the form of theme initiatives and priority projects (refer Table E-4) have been identified for the Corridor Development Authority to be undertaken in Centre-State collaboration. Theme initiatives are considered to be broad areas/ components which would shoulder the AKIC perspective plan; these initiatives include the economic development (industry), and sustainable development (infrastructure) in the AKIC region. These are broad areas where initiatives need to be taken (further studies, charting a road map, identification of projects and implementation)

<b>Economic Development (Industry)</b>	<b>Sustainable Development (Infrastructure)</b>
<ul style="list-style-type: none"> <li>○ Cluster Development</li> <li>○ Skill development</li> <li>○ Industrial Policy Initiatives</li> <li>○ Technical Assistance &amp; Capacity Building</li> </ul>	<ul style="list-style-type: none"> <li>○ Integrated Transportation System</li> <li>○ Integrated Water &amp; Wastewater Systems</li> <li>○ Solar power, &amp; other green energy projects</li> <li>○ Supply Chain Infrastructure for Agro Industry Linkages</li> </ul>

While growth and demand have been charted for the 20 year duration, certain infrastructure projects have been classified as projects of national and/ or state level significance; these projects will help ease out the existing saturation and bottlenecks, and are hence proposed for implementation in the immediate-/ short to medium term phases; refer Table E-4.

**Table E-4: List of High Priority Projects**

Sl. No.	Projects
<b>Pilot Integrated Manufacturing Clusters (IMCs)<sup>6</sup></b>	
1.	Rajpura-Patiala IMC, District Patiala, Punjab
2.	Saha IMC, District Ambala, Haryana
3.	Khurpia-Prag IMC, District Udham Singh Nagar , Uttarakhand
4.	Bhaupur IMC, District Kanpur Dehat, Uttar Pradesh
5.	Gamhariya IMC, District Gaya, Bihar
6.	Barhi IMC, District Hazaribagh , Bihar
7.	Raghunathpur IMC, District Puruliya , West Bengal
<b>2nd Batch of Integrated Manufacturing Clusters (IMCs)</b>	
1.	Shambhu-Ghanour, District Patiala, Punjab
2.	Manakpur, District Yamunanagar, Haryana
3.	Pantnagar IIE, District Udham Singh Nagar, Uttarakhand
4.	New Khurja EDFC station, District Khurja, Uttar Pradesh
5.	Hathia, District Jamui, Bihar
6.	Devipur, District Deoghar , Jharkhand
7.	Panagarh Industrial Park, District Bardhaman, West Bengal
<b>EDFC &amp; Feeder Route Projects</b>	
1.	Eastern Dedicated Freight Corridor Ludhiana to Dankuni & Feeder Routes
2.	Extension of EDFC main line from Ludhiana to Attari border, Punjab
3.	New EDFC Feeder Route from Uttarakhand IMC Khurpia to Khurja
4.	Extension of EDFC Feeder Route from Gaya to Nepal via Raxaul & Birganj, Bihar
5.	Extension of EDFC Feeder Route from Pakur to Siliguri , West Bengal
6.	Extension of EDFC feeder route from Kolkata Port to Kulpi and Sagar ports, West Bengal
<b>Seaports</b>	
1.	Development of Sagar Port, West Bengal

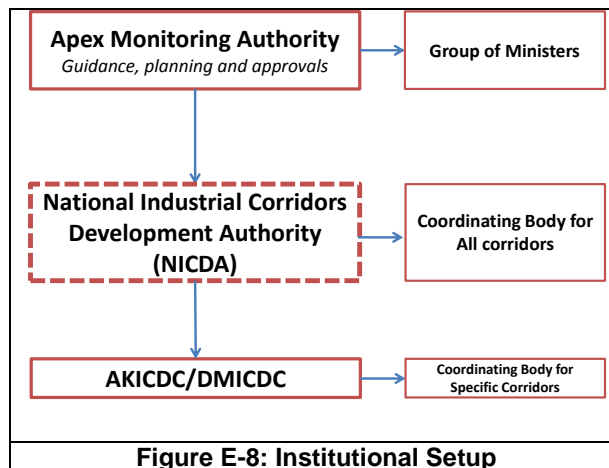
<sup>6</sup> As regards the IMC site/ land availability, all states within the AKIC region are at different levels of preparedness. It may be noted, the implementation of several pilot IMCs, including their land procurement, is envisaged in a phased manner. PI refer to Part B (Final Concept Master Plan) report for details on pilot IMCs,

Sl. No.	Projects
2.	Development of Tajpur Port, West Bengal
3.	Development of Kulpi Port, West Bengal
<b>Inland Waterways</b>	
1.	Dredging and desilting of NW-1 and converting 20 floating terminals to permanent ones.
<b>Highway Upgradation</b>	
1.	Main NH corridor along the EDFC comprised of AH 1, GQ and NS corridor (NH3, NH44, NH19 NH41 and NH16)
2.	Pathankot-Dasuya-Jalandha-Barnala-Ajmer Sections (NH44, NH703 and SH13)
3.	Ludhiana-Chandigarh-Panchkula-Shahzadpur-Jagadhari-Saharanpur-Chhutmalpur-Dehradun Sections (NH5, NH7 and NH344)
4.	Delhi-Gurgaon-Dharuhera-Bawal Sections of NH48
5.	Roorkee-Meerut-Hapur-Moradabad-Rampur-Rudrapur Sections (NH334 and NH9)
6.	Rampur-Bareilly-Lucknow Sections (NH530 and NH30)
7.	Sitarganj-Pilibhit-Bareilly Sections of NH30
8.	Agra-Jhansi-Sagar Sections of NH44
9.	Muzaffarpur-Gorakhpur-Faizabad-Lucknow-Kanpur-Jhansi-Shivpuri Sections of NH27
10.	Alipurduar-Dhupguri-Siliguri-Purena-Begusarai-Muzaffarpur Sections (NH27, NH17, NH517, NH717, NH10, NH231, NH31 and NH122)
11.	Begusarai-Bihar Sharif-Nawada-Barhi Sections (NH33 and NH20)
12.	Siliguri-Kishanganj-Malda-Farakka-Berhampore-Krishnanagar-Kolkata-Kulpi-Sagar Sections of NH12
13.	Pantnagar Kichcha Section of SH 37
14.	Chalbalpur Raghunathpur Purulia Section of SH5
15.	Upgradation to NH, Dumka to Sahibganj IWT Terminal
16.	Upgradation to NH, Umarpur to Behrampore IWT Terminal
17.	Upgradation to NH, Debagram to Guskhara IWT Terminal
18.	Upgradation to NH, Krishnanagar to Burdwan IWT Terminal
19.	Upgradation to NH, Katwa- Kalna- Dankuni IWT Terminal
20.	PR-9 road from Greater Mohali airport to connect with NH-44 near Patiala Bye-Pass or near village Kanwarpur to support the development of Rajpura Patiala IMC
<b>Airports</b>	
1.	Patiala Airport, Punjab
2.	Rohtak Airport, Haryana
3.	Hisar Airport, Haryana
4.	Hazaribagh Airport, Jharkhand
5.	Bhagalpur Airport, Bihar
6.	Deoghar Airport, Bihar
7.	Durgapur Airport, West Bengal
<b>Logistic Hubs</b>	
1.	Multi Modal Logistic Park, Ludhiana
1.	New ICD Development in South Uttarakhand
2.	Multimodal logistic hub, near Firozabad
3.	Multimodal logistic park in Kanpur
4.	Proposed Logistic Park & expansion of existing ICD, Dadri
5.	Multimodal Terminal at Ghazipur
6.	Multi modal terminal at Varanasi
7.	Multimodal Terminal at Haldia
8.	Multimodal Terminal at Tribeni/ Kalyani
9.	Multi Modal Logistic Hub at Tajpur
10.	Multimodal Logistic Hub in near Rajpura
11.	Multimodal Logistic hub in Kharkhoda
12.	Multimodal Logistic hub in Khurpiya-Prag
13.	Multimodal Logistic Hub in Kanpur
14.	Multimodal Logistic Hub in Agra
15.	Multimodal Logistic hub in Gamhariya
16.	Multimodal Logistic hub in New Barhi
17.	Multimodal Logistic hub in Raghunathpur
<b>Water Supply Projects</b>	
18.	Surface Water Supply Project for Khurpia Prag IMC, Uttarakhand IMC
19.	Surface Water Supply Project for Bhaupur IMC, Uttar Pradesh
20.	Surface Water Supply Project for Gamharia IMC, Bihar



The implementation of the AKIC Development Programme shall be undertaken by AKICDC/DMICDC under the overall institutional framework that has been set up at National levels. It is expected that a project of a massive scale as the AKIC perspective plan can be successfully implemented with sharing of responsibility by various line departments, and support from government agencies.

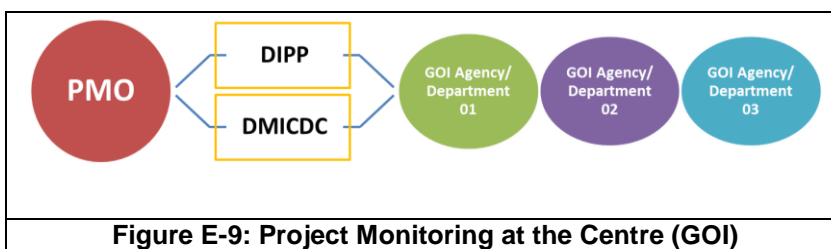
A mega AKIC project of large magnitude is expected to involve several stakeholders at various levels who will impact the development of AKIC in different ways. These stakeholders are a key to success of AKIC and hence a proper marketing approach should be followed to influence them (Figure E-8).



- Centre-Centre & Centre-State Collaboration:** To realise regional development projects and prepare action plans on the theme initiatives several Central Government departments would need to be partnered with (a) DMICDC, (b) M/o Water Resources/ CWC, (c) NHAI, (d) M/o NRE, (e) NTPC, NHP, and PGCL, (f) DFCCIL/ M/o Railways, (g) CONCOR, (h) NWAI, M/o Irrigation, & MOEF, and (i) M/o Civil Aviation, & AAI (Figure E-9).
- For planning and implementation within States various state agencies in AKIC states will include – (a) State D/o Transport, PWD, (b) State D/o Irrigation, (c) M/o Agriculture, (d) State D/o Electricity, Power generation and distribution corporations, State Electricity Board, (e) State D/o NRE, (f) D/o Technical Education, (g) Development authorities/ ULBs, and (h) SPV for IMC; Figure E-10.
- Public Private Partnership:** There will be opportunities for public-private participation and investment during planning and implementation of the AKIC region; some indicative projects/ areas are: (i) Transport and logistics, (ii) Water merchandise, (iii) Energy merchandise, and (iv) Smart industrial townships. Out of these stakeholders, infrastructure developers, industries and realtors are also the customers of the investment opportunities in AKIC.

AKIC Development programme is of National significance. GOI has envisioned that the manufacturing industry shall grow at an unprecedented rate and contribute to the overall economic growth of the country. AKIC is a key contributor towards this Vision. The GOI is seen to facilitate the development through involvement of various government departments and agencies as regards implementation of various national level infrastructure projects. These projects are better coordinated and monitored for timely implementation by the M/o Commerce and Industry through DIPP/ DMICDC as the nodal agency.

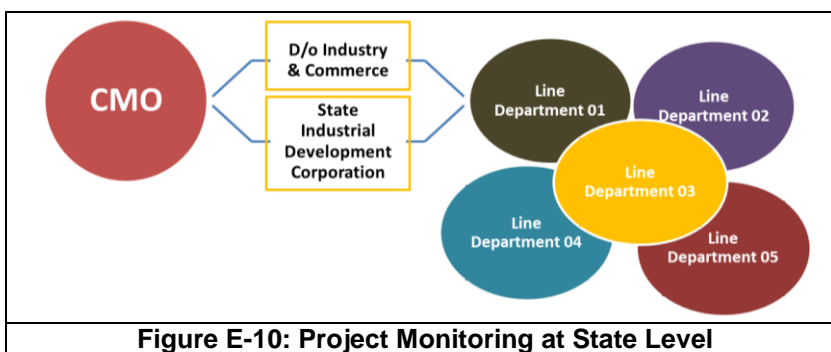
The respective state government will do good to keep track and monitor the implementation activities as per the agreed timelines of the project. The Chief Minister's officer would need to form a cell to continuously monitor and advise on the action plan.



**E.11 PROJECT IMPACTS**

The AKIC development programme would result in several positive impacts.

- Increase in Economic Activity (mainly manufacturing)/ growth, 2-3% over current growth rates



- Reduction in Inequality in Income/ Redistribution of Economic Activity
- Increase in job opportunities for people, Create 1 million jobs from IMCs in Phase 1 and 37 million by 2037.
- Increase in Global Integration, Increase in exports from 20% to 37% of output
- Increase in Human Capital, skilling of human resources
- Creation of global standard infrastructure, Expressways, Logistic Hubs, IWWs, Airports, Seaports
- Greening Impacts, achieve 100% recycling, 20% renewable energy, land optimisation and reduced T&D losses in IMCs.

Yet impacts are dependent on the successful rollout of the AKIC programme. A successful implementation of the AKIC programme would enable growth in economy by about 9% and generation of close to 4 crore jobs. In case the programme falls short of its expectations AKIC contribution to national economy (and its transformative growth needs) would fall short. Growth would be around 7-8% creating 2-3 crore jobs (refer Table E-5).

**Table E-5: Scenario Comparison on Key parameters – 2037**

Scenario	Other Sectors	Impact on GSDP (Lakh Crore)	Value of Output (Lakh Crore)	Investment (Lakh Crore)	Incremental Employment (million)
<b>BCS: 5-6% pa growth in manufacturing sector</b>	Constant growth in Primary, gradual growth in Tertiary	7%	55	3	22
<b>ACS: 8% growth in manufacturing sector</b>	Relatively Slower growth in primary & tertiary	8%	100	5	27
<b>AIS: 10 % growth in manufacturing sector</b>	Fast growth in Primary & Tertiary	9%	135	6	37

Most importantly AKIC would enable contribution towards the UN Sustainable Development Goals and commitments made by India in the Paris Agreement (refer Table E-6).

**Table E-6: AKIC Impacts on Global Commitments**

INDIA	AKIC
<ul style="list-style-type: none"> <li>• Reduce the country's emissions intensity per unit GDP by 33 to 35% below the 2005 level by 2030</li> </ul>	<ul style="list-style-type: none"> <li>• EDFC and WDFC together are expected to reduce emissions by about 457 million ton CO2 over a 30 year period</li> <li>• GHG reduction can achieve up to 2.9 million ton CO2e from the deployment of identified green initiative in the IMCs by horizon year.</li> <li>• AKIC Programme promotes rail transport and Inland waterways. Rail transport emits 28 gram CO2 equivalent per NTKM as compared to 64 gram per NTKM in case of road transport.</li> <li>• Per capita energy consumption is low, further reduced for demand estimations at a regional level and IMC level.</li> </ul>
<ul style="list-style-type: none"> <li>• To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund (GCF).</li> </ul>	<ul style="list-style-type: none"> <li>• 20% energy from renewable sources in IMC includes waste to energy, geothermal and solar energy.</li> </ul>
<ul style="list-style-type: none"> <li>• Enhancing Energy Efficiency In Industries</li> </ul>	<ul style="list-style-type: none"> <li>• Strategies to support Zero Effect, Zero Defect (ZED)</li> </ul>
<ul style="list-style-type: none"> <li>• To create an additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.</li> </ul>	<ul style="list-style-type: none"> <li>• Sites for Integrated Manufacturing Clusters identified with priority given to Government and barren lands. Forest lands only being converted in 1 IMC of Jharkhand. Compensation of Forests included as part of Project Cost.</li> <li>• Further, industrial strategies include suggestion on the protection of natural resources.</li> </ul>

## E.12 CONCLUSION

The development of industrial corridors and regions along the dedicated freight routes and national highways is a major economic growth paradigm that the GOI has envisaged. These corridors and the AKIC project will bring in investments and raise the contribution of manufacturing sector to India's GDP,

besides yielding new employment opportunities, and multiplier benefits. This is achievable through enabling institutional mechanism and quality infrastructure.

Among the many outcomes and impacts of the AKIC perspective plan will include increase in – industrial investments, industrial output (including multiplier effect), GVA, employment (including multiplier effect), GSDP and impact on national economy, exports, in-migration & skill development (human capital), labour productivity, per capita income, transport connectivity, infrastructure facilities, IMCs<sup>7</sup>, and brownfield industrial parks, and green impacts – altogether benefiting the people and economy of the nation as a whole. AKIC would also have an impact on the global commitments on sustainable development.

The AKIC programme, for a successful implementation, calls for the following programmes/ activities to be taken forward, and implemented as proposed –

- Pursue the high priority projects as presented in Chapter 9 and engage further studies on thematic areas.
- Early formation/ setting up of agencies for implementation of the proposals of the Perspective Plan, and monitoring the progress; and
- Setting up of funds for implementation of proposals beyond the pilot IMCs.

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<sup>7</sup> IMCs will be among the most visible projects on AKIC. The states are nonetheless constrained of land for industrial development. The states may further look up to the Gol for guidance/ arrangement of funds for land procurement.

# 1. INDUSTRIAL CORRIDORS IN INDIA – A NEW GROWTH PARADIGM

## 1.1 THE CONTEXT

The Government of India (GoI) has launched a national programme for building a pentagon of Industrial/ Economic corridors in the country (Figure 1-1). The programme is aimed at unleashing the manufacturing potential of the country, raising its contribution to GDP thereby achieving – (a) accelerated development, (b) inclusive growth and (c) gainful employment.

Enabled with ease of access, the corridors are conceived to foster global manufacturing and investment destination hubs and smart cities with the best in-class infrastructure. The corridors are (Figure 1-1):

- Delhi-Mumbai Industrial Corridor (DMIC), 1483 km; first corridor in the league, project under implementation;
- Bengaluru-Mumbai Economic Corridor (BMEC), 1000 km;
- Chennai-Bengaluru Industrial Corridor (CBIC), 560 km;
- East Coast Economic Corridor (ECEC) with Vizag- Chennai Industrial Corridor as the first phase of the project (VCIC), 800 km; and
- Amritsar-Kolkata Industrial Development Corridor (AKIC), 1839 km.

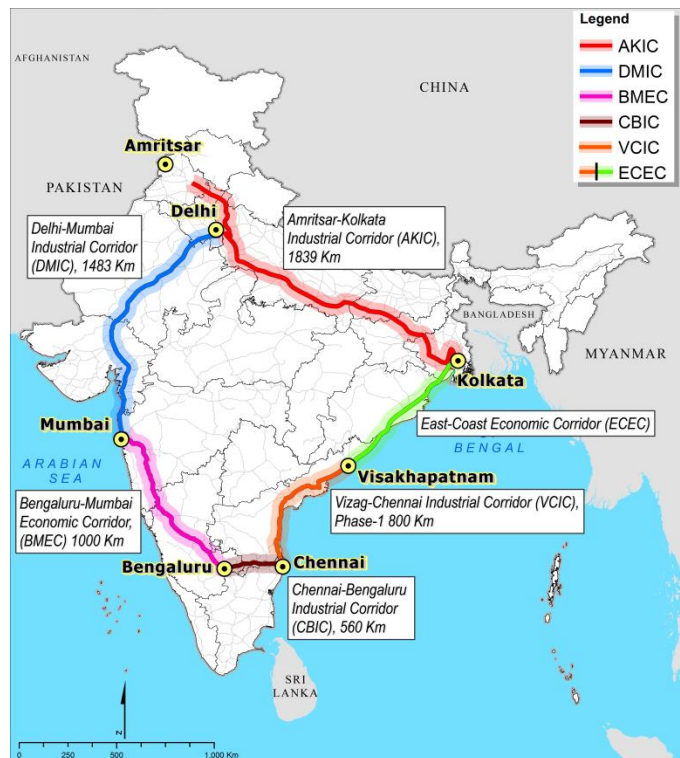
The development of AKIC is expected to leverage – (a) the proposed Eastern Dedicated Freight Corridor (EDFC), (b) the existing National Highway system and (c) National Waterway-1, connecting Allahabad with Haldia (refer Figure 1-23 for Base Map).

### 1.1.1 THE EDFC AND ITS SECTIONS

The Eastern Dedicated Freight Corridor (EDFC) is envisaged to traverse a length of over 1839 km along the existing railway line across six Indian states and serve the important origin-destination points, between Ludhiana in Punjab, and Dankuni in West Bengal, catering to the movement of commodities including coal, ores, steel, food grains, petroleum, oil and lubricants (POL), fertilizer, cement, containers, and others; Figure 1-2. The corridor has been divided into six sections as in Table 1-1; it is funded by the World Bank loan of US\$ 2.725 billion.

The corridor is expected to complete by end of 2019, the commissioning will happen in a phased manner with a section slated for December 2017. All tasks relating to planning, construction, operation and maintenance of all DFCs in the country have been entrusted to the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a Special Purpose Vehicle (SPV) of the Ministry of Railways, Government of India.

The EDFC is planned to meet with the Western Dedicated Freight Corridor (WDFC; Delhi Mumbai Industrial Corridor) through a spur line between Dadri and Khurja in Uttar Pradesh. The success of AKIC project, other such industrial corridors in the country, and the envisioned economic growth are contingent to the timely implementation of the rail freight network.



**Figure 1-1: Industrial Corridors in India**

Source: DIPP

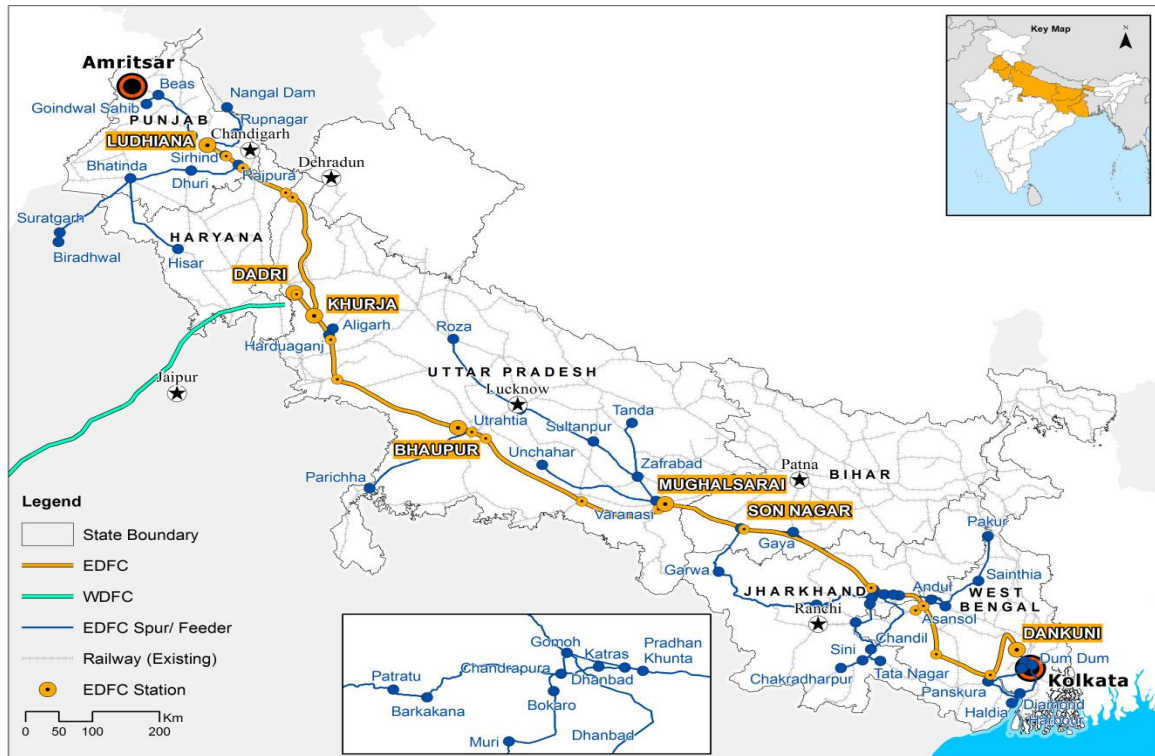


Figure 1-2: The Alignment and Feder Links of EDFC

Source: DFCCIL

Table 1-1: Various Sections of the Corridor

Sl. No.	EDFC Sections	Length (km)	Timelines	Funding agency
1	Mughalsari to Sonnagar	126	December 2017	Railway Funded
2	Bhaupur to Khurja	342	March 2018	World Bank Funded
3	Bhaupur to Mughalsarai	402	December 2018	World Bank Funded
4	Dadri to Khurja	46	December 2018	World Bank Funded
5	Khurja to Ludhiana	401	December 2019	World Bank Funded
6	Sonnagar to Dankuni	533	Based on finalisation of PPP Contract	PPP basis

Source: Press Brief, DFCCIL, 16th Feb, 2016.

### 1.1.2 EDFC INFLUENCE

The AKIC planned along the alignment of the EDFC is conceptualised to connect the states of Punjab and West Bengal through the Hindi heartland of Haryana, Uttarakhand, Uttar Pradesh, Bihar, and Jharkhand. The AKIC states cover nearly 20% of India’s geographical spread, inhabit about 40% of its population, and contribute over 27% to country’s GDP. The objective of planning and development of an industrial corridor is to trigger the economic and employment potential of the region by creation of quality industrial infrastructure and a business friendly environment along the freight (railway) spine, thereby attracting investments and industrial development.

A region carved out of a 200 km buffer along the EDFC is likely to be inclusive of (apart from 7 AKIC states): (i) the National Capital Territory of Delhi (NCTD), and the Union Territory of Chandigarh within the heart of the AKIC region; (ii) the state of Himachal Pradesh, and parts of Jammu & Kashmir in the north of identified states; and (iii) parts of Rajasthan, Madhya Pradesh, Chhattisgarh, and Odisha states, in the south of the identified states (refer Figure 1-3).

The geographical areas beyond the seven states of Punjab, Haryana, Uttarakhand, Uttar Pradesh, Bihar, Jharkhand and West Bengal currently do not include in the scope of work, and hence make as shadow zone of EDFC influence. These areas will benefit if included in the purview of the AKIC region, at a later stage which may call for some exercise as regards identification of future industry locations (IMCs), suitable industry (market assessment), support infrastructure, and the desired business environment (enabling mechanism). For all practical purposes, therefore, the seven states as above make the study area for the current study, i.e. preparation of perspective plan for the AKIC region.

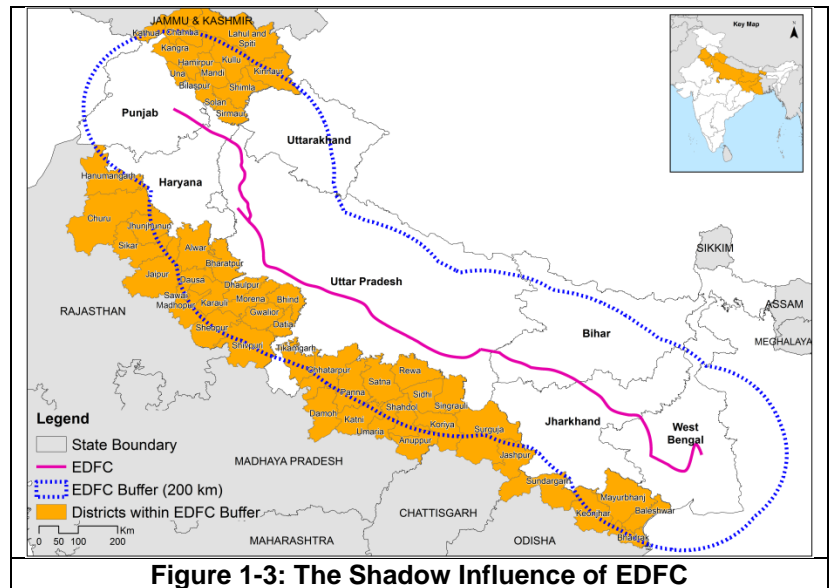


Figure 1-3: The Shadow Influence of EDFC

## 1.2 PREPARATION OF PERSPECTIVE PLAN

### 1.2.1 DOMAIN OF SERVICES

The setting up of AKIC was approved by the Government of India (GoI) in January 2014 to realise the above objectives, and the Delhi-Mumbai Industrial Corridor Development Corporation Limited (DMICDC) entrusted the responsibility of being the nodal agency.

The DMICDC subsequently, through international competitive bidding, appointed LEA Associates South Asia Pvt. Ltd, India (LASA) in joint venture with Ernst & Young LLP, India (EY) as their Consultant for preparing the Perspective Plan for the region, and feasibility study and Concept Plan for seven Integrated Manufacturing Clusters (IMCs) across the AKIC states.

The objectives of this assignment are twofold: (a) preparation of a regional perspective plan for the AKIC region, along with developing a strategy for transforming the region into a globally competitive manufacturing and investment destination through sustainable development; and (b) to undertake feasibility study and concept master planning for establishing one Integrated Manufacturing Cluster (IMC) in each of the AKIC States in consultation with respective state government.

Further, the benefits of development of AKIC, including impact on regional growth, employment, industrial output, exports and human capital need be assessed for the region as a whole and IMC in particular.

The horizon of the perspective plan is 20 years; further goals and scope for addressing the objectives include the following:

- Finalisation of the delineation of the corridor and its influence area within the seven states;
- Setting out the macro level development vision and targets for the corridor and evolving the strategies to achieve the same. These targets need be physically, environmentally and financially sustainable, while the strategies should facilitate balanced regional development that reduces regional imbalance and creates economic agglomeration and industrial clustering;
- The perspective plan should aim at creating opportunity for greater economic integration, improved transport efficiency, increased public-private partnership and enhanced economic competitiveness;
- Promotion of industrial development particularly in the manufacturing, agro-processing, services and export oriented units in the AKIC region that would help to attract investments in manufacturing from across the world and in parallel, enhance the competitiveness of local manufacturers to global standards;
- Identification of IMC in consultation with respective state governments to be taken up for feasibility study and concept master planning;

- Recommendations for development and upgradation of the regional infrastructure linkages, including feasibility of seamless, efficient, dedicated and sustainable connectivity across the corridor, and with the hinterland as well as export markets;
- Defining the roles and responsibilities of various stakeholders (including but not limited to Government of India and the states involved);
- Developing a green vision for AKIC which identifies opportunities for the implementation of best practices in sustainable development and includes resource-efficiency targets for the corridor's infrastructure; and
- Creation of a phasing strategy for AKIC development.

The following key words may briefly look to define the scope of work of PART A of the project: (i) define region, (ii) unit of analysis, (iii) measurement of development, (iv) identify best practices, (v) drawing parallels, (vi) the long term development vision/ perspective – physically-, environmentally- and financially sustainable targets, (vii) reduced regional imbalances, (viii) economic and industrial agglomeration/ clustering, (ix) development strategy, (x) plan preparation, (xi) development priorities, (xii) phased development, (xiii) make the region competition worthy (globally competitive!), (xiv) most potential industry with suitable locations as models of development, (xv) inward investment flow, (xvi) transform the economy, create employment, and (xvii) benefit analysis and impact assessment – growth, employment, output exports, human capital.

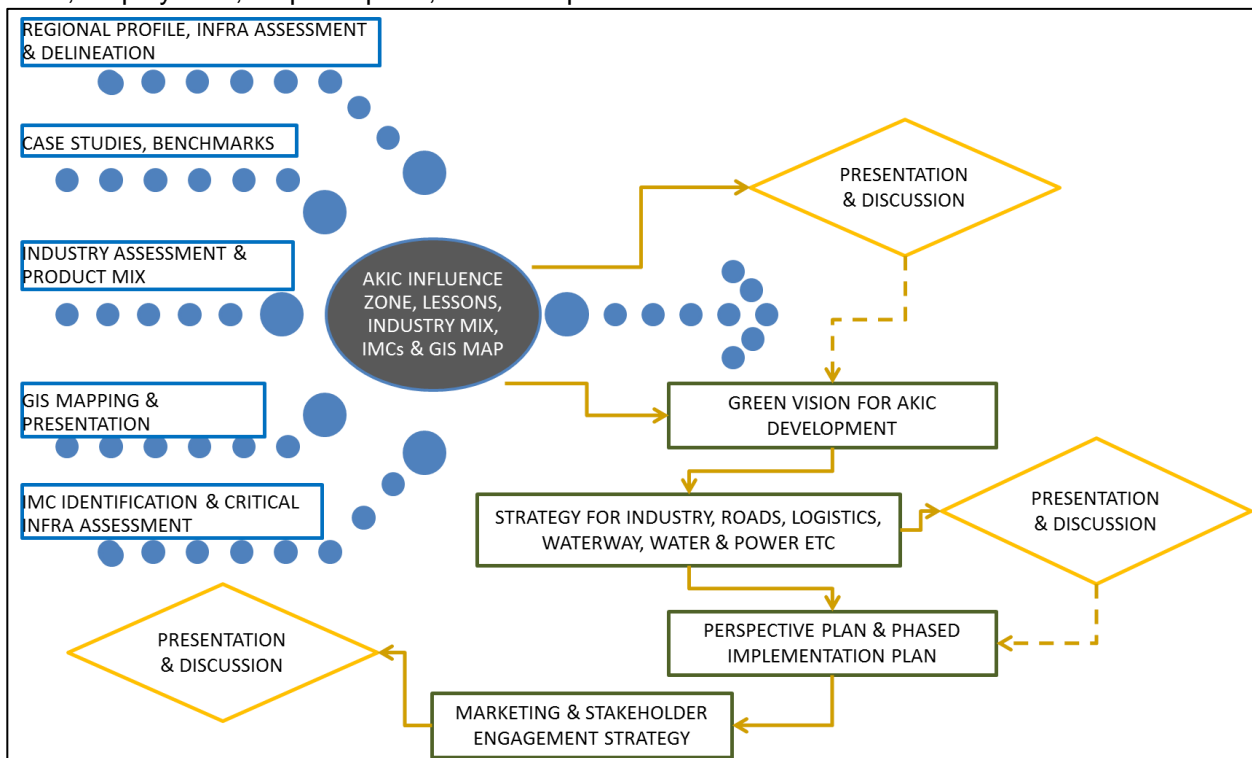


Figure 1-4: Framework of the Perspective Plan

### 1.2.2 FRAMEWORK OF THE PERSPECTIVE PLAN

The industrial and/ or economic corridors are meant to attract investment and generate economic activities within a contiguous region, on the foundation of an efficient transportation system. These are meant to provide two important inputs for competitiveness: lower distribution costs and high-quality real estate. The corridor approach for industrial development primarily takes advantage of the existence of proven, inherent and under-utilized economic development potential within the region.

Apart from the development of infrastructure, long-term advantages to business and industry along the corridor include benefits arising from smooth access to the industrial production units, decreased transportation and communications costs, improved delivery time and reduction in inventory cost. The strategy of developing an industrial corridor is thus intended to develop a sound industrial base, served by competitive infrastructure as a prerequisite for attracting investments into export oriented industries and manufacturing.

The industrial/ economic corridor integrates infrastructure development with the trade, investment, and other economic potentials of a set of specific geographical areas, while at the same time undertaking efforts to address social, environmental, and other potentially adverse impacts of increased connectivity. It is hence the most comprehensive and holistic strategy for industrial and economic development, that improves and enhances investments in transport, energy, and telecommunications in the region. Figure 1-4 presents a broad framework of the perspective plan. The approach to various aspects of the project has been detailed and discussed as the report progresses.

### 1.3 AKIC IN LARGER REGIONAL CONTEXT

It is of paramount importance that the EDFC is nationally linked with northern, southern and western corridors providing impetus to the national economy per se. The pentagon of proposed industrial corridors would bring production centres and consumption markets closer. While the industrial corridors are conceptualised on the backbone of the manufacturing sector, there is expected a multiplier impact on the region as a whole including the growth in the primary and tertiary sectors. The EDFC (currently under construction in stretches) is a transport corridor that would form spine of transportation networks, provide linkage to major centres of articulation (e.g. gateways and hubs), and convergence of freight and passenger flows.

Also, India is uniquely placed in South Asia. It connects with most of the countries of the region that do not have contiguous borders, and also serves as a vital link between East and West Asia. A trans-national economic corridor requires linking of national plans and corridors. The seven AKIC states fall on an international trade route<sup>1</sup> (Figure 1-5), and are well connected with South Asian-/ South East Asian countries through a good road- and rail connectivity, thus offering the region a great advantage.

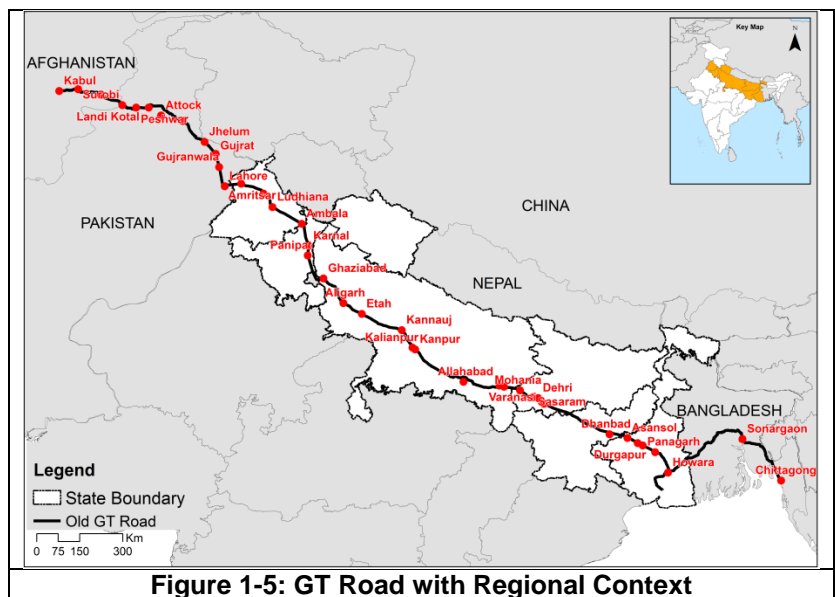


Figure 1-5: GT Road with Regional Context

This is enhanced cooperation among the members of the South Asian Association of Regional Cooperation (SAARC) that have agreed to set up a South Asian Economic Union, the Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation (BIMSTEC), and the Asia-Pacific Trade Agreement (APTA). Besides, India has adopted the “Look East” policy and is engaged in enhancing economic cooperation with Association of South East Asian Nations (ASEAN) and countries belonging to the East Asia Summit (EAS) that brings together ASEAN and eight of its partner countries including India.

The linking of Indian corridors with neighbouring countries and corridors in the continent (Figure 1-6 & Figure 1-7) is for the reason that India has significant trade with ASEAN, South Asia, West Asia (comprising of developed/ emerging nations) that should be further strengthened.

The AKIC region thus has a much larger regional context, and its good planning and development will help strengthen the cause of industrial productivity and growth, further establishing linkages with international markets and consumption centres.

<sup>1</sup> The Grand Trunk (GT) Road has historically connected Kolkata with Kabul and Chittagong. This route has been strengthened and updated as GQ.





### 1.4 ECONOMIC CORRIDORS

The industrial corridor called as AKIC has been conceptualised along the EDFC with the objective of triggering the economic and employment potential of the region by creation of quality industrial infrastructure and a business friendly environment along the rail-based freight spine, thereby, attracting investors into industrial development.

The three international corridors selected as benchmarks have similarities with EDFC/ AKIC in the sense that they cover a sizeable length (700-1400 km), connect with many metropolitan cities, and serve a large population; their study and lessons drawn may be replicated in the long term perspective plan for development of the AKIC region.

#### 1.4.1 INTERNATIONAL CORRIDORS

The economic corridors are meant to attract investment and generate economic activities within a contiguous region, on the foundation of an efficient transportation system. They are meant to provide two important inputs for competitiveness – lower distribution costs and high-quality real estate.

Several corridors are being developed to constantly promote growth and development; this includes -

- Rotterdam-Antwerp-Genoa Corridor: It's the first European transnational corridor conceptualised along freight corridors feeding into the European freight corridor system.
- The Boston-Washington (Bos-Wash) Corridor, USA is the most heavily urbanized region in USA connecting some of the biggest metropolitan cities in the country.
- Quebec-Ontario Trade Corridor & Continental Gateway, Canada links Canada with North America and is supported by other key corridors of Canada.

The exercise suggests that the economic/ industrial corridors go a long way in facilitating and stimulating the manufacturing industry as well as the overall economic and social development of the region.

##### 1.4.1.1 Rotterdam-Antwerp-Genoa Corridor, Europe

Rotterdam is one of the busiest ports worldwide whereas Genoa is among the most important sea ports in the Mediterranean Sea. Ports require an excellent connection to the European hinterland which can be offered by the corridor. The corridor stretches all along the 'Blue Banana', the busiest economic region in Europe.

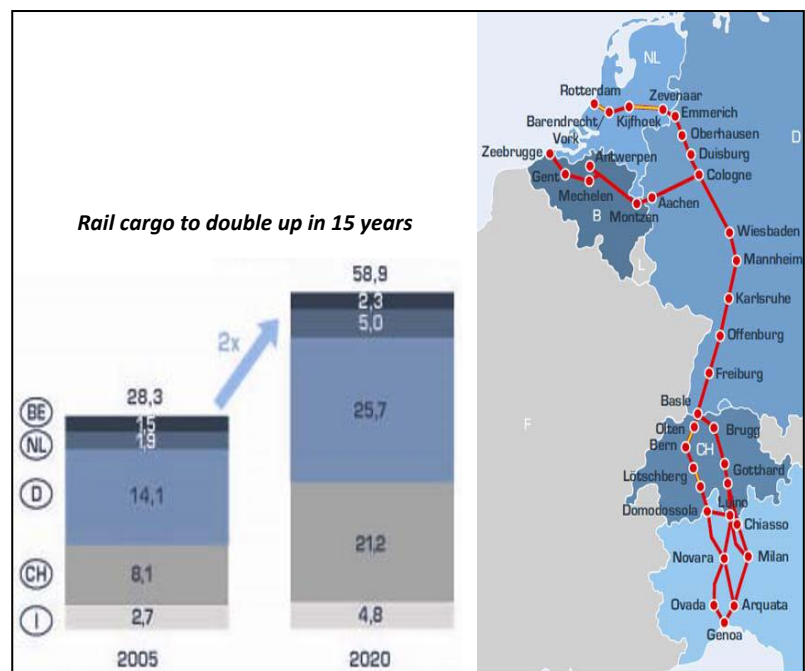


Figure 1-8: Blue Banana Corridor

The Blue Banana corridor (Figure 1-8) constituted of two freight corridors<sup>2</sup> passes through four countries, namely – Italy, Germany, the Netherlands and Switzerland. It is home to around 100 million people, out of a total of 730 million for all of Europe.

All urban centres are served and connected by the corridor, receiving a large number of international freight trains. The line distance between Rotterdam and Genoa is 1400 km, while it is 1500 km between Zeebrugge and Genoa, with 22 hour transport time end to end. There is 4900 km length of

<sup>2</sup> (a) EU railway freight corridor No. 1 along the river Rhine (particularly Rotterdam Milano) called the central corridor (Genoa not yet connected), and (b) EU railway freight corridor No. 2, particularly Antwerp-Metz within the Blue Banana (less important) constitutes a bypass for traffic to central corridor.

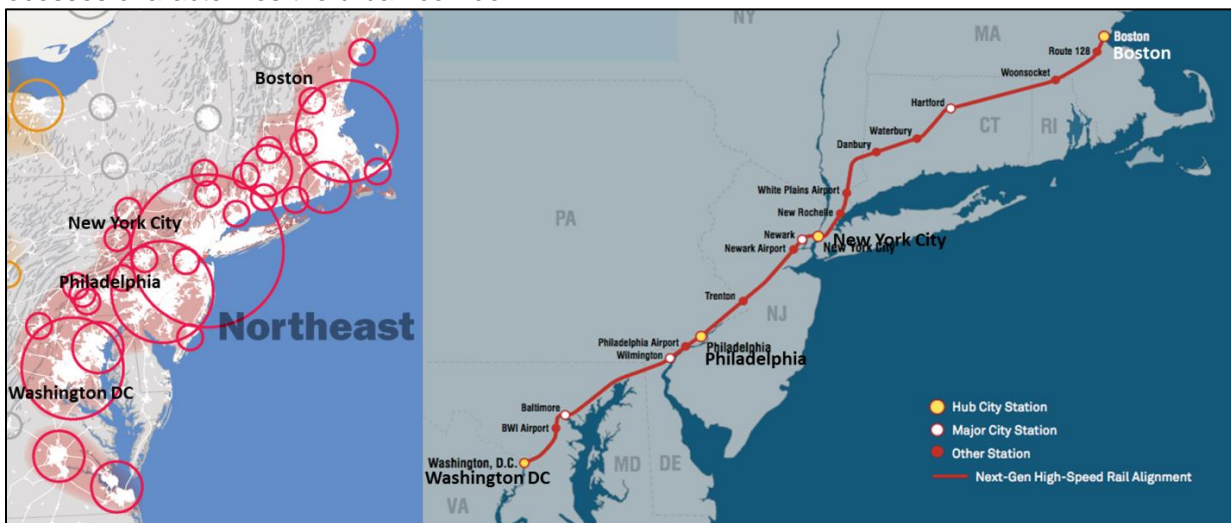
tracks on the corridor, enjoying tremendous connectivity with gateways, i.e. 4 seaports, and 6 inland ports.

It includes major seaports such as Rotterdam and Antwerp (#1 and #2 in Europe, both in the world top 20); airport hubs like Heathrow, Frankfurt and Schiphol (#3, #11 and #14 in the world); and the headquarters of the European Union, the European Parliament, the International Court of Justice, NATO and the European Central Bank.

The corridor began operations in 2005 and has high freight transport demand. The rail cargo is expected to double up by the year 2020. The transportation policies of each country are promoting shift from road to rail based movement, more attractive inter-operability so as to gain from the advantages of a cross-border high speed transit system. This corridor is going to be an integral part of the European Union freight corridors.

**1.4.1.2 The Boston-Washington Corridor, USA**

The Boston-Washington Corridor (Bos-Wash Corridor; Figure 1-9), also known as Northeast Corridor (NEC)/ megalopolis is the most heavily urbanized region of the United States of America (USA), running primarily northeast to southwest from the northern suburbs of Boston, Massachusetts, to the southern suburbs of Washington, DC, in Northern Virginia. It includes the five major metropolitan areas of Boston, New York City, Philadelphia, Baltimore, and Washington, DC, along with numerous smaller urban areas with indistinct functional boundaries between them. Overlapping influences of large metropolitan areas, their inter-relatedness and their relationships with local, regional and global processes characterizes the urban corridor.



**Figure 1-9: The Boston-Washington Corridor**

The corridor is 735 km long and supports a productive economy and a growing population. The NEC region is home to more than 51 million people, accounting for 17% of USA’s population (year 2000) with less than 2% of country’s landmass; the significance of the corridor as a sphere of consumption is undisputable. The NEC region is the most densely settled region in the USA with a population density of 359.6 people/ sq km, compared to the USA average of 31 people/ sq km) – over ten times greater than the national average. America 2050 projections expect the area to grow to 58.1 million people by 2025.

The NEC is a resource rich railroad accounting for 20% of the USA’s GDP. The NEC region is an international centre for education, healthcare, technology, media, and finance. Six of the ten top US universities are located along the NEC. Ten of the twenty eight top US adult and children’s hospitals are located along the NEC. Six of the ten largest financial institutions in the world are based in New York. It is used by eight commuter rail operators, and four freight railroads.

One out of three Jobs in the NEC region is within 8 km of an NEC station. Over 100 million square feet of development lies within walking distance of the ten largest NEC stations. The share of residents who take public transportation to work is three times higher than the national average of 5 percent, and far higher for jobs located in core cities.

Freight railroads move nearly 400 million tons of freight in the NEC region each year. Quonset is an intermodal hub, with its own airport and the Port of Davisville. NEC's location along the shore in many areas, ports in New Haven, New London, Providence, and Davisville are only connected to the national freight rail network via the NEC. The Port of Baltimore connects manufacturers like Ford, Case New Holland, and John Deere to global markets with a direct rail connection via the NEC. The airports in NEC region serve 244 million annual passenger trips, representing 30 percent of all US trips.

**1.4.1.3 Quebec-Ontario Trade Corridor & Continental Gateway, Canada**

The Continental Gateway or Quebec-Ontario Trade corridor (QOTC; Figure 1-10) is an important component of Canada's multimodal transportation system, and a key gateway to North America<sup>3</sup>. The central location of the Continental Gateway facilitates international trade and the domestic inputs towards foreign trade with USA and other key trading partners. The Continental Gateway includes strategic ports, airports, intermodal facilities and border crossings as well as essential road, rail and marine infrastructure that ensures transport connection to, and seamless integration with, Canada's other gateways – Asia-Pacific and Atlantic.

The Continental Gateway initiative is focused on developing a sustainable, secure and efficient multimodal transportation system that keeps Canada's economic heartland competitive, attractive for investment and essential for trade. The QOTC runs 1150 km from Quebec to Ontario connecting Montreal, Dorval, Toronto and Windsor providing direct access to major North American markets with over 135 million consumers in less than 1000 km which is less than a day truck trip.

The development of industrial infrastructure and logistics facility is a key to competitive trucking industry, i.e. providing logistics services for customers, international repackaging, and satellite tracking systems, as well as integrated green technologies. Toronto (Lester B. Pearson) and Montréal (Pierre-Elliott-Trudeau and Mirabel) airports transport over 250 million tons of cargo each year on the St. Lawrence River–Great Lakes system.



**Figure 1-10: The Continental Gateway, Canada**

The Port of Montréal, open all year round, is the second largest container port in Canada. It handled nearly 1.5 million of twenty foot equivalent containers (TEUs) in 2008. The two major Canadian railroads travel along the QOTC. More than 60% of Canada's GDP is generated within the Ontario-Quebec region.

International corridors have demonstrated how geographies/ strategic locations, fully integrated supply chain and multi-modal transportation network offer strategic competitive advantages and have resultant benefit in economic development. The following are relevant inferences that may be drawn;

- Corridors promote integrated transportation systems – road, rail, inland waterways, ports, airports, and logistics. Corridors connect hinterlands with ports.
- Significant infrastructure investments are made by Government/private sector to realise further trade and industries.
- Corridors integrate into the regional/cross country/transnational economic corridors.
- Economic corridors have been built on the backbone of manufacturing sector.
- Internationally efforts are still being taken towards making rail freight attractive to enable shift from road to rail

<sup>3</sup> USA consists of 70% of Canada's international trade.

### 1.4.2 INDIAN ECONOMIC/ INDUSTRIAL CORRIDORS

#### 1.4.2.1 Delhi-Mumbai Industrial Corridor

The Delhi-Mumbai industrial corridor (DMIC) is 1483 km long industrial corridor (Figure 1-1 & Figure 1-11), the first in India, embracing six states (Haryana, Uttar Pradesh, Gujarat, Maharashtra, Madhya Pradesh, and Rajasthan), and the dedicated freight line (WDFC) cutting all through in the middle. The corridor is comprised of a mix of investment regions (each 200+ sq km in area), and industrial areas (each 100+ sq km in area) to facilitate the economic growth.

The DMIC states<sup>4</sup> have been traditional centres of economic activity with approximately 43% contribution to India's GDP in 2004-05. The region also contributed more than half of India's industrial production and exports, accounting for 40% workers and number of factories. The industrial sectors with greatest growth potential in the region include – (i) automobile an auto components, (ii) textiles and apparel, (iii) light and heavy engineering, (iv) chemicals including petrochemicals, plastics and pharmaceuticals, (v) food products and beverages, and (vi) IT/ ITES. The forecast in manufacturing (2009-39) suggested 350% growth in value of manufacturing output between 2010 and 2020, i.e. from INR 15.2 billion to INR 212.6 billion – a CAGR of 13.2% between 2010 and 2020, and 9.2% between 2010 and 2040.

The corridor is projected to yield INR 212,637,984 million worth value of output as against the BAU scenario of INR 80,959,933 million value of output by 2040. The employment required to generate the above value of output would grow from existing 3.4 million in 2009 to 28.7 million in 2040.

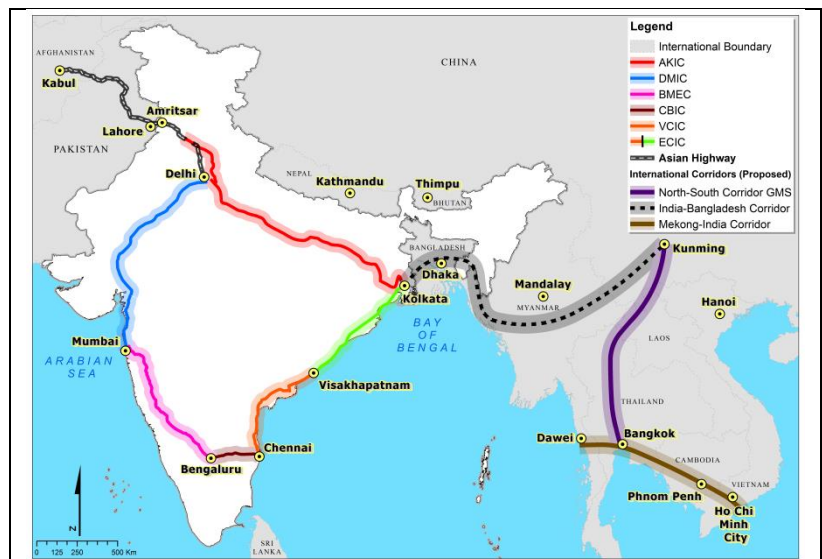
#### 1.4.2.2 Bengaluru-Mumbai Economic Corridor

The Bengaluru-Mumbai Economic Corridor (BMEC; Figure 1-1 & Figure 1-11) is a 1000 km industrial corridor aimed at promoting the Peninsular Region Industrial Development (PRIDE) in central and southern India by way of connecting Chennai and Bengaluru with Mumbai, in collaboration with Government of United Kingdom (UK).

BMEC is expected to generate a turnover of USD 40,000 million by 2040-41 with a total land demand of 85,000 hectares. The region is expected to create 65 million employment opportunities by 2040-41; 31 million employment will come from BAU scenario, and the rest (33.7 million) courtesy economic corridor initiatives (BIS). The estimated exports will be worth USD 86,000 million in 2040-41 with nodes generating 92% (USD 79,000 million) exports. The industrial development in the region is estimated to require investments of USD 105,200 million by the horizon year with 88% of this going into the identified nodes.

#### 1.4.2.3 Chennai-Bengaluru Industrial Corridor

The Chennai-Bengaluru industrial corridor (CBIC) is a 560 km long corridor (Figure 1-1 & Figure 1-11) aimed at achieving accelerated industrial agglomeration and regional development in line with the National Manufacturing Policy (NMP; 2013), and support from JICA. It is comprised of sets of projects including industrial parts at delineated nodes, access to sufficient utilities such as water and power, and connectivity through road and rail to markets, ports, and airports. The priority infrastructure investment in the region is seen to yield higher economic activity in a short run.



**Figure 1-11: Industrial Corridors in India Connecting with South Asian Corridor**

Source: Consultant's analysis.

<sup>4</sup> More discussion on economy, industry etc in DMIC region is given in Section 2.5, Chapter 2 of this report.

The CBIC is planned to cover 16 districts spread across the states of Tamil Nadu, Karnataka, and Andhra Pradesh. The corridor development plan envisages development of the region for attracting domestic and foreign investment in industry by providing world class infrastructure, connectivity to eastern ports, associated soft infrastructure and policy support allowing rapid inclusive industrial growth with sustained employment creation.

A total of eight industrial nodes identified on the corridor includes – (i) Ponneri industrial area (42 sq km; Ponneri taluk), (ii) Hosur industrial area (27 sq km; Hosur taluk), (iii) Mulbagal NIMZ (70 sq km; Kolar), (iv) Kanchugaranahallikaval industrial area (42 sq km; Bidadi), (v) Vasanthanarasapura industrial area (6 sq km) and Tumakuru NIMZ (48 sq km), (vi) Hindupur industrial park (32 sq km), (vii) Pileru NIMZ (52 sq km; Chittoor), and (viii) Krishnapatnam (31 sq km).

*48.5 million people with varying poverty levels live in states along the VCIC. As per estimates, Andhra Pradesh, Tamil Nadu, Odisha and West Bengal had, in 2012, poverty levels of 9.2%, 11.3%, 32.6%, and 20.0% respectively. The industrial output and the net value added is most concentrated in Tamil Nadu, accounting for over 10% of total Indian industrial output and value added.*

The focus industrial sectors to drive the economic growth in CBIC include – (a) machinery, (b) electrical machinery, (c) pharmaceuticals, (d) automobile, and (e) computer, electronics and optical (CEO) products. The IT sector and financial services will be important too in the services sector contributing to the growth in GDP. The employment scenario is anticipated to change from 4 million under BAU scenario to 22 million in BIS.

#### 1.4.2.4 Vizag-Chennai Industrial Corridor

The Vizag-Chennai industrial corridor (VCIC) is an important 800 km long segment and the first phase of the planned East Coast Economic Corridor (ECEC; Figure 1-1 & Figure 1-11) project, meant to be India's coastal corridor. VCIC is aligned with GQ and is poised to play a critical role in driving India's 'Act East Policy' which focusses on increasing the integration of the Indian economy with the economies of the Association of South East Asian Nations (ASEAN). VCIC's long coastline and strategically located ports provide it with an opportunity to create multiple international gateways to connect India with the vibrant global production networks of South East and East Asia that form the bedrock of global manufacturing. The ports are critical to unlocking the potential of VCIC and seen as a source of value added to domestic and global supply chains.

The industrial sectors identified as drivers of industrial development include – (i) food processing, (ii) pharmaceuticals, (iii) auto and auto components, (iv) textile, (v) metallurgy, (vi) chemicals and petrochemicals, and (vii) electronics. Small and medium sized enterprise (SME) development is a key priority on the corridor, and an emphasis has been laid on developing supply chains for integrating SMEs.

*With 4.1% population and 3.6% land area, CBIC region contributes 6% to the national GDP and hosts 15.6% of India's MSMEs. The MSME sector contributes to 65% employment in the CBIC corridor.*

The node based industrialisation strategy in VCIC is targeted to achieve regional and global competitiveness and infrastructure development is seen as one of the most important levers to attain this core objective. The enabling infrastructure include multi-modal transport infrastructure to enable competitive supply chains, and other infrastructure to enable competitive value-addition. Among the proposed regulatory framework include – (a) regulatory issues specific to VCIC that improve the investment climate and facilitate the establishment of enterprises, such as a single window system for start-up related approvals and the ongoing operations of existing firms; and (b) regulatory issues involving more than one state, such as the transit of goods across state borders or through ports. The trade facilitation and implementation of the single window system are critical to reducing the cost of doing business and integrating into global value chains.

The total land demand for industrial development is worked out as 178 sq km, which is distributed over four geographical locations (nodes) that are anticipated to drive the growth of industry, supported by a multi-modal transport system that would connect demand centres, urban clusters, and international gateways. These nodes include – (a) Visakhapatnam node (~46 sq km; Visakhapatnam district), (b) Kakinada node (~40 sq km; East Godavari district), (c) Kankipadu Gannavaram node (~22 sq km; Krishna district), and (d) Yerpedu, Srikalahasti node (~37 sq km; Chittoor district).

## 1.5 INFERENCES FOR AKIC

An industrial corridor is pivotal to economic growth for it reduces trade barriers, and increases the outreach of production and consumption centres. The international benchmark corridors have proved to be so for they cater to high freight movement, international connectivity through ports and gateways, faster travel and reduced trip time, strategic competitive advantage etc. They demonstrate how geographies/ strategic locations integrated with supply chain and multi-modal transportation network offer strategic competitive advantages and result in economic development.

The corridors demonstrate the vision and plan execution to good effect:

- The European (Blue) corridor connects with 4 countries, i.e. 100 million people over 1500 km; it has tremendous connectivity with gateways (4 seaports & 6 inland ports) that make it possible to move goods. The cargo will double up in 15 year time span (2005-2020), courtesy, policies that promote shift from road to rail based freight movement, and cross border high speed transit system.
- The Bos-Wash corridor (NEC) connects 5 metropolises over 734 km with over 51 million people. It has the services of excellent ports and airports, serving 244 million annual air passenger trips, i.e. 30% of all USA trips.
- QOTC gives Canada access to a large consumer base (135 million consumers over 1100 odd km), thus capturing 70% of USA market. Toronto and Montréal airports fulfil the air cargo requirement of the corridor. 60% of Canada's GDP is generated within Quebec-Ontario region served by the corridor.

The corridor approach to industrial development takes advantage of the existence of proven, inherent and underutilized economic development potential within a given region; the corridor also brings together the long-term advantages that include benefits arising from smooth access to the industrial production units, decreased transportation and communication costs, improved delivery time and reduction in inventory cost.

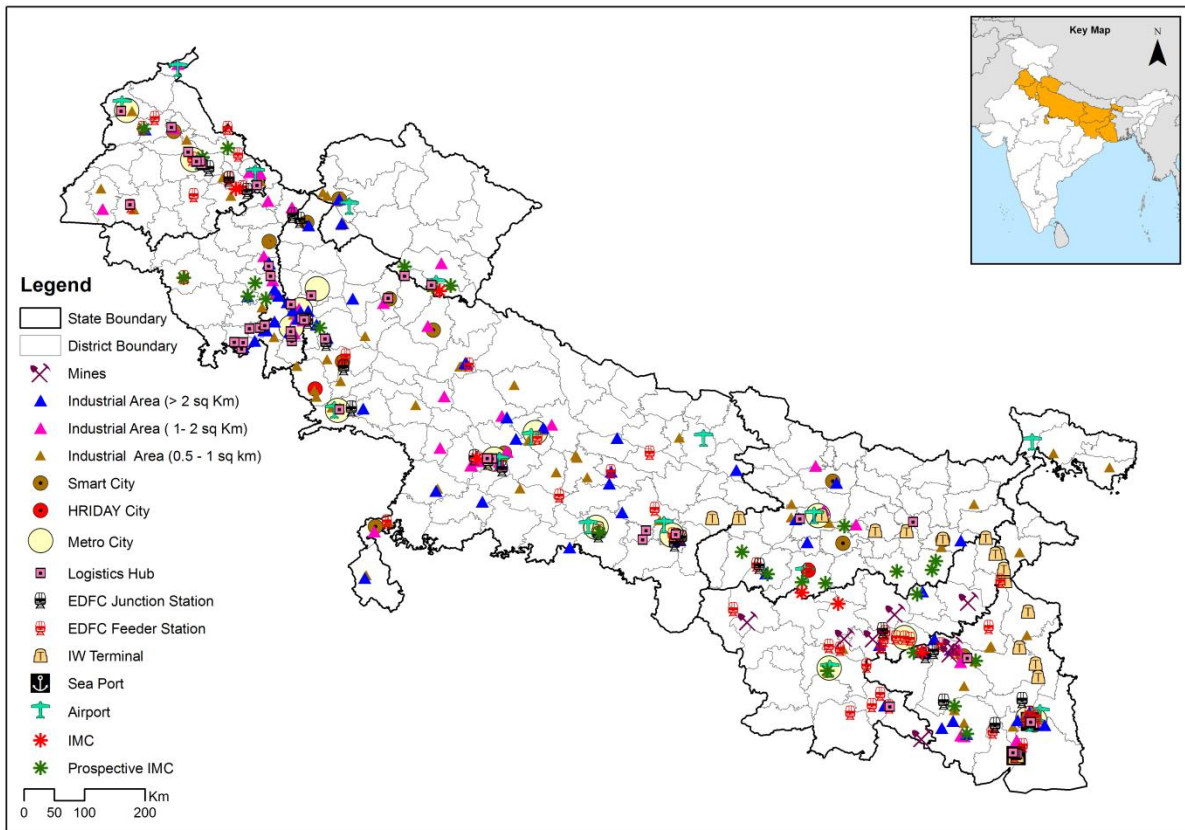
The planning of freight corridors is all about increasing the outreach of production centres and expand/internationalise the consumer base. The EDFC holds promise of a larger consumer base for it aligns with Asian trade route. The Indian corridors discussed in the chapter are either in planning stage (BMEC, CBIC, VCIC), or in implementation infancy (DMIC). The ambitious economic goals and targets on all/ simultaneous industrial/ economic corridors will nonetheless help manufacturing industry and pit them against each other for a healthy competition. A listing of lessons with summary inferences and lessons from various case studies and benchmarks that may be useful in determining location of industries, framing strategies for enabling infrastructure, and planning of IMCs in the AKIC region is contained in Annex 1.1.

## 1.6 AKIC – AN ECONOMIC TRANSFORMATIVE EFFORT

The industrial corridor called AKIC is conceptualised along the EDFC (currently under construction in stretches; refer Figure 1-2) between Punjab and West Bengal. The objective of planning and development of an industrial corridor is to trigger the economic and employment potential of the region by creation of quality industrial infrastructure and a business friendly environment along the rail-based freight spine, thereby, attracting investors into industrial development.

The AKIC region is blessed with mineral resources, is rich in agriculture, and has a significantly good presence of manufacturing industry, in addition to primary and tertiary economic activities (Figure 1-12). Among the objectives of AKIC – a region making for 1/5<sup>th</sup> of India's geographical area, inhabiting 2/5<sup>th</sup> of its population, and contributing 1/4<sup>th</sup> to country's GDP – is to leverage the construction of EDFC, supported by other enabling mechanisms to achieve an increased economic growth to create employment, and transform the region that would complement the national GDP.

The AKIC region spans across Northern India and is already a functional (albeit with constraints) transportation corridor developed around the historical Grand Trunk (GT) Road. The GT Road connected the Indian subcontinent from west (Kabul in Afghanistan) along the Gangetic plains to the east (Chittagong in Bangladesh) and was considered to be one of the longest roadways in Asia; refer Figure 1-5. It is still the lifeline of northern India providing connectivity to several Indian cities/ states.



**Figure 1-12: Multiple Engines of Economic Growth**

Source: Consultant’s analysis.

A development corridor along the historic route would form an obvious identifiable strip characterized by definite high intensity of economic and industrial activity and movement than the surrounding environment. The EDFC and the overall transport system (railways, roads, air, inland waterways, airports and seaport) will facilitate the movement of goods and services in the region and beyond, and integrate the corridor with the south Asian region and global production networks. **The AKIC is therefore an effort, and a larger development programme that holds promise to greatly transform the region into a manufacturing based economy.**

## 1.7 DELINEATION OF AKIC CORRIDOR & INFLUENCE ZONES

### 1.7.1 STAGE 1: MEASURING DEVELOPMENT AT DISTRICT LEVEL

The delineation of an industrial corridor needs to be based on a scientific approach. The Perspective Plan for DMIC<sup>5</sup> attempts to match the closest administrative boundary, i.e. the district boundary on the imaginary 200 km band along the WDFC. The World Bank study report<sup>6</sup> focuses on 120 km buffer in their analysis, hence the influence area. The approach adopted for identification of EDFC influence/delineation of AKIC region in this report is a scientifically evolved approach.

Stage 1 deals with the measurement of levels of development in EDFC influence states using the geographic information system (GIS)<sup>7</sup> platform over a set of multiple criteria as depicted in Figure 1-13.

<sup>5</sup> Perspective Plan: Delhi-Mumbai Industrial Corridor, Final Report, Volumes I & II, October 2009.

<sup>6</sup> The International Bank for Reconstruction and Development/ The World Bank [World Bank Group, Korea Green Growth Partnership, and Australian Aid], ‘Demographic and Economic Overview of the Corridor States: Punjab, Haryana, Uttar Pradesh, Bihar, Jharkhand, and West Bengal’, June 2014.

<sup>7</sup> GIS is an efficient tool for organizing, storing, analysis, display and reporting spatial information.



A set of 16 parameters (attributes) has been considered to account for various aspects including availability of data sets, its relevance to study region, and source/ authenticity of data, and clubbed together to form criteria (groups). The multiple criteria therefore include – (a) socio-economic features, (b) industrial initiative/ environment, (c) connectivity/ transport infrastructure, and (d) water resources/ potential.

The socio-economic features reflect demographic, urbanization, and economic development indicators at the district level - (i) urban population (classes I-III cities), (ii) urban area (classes I-III cities), (iii) district domestic product (DDP), and (iv) per capita DDP. The industrial environment/ initiative at district level is represented by - (i) number of registered units, (ii) area under industrial activity, (iii) investments in registered industry.

Water resources include – (i) ground water table – demonstrating severity of exploitation, (ii) ground water availability – as a measure of ground water potential, and (iii) incidence of total rainfall (mm; 1901-2000). Transportation is a significantly large group (criterion); it includes – (i) NH road density (km/population), (ii) number of railway junction stations, (iii) number of EDFC stations, (iv) number of logistic hubs, (v) number of airports, and (vi) number of Inland waterway terminals.

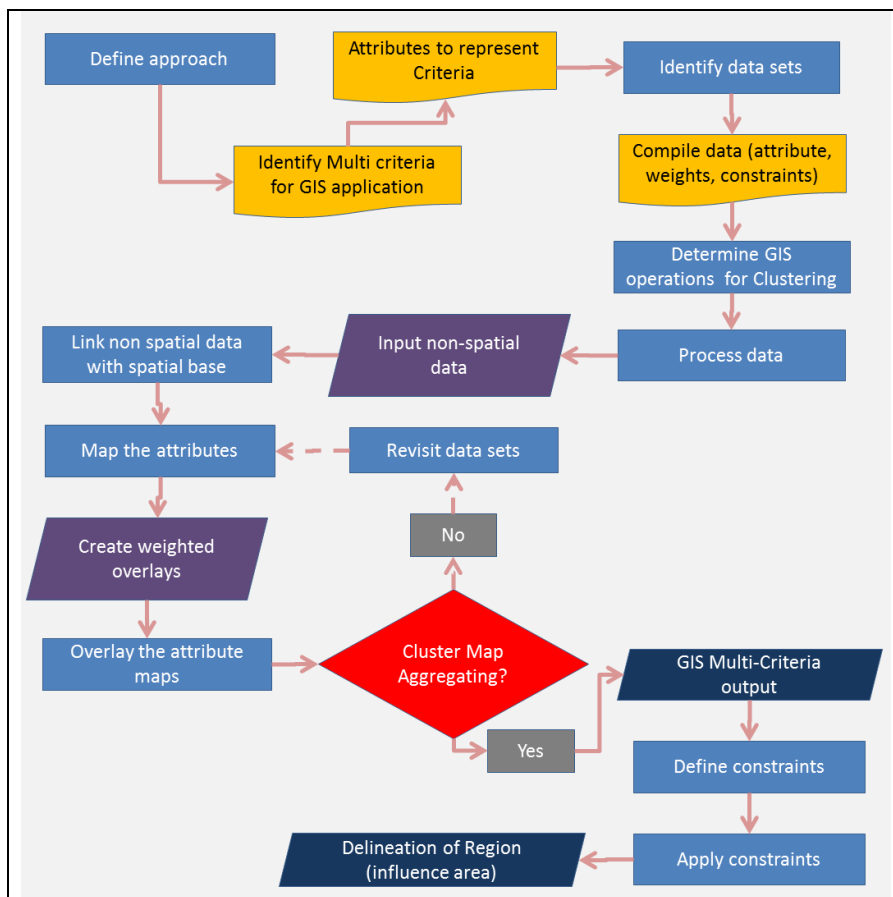


Figure 1-13: Process Flow for GIS-MCA (Stage 1)

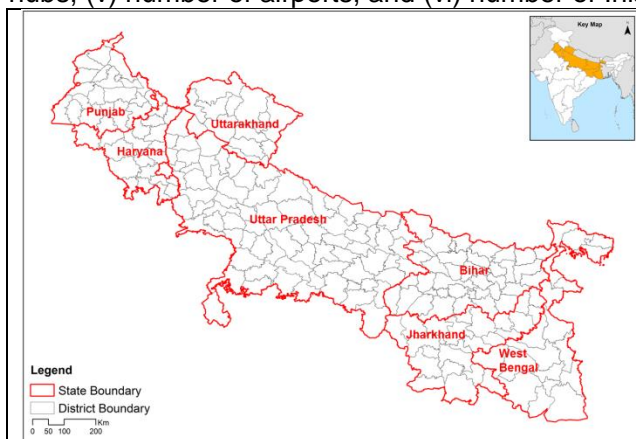


Figure 1-14: Base Map comprising 7 states

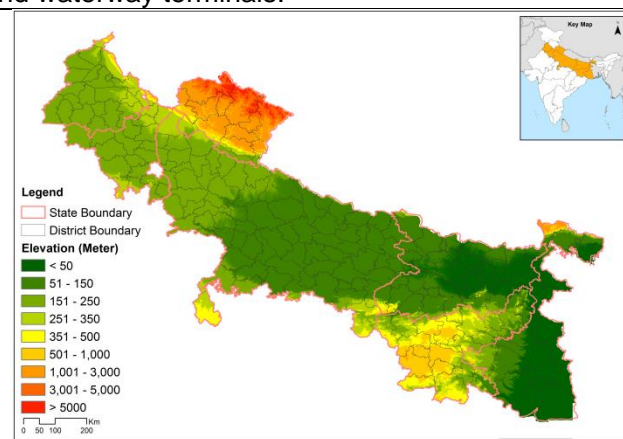


Figure 1-15: Terrain Map of AKIC states

Source: Consultant's GIS-MCA.

The base map for delineation of AKIC region includes the geographical and administrative domain of seven states – Punjab, Haryana, Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal (Figure 1-14). Figure 1-15 shows the physiographic and terrain features of the region. The district is taken as the unit for data interpretation, analysis and delineation. The details and source of data is given in Annex 1.2. All data attributes are assigned weightages reflecting their role in development, and

hence assessment (Annex 1.3). The attribute data and the weighted normalised data for usage in the GIS analysis are given as Annex 1.4.

The GIS-based assessment into levels of development at the district level is carried out in three parts, as under:

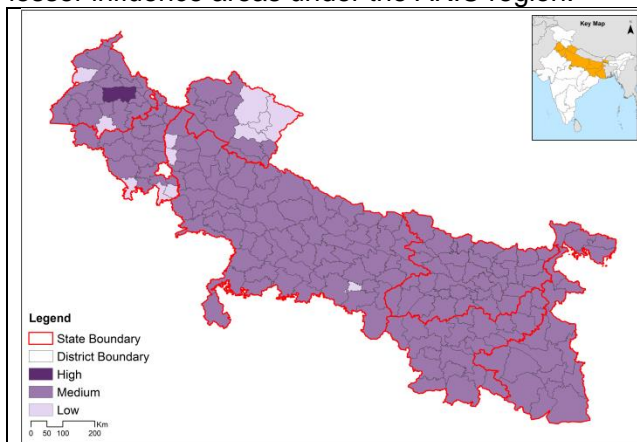
- (i) The Advantage (untraded advantage; UTA) indices represent the presence of infrastructure/ current performance at the district level through individual parameters/ attributes (Figure 1, Annex 1.5).
- (ii) The Traded Advantage (TA) indices present a trade-off for each other within a criterion, across four classes; in GIS terms this is a weighted overlay of attributes within a criterion. These indices thus produce performance rankings of districts across the region (Figure 2, Annex 1.5).
- (iii) A final overlay of all criteria demonstrates the traded levels of development in the AKIC region across the select criteria (Figure 1-16).

The results of Stage 1 assessment (Figure 1-16) suggest that almost all districts perform well in case the advantages are traded, except for a few minor variations.

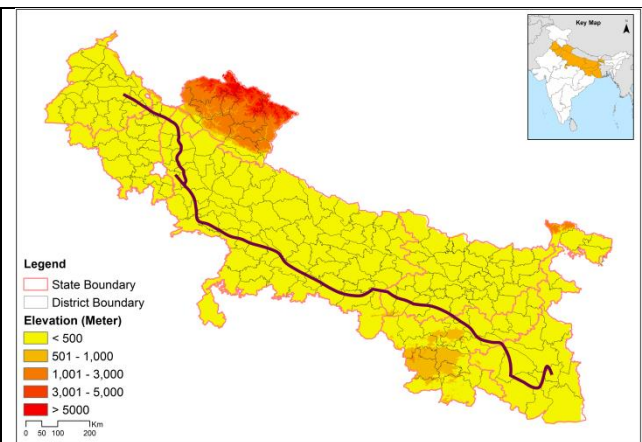
**1.7.2 STAGE 2: RINGS OF INFLUENCE**

The analysis of physiographic and terrain features of the region as depicted in Figure 1-15, shows presence of contoured lands (Trans Himalayas, Higher Himalayas, Lower Himalayas, and Shiwalik Hills), particularly in Uttarakhand state. The steep contours and unfavourable slope deter development, particularly the industrial development, and hence for reasons of inaccessibility and forest cover, there are smaller settlements and fewer industrial developments in the state.

The distance thresholds are important and would apply to the region and the EDFC would be more influential in determining the course of industrial and other affiliated development in closer districts across the region (Figure 1-17). The influence would diminish as the distance from the corridor increases, more so into the north. The districts constrained due to distance threshold will make for lesser influence areas under the AKIC region.



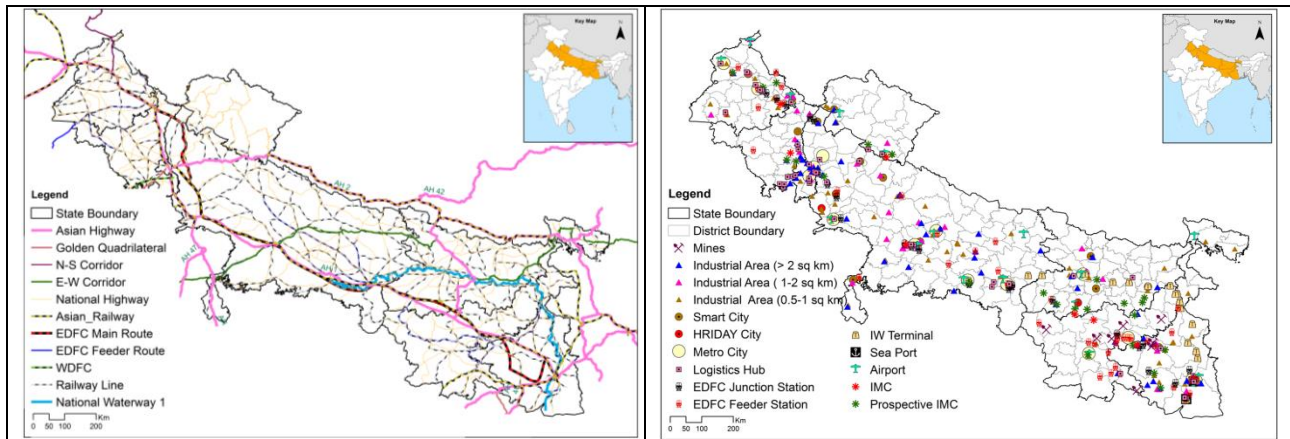
**Figure 1-16: Overlay of Indices - Development levels at District Level**



**Figure 1-17: Difficult Terrain & Distance Threshold**

Source: Consultant's GIS-MCA.

There is a large number of urban settlements, industrial centres, markets, logistic hubs, etc that are key to traffic generation and attraction in the region, in particular along the alignment of the EDFC. The corridor hence services (a) the traffic/ freight generators and attractors, (b) coal mines, iron and steel industries, other heavy industries, (c) logistic centres/ hubs and feeder rail lines as nodes/ links on the freight network, and (d) all other major/ critical network, urban centres, industry and logistic locations there around.



**Figure 1-18: Virtues of Development 1 (lines)**

**Figure 1-19: Virtues of Development 2 (dots)**

Source: Consultant's analysis.

These are some of the key developments/ features that have helped crystalize the idea of the freight corridor. The locational aspects of these features, (a) key infrastructure (shown as lines in Figure 1-18)<sup>8</sup>, and (b) development nodes (shown as dots in Figure 1-19)<sup>9</sup> make the Stage 2 of analysis leading to delineation of EDFC influence zone/ AKIC region. These infrastructure and developments, called as virtues, have together resulted in a higher level of development in certain areas/ districts.

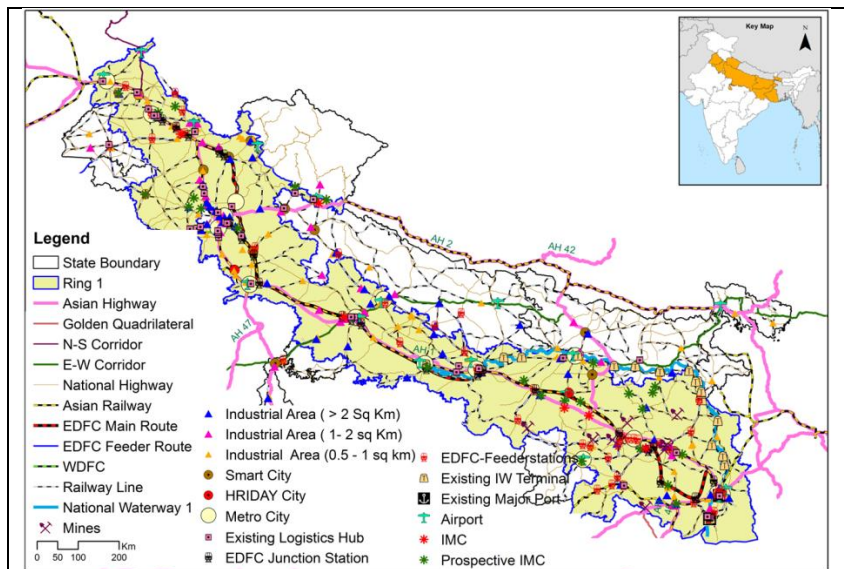
The overlay of these virtues, together with analysis of physiographic features of the region (Figure 1-15) and distance thresholds (Figure 1-17) suggests that the greatest virtue for future industrial development including the locations of pilot and future IMCs will be the EDFC that needs to be best leveraged (Figure 1-20). The EDFC influence would diminish away from the corridor, and the levels of influence of the EDFC would vary within the region.

**1.7.2.1 The Primary Influence Zone [PIZ/ Ring 1]**

As an outcome of multi-criteria analysis (Stages 1 & 2), the districts broadly falling within 75-100 km range of EDFC alignment would make for Ring 1 or the primary influence zone (PIZ; Figure 1-21 & Figure 1-22), as per the state wise details given in Annex 1.6.

**1.7.2.2 Constrained Districts [Ring 3]**

The physical constraints such as difficult terrain and distance threshold have pushed some districts, particularly, in the states of Uttarakhand and West Bengal outside the PIZ in the region despite their reasonably good performance in GIS based multi-criteria analysis (Stage 1). These districts are classified as Ring 3 or constrained districts. Apparently there are physical constraints as regards proposing development in the state of Uttarakhand that include – (i) difficult terrain, (ii) eco-sensitivity and dense forest cover, and (iii) long physical distance from the EDFC route.



**Figure 1-20: Overlay of All Virtues**

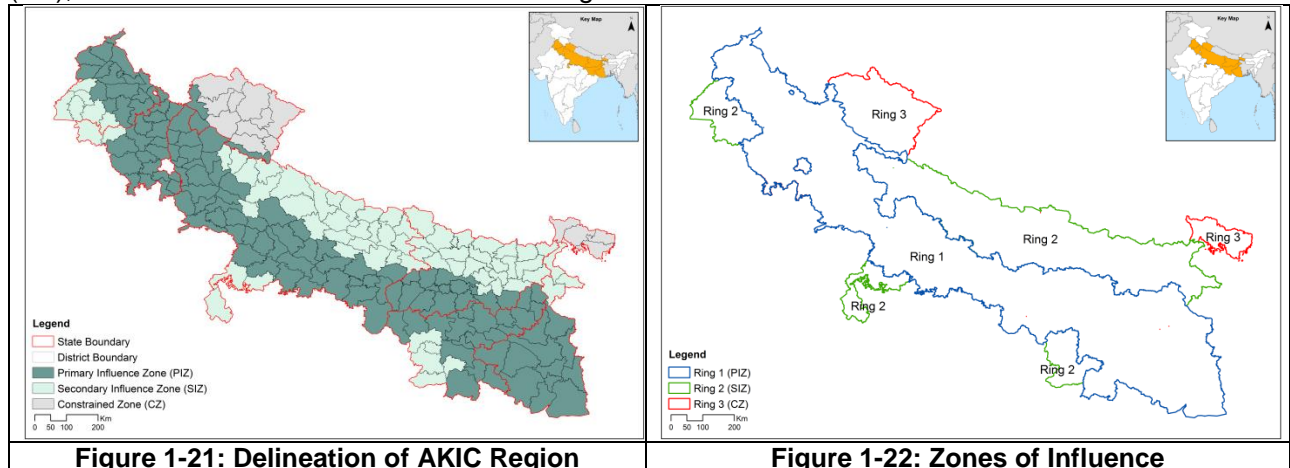
Source: Consultant's analysis.

<sup>8</sup> The lines include – (i) Golden quadrilateral, (ii) North-South transport corridor, (iii) East-West transport corridor, (iv) National highways, (v) Railway lines, (vi) National waterway 1, (vii) EDFC line, and (viii) EDFC feeder lines.

<sup>9</sup> The dots include – (i) Mines and industry, (ii) Urban, Smart-, and HRIDAY cities, (iii) IWT, logistic hubs, seaport, airport, (iv) EDFC stations, (v) IMCs

**1.7.2.3 The Secondary Influence Zone [SIZ/ Ring 2]**

The overlay of credentials/ attributes in Stage 1 analysis has demonstrated that all districts in the seven states have performed well, but for the reason that many of them fall beyond the 75-100 km distance threshold of the freight corridor, all of them do not qualify to be part of PIZ/ Ring 1. The influence zone defined on the basis of performance of districts and post demarcation of PIZ/ Ring 1 and CZ/ Ring 3 is hence called as secondary influence zone (SIZ/ Ring 2). Simply put, the Ring 2 or the secondary influence zone consists of the remaining districts of the 7 states except for Ring 1 (PIZ) and Ring 3 (CZ); refer to Annex 1.6 for details of these rings/ zones.



It is hence important to note that the delineation proposal does not disqualify any parts of the seven states from the AKIC region based on 2-stage analysis i.e. proximity to enabling infrastructure, physical constraints, and distance thresholds etc. The industrial development will nonetheless be based on the industrial climate, demand and other such parameters in the region.

The delineation process has been a consultative process with State Government departments. A list of meetings with State Governments as well as review meetings with DMICDC has been enclosed in Annex 1.7.

**1.7.3 THE RELEVANCE OF INFLUENCE ZONES**

The AKIC region is too vast to achieve equitable benefits of construction of a freight corridor. There is presence of metropolitan cities, urban centres, industrial centres, mines, IMCs, logistic hubs, airports, ports, and multiple modes of transport close to the EDFC, i.e. GQ, NS corridor, EW corridor, NHs, railway lines, national waterway 1, EDFC line (refer Figure 1-18 and Figure 1-19) which means that there is higher industrialisation, urbanisation, and concentration of population closer to the corridor. Going forward, it would make sense to locate industrial zones/ IMCs in close proximity to the EDFC. The identification of rings of influence will help identify future industrial locations including IMCs, and decide and prioritise on infrastructure investments etc.

**1.8 STRUCTURE OF REPORT**

The final report on Perspective plan (Part A of the TOR)<sup>10</sup> has been compiled in eleven (11) chapters<sup>11</sup>. **Chapter 1** establishes the new growth paradigm in the country, i.e. through setting up economic/ industrial corridors. The chapter begins with discussion on the context of freight corridor; it discusses the objective, approach and scope of the perspective plan; it studies and draws inferences from other national and international corridors and establish the relevance of transport corridors. The chapter is also devoted to discussion on delineation of project region and influence areas of the freight corridor, and the report structure.

The base map developed for the purpose of land use and land cover assessment has been developed from IRS-LISS III at a 1:50,000 scale. This is presented in Figure 1-23. Further administrative info with

<sup>10</sup> This is the revised Final report on the Perspective Plan, and includes improvements based on observations and comments from states/ stakeholders.

<sup>11</sup> Part B of the TOR (Final Concept Master Plan and Feasibility Report for IMCs in 7 AKIC states) is given as Volume 2 of the Final report.

regard to state boundaries and districts has been taken as the base information for the purpose of analysis/ assessments, and demonstration of results.

**Chapter 2** is focused on building the regional, industrial and urban development profile of the study region. To begin with, it captures the demographic and social aspects of the region, followed by urban development, and natural resource profile. The chapter importantly presents economic and industrial profile, along with industrial lands, to arrive at strengths and opportunities as against the weaknesses and threats for economic and industrial development in the region.

**Chapter 3** carries the profile of key infrastructure in the seven states and undertakes assessment of critical gaps. The physical infrastructure includes transport (road networks, railways, sea ports, inland water transport, airports, and logistics), water and wastewater, energy (power, renewable energy, and gas), and ICT. Among the social infrastructure addressed in the chapter include housing, health, and education.

**Chapter 4** is devoted to review of policies and programmes primarily focussing on industry, transportation, urban development, land procurement, energy and infrastructure in the country – national initiatives and policies, and state policies and schemes. **Chapter 5** is a brief yet significant chapter; it discusses on the promise of preparation of the perspective plan – national level, state level, and the rings of influence in the AKIC region.

The next two chapters to follow, **Chapter 6 and Chapter 7**, are devoted to drawing the economic and industrial perspective of the corridor. **Chapter 6** dwells at global perspective of economic development, and Indian economy post-independence to identify drivers of future economic growth, projected Indian economic and manufacturing scenario to translate it into AKIC economic/ manufacturing perspective etc. **Chapter 7** presents industrial product mix for the AKIC in a step-wise manner; it goes on to present demand forecast, spatial development, urban and population forecast, culminating in industrial vision and strategy.

**Chapter 8** deals with the enabling infrastructure in the region. it begins with green vision and broad strategy for core infrastructure i.e. transport, water and wastewater, and energy. The chapter discusses the demand forecast, strategies, project proposals etc for key enabling infrastructure – roads, railways, IWT, port connectivity, airports, logistics, water, power, and energy.

**Chapter 9** is aimed at framing a phasing, implementation, and monitoring plan. It outlines the projects by their significance at national/ regional and local levels, and identifies government agencies/ departments for implementation, including projects for implementation through PPP. The chapter proposes an institutional and financial framework as well as a programme for market outreach, and concludes with a monitoring framework at national and state levels.

**Chapter 10** begins with impacts of the project on national economy. It defines direct impacts and multiplier effects of project related activities, and discusses the potential impacts of the perspective plan.

**Chapter 11** concludes the report on the perspective plan by way of highlighting the key features of transformation of the AKIC region.

It is to be noted that several aspects of assessment including regional-, economic, industrial, infrastructure etc. presented in detail in various deliverables on the project, have been presented in a condensed form in this final report [D8]; the DMICDC and the state Nodal agencies may like to corroborate with other periodic reports for better clarity.

Further, the database prepared during the course of this project, and the mapping work undertaken in GIS platform is separately put together for submission.



Figure 1-23: Base Map (Land Use/ Land Cover Map)